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Multidimensional Treatment Foster Care as a Preventive Intervention to Promote Resiliency Among Youth in the Child Welfare System

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Abstract

Demographic trends indicate that a growing segment of families is exposed to adversity such as poverty, drug use problems, caregiver transitions, and domestic violence. Although these risk processes and the accompanying poor outcomes for children have been well-studied, little is known about why some children develop resilience in the face of such adversity, particularly when it is severe enough to invoke child welfare involvement. This paper describes a program of research involving families in the child welfare system. Using a resiliency framework, evidence from four randomized clinical trials that included components of the Multidimensional Treatment Foster Care program is presented. Future directions and next steps are proposed.

Keywords

child welfare; resilience; parenting; strength-based; intervention

The number of children in the United States who experience neglect and maltreatment has risen steadily for several decades, with an estimated 3.3 million referrals to child welfare authorities involving 6 million children during 2005 (U.S. Department of Health and Human Services, 2007). It has been estimated that 7% of all children and adolescents will have some involvement in the child welfare system during their lifetime (Barth et al., 2005). The most prevalent cause of child welfare involvement is parental neglect (64% of the cases): inadequate child supervision; failure to attend to the child's physical, emotional, or educational needs; spousal abuse in the child's presence; parental drug or alcohol use that interferes with parenting abilities; and inadequate medical care for the child. Other common causes of child welfare involvement include physical abuse (16%), sexual abuse (9%), and psychological maltreatment (7%), with children often experiencing more than one type of maltreatment (e.g., neglect and physical abuse; U.S. Department of Health and Human Services, 2007).

A sizable literature details the disparities in the child welfare system population compared to the general population on indicators of health, mental health, social, and economic well-being (Barth, Wildfire, & Green, 2006; Gassman-Pines & Yoshikawa, 2006; Kerman, Wildfire, & Barth, 2002). For example, child welfare system children and parents exhibit extremely high rates of behavioral and emotional problems (Aarons, Brown, Hough, Garland, & Wood,

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2001; Garland et al., 2001; Klee et al., 1997; Landsverk & Garland, 1999; Landsverk et al., 2001; Pilowsky, 1995). In a study with a large representative sample of 5- to 9-year-olds, Briggs-Gowan, Horwitz, Schwab-Stone, Leventhal, & Leaf (2000) reported that the rates of childhood psychiatric disorders (e.g., major depression, conduct disorder, and ADHD) increased by 2.91 times in families in which potential child abuse was indicated: 49% of the children in such families were diagnosed with a psychiatric disorder (vs. 16.8% of the full sample).

In addition, more than half of the children in the child welfare system have been identified as having cognitive delays (Frankenberg, Dodds, Archer, Shapiro, & Bresnick, 2002; Landsverk, Davis, Ganger, Newton, & Johnson, 1996). Substance use rates are also very high. In one study, Forrester (2000) indicated that parental substance use was a concern in over half of the child welfare families, with 24% of all families experiencing alcohol abuse and 16% experiencing heroin abuse. However, despite an abundant literature that focuses on negative outcomes, little is known about why some children in the child welfare system show resiliency in the face of exposure to adverse life experiences.

In this paper, we describe a program of research based on developmental studies, randomized efficacy trials, and effectiveness studies with child welfare-involved families. We present data highlighting resiliency processes among children and adolescents with child welfare involvement due to a variety of life experiences, including parental drug use, severe parenting, poverty, exposure to trauma, caregiver transitions, and/or lack of medical care. We consider child welfare involvement to be the extreme end of a continuum of exposure to such adverse life experiences, with levels of exposure that are severe enough to endanger the well-being of the child. As described in the statistics below, many children are exposed to similar types of adversities (severe parenting, parental drug abuse, marital conflict), but at less extreme levels. In the following sections, we first illustrate how a resiliency framework can provide insight into the mechanisms whereby youth in the child welfare system show positive outcomes. Second, we describe key components of an intervention for youth exposed to severe early adversity: Multidimensional Treatment Foster Care (MTFC; Chamberlain, 2003). Third, we present evidence from four completed randomized clinical trials that incorporated MTFC components to illustrate support for resiliency processes in buffering children and adolescents against risks arising from early adversity. We conclude with a discussion of directions for future research and implications for services.

Applying Resiliency Concepts to Interventions for Youth in the Child Welfare System

According to a recent U.S. Census Bureau report (2007), 17.4% of children under age 18 (nearly 13 million) live in poverty, and 11.7% of children (8.7 million) were uninsured as of 2006. Concurrent with these factors is widespread exposure to illicit drug use and domestic violence. Over half of the U.S. adult population of child-bearing age report having used illicit drugs in their lifetime (Substance Abuse and Mental Health Services Administration, 2007), and nearly one third (31%) of women in the United States report having been physically or sexually abused by a husband or boyfriend at some point in their lives (The Commonwealth Fund, 1999). Moreover, 3.3-10 million U.S. children annually witness some form of domestic violence (Carlson, 1984; Straus, 1992). These types of adverse life experiences (extreme poverty, domestic violence, parental drug use) are among the defining characteristics of experiences that necessitate child welfare system involvement (Child Welfare Information Gateway, 2008). However, not all youth exposed to such conditions show poor outcomes. In this paper, we focus on resiliency mechanisms that may help to explain why some youth exposed to adverse experiences have positive social, school, and/or behavioral adjustment.

As noted by Rutter (2000), understanding resilience in children and adolescents exposed to adversity is of considerable importance in guiding public policy aimed at the prevention of psychopathology. In particular, learning about the protective factors and mediating mechanisms that promote resilience in the face of adversity is key to the prevention of poor outcomes (Masten, 2001; Rutter, 2000, 2007). In a recent concept paper, Luthar and Brown (2007) noted that a primary characteristic of resiliency research is that it is applied in nature, using scientific knowledge to maximize the well-being of those at risk. The authors described the central mission of resiliency research: to “illuminate processes that significantly mitigate the ill effects of various adverse life conditions as well as those that exacerbate these, and thus to derive specific directions for interventions and social policies” (p. 931). Originating from investigations of poverty and response to trauma (in addition to schizophrenia), resiliency research is thus highly germane to understanding outcomes for youth in the child welfare system, who have experienced similar adversities (Cicchetti & Garmezy, 1993).

Masten's (2001) review of converging findings on resiliency highlighted a critical phenomenon: that resilience occurs through ordinary (rather than extraordinary) processes involving the operation of basic human adaptational systems, even in the face of severe adversity. These adaptational systems include individual level characteristics (e.g., cognitive functioning, sociability, self-efficacy), family level characteristics (e.g., close relationships with caring adults, authoritative parenting), and extrafamilial characteristics (e.g., social support, effective schooling; Masten & Coatsworth, 1998). Through these adaptational systems, interventions could therefore enhance child resilience in several ways. First, compensatory effects could be attained if enough positive assets are directly added to the child's life to offset the adversity (Garmezy, Masten, & Tellegen, 1984; Masten, 2001). Second, resilience could be attained indirectly, through the targeting of mediating variables that are hypothesized to relate to the desired outcome. For example, numerous studies have indicated the mediating role of parenting in linking early adversity with child outcomes (Masten et al., 2001).

Emanating from a life-course developmental model that specifies malleable, family-centered intervention targets, the MTFC intervention is based on similar individual, familial, and extrafamiliar processes as described in Masten's (2001) conceptualization of resilience as an “ordinary” set of processes. Further, it applies intervention and policy implications as described by Rutter (2000). The MTFC model emerges from the translation of basic theory into systematic, effective interventions (Type 1 translational research) and the bringing of those interventions to scale in community settings (Type 2 translational research; see Figure 1). A guiding core principle is that intervention development is informed by empirically grounded theory, and in particular, by those involving resiliency processes. As is shown in Figure 1, we conceptualize this process as an iterative cycle, in which information from each step in the cycle informs the next, leading full circle to the testing of more refined developmental models that can inform intervention development and implementation methods.

The theoretical model that guides our work evolved from research by Patterson and colleagues (Patterson, 1974; Patterson & Cobb, 1973; Patterson & Fleischman, 1979; Patterson & Reid, 1973; Reid, 1978; Reid & Patterson, 1974). These early studies provided a foundation for coercion theory, which emphasizes the role of family interactions as primary determinants and predictors of outcomes for children (Patterson, 1982; Patterson, Chamberlain, & Reid, 1982; Patterson & Reid, 1984). Those original studies and the theory have since been replicated and validated by many other researchers (Eddy, Reid, Stoolmiller, & Fetrow, 2003; Reid, Patterson, & Snyder, 2002; Snyder et al., 2005). Coercion theory, in turn, has been used to identify clear intervention targets within the parenting practices of families with children who exhibit disruptive behavior. We have developed and refined theory-driven interventions for parents of children with externalizing problems referred by schools, mental health, and juvenile justice

(e.g., DeGarmo & Forgatch, 2005; Eddy et al., 2003; Patterson & Brodsky, 1966; Patterson et al., 1982; Patterson & Reid, 1973), and have systematically tested alternate implementation methods for delivering such services in community settings (Chamberlain, Brown, et al., in press).

In the mid-1980s, we applied the coercion model theory to inform the development of the MTFC model (description follows). Consistent with coercion theory and with Masten and Coatsworth's (1998) resiliency frame, the MTFC intervention model targets parenting and peer interaction processes to prevent negative, coercive interactions between caregivers and children and to enhance positive interactions; enhances caregiver monitoring and supervision skills to improve youths' prosocial behavior; and reinforces youths' positive and prosocial behavior. The MTFC intervention has been shown to have powerful effects on reducing delinquency (Chamberlain & Reid, 1991; Eddy & Chamberlain, 2000). However, consistent with this issue's theme on adverse life experiences, it became evident that many of the youth in these studies experienced early adversity that predated their involvement in the intervention by many years.

Our focus, therefore, has recently broadened to include prevention and the promotion of resiliency prior to the onset of serious child adjustment problems. This view led to adaptation of the MTFC intervention for foster preschoolers (MTFC-P; Fisher, Burraston, & Pears, 2005; Fisher, Ellis, & Chamberlain, 1999), a universal preventive intervention for foster parents of preadolescents (Project Keep; Chamberlain, Price, Reid, & Landsverk, in press), and a preventive intervention for girls in foster care who are transitioning to middle school (Chamberlain, Leve, & Smith, 2006). Throughout our MTFC-based research, the central elements of coercion theory remain at the core of our theoretical model (e.g., enhancing parenting behaviors and improving child adjustment outcomes). Additionally, consistent with research on resiliency, the model now incorporates key positive individual and interpersonal adjustment outcomes, such as supportive interpersonal relations, adaptive neurobiological functioning, and adaptive social behavior.

As shown in Figure 2, our conceptual model illustrates the MTFC intervention components that encompass the family system (foster parent and biological parent), the individual (child or adolescent), and the extrafamilial context (the service system). Consistent with Masten and Coatsworth's (1998) framework on resiliency, the intervention focuses on direct intervention to increase the assets a child is exposed to, and also targets hypothesized mediated processes that are expected to lead to resiliency outcomes. The panels in Figure 2 portray a sequence of resiliency processes for children and adolescents exposed to severe early adversity, such as child maltreatment. The left panel of Figure 2 (described in detail in the next section) illustrates the strength-based components of the MTFC intervention that are intended to create experiences that lead directly to resilience. Intervention targets include the foster parent (enhancing and supporting parenting skills), the biological parent (support and training for the aftercare family), the youth (skill-building, academic support for youth), and the service system (coordination of services). The center panels illustrate a set of interpersonal and biological processes that might mediate the association between early adversity and resiliency outcomes. For example, at the interpersonal level, youth exposed to a strength-based preventive intervention are hypothesized to develop supportive interpersonal relations (e.g., normative peer affiliations, secure attachments to their caregivers, mentoring adults in their lives), and to have caregivers who use positive-reinforcement parenting practices and will secure effective social support, which in turn will lead to resiliency outcomes including social competence and behavioral adjustment.

Figure 2 also shows how neurobiological functioning might serve as a mediating mechanism between early adversity and resilience outcomes. The inclusion of neurobiological functioning

is a recent addition to our work and to our model of resiliency (Fisher, Gunnar, Dozier, Bruce, & Pears, 2006). The focus is on examining specified underlying neurobiological systems that are impacted by the types of early adversity experienced by children in the child welfare system and that are associated with risk for negative outcomes, including ADHD, disruptive behavior, anxiety, and affective disorders. We have included measures of these neurobiological systems (in particular, the prefrontal cortex and hypothalamic-pituitary-adrenal [HPA] axis) in some more recent randomized trials to evaluate interventions and identify resilience processes internal to the child. Results suggest that the interventions produced positive outcomes not only on psychosocial adjustment, but also on the functioning of these neurobiological systems (Bruce, Martin McDermott, Fisher, & Fox, 2008;Fisher & Stoolmiller, 2008;Fisher, Stoolmiller, Gunnar, & Burraston, 2007).

As shown in Figure 2, the resiliency processes (neurobiological functioning and adaptive interpersonal relations) are hypothesized to benefit directly from the intervention, but also to initiate a cascade of subsequent, positive long-term effects, thereby acting as a mediator of long-term resilience. Resilience outcomes we have examined to date include child characteristics (social competence, school success, and behavioral adjustment) as well as caregiver characteristics (caregiver stress). Further, we hypothesize feedback loops such that the resilience outcomes will positively affect the extent to which an individual is able to form supportive interpersonal relations and adaptive neurobiological functioning. In the sections that follow, we describe the strength-building components of the MTFC intervention intended to enhance resilience and present study evidence indicating support for the intervention as leading to the resiliency processes (center and right panels of the model) by buffering against adversity.

The MTFC Program

The MTFC program began as a community-based alternative to placement in group or residential care for children and adolescents with severe emotional and behavioral problems (Chamberlain, 2003). It originated in 1983 in response to an Oregon State request for proposals from the juvenile justice system to develop community-based alternatives to incarceration for adolescent placements in residential/group care. Since then, studies have been conducted with young children in foster care, school-aged children and adolescents referred from the mental health and child welfare systems, and adolescents referred from juvenile justice. In partnership with these systems, we conducted a number of randomized trials to test the efficacy of MTFC. Publication of these studies led to national attention and to MTFC's designation as a cost-effective alternative to institutional and residential care. MTFC was selected by the Office of Juvenile Justice and Delinquency Prevention (Elliott, 1998) as 1 of 10 evidence-based National Blueprints Programs; was selected as one of nine National Exemplary Safe, Disciplined, and Drug-Free Schools model programs; was highlighted in two U.S. Surgeon General reports (U.S. Department of Health and Human Services, 2000a, 2000b), and was designated by the Center for Substance Abuse Prevention as an exemplary program (Chamberlain, 1998).

In terms of preventing ongoing delinquency, incarceration, and associated behavioral problems for adolescents—outcomes that the model was originally developed to prevent—the results from three separate randomized trials have shown the following benefits: (a) MTFC children (ages 9-18) leaving the Oregon State mental hospital fared better than children receiving typical community services, with quicker placements, lower rates of behavioral/emotional problems, and less time in the hospital in follow-up (Chamberlain & Reid, 1991); (b) MTFC boys (ages 12-18) referred from juvenile justice with 14 criminal referrals (on average) fared better than boys in group care, with fewer official and self-reported follow-up offenses, more time in assigned placements, being returned to their families more often, less time1 incarcerated and as runaways, and fewer violent offenses (Chamberlain & Reid, 1998; Eddy, Whaley, &

Chamberlain, 2004); and (c) MTFC girls (ages 13-17) from juvenile justice with 11 previous criminal referrals (on average) fared better than girls in group care, with fewer incarcerations and less delinquency 1 and 2 years later (Chamberlain, Leve, & DeGarmo, 2007; Leve, Chamberlain, & Reid, 2005).

MTFC originally aimed to reduce delinquency and related outcomes, but more recently includes foci on prevention and the enhancement of positive social and behavioral skills. The current MTFC program is thus more fully conceptualized not only to help prevent negative outcomes, but to promote resiliency among children and adolescents exposed to a variety of adverse life experiences. This resiliency-enhancing aspect of the model is the focus of this paper.

Key Components of the MTFC Intervention

Within the MTFC intervention, children are placed in community foster homes where foster parents are intensively trained, supervised, and supported to provide positive adult support and mentoring, close supervision, and consistent limit setting. MTFC placements typically last 6-9 months and involve coordinated interventions in the home, with peers, in educational settings, and with the child/adolescent's birthparents, adoptive family, or other long-term placement resource. Specific service components vary depending on the child's age and developmental level and include: daily behavior management in the foster home and at school/preschool that emphasizes reinforcement for normative behavior and strengths; participation in family and individual therapy; social skills training; academic support; and case management by a program supervisor to direct and coordinate the services. There is a strong focus on strength-building and positive reinforcement, as is illustrated in each of the following components described below and shown in Figure 2.

Foster parent: Enhancing parenting skills via foster parent groups—Foster parents meet weekly (for 90 min) in small groups (7-10 participants) with a program supervisor for the duration of the child's foster placement. The parents are provided support and instruction during these meetings, and are encouraged to share experiences of positive parenting strategies. The program supervisor coaches the group to consistently and regularly reinforce positive and normative child behaviors by using incentives such as providing small rewards or allowing the children to accumulate points for complying with routine expectations (e.g., getting up on time, doing household chores, and attending classes). In addition, nondegrading definitions of problem behaviors are developed, and the foster parents are instructed to deduct points for problem behaviors rather than engage in lecturing or angry interactions. As such, negative behaviors or problems are not the primary focal point of the intervention; rather, the emphasis is on developing children's positive behaviors and emotions. For example, the foster parents are coached on the “four-to-one rule”; there should be at least four positive interactions for every one correction. For families with adolescents, incentive systems are organized into a point-and-level system in which the youths earn points each day and acceptable behaviors are reinforced by earned privileges (e.g., additional time with friends, computer game time, and attendance at a special event or show). Points are reviewed daily, emphasizing the adolescent's strengths and accomplishments and minimizing problems (e.g., “You lost 1 point for arguing at breakfast, but earned 5 points for having a positive attitude in the afternoon.”). For families with younger children, a similar incentive point system is used, with the privileges typically being smaller, tangible items such as stickers, small toys, or family activities. For youth of all ages, the program supervisor encourages foster parents to work together with the youth in advance to select incentives that are attainable, appropriate in magnitude/cost, and of sufficient interest to the child/adolescent to be motivating. Occasionally a youth will change caregiving environments during the course of treatment (e.g., move to a different foster home or a kinship

family). Whenever possible, intervention services are continued within the new caregiving environment and with the new caregivers(s).

Biological parent: Support and training for aftercare family via family therapy— Simultaneous to the foster parent group meetings, a family therapist works with the birthparents, relatives, or other long-term aftercare resources to improve their reinforcement, relational, supervision, and limit-setting skills and behaviors. These caregivers are taught to use the same incentives or point systems employed in the foster home to provide positive feedback and brief, nonemotional consequences for problem behavior. For example, the family therapist works with the caregivers to practice avoiding debates and discussions during discipline situations. For many caregivers, this is a fresh approach that frees them to invest more emotional energy and time to positive interactions with their youth. The family therapist coaches the parents to practice and adhere to these methods to help recalibrate the parent's executive role in the family. Regular home visits are scheduled throughout the youth's foster care placement so that aftercare parents can practice the skills with the support and feedback of the family therapist before the youth returns home.

Youth: Strength building via individual therapy—Adolescent-aged youth are assigned an individual therapist to help them identify and build on their strengths and assets, to find solutions to problems at school, and to have adaptive relationships with their foster parents and aftercare parents. Topics for individual therapy are selected based on data from the daily point system in the foster home, at school, and during home visits. The individual therapist's role is to motivate and encourage the adolescent to find and practice alternatives to problem behaviors and negative emotions that appear to be having a destructive impact on their short- and long-term goals. For example, if an adolescent experiences rejection or conflict with peers at school, the therapist would likely role-play ways for the adolescent to react to perceived provocations from peers or learn ways to initiate friendship-oriented interactions. Psychiatric consultation is used as needed.

Youth: Social skills coaching—To help generalize developing skills to community settings and with peers, a skills coach is assigned to each youth. The coach is typically a recent college graduate who helps the youth to identify and participate in community activities that interest them, and addresses their development of specific social skills through practice and feedback in real-world settings. The skills coach works with the program supervisor to determine specific behavioral targets and role-play options for reacting and behaving in both hypothetical situations and real-world settings. In vivo treatment in community settings allows the skills coach to practice particular situations that are particularly challenging for the child. A variety of behavioral treatment strategies, including pre-teaching and direct positive reinforcement are employed to strengthen skills. The skills coach is trained and supervised to emphasize skills and actions rather than spend limited time discussing past behaviors or problematic situations.

Youth: Academic support—Each MTFC youth attends public schools. The foster parents and program supervisor work together to carefully monitor youth adjustment in the classroom and with peers and to build an individualized network of services that supports academic and social success. For adolescents, this involves earning daily incentives for attendance, attitude, and homework completion tracked on a school card that teachers initial following each class. Positive involvement in school also is rewarded, and tutoring is provided when needed. For young children, school readiness is emphasized via a therapeutic playgroup that children attend on a weekly basis. The playgroup uses the same pre-teaching and direct positive reinforcement strategies as used by the social skills coach to focuses on two key elements of school readiness: early literacy and social emotional skills. For example, children practice sitting in a circle and

raising their hand when they have a question, and staff provide positive reinforcement to children actively practicing this activity. A high staff-to-child ratio ensures that the playgroup is highly structured and that the children receive extensive reinforcement for prosocial behavior (for more details about the playgroup, see Pears, Fisher, & Bronz, 2007).

Service system: Coordinated services via the program supervisor—The program supervisor directs, coordinates, and monitors all of the youth and family services. To direct and coordinate, the supervisor conducts weekly group foster parent meetings (described previously) to discuss the youth's gains and problems, and reviews and revises the daily behavior management charts and school cards to reflect progress and emerging problems. The program supervisor conducts a second weekly meeting with clinical staff (the family and individual therapists and skills coaches) to formulate the treatment plan and supervise their efforts. The youth's gains and foster parent stress levels are monitored by the supervisor through the Parent Daily Report telephone interview (PDR; Chamberlain & Reid, 1987), in which foster parents report on the occurrence/nonoccurrence of specific behaviors within the past 24 hours and indicate the level of stress they experienced as a result: 0 (*not stressful*) to 3 (*very stressful*). In addition, specific point gains and losses are recorded. The PDR data are also used to monitor the balance between the foster parents' use of encouragement/reinforcement and discipline.

The key components previously described are generally delivered as an integrated set of services to each MTFC youth and family; however, variations occur depending on the developmental needs of the youth, the skill level of the foster and aftercare parents, and the specific strengths and challenges inherent in the youth. In addition, one study has tested the implementation of only the foster parent groups (Project Keep; Chamberlain et al., 2006). Notably, although the MTFC intervention is multicomponent and requires multiple staffing positions, the benefits of the program have been shown to greatly outweigh the costs. A series of independent cost-benefit analyses from the Washington State Public Policy group reported a $32,915 cost savings in 2006 to taxpayers for each juvenile justice youth placed in MTFC versus regular group care (Aos, Miller, & Drake, 2006; Aos, Phipps, Barnoski, & Lieb, 1999, 2001).

Evidence for Resiliency: Outcomes of Four Completed MTFC Trials

When considered together, the set of randomized clinical trials based on the MTFC intervention model provides evidence that the intervention leads to the development of resiliency mechanisms, including improved interpersonal relations and adaptive neurobiological functioning. In addition, the MTFC intervention leads directly to child and caregiver resiliency outcomes, including social-behavior adjustment and reduced caregiver stress (see Figure 2). Evidence from four completed independent studies that lend support for this resilience model is described below (Table 1 provides a brief overview of the four studies). In the first study (Chamberlain & Reid, 1998), referred to as “Juvenile Justice Boys,” 79 adolescent boys with chronic and severe delinquency who were referred for out-of-home care were randomly assigned to MTFC or to services as usual (typically group care facilities). The second study (Leve et al., 2005) was modeled after the Juvenile Justice Boys study and included 81 adolescent girls who were referred for out-of-home care by a juvenile court judge due to problems with chronic delinquency. After a determination by the judge that the girls were appropriate for placement in community-based, out-of-home care, the girls were randomly assigned to MTFC or to services as usual (typically group care). We refer to this study as “Juvenile Justice Girls.” The third study (Fisher & Kim, 2007) is a downward extension of the MTFC model that adapts the basic model to include components for preschool-aged children centered on their developmental needs and risks. This study, referred to as “Multidimentional Treatment Foster Care for Preschoolers” (MTFC-P), consists of 57 foster children who were

randomly assigned to MTFC-P, 60 children who were randomly assigned to regular foster care, and 60 low-income children living in their biological homes with no child welfare system involvement. The fourth study (Chamberlain et al., 2006), referred to as “Project Keep,” is an effectiveness trial of child welfare-involved families who were randomly assigned to receive the MTFC foster parent groups or services as usual. Project Keep consists of 700 families with children between ages 5 and 12 years from diverse ethnic backgrounds.

As shown in Table 1, study youth were typically referred to out-of-home care and to the MTFC program due either to chronic delinquency (and typically an accompanying history of child welfare involvement) or to caregiver neglect and emotional abuse. However, a wide range of prior maltreatment experienced characterized the youth. Although the analyses described below focus on outcomes with study sample (rather than by maltreatment type), a recent paper by Bruce and colleagues (in press) using the MTFC-P sample examined the association between maltreatment type and outcomes, finding associations between specific maltreatment experiences and foster children's morning cortisol levels: foster children with low morning cortisol levels experienced more severe physical neglect than the other foster children. In contrast, foster children with high morning cortisol levels experienced more severe emotional maltreatment.

Supportive Interpersonal Relationships

A key aspect of resilience is the ability to develop supportive interpersonal relationships and to mobilize support resources. MTFC studies provide evidence that the intervention increases the likelihood that youths and their caregivers will show more supportive interpersonal relationships relative to the control condition in five areas: parenting and attachment relations, peer group process, mentoring adults, and social support, and the stability of the home context.

Parenting and attachment—The primary, significant relationship for young children is with their parent(s) or caregiver(s), regardless of whether they are the biological caregiver or not. By definition, youth in the child welfare system have had adverse life experiences connected to this relationship. Thus, it is critical to examine resiliency processes in relation to parenting for youth who have experienced caregiver-based adversity. Three MTFC studies have examined how the intervention can impact the parenting relationship. First, Fisher and Kim (2007) used the MTFC-P sample to study the attachment relationships of preschool-aged children. The child's attachment-related behavior toward their foster parent was assessed at five 3-month intervals beginning on entry into the study using a Parent Attachment Diary (PAD; Stovall-McClough & Dozier, 2000). The PAD measures secure, resistant, and avoidant attachment-related behaviors by asking the caregiver to indicate how the child responds to situations in which he/she was frightened, hurt, or separated from the caregiver; it has obtained attachment patterns consistent with the Strange Situation attachment classifications. The results from the Fisher and Kim (2007) study indicated that children in the MTFC-P condition showed significant increases in secure behavior and significant decreases in avoidant behavior relative to children assigned to foster care services as usual, suggesting the ability of the MTFC intervention to promote resiliency in young children's abilities to form secure relationships with caregiving adults.

In Project Keep, the specific parenting practices of caregivers with a school-aged foster child were examined to see whether an MTFC-based intervention predicted improvements in parenting practices. The intervention goal was to reduce child problem behaviors by strengthening foster parents' skills. Chamberlain et al. (2008) measured positive reinforcement in foster and kinhip parents at baseline and 5 months later. Path models indicated that relative to foster parents in the control condition, foster parents in the intervention condition used a greater level of positive reinforcement relative to their disciplinary parenting behaviors 5

months after study entry, suggesting that the intervention was successful in increasing caregivers' positive parenting interactions with the child. This pattern of improvements in positive, effective parenting practices extends a pattern found with the Juvenile Justice Boys sample. In that study (Chamberlain & Reid, 1998), caregivers' discipline and supervision practices were examined across groups. `Caregivers' in this study were foster parents for the MTFC youth and group home staff for the control youth. The results of an assessment conducted when the boys had been in their treatment placement approximately 3 months indicated that, relative to caregivers in the control condition, caregivers in the MTFC condition reported higher levels of supervision and more appropriate, fair, and positively reinforcing discipline. Further, these caregiving variables partially mediated the association between MTFC intervention effects and later delinquency outcomes, suggesting the importance of positive parenting relations relative to later adjustment. Taken together, this set of MTFC studies on parenting suggests that strength-based interventions targeting parenting practices not only have effects on the quality of positive parenting, but can affect relationship processes such as the parent-child attachment relationship, thus serving as mechanisms of resiliency.

Peer group process—A second facet of a youth's relationship base is peers. Despite residence in contexts such as juvenile detention, in which the proximity and prevalence of antisocial peers is extremely high, some youth avoid associating with antisocial peers and select more normative peers. Two studies have provided evidence that adolescents placed in MTFC become more successful in avoiding relationships with antisocial peers and in forming relationship with normative peers than adolescents placed in group care. In the first study, Eddy and Chamberlain (2000) used the Juvenile Justice Boys sample to examine whether chronically delinquent boys' peer preferences were a causal factor in explaining why boys in the MTFC condition had lower subsequent arrest rates than boys in the control condition. After the boys had been in their respective treatment settings for approximately 3 months, they were asked about the kinds of friends they spent time with. Caregivers were also asked about the boys' friendship preferences. This peer factor was a significant mediator of the MTFC intervention effects on delinquency, with MTFC boys having peer relations that were two standard deviations above those of the control boys, and with this peer-preference variable significantly mediating the association between intervention condition and delinquency outcomes. This effect was replicated and extended in a second study that included the Juvenile Justice Girls sample. In that study, MTFC youth showed significantly more adaptive peer relations during treatment and at a 12-month follow-up, and peer relations during the treatment setting mediated the MTFC intervention effects on delinquent peer association (Leve & Chamberlain, 2005). In both studies, the adolescents had histories of affiliating with delinquent peers and had recently been in juvenile detention facilities where they were surrounded by other antisocial youth. However, despite these adverse experiences, the MTFC treatment program was significantly more effective in enabling such youth to separate from this context and to form affiliations with more normative peers, and that this qualitative change in the kinds of friendships they were able to develop mediated the association between intervention condition and reductions in delinquency.

Mentoring adults—There is some evidence to suggest that relationships with mentoring adults can help offset early adversity and facilitate resiliency (Tierney, Grossman, & Resch, 1995). Using the Juvenile Justice Boys sample, we examined whether MTFC improved the quality of the youth-adult relationship and whether this positive youth-adult relationship accounted for some of the variance in MTFC intervention effects on delinquency outcomes. In this study, Eddy and Chamberlain (2000) asked caregivers, boys, and interviewers about the quality of the youth-adult relationship, including how much they liked one another and how nice they were to one another. As such, this variable was intended to be distinct from “parenting,” focusing instead only on the positive, mentoring components of the youth-adult

relationship, regardless of whether the current caregiver was a foster parent, biological parent, or group home staff member. The results indicated that MTFC boys had higher mentoring scores 3 months into treatment than boys in the control condition. Further, together with the parenting and peer variables described for the above sample, this set of variables partially mediated the effects of the intervention on 12-month delinquency outcomes, accounting for over 30% of the variation in delinquency. Though in need of replication, this study not only suggests that the MTFC program increased mentoring within relationships, but also that mentoring was a mediating mechanism associated with greater well-being and adjustment later in development.

Social support—A fourth domain of supportive interpersonal functioning is the caregivers' ability to seek and create social contexts in which they are engaged and receive appropriate social support. The ability of caregivers to effectively receive and participate in supportive social contexts might be especially important in contexts when the family has experienced adversity, ultimately leading to better adjustment in the youth. For foster parents, interpersonal challenges might result indirectly from providing care for a child who has experienced adversity, posing additional parenting challenges because of the oft found behavioral, cognitive, and emotional deficits in foster children (Aarons et al., 2001; Clausen, Landsverk, Ganger, Chadwick, & Litrownik, 1998; Pilowsky, 1995). In light of the potential social support benefits of participating in a group-based parenting intervention, we examined caregiver engagement (e.g., participation, homework completion, openness to ideas, and apparent satisfaction) among foster and kin parents using Project Keep data. The group-based intervention was delivered in 16 weekly sessions. Multilevel modeling was employed for the intervention-only cases: 337 caregivers nested within 59 groups. The results indicated that the level of caregiver engagement moderated the effects of early adversity (measured by the number of prior home placements) on child behavior problems and moderated the risk of negative placement disruption for Hispanic children (DeGarmo et al., in press). Together, these findings suggest that a caregiver who actively engages in and attains support in group settings helps to buffer his/her child against the negative outcomes often associated with early adversity, promoting child resiliency.

Stable home context—Stability in safe, nurturing family settings affords children opportunities to develop positive and supportive relationships, especially with caregivers and other significant adults (e.g., teachers); this, in turn, facilitates normative development (Cicchetti & Valentino, 2006; Sroufe, Duggal, Weinfield, & Carlson, 2000; Thompson, Flood, & Goodwin, 2006). A stable home context also leads to stability in school settings, peer networks, health care providers, and access to community resources and activities. A stable home context that promotes well-being might thus ameliorate some of the consequences of early adversity and alter poor developmental trajectories (Harden, 2004). Two studies have examined whether an MTFC-based intervention can impact the stability of the home environment for foster children. In the first study, Fisher and colleagues (Fisher et al., 2005) found that, compared to the children in regular foster care, the MTFC-P children had fewer failed permanent placements 2 years later. Further, MTFC-P mitigated the risk of early adversity (as measured by the number of prior placements) such that the significant relationship between early adversity and placement failures was present only for children in regular foster care.

The second study utilized the Project Keep data and focused on a narrower time frame. Consistent with the MTFC-P effects, the Project Keep results indicated that early adversity (as measured by the number of prior placements) was predictive of foster placement disruptions up to 4 months later. Importantly, however, the foster parent training intervention increased the likelihood of a successful reunification with the biological parents. It also mitigated the negative risk-enhancing effect of multiple placements, similar to the MTFC-P finding. More

specifically, children in the Project Keep intervention condition were nearly twice as likely as the children in the control group to be successfully reunified with their biological parents by the end of the intervention period (Price et al., 2008). Together, the MTFC-P and Project Keep findings provide evidence that the effects of early adversity on the stability of the home context can be ameliorated through MTFC-based interventions.

Adaptive Neurobiological Functioning

Within the resiliency framework, the MTFC model emphasizes the impact of early adversity on underlying neurobiological systems, the associations between alterations in these systems and many of the psychosocial outcomes observed in the foster care population (e.g., disruptive behavior disorders, drug abuse, and affective and anxiety disorders), and the potential for interventions to enhance functioning in these systems (see Fisher et al., 2006). As such, measures of these systems serve as indicators of short-term intervention effects and as mediators of long-term psychosocial outcomes.

HPA axis—Our research to date has focused primarily on two neurobiological systems, the HPA axis and the prefrontal cortex. In the case of the HPA axis, there is extensive evidence from animal and human studies (see Gunnar, Fisher, & the Early Experience, Stress, and Prevention Network, 2006) that early life stress, and particularly disruptions in early caregiving, are associated with alterations in HPA axis functioning, as measured by levels of cortisol (corticosterone in rodents; the glucocorticoid hormone which is the end product of activity in this system). Similarly, we have observed alterations in the HPA axis among children in foster care, with atypical diurnal cortisol levels being especially prevalent among children who have experienced caregiver neglect (Bruce et al., in press). On the positive side, the randomized efficacy trial of the MTFC-P intervention provided evidence that the intervention is associated with increased regulation of the HPA axis relative to children in regular foster care (Fisher et al., 2007). Moreover, intervention effects on the children's HPA axis functioning were significantly associated over time (i.e., as a time-varying covariate) with intervention effects on caregiver self-reported stress levels (Fisher & Stoolmiller, 2008). This association is noteworthy because it indicates that qualities of the caregiving environment have an effect on a key neural regulatory system and that interventions have the potential to affect this system. This is one of the first documented associations that has been reported between caregiver behavior and children neurobiology in the literature.

Prefrontal cortex—More recently, we have begun to examine prefrontal cortex activity in our samples of foster children because of the link between particular executive functions that are know to emanate from the prefrontal cortex (e.g., inhibitory control, attention, and working memory) and problems such as attention deficit/hyperactivity disorder, disruptive behavior, and drug abuse. Similar to the HPA axis studies, our work has documented that problems with executive functioning are more common in foster children than in the general population (Pears, Kim, & Fisher, in press). In addition, these problems appear to be particularly common in foster children who have experienced frequent caregiver transitions (e.g., failed foster placements). However, in a pilot study using event-related potentials, we observed that MTFC-P children showed significantly more brain activity in the prefrontal cortex than regular foster children in response to performance feedback on a task designed to measure executive functioning (Bruce et al., 2008). Although these data are preliminary because they did not include a preintervention measure and assessed only a subsample of children in the MTFC-P efficacy trial, they provide further evidence of the plasticity of key underlying neurobiological systems in response to strength-based environmental interventions.

Resilience Outcomes

As shown in Figure 2, the end point of our conceptual model is positive youth outcomes and reduced caregiver stress. It is hypothesized that the MTFC intervention will lead directly and indirectly (via supportive interpersonal relationships and adaptive neurobiological functioning, as described above) to positive adjustment and outcomes across settings. To the extent that the evidence supports this model, the strength-based intervention components can be considered underlying mechanisms to promote resiliency among children and adolescents in the child welfare system who have been exposed to early adversity. We have examined positive adjustment outcomes in three areas within our child welfare samples: social competence, school success, and behavioral adjustment.

Child: Social competence—When children enter formal educational settings, they are expected to possess competencies that enable them to respond to the demands of the school environment. Children who lack basic social skills and fail to develop successful peer relations during school entry are at greater risk for conduct problems, peer rejection, and academic failure throughout childhood and adolescence (Brendgen, Vitaro, Bukowski, Doyle, & Markiewicz, 2001; Dishion, 1990; Snyder et al., 2005). Children who have experienced early life adversity may be at particular risk for failing to develop effective social skills. To examine the effects of early adversity on social skills, we assessed social competence in our MTFC-P sample. The MTFC-P and regular foster care groups were combined in the analyses and were considered to have experienced more extreme levels of early adversity than the biologically-reared comparison group. Self-and teacher-reported social competence was assessed at school entry via questionnaires that included items such as “compromises with peers when situations call for it,” “invites peers to play or share activities,” “resolves problems with friends/siblings,” and “shares things with others.” Controlling for prior level of behavior problems prior to school entry, results from a multigroup SEM analysis suggested a significant relationship between group (foster care vs. biologically reared) on social competence at school entry for girls only. Specifically, early adversity had a detrimental effect on social competence for foster girls, but not for foster boys (Leve, Fisher, & DeGarmo, 2007). Because this study did not examine the buffering effects of MTFC on these social competence outcomes, the specific mechanisms that buffer children against the ill-effects of early adversity have not yet been identified. However, the results suggest an important link between early adversity and social competence that might be specific to girls. Such group-specific processes are further discussed later in this manuscript.

Adolescent: School success—Involvement in the child welfare system has been shown to increase risk for low academic performance and school failure (Lenssen, Doreleijers, van Dijk, & Hartman, 2000), with maltreated children exhibiting severe impairments on standardized tests of language in middle childhood and adolescence (Dale, Kendall, & Schultz, 1999). Similarly, Trickett's (1997) review suggested that sexual abuse is linked to developmental delays, lower academic performance, and learning problems. This impacts later academic functioning and puts children at risk for later academic failure and placement in special education classes. Guided by resiliency research, we sought to investigate whether the potential consequences of early adversity on school success could be ameliorated with the MTFC intervention. In this set of analyses, we used the Juvenile Justice Girls study data to examine homework completion and school attendance, which are hypothesized to be fundamental to school success. Path modeling results suggested that MTFC was more effective than group care in increasing girls' school attendance and homework completion while in treatment and at 12 months postbaseline. In addition, the previously reported effect of MTFC on reducing girls' days in locked settings was mediated by homework completion while in treatment (Leve & Chamberlain, 2007). That is, doing homework while in treatment accounted for the positive effects of the intervention on reducing later problem behaviors. This set of

analyses suggests that MTFC can assist in buffering the effects of early adversity to promote adaptive school engagement behaviors.

Child: Behavioral adjustment—A third outcome that has been examined in MTFC studies is behavioral adjustment. It is widely-recognized that children exposed to early adversity exhibit psychosocial problems at a significantly higher rate than the general population (Clausen et al., 1998; Pilowsky, 1995). We used Project Keep data to test whether the MTFC-based intervention could lead children in the intervention condition to exhibit more normative behavioral adjustment. Using the PDR interview, we asked parents about the occurrence/nonoccurrence within the past 24 hours of specific child behaviors that pose parenting challenges (e.g., whining and ignoring). The behaviors were tallied each day to compute a sum of behaviors per day. Prior work with the PDR has indicated that it is normative for children to have several behaviors every day; however, when rates of behaviors increase beyond the sum of 6, the risk for problems increases dramatically. For example, children with 6 or fewer behaviors per day were found to be at low risk for subsequent disruption; in contrast, the risk for disruption increased by 17% for every child problem behavior reported over 6 (Chamberlain et al., 2006). Therefore, a goal of Project Keep was to enhance parenting practices to reduce the number of child behaviors. The results of SEM analyses indicated that intervention children had fewer behaviors than control children at the termination of the intervention. Specifically, the intervention children showed an average of 5.9 behaviors at the start of the study and 4.4 behaviors at the termination assessment, a reduction of 1.5 behaviors per day (Chamberlain, Price, et al., 2008). In comparison, children in the control condition only showed a .3 behavior per day reduction. These results suggest that the intervention was successful in buffering the risk of early adversity and facilitating more normative behavioral adjustment.

Caregiver: Caregiver stress—The evidence described earlier suggests that therapeutic interventions for foster children can affect HPA axis activity. However, the specific intervention components responsible for change have not been fully explicated. The association between HPA axis activity, the MTFC intervention, and caregiver stress were investigated using the MTFC-P sample to examine whether diurnal cortisol activity was associated with caregiver self-reported stress in response to child problem behavior (Fisher & Stoolmiller, 2008). Reduced caregiver stress was considered to reflect resilience processes in the adult caregivers who participated in the MTFC intervention. Results showed immediate reductions in caregiver stress that were sustained through 12 months postbaseline in the intervention condition. In contrast, caregivers in the regular foster care condition showed higher rates of stress across time and increased stress sensitivity to child problem behaviors. In addition, among caregivers in regular foster care, higher self-reported stress was associated with lower morning cortisol levels and more blunted diurnal cortisol activity. These results provide evidence that interventions can simultaneously impact caregiver stress and buffer children from the negative impacts of caregiver stress on HPA axis regulation.

Future Directions

Resiliency experts contend that it is important to measure children's resiliency across multiple contexts, including school, peers, and family (Richmond & Beardslee, 1988). The study results described above provide preliminary evidence to support the proposed resiliency model, with the resiliency-enhancing outcomes of the MTFC intervention noted across studies and across multiple outcome domains. Specifically, known links between early adversity and poor outcomes were reduced in the context of the MTFC intervention. Further, converging evidence from this set of MTFC studies indicates direct resiliency effects at two levels: hypothesized mechanisms (interpersonal relations and adaptive neurobiological functioning) and resilience outcomes (social competence, school success, behavioral adjustment, and reduced caregiver stress). This has important implications for social service provision. Given the increased risk

for social service involvement and dependence for youth exposed to early adversity, effective preventive intervention services that buffer children from the risks associated with early adversity can reduce costs at individual, familial, and societal levels.

Despite solid evidence in support of the study's resiliency model, not all of the pathways from Figure 2 have been tested within the context of the MTFC intervention model. With the exception of the Fisher and Stoolmiller (2008) examination of the association between MTFC-P, HPA axis functioning, and caregiver stress, the pathways between the resilience mechanisms and the resilience outcomes shown in Figure 2 have not been thoroughly examined. In addition, long-term follow-up is needed to understand the persisting effects of strength-based preventive interventions and to see whether effects persist into young adulthood, thereby serving to foster the intergenerational transmission of resilience. Also needed are studies that expand upon the gender and ethnic differences in resiliency processes noted here (DeGarmo et al., in press;Leve, Fisher, & DeGarmo, 2007) to provide a more comprehensive picture of how resiliency processes differ across subgroups.

Several additional directions for future research are suggested from our research findings. First, we have made the assumption that the underlying processes and mediational pathways described here would be similar for youth exposed to similar types of adversity, but at milder levels. A test of this extension to other populations, including those with exposure to adversities such as parental drug use, caregiver transitions, and poverty-but *without* involvement in the child welfare system-is needed to provide validating and convergent support for the proposed model.

Second, with the exception of Project Keep, analyses examining the outcomes of the randomized trials considered the full set of MTFC intervention components together, and grouped all early adversity experiences. Perhaps some types of early adversity are more readily offset by one or more specific components of the MTFC model. An examination of Adversity x Intervention Component interactions would provide more specific delineation of the pathways to resilience and could indicate a more efficient and cost-effective means of preventing poor youth outcomes.

Third, positive parenting and positive reinforcement was measured via interviewer- and self-report in the work described above. Although observational methods and constructs have been well-validated for studying negative parenting processes and child behavioral problems (e.g., Stoolmiller, Eddy, & Reid, 2000), little has been done to facilitate the development of theoretically driven contingent coding systems to reliably tap positive reinforcement interactions between parents and children.

Fourth, additional research on the underlying biological mechanisms that are affected by early adversity and that can be modified by strength-building interventions would increase our understanding of the basic processes whereby environmental process affect biological systems. Such work will benefit from the burgeoning technology allowing for noninvasive investigations of hormonal systems, and from the advances in EEG and neuroimaging technology that have made it possible to assess children at younger ages. We will continue to include measures of underlying neural systems in our prevention trial protocols, both as measures of immediate intervention effects and as mediators of long-term outcomes. As advances in technology are made, we expect to be better able to measure and modify neurobiological systems that effect resiliency processes.

A second focus of our ongoing work on underlying biological systems is to better understand the role that genetic characteristics play in resiliency processes. To this end, we have begun a prospective adoption study with 360 sets of adoptive parents, their adopted child, and the child's birth parent(s) (Leve, Neiderhiser, et al., 2007). This work, which includes in-home

assessments of infant behavior and continued follow-up through first grade, has the potential to inform resiliency research in two ways: by detailing specific environmental processes in early childhood that could offset genetic risk and lead to resilient adjustment in children and by detailing specific genetically influenced characteristics (e.g., sociability, persistence) that could increase resilience even in the face of early adversity. Together, work in these expanded directions will provide greater specificity to the understanding of mediating and moderating processes that promote positive long-term adjustment in youth exposed to early adversity.

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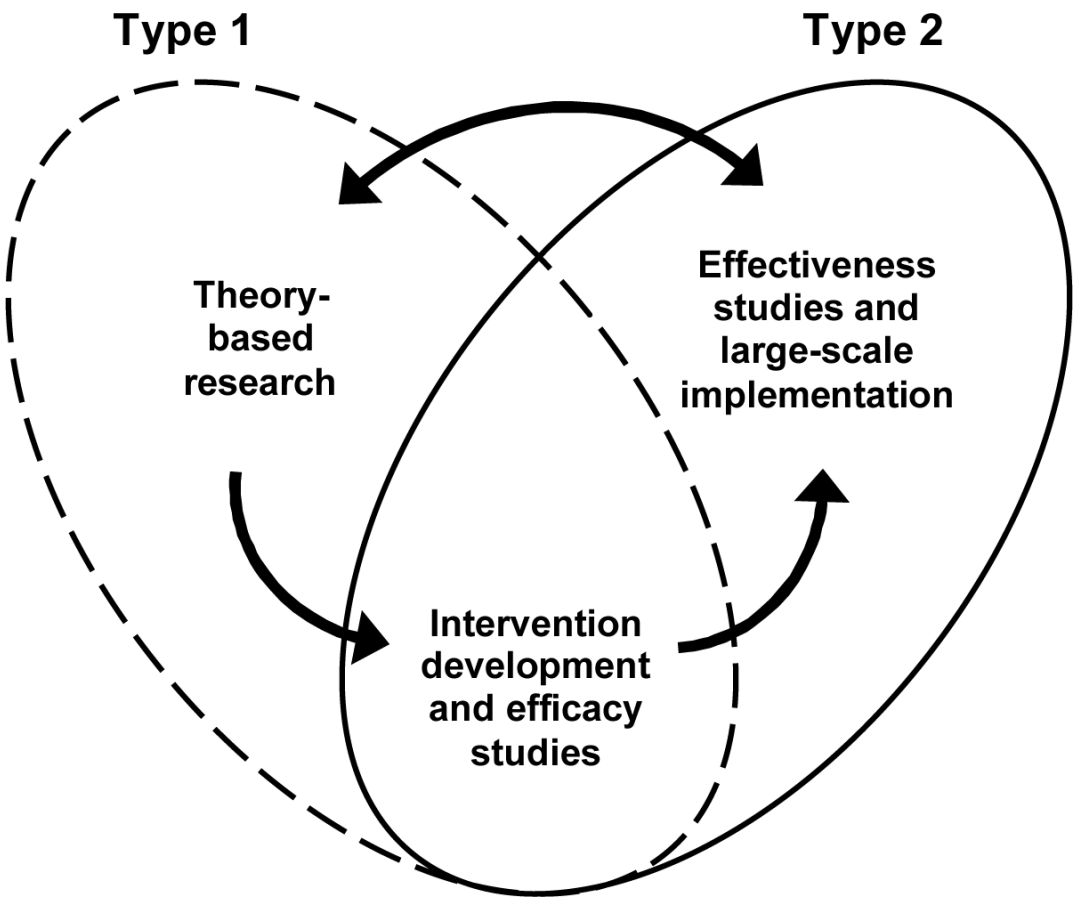

Figure 1.
Translational prevention research cycle showing Type 1 and Type 2 translation.

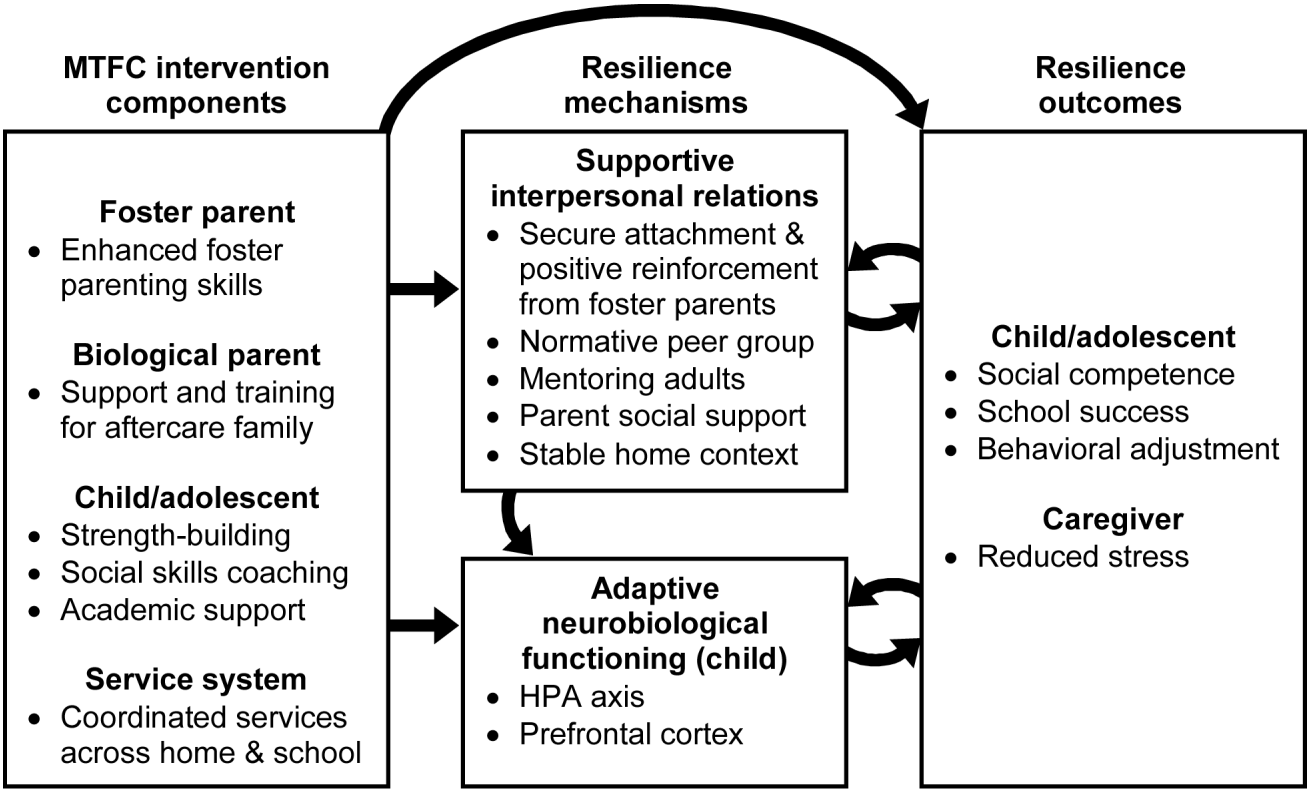

Figure 2.
Multidimensional Treatment Foster Care as a strength-based intervention promoting child and adolescent resiliency in youth exposed to early adversity.

Table 1

Overview of the Four Completed Studies That Utilized One or More of the Key Multidimensional Treatment Foster Care (MTFC) Intervention Components

Project title	Project description	Primary reason for placement in care	Research type	Intervention target
1. Juvenile Justice Boys	Randomized intervention trial of MTFC with 79 adolescent boys in the juvenile justice system who had been referred for out-of-home care due to chronic delinquency.	Chronic delinquency (often accompanied by a history of child welfare involvement)	Type 1 efficacy trial	Foster parent, biological parent, adolescent, service system
2. Juvenile Justice Girls	Randomized intervention trial of MTFC with 81 adolescent girls in the juvenile justice system who had been referred for out-of-home care due to chronic delinquency.	Chronic delinquency (often accompanied by a history of child welfare involvement)	Type 1 efficacy trial	Foster parent, biological parent, adolescent, service system
3. MTFC for Preschoolers (MTFC-P)	Randomized prevention trial of MTFC-P with 177 preschool-aged children: 117 foster children randomly assigned to MTFC-P treatment or regular foster care conditions and 60 low-income, nonmaltreated community children.	Caregiver neglect or emotional abuse (subset also experienced physical or sexual abuse, or both)	Type 1 efficacy trial	Foster parent, biological parent, child, service system
4. Project Keep	Randomize prevention trial of MTFC with 700 foster and kin parents in San Diego county child welfare system. Child age = 5-12 years. Sample is 74% minority. Intervention included foster parents only.	Caregiver neglect or emotional abuse (subset also experienced physical or sexual abuse, or both)	Type 2 effectiveness trial	Foster parent