FROM BIOLOGY TO BEHAVIOR TO THE LAW: POLICY IMPLICATIONS OF THE NEOBIOLOGY OF EARLY ADVERSE EXPERIENCES

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ABSTRACT

All mental processes have their basis in the underlying connections among the neurons of the brain. These connections begin their intricate development in utero and continue to develop, at varying rates well into young adulthood. Further, these connections, or neural circuits, are influenced by experience. The early experiences of a child, including their relationship (attachment1) with their caregivers, their exposure to stressful life events and the age of the child when these events occur, and their overall environment have a profound ability to shape these circuits, for better or worse. During early childhood, when the development and formation of neural circuits is most rapid, children may be particularly vulnerable to the impact of adversity. Burgeoning research is finding that the care giving children receive, the safety of the environment in which they exist, and their own genetic vulnerability may attenuate the impact of negative life events. Though


1. Attachment is a concept that will be described in detail later. Briefly attachment refers to the specific relationship between an infant and their caregiver and is hypothesized to form the basis of the child’s ability to explore their environment while using their “mother” (in this test used as a more general term for primary caregivers) as a safe base or “go to” person.
under-utilized, evidence-based treatments for very young children exposed to extreme adversity or traumatic events do exist. These treatments can decrease the child’s psychological symptoms, improve the child’s functioning in school and with peers, and improve family relationships and functioning. Though controlled studies are limited it is probable that these evidenced-based treatments will also influence developing neural circuits and perhaps attenuate the negative impact of adversity. The increasing number of studies that document heightened vulnerability in very young children, the important protective function of the caregiver, and the under-utilization of evidence-based treatments support a clear need for a reassessment at the policy level of the care provided to very young children exposed to early adversity.

This article will describe research which demonstrates that current policies neither reflect the known neurobiological factors associated with early adversity nor incorporate existing effective assessment and treatment practices for very young children. Following a brief discussion of early brain development we will discuss the current body of research documenting the biological impact of early adversity from studies of very young children exposed to a range of stressful experiences including abuse and neglect, trauma, and institutional care. Finally, we will outline the challenges and failures in Post-Katrina New Orleans that highlight many of these issues as well as two additional policies specific to disaster preparedness and the care of young children. At the conclusion of this paper we will recommend changes to address the following six policies we believe significantly contribute to the inadequate provision of care for our most vulnerable children: 1) State funded agencies that provide mental health care to young children generally do not permit or fund treatment of the parent(s) in the same facility or concurrently with the treatment of the child, 2) Inadequate attention is paid to the attachment relationship between caregivers and young children with exposure to early adversity, particularly those children in state protective custody, 3) State funded mental health clinics limit the amount of time for initial evaluations, in some cases to one hour, which results in an inadequate understanding of child, the family, and the many associated factors which are needed to achieve a clear diagnostic understanding of the

2. For the purpose of this article we will be focusing on children under the age of six. While many of these same challenges for the assessment and treatment of older children exposed to traumatic experiences this article is focused on very young children in part because the care of children in this age range likely has the largest gap between what is appropriate and adequate care and what is available.
patient. This inadequate assessment impairs the development of an effective treatment plan, 4) powerful medications, for which there is limited or no evidence of efficacy in very young children, are used too frequently rather than evidence based psychotherapy in part because of the limited availability of individuals who can provide therapy to young children and in part because psychotherapy is more time consuming. These four policies span all traumatic experiences but in the aftermath of large scale disasters two additional policies add further challenges for those seeking to provide appropriate care to very young children: 5) Current SAMHSA and FEMA plans of care following disasters do not include evidence based care for preschool and younger children,\textsuperscript{3} and 6) SAMHSA’s and FEMA’s efforts in post-disaster areas limit mental health support to crisis counseling which is not evidence-based and has no documented effectiveness to date.\textsuperscript{4}

I. EARLY EXPERIENCE AND THE DEVELOPING BRAIN

The intricate development of the brain begins a few short weeks after conception and continues through the early adulthood. Early in life there is tremendous overgrowth and differentiation of the neural substrates upon which future brain function is built. Multiple processes are involved in brain development including cellular migration, neurogenesis, dendritic, and axonal formation. The basic architecture of the brain is formed very early and is complete by the end of the first year of life. However, the shaping and refining of neural circuits through apoptosis\textsuperscript{5}, myelination, and synaptogenesis occurs at different rates throughout the brain and this shaping continues, in some areas

\begin{itemize}
\item \textsuperscript{5} Apoptosis is programmed cell death. Neurons, and other cells, follow a “use it or loose it” pathway. If a neuron does not get activated over time the cell activates its own self-destruct button and subsequently dies. Myelin is the protective insulation of the axons of neurons. Myelination of neurons results in faster transmission of electrical signals. Synaptogenesis is the formation of connections between neurons. Through these processes specific neural circuits or pathways within the brain are either eliminated or, if the neurons in those pathways are activated, then these circuits are strengthened and survive.
\end{itemize}
such as the prefrontal cortex\(^6\), until late adolescence. The refining of these circuits is directly influenced by experience.

There are countless examples of how early experience shapes neural architecture and brain development. Most examples come from the animal literature as it is easier to selectively manipulate experiences and examine, with greater precision, the subsequent effects on the brain. However, there remains much additional information to be learned from human studies. For example, infants born with a visual defect (their eyes are crossed or they cannot move their eyes together to converge on a distant object) must have this defect treated before the end of the preschool period (during the time there is plasticity in the visual system) or else risk having a permanent visual impairment. Similarly we know that the neural systems that are involved in processing faces are heavily dependent on exposure to faces during a sensitive period of development -- generally the first year of life. Finally, a similar sensitive period applies to processing speech; for example, at 6 months of age infants throughout the world are able to discriminate different speech sounds (phonemes) from one another from virtually any language in the world; however, as infants approach a year of age, they lose the ability to discriminate phonemes from non-native languages; that is, foreign language environments. These examples highlight three important aspects of brain development. First, early experiences, both positive and negative, impact how the brain develops. Second, different neural systems or networks develop at different rates and thus have different time frames or “sensitive periods” during which exposure to experiences are critical for development. Third, these experiences and the initial development of the underlying neural networks (connections) set the neurobiological foundation for the future functioning of an individual. A final factor to consider is that very young children exist, ideally, in the context of a supportive and available caregiver who plays a key role in many developmental processes.

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6. The prefrontal cortex is the center of an individual’s “executive function.” The prefrontal cortex is responsible for planning and considering outcomes of behaviors before they occur and is one of the latest parts of the brain to fully develop.
Attachment theory and the importance of the caregiver

In the 1950's a novel theory began to take hold in psychiatry about human development. Championed by John Bowlby and Mary Ainsworth, attachment theory stated that young children not only developed selective and powerful attachments to their parents or primary caregivers, but when there was a disruption of this relationship there were lifelong behavioral and psychiatric consequences. Attachment theory hypothesizes that children need more than just food, shelter, and clothing. They need someone that can soothe and comfort them, provide them with a safe base from which they could explore the world, and help them learn to manage their own internal distress, in short they need an attachment or "go to person." An attachment figure also serves as a buffer at the biological level for the child and helps the child learn to regulate their own stress levels, thus without an attachment figure the biological impact of elevated levels of stress might also be accentuated. Thus if that attachment relationship does not exist and a caregiver only provides basic life needs, such as in the case of children raised in institutions, children exposed to severe neglect, or perhaps even children in foster care settings, the long term developmental trajectory of multiple neurocognitive and biological systems may be negatively impacted.

II. THE IMPACT OF EARLY ADVERSITY AND TRAUMA

The development of neurons and neural circuits in the brain depends upon the interaction between experience, genetic variation, and the timing of when an experience occurs. Increasing evidence in both large epidemiological and preclinical animal studies have noted the detrimental impact, across biological domains, of early life

7. Attachment is classified by the use of a structured interaction that includes free play and task specific play time with the parent, times when the child is left alone or with a stranger, and a reunion with the parent. This interaction paradigm, called the Strange Situation Protocol (SSP), uses well validated scores to classify the relationship between the parent and child as secure, insecure (ambivalent or resistant), or disorganized. The greatest risk for negative outcomes is associated with those parent-child relationships which are classified as disorganized.


9. Increasingly psychological research is expanding the exploration of the association of mental health across different domains of functioning. Instead of simply
adversity.10 During times of rapid development these “hits” due to stress exposure may result in differences in how neurons connect to each other, what synapses are strengthened, and even how children learn to process environmental cues.11 The strength of these types of findings are most evident in animal studies where extreme conditions can be imposed in controlled conditions though increasing evidence for the neurobiological changes associated with early adversity are being demonstrated in studies of extremes of care for young children.

Psychological impact of early adversity

Exposure to adverse life events has consistently been associated with both adult psychopathology and negative medical health outcomes including diabetes, heart disease and early mortality.12 The Adverse Childhood Experiences (ACE) large-scale epidemiological study examined the impact of a range of stressful life events (SLE) on a variety of social, behavioral, and health outcomes.13 A clear and identifying mental illness based on behavioral components the National Institute of Health is developing a new project called Research Design Criteria (RDoc) that is focused on identifying the neural systems and developmental processes that connect mental illness and include areas such as cognitive function, information processing particularly how individuals respond to threat, and the specific neural systems that may be altered across psychiatric disorders. In line with this new focus this article will present research about the impact of early adversity across these domains and not simply focus on the psychological impact.


13. See Daniel P. Chapman et al., Adverse Childhood Experiences and the Risk of Depressive Disorders Childhood, 82 J. Affective Disorders 217, 218 (2004); see also Anda, supra n. 10, at 175-176.
graded relation between the prevalence of mental health disturbances and the ACE score was detected.\textsuperscript{14} A history of child abuse, independent of other SLE, has also been associated with elevated psychopathology, specifically anxiety.\textsuperscript{15} Several longitudinal studies have identified early SLE, including but not limited to abuse or neglect, as a risk factor for internalizing disorders, depression and anxiety in both older children and adolescents.\textsuperscript{16} Children with a history of involvement in child welfare and out of home placement before the age of four were found to have significantly elevated rates of both internalizing and externalizing disorders.\textsuperscript{17} In these children, long-term caregiver stability, lower frequency of physical abuse, and the child's social and cognitive skills were all protective factors.\textsuperscript{18} Another longitudinal study of children 2-18 years involved in child welfare found a direct relation between childhood internalizing and externalizing disorders and number of placement changes further supporting the need for caregiver stability in these vulnerable children.\textsuperscript{19}

\textsuperscript{14} See Anda, supra n. 10, at 178.


\textsuperscript{16} See generally Nicole K. Phillips et al., Early Adversity and the Prospective Prediction of Depressive and Anxiety Disorders in Adolescents, 33 J. Abnormal Psychol. 13, 13-14 (2005); see Emmanuel P. Espejo et al., Stress Sensitization and Adolescent Depressive Severity as a Function of Childhood Adversity: A Link to Anxiety Disorders, 35 J. Abnormal Child Psychol. 287, 287-299; see Janka Ashford et al., Early Risk Indicators of Internalizing Problems in Late Childhood: A 9-year Longitudinal Study, 49 J. Child Psychol. & Psych. 774, 774-780 (2008).

\textsuperscript{17} Internalizing disorders include anxiety and depression while externalizing disorders refers to attention deficit disorder, oppositional defiant disorder and conduct disorder. Often psychiatric studies will look at these scores from standardized measures as a broad based indicator of distress in these children. While not officially a diagnosis of mental illness elevations on these scales often indicates significant emotional distress and there is a strong correlation with DSM diagnoses. Further elevations on these scales is often associated with functional impairment of these children.


While once thought protected by being “too young to remember,” very young children exposed to early adversity show similar rates of psychological distress and behavioral problems as older children and adolescents. A large epidemiological study found a clear association between DSM-IV diagnosis of psychiatric disorders in preschool children and the number of SLE they experienced. In this study 50% of preschool children had experienced at least one high magnitude stressful life event such as abuse (neglect, physical, or sexual), exposure to violence or death of loved one, serious illness or accident, or natural disaster. Preschool children with any lifetime SLE exposure had an increased risk of psychopathology, particularly anxiety disorders, illuminating the fact that even in very young children SLE have both an immediate and a long-term impact. Another community based study examining the association between both stressful life events such as parental divorce, hospitalization of a caregiver, birth of a sibling, et cetera, as well as potentially traumatic life events such as injury, abuse, or natural disaster found that 38% of children 24 to 48 months of age had at least one exposure. Further, exposure to adverse events resulted in significantly increased rates of the diagnosis of psychiatric disorders in these toddlers. While low socioeconomic status (SES) increase the risk of exposure to stressful life events the correlation between stress and the development of psychopathology seems to be somewhat independent of socioeconomic status. In the study by Briggs-Gowan et al., poverty was associated with an increased risk of exposure to stressful events, however controlling for poverty did not alter the significance of the relationship between stress exposure and child psychopathology. Further in a

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20. DSM is the diagnostic standard manual for the American Psychiatric Association. The DSM has gone through multiple versions over the course of several decades and is currently under revision for the publication of DSM5. The DSM is the standard measure by which psychiatric disorders are determined.


22. Id.

23. Id.


25. See id.

26. See id.

27. See id.
large meta-analysis of risk factors for PTSD while SES was related to
the development of PTSD it played a significantly smaller role in the
development of PTSD compared to other predictors including severity
of trauma and perceived social support.28 These findings indicate that
the negative psychological impact of early adversity is at least in part
independent of SES.

Studies have also demonstrated that in the case of interpersonal
violence exposure, the severity of very young children’s psychiatric
symptoms were clearly related to parental psychopathology.29 This
highlights an important under recognized factor in the treatment of
young children: children exist within a family context. Because young
children are particularly dependant on their caregivers, the treatment of
parental psychopathology needs to be part of any comprehensive
treatment plan for young children and this ought to be reflected in
policy.

Unfortunately the majority of state funded agencies that provide
mental health care to children, particularly those supported by
Medicaid, do not permit or fund direct treatment of the parental
psychopathology in the same facility or concurrently with the treatment
of the child. Thus in some cases parents may end up choosing to attend
psychiatric treatment only for their child and forgo their own treatment.
This arbitrary separation of mental health care treatment results in
inadequate and inefficient treatment for both the parent and the child.
Particularly for very young children, who spend far more time with
their caregivers than older children, their treatment often depends on
the ability of the caregiver to provide a safe environment, both
emotionally and physically, in which they can process their own
traumatic experiences. To artificially separate the mental care from the
family environment is inappropriate.30

Apart from abuse and neglect young children exposed to
traumatic events including injuries requiring hospitalization, the
diagnosis and treatment of a life threatening illness, and natural
disasters also have increased rates of psychopathology, including
depression and anxiety but particularly post-traumatic stress disorder

28. Chris R. Brewin et al., Meta-Analysis of Risk Factors for Posttraumatic Stress
Disorder in Trauma-Exposed Adults, 68 J. Consulting & Clinical Psychol. 748, 748-
766 (2000).
29. See Briggs-Gowan, supra n. 24.
30. See infra. Part V. Policy #1.
PTSD is defined in DSM IV by several criterions. Criterion A involves the exposure to a potentially life threatening or traumatic event, and for adults the subjective experience of shock at the time of events. Criterion B describes a collection of symptoms that relate to re-experiencing of the traumatic event including nightmares or flashbacks of the event. Criterion C involves symptoms of avoidance of reminders of the traumatic experience, such as refusing to ride in a car after a car accident, as well as a general sense of emotional numbing. Criterion D refers to symptoms of hyper-alertness or hyper-arousal. The diagnosis of PTSD requires that an individual have symptoms in each of these categories for at least one month and these symptoms must cause functional impairment. Longitudinal studies of PTSD in children have demonstrated that without effective treatment PTSD is a chronic, impairing, unremitting disorder. In the largest study to date of PTSD in preschool children, 284 children between the age of three and six were recruited from the Greater New Orleans area between 2003 and 2008. The sample included 62 exposed to single incident accidental trauma requiring care in a Level III emergency room, 85 exposed to domestic violence, and 137 exposed to Hurricane Katrina and assessed for PTSD using a developmentally specific semi-structured interview, the Preschool Age Psychiatric Assessment. In this group of preschool children 44% had PTSD and the rates of children with clinically relevant symptoms, but not meeting full criteria for PTSD was even higher. This study demonstrates that a range of traumatic experiences can result in significant psychological distress even in preschool children.

Research in very young children exposed to the severe social and emotional deprivation associated with living in institutions or orphanages provide further evidence of the impact of early adversity on child development. The number of children who are orphaned and cared for in institutions is daunting with some estimates reaching

34. Personal communication with Michael S. Scheeringa, January 2010.
upwards of 143,000,000 orphaned children worldwide. A significant proportion of children orphaned by the civil unrest and wars in Africa, Afghanistan, and Iraq continue to reside in institutional settings. Officials in Afghanistan estimate that of the nearly 1.6 million orphaned children at least 10,000 are living in institutional care. Further expanding the number of orphaned children is the continuing AIDS epidemic in Africa. While not necessarily specific to policy issues in the United States this research adds to the neurobiological evidence about the detrimental impact of early adversity in a naturalistic setting. Findings from these studies reflect similar finding in the preclinical animal studies where researchers are able to manipulate the early environment. This research has further relevance as many of these children are subsequently adopted into the United States. Upon adoption the importance of early stable care giving and attention to the attachment relationship in these children is critical.

Children raised in institutions are exposed to atypical care giving and decreased normative social interactions with peers and adults. Their daily schedules are highly regimented and there is little individual attention by caregivers to the immediate needs of the child. The high child-to-caregiver ratio and continual rotation of caregivers limits the ability of the child to form a selective relationship with a specific caregiver. This bonding to a specific caregiver, called attachment, is a key developmental process that when not present, or disrupted, has been independently linked to a range of negative social and emotional outcomes. Children with a history of institutional care

36. See Kathryn Whetten et al., A Comparison of the Wellbeing of Orphans and Abandoned Children Ages 6–12 in Institutional and Community-Based Care Settings in 5 Less Wealthy Nations, 4 PLoS ONE 1, 1-11 (2009) (a recent study published by Kathryn Whetten and colleagues in an open access journal PLoS ONE noted positive outcomes for children raised in institutions. However, this contrasts sharply with multiple studies including the Bucharest Early Intervention Project and the English Romanian Adoption study which have consistently documented lasting negative outcomes for children raised in institutional care. Two key factors may explain the difference between the Whetten study and the significant findings across other studies. First, in the Whetten study the comparison group was orphaned children living on the streets and not children raised in family settings. Second, the majority of the children in the Whetten study were not placed into the orphanages until after five years of age though globally the majority of children enter orphanages as infants and young children).
have significantly elevated rates of a range of psychiatric conditions including attachment disorders, Attention Deficit Hyperactivity Disorder (ADHD), oppositional behaviors, anxiety and depression.\textsuperscript{37} The negative impact of institutional care on other domains including growth, cognitive abilities, and brain function has also been repeatedly demonstrated.

Impact of early adversity on physical growth, brain development and brain function

Early adverse experiences not only increase the risk of negative mental health outcomes but an expanding body of evidence indicates that early adverse experiences result in observable differences in physical growth, cognitive function, and changes in both brain structure and connectivity. The first three years of life are a phase of dramatic growth for the child’s entire body but also for key brain structures related to cognition, memory, and emotion processing, such as the amygdala and the corpus callosum.\textsuperscript{38} Not surprisingly it is these areas of the brain that are highly sensitive to early adverse experiences.\textsuperscript{39}

There is evidence documenting delays in physical growth, including head circumference, in children with a history of care in institutions. Equally notable is that when children are placed in improved caregiving environments, such as foster care, they experience increased physical growth.\textsuperscript{40} Notably the initial decreased growth is not simply the consequence of caloric restrictions or nutritional compromise but rather likely reflects the combination of inadequate caregiving, social and emotional deprivation, stress, and nutritional


\textsuperscript{38} See Mitsuhiro Nishida et al., Detailed Semiautomated MRI Based Morphometry of the Neonatal Brain: Preliminary Results, 32 NeuroImage 1041, 1041-1046 (2006).


\textsuperscript{40} Foster Care Associated With Improved Growth, Intelligence Compared to Orphanage Care, Science Daily (Apr. 9, 2010).
compromise. While physical growth and nutrition are important, multiple factors, including a range of variables likely not measured, are critical for healthy overall growth and development.41

Children with a history of institutional care also demonstrate poorer performance on a range of neuropsychological tests assessing memory, language, attention and learning.42 Abused and neglected children have also been found to have differences in their perception of emotions. Specifically, they demonstrate alterations in their ability to identify anger and fear facial expressions, and increased attention to fear eliciting stimuli. These changes are seen in both behavioral measures, such as how quickly the child identifies negative emotions in computer generated photographs of faces that are gradually ‘morphed’ from neutral to angry expressions, as well as in the level of brain activity measured with electroencephalography (EEG).43

The detrimental impact of institutional care on the development of brain, seen most clearly in studies of children exposed to extreme adversity such as abuse, neglect and institutional care, has been documented using a range of neuroimaging methods including Magnetic Resonance Imaging (MRI), Positron Emission Tomography

41. Id.


43. See Patricia Cohen et al., *Child Abuse and Neglect and the Development of Mental Disorders in the General Population*, 13 Dev. & Psychopathology 981, 981-999 (2001); Seth Pollack & Stephanie A. Tolley-Schell, *Selective Attention to Facial Emotion in Physically Abused Children*, 112 J. Abnormal Psychol. 323, 335-36 (2003); Jessica E. Shackman et al., *Physical Abuse Amplifies Attention to Threat and Increases Anxiety in Children*, 7 Emotion 838, 849 (2007) (EEG refers to measurement of electrical activity of the brain. Medically used to detect seizure activity and monitor sleep wake cycles EEG has a significant research literature and permits exploration of how the brain, even in infants, processes information. Additionally EEG can be used to measure the response of the brain to a specific target or task that provides greater information about the speed at which information is processed and a behavioral response is generated. In these studies the measurement is called the evoked response potential (ERP)).
(PET), and cortical electroencephalography (EEG). Recent research can connect these changes in brain function with psychiatric outcomes providing the first direct evidence that behavioral challenges in children following significant early adversity is linked to alterations in the underlying neurobiology. Collectively these studies point to a lasting alteration in the basic architecture and connectivity of the brain, particularly in regions of the brain associated with higher cognitive function, memory and emotion.

Although these findings demonstrate the critical nature of early experience, the brain also has a tremendous ability to adapt and recover. These is also a growing body of evidence that intrinsic factors in the young child, such as genetic variation, may also be involved in both resilience and vulnerability following early adversity. Even after extreme adversity if children are placed with stable and caring individuals there is significant potential for recovery, particularly for


45. Katie A. McLaughlin et al., Delayed Maturation in Brain Electrical Activity Partially Explains the Association Between Early Environmental Deprivation and Symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD), 68 Biological Psych. 329, 332-33 (2010).

those children who find families and appropriate caregiving earlier in life.47

The role of attachment

As discussed earlier, one protective factor for children exposed to early adversity is the relationship the child is able to form and sustain with a primary caregiver called attachment. Multiple studies have demonstrated that children with a history of abuse, neglect or institutional care have significantly elevated rates of insecure, and more importantly disorganized attachment where children, when distressed, appear to have no clear strategy of how to access support from their caregiver. This disruption of attachment likely compounds the impact of early adversity.48 Psychotherapies to help at risk children center around the establishment of a secure attachment relationship, whether with the original parent or an alternative caregiver such as a foster parent, and predicts long term outcome.49 Unfortunately except in rare cases there is limited focus on the attachment relationship, either in the assessment or the treatment planning, of children in protective custody who are at greatest risk for disturbed attachment relationships.50

One of the most extreme examples of disturbed attachment relationships can be seen in children raised in orphanages and institutions. Rates of disorganized attachment in children raised in institutional care in Romania reach greater than 60%, compared to 20% in community children with no history of institutional care.51 Yet, there are alternatives to institutional care, such as foster care or adoption, and there is now extant evidence that altering the care-giving relationship by placing children in family homes can ameliorate some of the negative impact. In the only randomized controlled trial to date of foster care compared to institutional care, the Bucharest Early

47. Nelson, supra n. 42; Edmund Sonuga-Barke et al., Is Sub-Nutrition Necessary for Poor Outcome Following Early Institutional Deprivation? 50 Developmental Med. & Child Neurology 604, 669 (2008); Anna T. Smyke et al., Placement in Foster Care Enhances Quality of Attachment Among Young Children in Institutions, 81 Child Dev. 212, 220 (2010).
50. See infra. Part V. Policy #2.
51. Zeanah, supra n. 48, at 1021.
Intervention Project (BEIP), alteration of the care-giving environment by placing children in newly created Romanian foster care resulted in increased growth, improvement in IQ and decreased rates of psychopathology.\textsuperscript{52} Similar findings have been demonstrated in other studies of children with a history of institutional care that are adopted internationally.\textsuperscript{53} While improving the care-giving relationship clearly results in recovery, across cognitive, social and emotional domains this recovery is not uniform and there appears to be a clear benefit from earlier placement in an improved care-giving environment.\textsuperscript{54} For maltreated children in protective custody, the relationship to the caregiver is equally important as studies have shown that the number of placement disruptions while children are in foster care is directly related to the amount of behavioral and psychological problems they experience.\textsuperscript{55} Thus it is not just changing the child’s care-giving experience that matters, but also the age that the child is moved and the stability of their new home.

These studies highlight several important issues. First, very young children, somewhat independent of ethnicity or socioeconomic status, are exposed to violence, traumatic events, and stress at remarkable rates. Second, exposure to these events, particularly in very young children, leads to high rates of psychopathology and changes in brain function, architecture and structure. Third, without early appropriate intervention and treatment these neurobiological changes appear to be associated with a life-long increased risk of a wide range of negative outcomes. Fourth, the ability of the child to form a stable attachment relationship to a caregiver appears to be

\textsuperscript{52} Nelson, \textit{supra} n. 42; Zeanah, \textit{supra} n. 37 (the ethical implications of this study have been discussed at length elsewhere. However, several important features of this study ought to be highlighted. Prior to the study’s initiation there was no foster care system in Romania a multitude of children in institutional care. Second, the study design was such that while children were randomized to either continued care in the institution or newly created and psychologically well supported foster care, there was no attempt to intervene with the natural course of placement of any children. As a result many children in the continued care in the institutional group were actually in foster care or family homes at the time of later assessments. Therefore the negative impact of continued institutional care is likely under-estimated by these studies).

\textsuperscript{53} Pollak, \textit{supra} n. 42, at 230-231.

\textsuperscript{54} Nelson, \textit{supra} n. 42; Michael Rutter et al., \textit{Effects of Profound Early Institutional Deprivation: An Overview of Findings from a UK Longitudinal Study of Romanian Adoptees}, 4 European J. Developmental Psychol. 332, 346 (2007).

\textsuperscript{55} Aarons, \textit{supra} n. 19, at 76-79.
protective. Lastly, while the negative consequences have been highlighted to underscore their historic under-recognition, or perhaps worse, misidentified and inappropriate treatment it should also be noted that there is evidence that many children are resilient in the face of adversity.\textsuperscript{56} Moreover, while experience and care-giving in the extreme circumstances have significant influence on child outcomes, caution is urged accepting theories that children are easily and only modeled by experience.\textsuperscript{57}

III. THE IMPACT OF INTERVENTION AND TREATMENT: CHANGING THE TRAJECTORY

After setting the scene for the neurobiological and behavioral consequences of early adversity we now move the discussion in a positive direction- the effectiveness of early intervention and treatment. Effective, evidenced based treatments for young children exposed to extremes of early adversity and trauma exist and can be implemented in a focused and economically efficient manner. Although longitudinal, rather than cross-sectional, studies are needed to confirm this, it is reasonable to presume that early interventions with young children may ameliorate the lasting neurobiological changes associated with early adversity and improve immediate and long-term outcomes. Yet it is precisely this group of children that have been excluded from evidenced based treatment following disasters.\textsuperscript{58} For example the first federally funded programs to train clinicians to treat PTSD in children following the attack on the World Trade Center and the 2004 Florida Hurricanes excluded preschool and younger children due to the perception that there were no appropriate treatment protocols for this age group. Unfortunately even though these protocols actually existed, in the wake of Hurricane Katrina the SAMHSA and FEMA supported programs provided no such treatment for preschool children, or for that


\textsuperscript{57} Steven Pinker, \textit{The Blank Slate: The Modern Denial of Human Nature} (2002).

matter any age group, and instead provided funds for crisis counseling programs (CCP) that has no demonstrated efficacy.\(^5\)

Perhaps more challenging is that even when young children with psychological and behavioral problems have access to treatment, the current policies, lack of adequate funding, and perhaps lack of knowledge, seldom result in children receiving these treatments. One example of policies that impair effective treatments for young children is that many state funded mental health clinics limit the amount of time for an initial evaluation to one hour. In that time the clinician is expected to interview the parent, evaluate the child, assess the family system, determine the functioning of the parent-child relationship and design and implement an effective treatment plan. Since many of the treatment approaches described below rely on an adequate understanding of each of these factors a lack of clear diagnostic understanding can often undermine treatment success.\(^6\)

Not only is there decreased recognition of psychological distress in children under six,\(^6\) but when behavior problems are noted there is evidence that a growing number of preschool children are prescribed medications, including atypical antipsychotics. Young children often receive these strong and expensive medications with known significant side effects\(^6\) and yet only a minority of them are ever being seen by a child psychiatrist.\(^6\) Additionally in the study by Olfson et al., nearly


\(^6\) See infra. Part V. Policy #5.


\(^6\) For example a month supply of Abilify (aripiprazole), recently FDA approved for use in adolescent children with schizophrenia and bipolar disorder, costs between $300 and $500/ month. CBT by a trained therapist would be anywhere from $50 to $200/ hr depending on the level of training and would occur for 12 sessions-16 sessions. Over the course of the 12 week sessions the cost for CBT would be $2,400 and medication would be $1500. However there is no evidence that atypical antipsychotics are effective for trauma exposure and instead there is clear evidence that they have significant medical risks. CBT on the other hand has significant evidence for efficacy often with a moderate to large effect size.

80% of preschool children who were prescribed an antipsychotic medication were on at least one other psychiatric medication. Only 40% of young children taking an antipsychotic medication had received any type of psychotherapy, mental health assessment, or psychiatry visit in the year they were on the medication. While potentially a sign of progress that young children are being given access to some treatment, the use of medications without a previous trial of psychotherapy and without concurrent therapy is in direct opposition to the existing research supported guidelines for the use of medications in preschool children. Thus it appears that these medications are being prescribed in place of evidence-based treatments, though there is little evidence of their efficacy in this age range. Medications alone cannot repair or stabilize relationships with caregivers or improve the chaotic environments in which many of these children exist. Factors that may contribute to the under-utilization of psychotherapy include the increased time commitment of psychotherapy combined with the lack of an adequate number of trained child mental health providers. These issues—the under identification of preschool and infant psychopathology, limited use of evidenced-based psychotherapy interventions, inadequate number of trained child mental health professionals particularly for young children, and potential overuse of medications illustrate the major concerns about the existing policies for the treatment of young children. The existing evidence-based treatments for trauma exposed infants and preschool children have all demonstrated improvement in the child’s overall functioning and the parent-child relationship as well as decreases in child psychological symptoms.

Child (infant)-parent psychotherapy (CPP) utilizes dyadic parent-child therapy sessions focused directly on improving the parent-child relationship and the attachment system. CPP can be used effectively with children as young as twelve months of age and combines multiple


64. Olfson, supra n. 64, at 14-16.
65. Id.
66. See generally Gleason, supra n. 61, at 1565-1566.
therapeutic modalities and theories including psychodynamic, attachment, cognitive behavioral and social learning. Through guided parent-child sessions the therapist strives to help the mother understand how her own current and past experiences shape her perceptions, feelings and behaviors toward the child. In this therapy neither the child nor the mother is the identified patient, but rather the focus is on the relationship between them. The positive outcomes for the child emerge in the context of the interaction between the parent and child and the alterations of the attachment relationship. The therapist focuses specifically on joint attention of the child and parent, critical parenting, emotion regulation in the child, and the creation of a joint trauma narrative. CPP has been found to be more effective than individual therapy and case management in the treatment of PTSD symptoms and behavioral problems in infants and children exposed to domestic violence. Interestingly in the six month follow up of these children there was maintenance of their clinical improvement and an associated decline in maternal psychological distress, though no additional treatment was provided to the mother. This suggests that this focused relationship-based therapy not only helped the child improve but also over time the improvement in the child’s behavior may have resulted in the mother’s improvement as well. While CPP has strong evidence to support its efficacy for children exposed to early adversity one significant drawback is that it is a long term treatment that requires upwards of 50-hour long sessions.

Increasing evidence of the efficacy of another relationship based therapy, parent-child interaction therapy (PCIT), has been documented for children three to six years of age. Initially designed as a treatment modality for children with oppositional behavior this treatment has now been used effectively with children with depression, anxiety, and following physical abuse. PCIT integrates traditional and behavioral modalities targeting behavior and emotion regulation difficulties in

68. While the term mother is often used this refers to the primary caregiver of the child and should be considered interchangeable with caregiver or father.


71. Id. at 913.
young children. PCIT is a twelve session therapy that is divided into two components: child-directed interaction sessions followed by parent-directed interaction sessions. During the child-directed interaction sessions the parent is coached, through an earpiece, on how to follow the child’s lead in play and provide positive reinforcement. These sessions are designed to improve the parent’s ability to follow the child’s lead, engage in play, and foster a sense of control in the child. The second half of the sessions are parent-directed activities whereby the parent is guided in setting behavioral limits and the child is given the opportunity to choose to follow parent instructions or have a time out. The premise of PCIT is that the parent uses the skills learned in child-directed play to better understand and engage with the child and this in turn translates to a strengthened and supportive relationship. For children with a trauma history there is often a breakdown in the parent’s ability to set limits either due to guilt that the traumatic event happened or perhaps due to the parent’s own psychopathology. PCIT thus targets this breakdown and improves the parent-child dynamic while also increasing the parent’s own perception of their parenting skills and providing the parent with new behavioral interventional strategies. PCIT has been documented to decrease oppositional behavior, depression and separation anxiety in three to six year old children.72 What is equally important about this treatment approach is that two of the most common co-morbid disorders with PTSD following trauma exposure are separation anxiety and oppositional defiant disorders. Thus PCIT has the potential to target multiple psychiatric disorders and their associated behavioral disturbances while at the same time improving the attachment relationship and the parent’s confidence in their own parenting ability.

Cognitive behavioral therapy (CBT) is one of the most well-studied therapies used for the treatment of a range of disorders in children and adolescents. CBT involves between 12 and 16 one to two-hour sessions that focus on defining the link between thoughts, feelings, and behaviors. CBT protocols, which have been used in children three years of age and older, incorporate psychoeducation, safety planning, relaxation strategies, emotion recognition, and a series of graded exposures to fear-evoking stimuli. The greatest number of

controlled studies with trauma exposed preschool children is found with trauma-focused cognitive behavioral therapy (TF-CBT). Two randomized controlled studies of preschool children who had been sexually abused demonstrated significant symptom improvement following TF-CBT. In a large controlled trial of TF-CBT seventy-five trauma exposed preschool children with significant PTSD symptoms were randomized to either a twelve week wait list control group or immediate treatment with TF-CBT. TF-CBT was significantly more effective in reducing PTSD symptoms than the wait list group, who demonstrated no decline in symptoms consistent with other longitudinal studies that demonstrated that time does not cure PTSD. Perhaps equally significant from a policy standpoint is that this study also demonstrated unequivocally that TF-CBT, often used in post-disaster settings, was feasible and effective in children as young as three years of age. These three treatment modalities, and others not discussed, have demonstrated efficacy even in very young children and therefore federal funding and disaster planning should incorporate training and dissemination of these methodologies.

IV. TWO STEPS FORWARD, ONE STEP BACK: LOOKING TO THE PAST AND THINKING IN THE FUTURE

The inattention and inappropriate treatment of young children exposed to traumatic and adverse experiences is particularly accentuated following disasters. A discussion of these large scale real life events highlights additional challenges to current policies. The specifics of the Hurricane Katrina disaster provide an eye-opening lesson about the inadequacies of interventions for young children. This section will describe how the large-scale, mental health response


74. See Scheeringa, supra n. 32.


76. See infra. Part V. Policy #5 & #6.
following this disaster was inadequate for children of all ages.\textsuperscript{77} Indeed, it has been estimated that over 260,000 individuals developed full PTSD, of which over 67,000 of those were children and adolescents.\textsuperscript{78} A substantial proportion of the early longitudinal studies of PTSD in youth are indicating that PTSD symptoms appear to be more chronic in young children than they are in most adults.\textsuperscript{79} As these young victims with more chronic symptoms continue each year without treatment, they may be carrying a disproportionate burden of illness.

Amidst the destruction there were large breakdowns in the medical and mental health care systems. In the acute period, multiple institutions permanently closed and dozens of individual providers moved away, resulting in a substantial loss of clinicians able to treat children. Beyond this acute period, the federal government had the opportunity to fund mental health training and treatment programs for disaster victims. Yet, despite a federal government that was willing to allocate millions of federal funds for many things in Louisiana and the Gulf Coast, to date in Louisiana there has been no coordinated effort by the State or Federal government to provide evidence-based mental health treatment. The problem in funding appears to lie in bureaucratic interpretation of the Stafford Act. It is this disconnect that future policy should directly confront.

In 1974, the United States Congress passed the Disaster Relief Act, later amended by the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988, that formalized the mechanism through which federal assistance following emergencies would be accessed.\textsuperscript{80} The mental health response in this act is described as “crisis counseling” and defined as “professional counseling services, including financial assistance to State or local agencies or private


mental health organizations to provide such services or training. 81

The Federal Emergency Management Agency (FEMA) has an interagency agreement to manage the mental health component after disasters with the Substance Abuse and Mental Health Services Administration (SAMHSA), which interpreted the Stafford Act to mean that FEMA funds after disasters cannot be used for mental health treatment but instead must be limited to “crisis counseling”. A subdivision of SAMHSA, the Emergency Mental Health and Traumatic Stress Services Branch, manages the mental health program post-disaster called the “Crisis Counseling Program” (CCP). Unfortunately CCP is not mental health treatment, is provided by laypersons and includes “providing emotional support, and encouraging linkages with other individuals and agencies who may help.” For those who truly need treatment, however, crisis counseling is by definition a referral program. CCP was created idiosyncratically by SAMHSA, it appears, to fulfill its legislative mandate. That is, it is not a clinical intervention. It does not require licensed clinicians. There is no literature of controlled (or uncontrolled) studies. There is absolutely no evidence that crisis counseling helps people who have substantial mental health needs recover more quickly or more fully. Further there is also no evidence that CCP was able to fulfill its referral function, particularly in post-Katrina New Orleans when there were few if any functioning agencies to which CCP counselors could refer. 82 The federal government allocated over $44 million to Louisiana for disaster mental health response (not all of which Louisiana was willing or able to draw down), largely for CCP.

CCP has no formal measures of psychological distress at all and therefore has neither a mechanism to either formally identify those with significant emotional distress that ought to be referred for mental health treatment, nor any method to determine the efficacy of CCP for those without substantial mental health needs. These quality control deficiencies were actually documented in a report following the 2004 and 2005 hurricanes by the Congressional Research Service, which stated “the actual effect of the program [CCP] on health outcomes has not been demonstrated.” 83 The report further documented that in 2002

81. Id.
82. See Carl F. Weems et al., Hurricane Katrina and the Need for Changes in the Federal Funding of Disaster Mental Health, 5 Am. J. Disaster Med. 57, 57-59 (2010).
83. Ramya Sundararaman et al., Gulf Coast Hurricanes: Addressing Survivors'
the Government Accountability Office had “recommended that FEMA and SAMHSA collaborate in evaluating the effectiveness of CCP,” noting that the FEMA Inspector General had made the same recommendation in 1995. No evaluation has taken place.

Hurricane Katrina serves as a continual reminder of the mental health outcomes that can result when government and private disaster plans are insufficient, health care infrastructures fail, and there is an absence of a coordinated federal plan to utilize local existing organizations to provide funding for training and dissemination of evidence-based treatments. Current research indicates that the mental health rates in children three years post-Katrina have not declined to baseline levels and between 16 to 39 percent of children in highly impacted areas of Louisiana could still benefit from mental health treatment. While the high rates of mental health issues that remain in post-Katrina Louisiana are different than what has been seen following other Hurricanes they highlight one important fact: mental health problems in children, if left untreated, do not go away. Thus effective, early, and coordinated efforts to provide evidence-based treatments to children in the wake of natural disasters, and to those exposed to all types of traumatic experiences, need to be implemented at the policy level. Perhaps if we can learn from the past mistakes and effect change at the policy level, we can better protect our most vulnerable children now and minimize their need for mental health care throughout their lifespan.

V. WHERE TO GO NOW: POLICY IMPLICATIONS OF THE IMPACT OF ADVERSITY ON CHILDREN

Young children are one of the most vulnerable populations in our society. They are reliant on others for most aspects of their basic function and the experiences they have, both positive and negative. It appears that the most extreme end of the spectrum of negative experiences can sculpt aspects of their neurobiological, social, cognitive, and emotional development. Unfortunately these extreme adverse experiences for young children are common and few children escape childhood unexposed. In the United States almost half of young


84. Weems, supra n. 82, at 57.
children are exposed to at least one traumatic event and many are exposed to multiple stressful life events which may have a cumulative negative developmental impact. Fortunately, there are treatments for these children. If children receive appropriate treatment, have access to supportive caregivers, and are placed in safe environments their future outlook is significantly brighter. As we move forward these research findings should guide the development of policies that create a comprehensive plan of care for young children exposed to early adversity. These policies should incorporate the following recommendations:

1. There is a critical shortage of all levels of child mental health providers and federally supported efforts to address this shortage should be implemented. These efforts include providing funding for the currently approved Child Health Care Crisis Relief Act (H.R. 1932/S.999) that will provide student loan repayment for child health care providers as well as training stipends directly to institutions to support the training of child psychiatrists, psychologists, and social workers. This direct-to-institution funding allows training programs to expand their training opportunities and fosters the creation of well trained clinicians who are able to provide a range of evidence-based mental health services.

2. Based on the neurobiological evidence that early intervention is critical for outcomes with young children policy makers should work closely with judges, clinicians, and organizations providing intervention to young children in protective custody to improve the assessment and treatment planning. A directed focus on achieving permanent placement decisions in less than one year, and ideally more rapidly, should be achieved that incorporates particular attention to the assessment and treatment of the attachment relationship.

3. Recognizing the complexities of assessing mental health needs in very young children and the current limited use of evidence-based treatments, particularly in this age range, mental health care reform should focus on increasing the time allotted for initial assessments and increase the availability of psychotherapeutic modalities. Existing guidelines for the use of psychotropic medications in young children should be implemented in all federally supported mental health care systems and strongly encouraged in other locations that provide care to very young children.
4. Implement legislation that requires SAMHSA and FEMA to support evidenced based interventions for individuals of all ages in post-disaster areas. These treatments should incorporate standardized measurements able to document treatment efficacy.

5. Design a new federal funding system that can provide direct funding to existing community based programs immediately after disasters to implement evidenced based treatments. These funds should be distributed with appropriate oversight of both the allocation of funds and dissemination of treatment. These grants could be reviewed similarly to the NIMH, Rapid Post Impact of Disaster (RAPID) grant program following disasters. 85

6. Further research on the neurobiological impact of early negative experiences as well as the neurobiological benefits of early intervention should be supported.

Implementation of these recommendations would make substantial progress toward ending the historically disproportionate under-recognition of young children’s psychopathology and limited access to mental health interventions. Effective, early intervention and appropriate support and treatment of the caregivers of these vulnerable children will not only improve short term outcomes but has the potential to provide positive lifelong benefits.

85. Weems, supra n. 82.