

Toxic Stress and Poverty

Last year's 2015 Community Needs Evaluation included a section on Consequences of Poverty in Childhood and Beyond (beginning on page 129). Because of the significant research findings about how toxic stress impairs the cognitive development of children, the 2016 Community Needs Evaluation will explore in detail how toxic stress in childhood is related to a variety of negative experiences, including poverty.

Adverse Childhood Experiences (ACEs) create toxic stress in minor children that can result in serious health, emotional and intellectual problems throughout adulthood. Recent research builds on the initial research in the research by the U. S. Centers for Disease Control and Kaiser Permanente in the mid-1990s to enhance the scientific knowledge on this multifaceted issue.

<https://www.cdc.gov/violenceprevention/acestudy/>

What PARENTS should know:

All young children need regular, frequent, ongoing positive interactions with their parents and other caregivers. Parents and other caregivers can protect children from the damage of toxic stress, by being loving and supportive. They can reassure the child and help them heal afterwards. Positive relationships (that are safe, stable and nurturing) can cushion the blow of toxic stress to children. Most damage to children through neglect because infants and toddlers need frequent positive interaction. Parents have many distractions (cell phones, television, etc.) that can interfere with interaction with their children to create long-lasting damage.

Children can handle some stress, especially if it is for short periods or results from less intense events. When the stress happens for a long period of time or is from very intense experiences, it can cause lasting damage to children. With toxic stress, the brain and body functions may not develop as they should, resulting in later emotional, mental, behavioral and physical problems.

Parents may have been affected by toxic stress when they were growing up, and may have difficulties created by their childhood experiences. Parents who suffered from toxic stress may have difficulty when they face stressful situations – losing their temper, having health problems or experiencing depression. Some may use unhealthy ways to calm down – yelling at their partners or children, smoking, drinking, using drugs, etc.

Parents can use healthy ways to cope with stress, including mental health treatment, physical exercise, keeping a positive attitude, meditation and talking to peers. These can help parents protect their children from Adverse Childhood Experiences. Parents need to take care of themselves so they will be able to help their children (being a positive influence for the children, modeling good behavior, praising children for good things you see them do, etc.

<https://www.healthychildren.org/English/healthy-living/emotional-wellness/Building-Resilience/Pages/When-Things-Arent-Perfect-Caring-for-Yourself-Your-Children.aspx>

Additional information from the American Academy of Pediatrics, *When Things Aren't Perfect: Caring for Yourself and Your Children* - https://www.aap.org/en-us/Documents/ttb_caring_for_yourself.pdf

What **POLICY MAKERS** should know:

1. While babies are born with most of their brain cells (neurons), the synapses they need for everything (coordination, analytic ability, etc.) form in early childhood – influenced by environment and relationship with parents/caregivers. *Investment in early childhood improves critical connections needed for success in later life.*
2. Stress changes the brain and toxic stress (severe or repeating) can impair the child's brain permanently. Brain structure is damaged, often resulting in poor long-term health, social and educational outcomes. *Investments to prevent and address sources of toxic stress early in life improve long-term outcomes for children.*
3. Harmful exposures (toxic chemicals) can also change the brain that may result in negative neurological and behavioral outcomes. *Investments can prevent and reduce exposure to harm from built, consumer and natural environments.*
4. Positive relationships are essential and protective. Just one caring and consistent relationship with an adult can protect children against damage from toxic stress, whether it is with a parent, relative, professional or other caregiver. *Investments can promote and ensure positive relationships for children with caregivers, at home, in neighborhoods and at school.*
5. Timing is crucial because there are limited "windows of opportunity" for children to develop necessary skills, including language acquisition. For example, at six months a child can distinguish an array of sounds that will mostly disappear by the first birthday. There are additional windows during adolescence and early adulthood related to impulse control and decision making. *Investments made early achieve maximum effects on brain development. By working with young parents, interventions can catch critical periods for both parent and child to promote healthy development and counter stress.*

<http://live-penn-impact.pantheonsite.io/wp-content/uploads/2016/2015/06/Why-Invest-New-Brain-Research.pdf>

Current programs often focus on disadvantaged adults – job training, adult literacy, prisoner rehabilitation, education programs, etc. As discussed in *The Case for Investing in Disadvantaged Young Children* (Big Ideas for Children: Investing in Our Nation's Future, 2008), the skills needed for successful completion of such programs depends on foundations developed as children. Without earlier intervention, the abilities of adults who experienced toxic stress because of Adverse Childhood Experiences are often compromised.

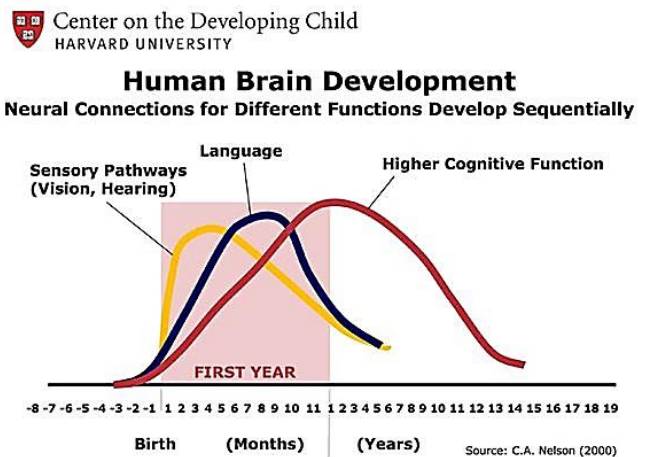
The report shows investments in programs that reach children early are far more cost-effective than waiting until later, with the highest return per dollar in programs for children under age 3. Earlier intervention programs, particularly pre-school programs not only save money but also prevent other types of potential problems that may arise.

<http://heckmanequation.org/content/resource/case-investing-disadvantaged-young-children>

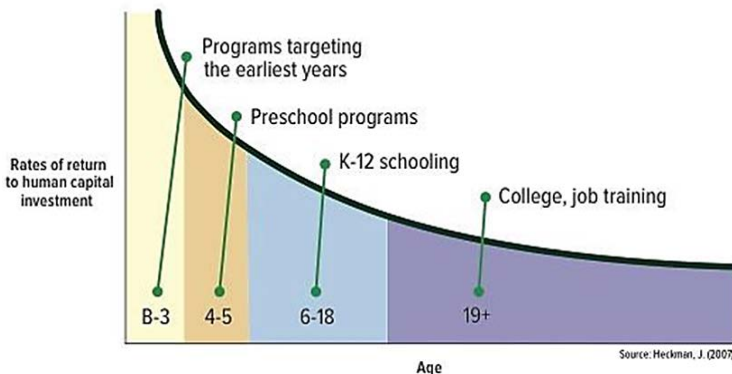
What **EVERYONE** should know:

1. The damage caused by toxic stress and Adverse Childhood Experiences can be severe, with some research showing up to a 6% smaller brain and up to a drop of 13 points in IQ.
2. The changes a child's brain development often have a wide range of negative consequences, including poor health, emotional/behavioral problems, higher high school dropout rates, and early death.
3. Of particularly consequence is the impairment to the executive function, which can affect inhibitory control, working memory and cognitive flexibility. These skills would allow focused attention, problem solving, planning ahead, impulse control and adjusting to new circumstances. Without these skills, it would be difficult to function at school, at work and in society.
4. The time frame for developing specific functions is short. As shown in the graphic below, the development of sensory pathways peaks at about 3 months of age, dramatically decreasing by age 6. Language capacity peaks around 9 months of age, dropping rapidly through about age 6. Even the higher cognitive function development becomes minimal by the time a child becomes a teenager, since it peaks around 1 year of age.
5. If the development of the specific brain function does not occur during the most active developmental periods, some level of function will be lost permanently – with devastating results that will cost the person in physical, intellectual, mental and behavioral capacity.

The graphic at right shows that peak learning occurs within the first year of life. Language and sensory pathways have dropped noticeably by the time a child begins school. Higher cognitive function begins to decline around the time a child begins school and continues decreasing until about age 14. As a result, it is far more difficult to teach children at younger ages, when they are most able to learn.



Early Intervention Is More Effective in Producing Favorable Outcomes Than Later Remediation



The graphic at left shows that early interventions are far more cost effective than those provided in later years. The age at which interventions are most likely to produce favorable outcomes occur from birth through age three. As the children get older, interventions become less effective, although most spending occurs during later years.

The economic burden of child maltreatment in the United States and implications for prevention (ScienceDirect, February 1, 2012) explained the financial cost for child neglect and abuse.

The estimated lifetime cost for someone who was a victim of child maltreatment, the lifetime cost in 2010 dollars was estimated to be \$210,012. This included \$32,648 in childhood health care costs; \$10,530 in adult medical costs; \$144,360 in productivity losses; \$7,728 in child welfare costs; \$6,747 in criminal justice costs; and \$7,999 in special education costs. The average lifetime cost per death for child maltreatment was \$1,272,900, for \$14,100 in medical costs and \$1,258,000 in productivity costs.

The total lifetime economic burden resulting from new cases of fatal and nonfatal child maltreatment in the United States in 2008 is approximately \$124 billion. In sensitivity analysis, the total burden is estimated to be up to \$585 billion.

Conclusions: **Compared with other health problems, the burden of child maltreatment is substantial, indicating the importance of prevention efforts to address the high prevalence of child maltreatment.**

~*The economic burden of child maltreatment in the United States and implications for prevention* (ScienceDirect)

<http://www.sciencedirect.com/science/article/pii/S0145213411003140>

Toxic stress can be caused by adverse experiences (neglect, abuse, poverty, etc.), particularly at younger ages if the experiences are severe or prolonged. It can affect these individuals in a way that is similar to how traumatic experiences can result in Post-Traumatic Stress Disorder (PTSD), with extreme cases often observed in combat veterans. The body of knowledge about PTSD continues to grow, having been first identified in 1980. Subsequent research has identified and expanded the understanding of causes and manifestations of PTSD.

<http://www.ptsd.va.gov/>

The Center for Child Counseling explains that "Childhood trauma isn't something you just get over when you grow up." It describes how children who grow up with ongoing exposure to violence, abuse and neglect (without caring relationships to buffer the damage) remain at risk for a multitude of problems throughout their lives.

<http://www.centerforchildcounseling.org/news/latest-news/>

His score is 4

Without Intervention he is
4.7 times as likely to use DRUGS and
7.4 times as likely to be an ALCOHOLIC
when he grows up





According to the U.S. Substance Abuse and Mental Health Services Administration (SAMHSA), "Individual trauma results from an event, series of events, or set of circumstances experienced by an individual as physically or emotionally harmful or life-threatening with lasting adverse effects on the individual's functioning and mental, physical, social, emotional, or spiritual well-being." Unfortunately, trauma is common, with 61% of men and 51% of women reporting exposure to at least one traumatic event during their lives. Among clients in public behavioral health care settings, 90% report they have experienced trauma.

SAMHSA also provides information about various types of trauma and violence. These may include sexual abuse/assault, physical abuse/assault, emotional abuse/psychological maltreatment, neglect, serious accident/illness/medical procedure, victim or witness to domestic violence/community violence, historical trauma, school violence, bullying, natural/manmade disasters, forced displacement, war/terrorism/political violence, military trauma, victim/witness to extreme personal/interpersonal violence, traumatic grief/separation or system-induced trauma and re-traumatization.

Without intervention, people with mental illnesses and addictions would likely have poor physical health outcomes, further impairing their recovery by ignoring trauma. SAMHSA encourages the use of trauma-informed care that recognizes the widespread and severe impact of trauma, how it can affect recovery and the signs and symptoms in clients, families, staff and others involved in the service delivery system. Services should fully integrate knowledge about trauma into organizational policies, procedures, processes and practices, in order to actively prevent re-traumatization.

A variety of SAMHSA publications describe coping with traumatic events, with resources for children, parents, educators and other professionals.

http://www.integration.samhsa.gov/clinical-practice/trauma#trauma_informed_care

In order to diminish the cycle of poverty, it is important to understand and address the factors that continue to perpetuate poverty and disparity.

The National Scientific Council on the Developing Child was established in 2003 as a "multidisciplinary, multi-university collaboration committed to closing the gap between what we know and what we do to promote successful learning, adaptive behavior, and sound physical and mental health for all young children." This evidence-based innovation communicates the science from research findings and recognizes the complementary responsibilities of the elements that can promote child well-being, including family, community, workplace and government.

<http://developingchild.harvard.edu/science/national-scientific-council-on-the-developing-child/>

The Council conducts, analyzes and integrates scientific knowledge to promote knowledge about the rapid advances in the science of early childhood development and the underlying neurobiology. One of its publications, *A Decade of Science Informing Policy* (December 2014) describes how "a diverse group of distinguished scientists has worked to translate complex research about early brain development into language that is scientifically accurate, highly credible, understandable to nonscientists, and useful to public decision makers." These findings have helped change the conversation about the importance of young children having "a healthy, safe, and nurturing start in life."

<http://46y5eh11fhgw3ve3ytpwxt9r.wpengine.netdna-cdn.com/wp-content/uploads/2015/09/A-Decade-of-Science-Informing-Policy.pdf>

Working with Harvard University's Center on the Developing Child, the Council presents other publications, including those that describe these implications to help policymakers, elected officials and the general public identify policies and programs to ensure future opportunities for children.

<http://developingchild.harvard.edu/resources/>



Children may be exposed to a wide range of adverse experiences that often create toxic stress. Adult capabilities can be built to improve outcomes for children.

https://www.youtube.com/watch?v=urU-a_Fs5Y

Many public and private organizations recognize the critical importance of recent neuroscientific findings. Both the **State of Tennessee** (Building Strong Brains) and the **Metropolitan Government of Nashville and Davidson County** (ACE Nashville) have initiatives to bring attention to and address the damage that affects children through toxic stress often caused by Adverse Childhood Experiences.

<https://www.tn.gov/tccy/article/tccy-ace-aces-trauma-toxic-stress>

<https://www.facebook.com/AllChildrenExcel/>



Center on the Developing Child HARVARD UNIVERSITY

The Center on the Developing Child was established at Harvard University in 2006, with a mission "to generate, translate, and apply scientific knowledge that would close the gap between what we know and what we do to improve the lives of children facing adversity." As the Center embraced a scientific foundation to improve outcomes for children, its mission evolved – "Our current mission is to drive science-based innovation that achieves breakthrough outcomes for children facing adversity.

The five key concepts that are the building blocks of the science of child development are shown below. Of



these, brain architecture is the foundation for all future learning, behavior and health. If the foundation is weak and compromised, early adverse experiences can damage brain architecture in a lasting way.

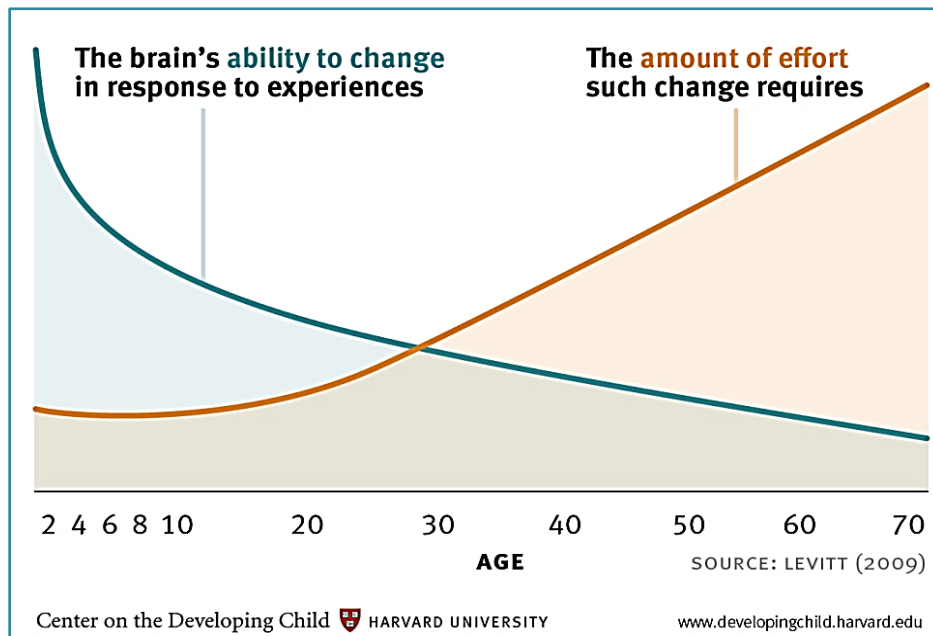
Brain Architecture

Early experiences affect the development of brain architecture, which provides the foundation for all future learning, behavior, and health. Just as a weak foundation compromises the quality and strength of a house, adverse experiences early in life can impair brain architecture, with negative effects lasting into adulthood.

~ Center on the Developing Child, Harvard University

Brains are built over time, from the bottom up. The process begins before birth and continues until adulthood. During the first few years, 700-1,000 new neural connections are formed every second, with many eventually being pruned (eliminated) to help brain circuits be more efficient.

- There are billions of connections across individual neurons in different parts of the brain, with lightning fast connections. During the early years, neural development is most active. These connections provide the foundation for later connections, with the foundation weak or strong depending on the young child's experiences.
- Genes and experiences interact and shape the developing brain, with circuits reinforced by repeated use. The "serve and return process" (described later in this document) refer to the interaction between infants and young children and their parents or other adult caregivers. As individuals age, the brain's ability to change decreases and the effort needed to make changes increases, as shown in the graphic below. This demonstrates why the earliest possible efforts are most effective. For example, the ability the brain has to change is much higher for a 2 year old than a 70 year old, while the amount of effort that would be minimal for a 2 year old would be tremendously increased for a 60 or 70 year old.



- Cognitive, emotional and social capacities are interwoven throughout life, and brain functions coordinate with each of these. Emotional well-being and social competence strengthen the foundation for cognitive development. Success in school (and later in the community and the workplace) depends on emotional and physical health, social skills and cognitive-linguistic capabilities.
- Toxic stress weakens the development of the brain that can lead to lifelong problems in learning, behavior, physical health and mental health. Some stress is positive, but higher levels of stress for longer periods, especially when there are no supportive relationships to ameliorate the damage, can lead to a range of detrimental effects from toxic stress including the impairment of neural connections.

<http://developingchild.harvard.edu/science/key-concepts/brain-architecture/>

Toxic Stress

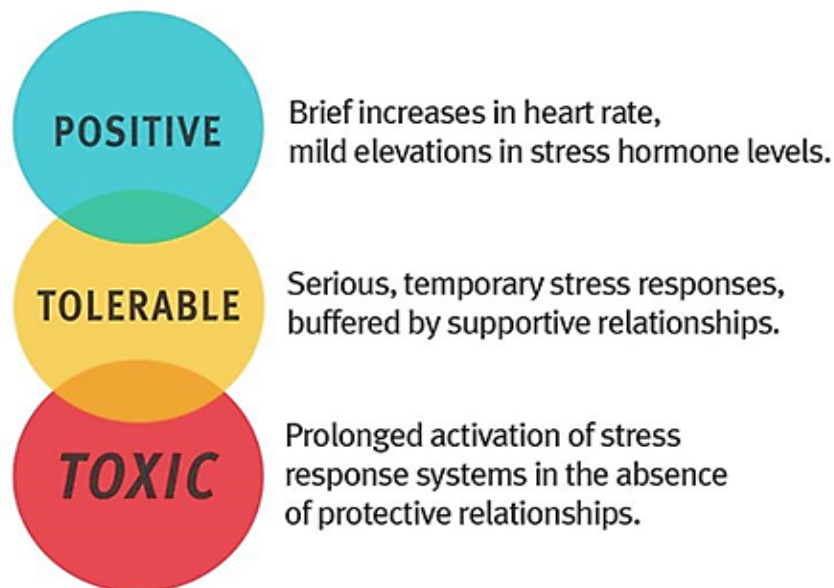
Everyone experiences stress, but healthy development can be impaired by excessive or prolonged activation of stress response systems in the body and brain. It is important that children learn how to cope with adversity within an environment of supportive relationships with adults. The positive relationships buffer the physiological responses to stress (increased heart rate, blood pressure and stress hormones).

Positive stress response is part of normal development, reflected in temporary increases in heart rate and hormone levels. Examples would be the first day with a new caregiver or an injection of an immunization.

Tolerable stress response elicit a stronger response in the body's alert systems, due to a more severe or longer-lasting negative circumstances. Examples include an injury, natural disaster or loss of a loved one.

Toxic stress response is the result of a child's frequent, more intense or prolonged adversity, to the level that it can disrupt the development of brain architecture and other physical/cognitive development.

Examples of toxic stress include physical or emotional abuse, continuing neglect, exposure to caregiver substance abuse or mental illness, exposure to violence or the burden of family economic hardship – without adequate adult support.



The future of any society depends on its ability to foster the healthy development of the next generation. Extensive research on the biology of stress now shows that healthy development can be derailed by excessive or prolonged activation of stress response systems in the body and brain. Such toxic stress can have damaging effects on learning, behavior, and health across the lifespan.

~ Center on the Developing Child, Harvard University

Without supportive relationships, or when the stress is extreme and continuing, the stress becomes toxic, damaging the child's brain architecture. An individual's biological response is also a factor in how he or she would respond to various levels of stress, influenced by the person's genetic factors. The combination of genes with the duration, intensity, timing and context of the stressful experience determine magnitude of the effect on an individual.

<http://developingchild.harvard.edu/science/key-concepts/toxic-stress/>

Harvard's JPB Research Network was created in 2015, bringing together scientists, physicians and community leaders to address these objectives:

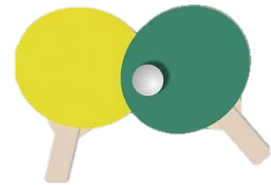
1. Develop measures to identify evidence of toxic stress, appropriate for use in community settings and acceptable to parents.
2. Conduct basic research on neuroplasticity (potential for the brain to reorganize and adapt), critical periods in development and individual differences in susceptibility to stress.
3. Build a community-based infrastructure to apply new scientific insights and rigorous measures to promote more effective intervention strategies for children and families who face significant adversity.

<http://developingchild.harvard.edu/science/the-jpb-research-network-on-toxic-stress/>

Serve and Return

The serve and return interactions between very young children and their parents or other caregivers allow neural connections in the brain that support communication and social skills to strengthen. The "serve" is when the very young child babbles, gestures or cries, and the "return" occurs when the adult makes an appropriate response, such as eye contact, words or a hug. The serve and return process (described in the next section) helps to build resilience to protect against and mitigate damage to the child.

The serve and return interface is similar to the back-and-forth action of tennis, volleyball or ping-pong.



Adults may not appropriately respond, sometimes because they are stressed because of some or all of the following problems: financial problems, chronic health issues or lack social connections. If an adult fails to respond or responds in an inappropriate way, the child's brain circuits may not develop, creating a serious

threat to a child's development and well-being. Such neglect can impair subsequent learning, behavior and health.

Serve and return interactions are among the most essential experiences that shape brain architecture. When an adult responds appropriately to sounds or movements of a baby, neural connections are built and strengthened in the child's brain to support the development of communication and social skills.

Although chronic neglect can result in an even wider range of damage than active abuse, it receives far less attention in policy and practice. For all child maltreatment in the U.S.:

- 78% is from neglect
- 17% from physical abuse
- 9% for sexual abuse
- 8% for psychological abuse

The research findings demonstrate that deprivation/neglect:

- Disrupt how children's brains develop and process information (creating attentional, emotional, cognitive and behavioral disorders)
- Alters the development of biological systems to respond to stress (increasing the likelihood of later anxiety, depression, cardiovascular problems and other chronic health problems later)
- Increases the risk of emotional and interpersonal difficulties (high levels of negativity, poor impulse control, personality disorders (lowering enthusiasm, confidence and assertiveness))
- Is associated with significant risk for learning difficulties and attention (low IQ scores, poor reading skills and elevated dropout rates)

<http://developingchild.harvard.edu/resources/serve-return-interaction-shapes-brain-circuitry/>

The Center's *The Science of Neglect* explains that sometimes the damage is permanent, while other times intensive interventions can reduce the detrimental effects of neglect. Not only must the child be removed from a nonresponsive environment, children who experience severe neglect typically need therapeutic intervention and highly supportive care.

In neglectful situations, prevention and very early intervention can minimize the damage to very young children. The graphic below shows a continuum on which degrees of neglect may occur, indicating that the degree and length of the neglect determines the type and intensity of intervention needed.

| Science Helps to Differentiate Four Types of Unresponsive Care | | | | |
|--|---|--|---|--|
| | OCCASIONAL INATTENTION | CHRONIC UNDER-STIMULATION | SEVERE NEGLECT IN A FAMILY CONTEXT | SEVERE NEGLECT IN AN INSTITUTIONAL SETTING |
| Features | Intermittent, diminished attention in an otherwise responsive environment | Ongoing, diminished level of child-focused responsiveness and developmental enrichment | Significant, ongoing absence of serve and return interaction, often associated with failure to provide for basic needs | “Warehouse-like” conditions with many children, few caregivers, and no individualized adult-child relationships that are reliably responsive |
| | Can be growth-promoting under caring conditions | Often leads to developmental delays and may be caused by a variety of factors | Wide range of adverse impacts, from significant developmental impairments to immediate threat to health or survival | Basic survival needs may be met, but lack of individualized adult responsiveness can lead to severe impairments in cognitive, physical, and psychosocial development |
| Action | No intervention needed | Interventions that address the needs of caregivers combined with access to high-quality early care and education for children can be effective | Intervention to assure caregiver responsiveness and address the developmental needs of the child required as soon as possible | Intervention and removal to a stable, caring, and socially responsive environment required as soon as possible |

Recent advances in science should result in a modernized understanding and approaches to the identification, prevention, reduction and mitigation of neglect and its profound consequences, especially during the early years of life.

<http://developingchild.harvard.edu/resources/inbrief-the-science-of-neglect/>

Yale University’s *Yale Nursing Matters* (Fall 2015) describes how a mother’s response to her baby’s cries can “make a big difference in the child’s ability to learn, develop and thrive.” Exposure to toxic stress in childhood linked to risky behavior and adult disease explains that a warm, supportive response from the mother calms the baby and helps the baby feel more secure, a response that fails to nurture (distant or angry) leaves the child to cope alone in a scary world. If this neglect continues, it can create the type of toxic stress that can create damage that lasts throughout the child’s life.

It notes that advances in neuroscience, epigenetics and other fields have led to attention that focuses on the significant effect of toxic stress, noting that it is a rapidly evolving field.

<http://news.yale.edu/2015/11/19/exposure-toxic-stress-childhood-linked-risky-behavior-and-adult-disease>

Additional information about what happens when there is a failure in the serve and return process is described in *Understanding the Effects of Maltreatment on Brain Development* (April 2015) from the U. S. Department of Health & Human Services-Child Welfare Information Gateway. It describes how toxic stress, including neglect/child maltreatment can affect different parts of the brain, potentially damaging learning, memory, communication, motor function, executive development, and more.

https://www.childwelfare.gov/pubPDFs/brain_development.pdf

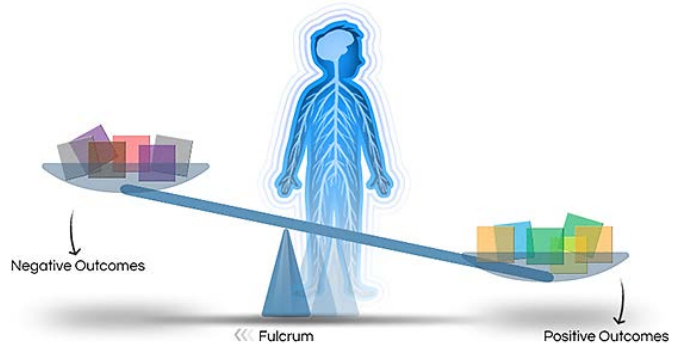
Resilience

Resilience is the capacity to positively adapt to significant adversity and how people can be “protected” from damage after experiencing adverse experiences. Resilience is an adaptive response to serious hardship that can diminish the damage to the development of children.

Harvard’s Center for the Developing Child indicates that reducing the negative effects of significant adversity on the development of children is essential to progress and prosperity of society. They note that some children do well despite adverse early experiences while others do not, and that a better understanding of this variation can inform policies and programs that could be more effective in helping children reach their potential.

Resiliency can develop through supportive relationships and the opportunity for skill building. The development of resilience can be visualized as a balance scale or seesaw, as shown in the graphic from Harvard’s Center on the Developing Child. “Tipping the Scales” is a resilience game available online.

<http://developingchild.harvard.edu/resilience-game/>



Negative experiences and adversity build up on one side that could be offset by positive outcomes, also affected to some extent by genetic predisposition. Positive influences, if operating effectively, stack the scale with positive outcomes and optimize resilience through:

- Facilitating supportive adult-child relationships;
- Building a sense of self-efficacy and perceived control;
- Providing opportunities to strengthen adaptive skills and self-regulatory capacities; and
- Mobilizing sources of faith, hope, and cultural traditions.

There are additional influences on how children are affected by adverse experience. Protective factors also include a combination of biology and environment, which is more difficult to quantify. It is unlikely that either individual biological influences or social environments are powerful enough to result in positive outcomes for children who experience prolonged toxic stress.

Children may experience “manageable stress,” in which supportive adults teach them how to deal with stress (since not all stress is harmful). As children gradually learn how to manage stressors, their brains are more likely to perceive these events as manageable and they learn how to deal with them. When the level of adversity is overwhelming and there are no supportive relationships to help, stress can become toxic.

As positive experiences continue to build up, people build the skills to cope with physical and mental obstacles and hardships. Building resilience is easiest during early life and builds a foundation for a wide range of resilient behaviors. However, some resilience can still be built through positive experiences (physical exercise, stress reduction practices and specific age-appropriate/health-promoting activities). Adults who strengthen their own skills can model more positive behaviors for their children, creating a generational impact.

<http://developingchild.harvard.edu/science/key-concepts/resilience/>

Executive Function and Self-Regulation

The skills in executive function and self-regulation allow people to plan, focus attention, remember instructions and juggle multiple tasks. The Harvard's Center for the Developing Child compares the role of executive function and self-regulation to an air traffic control system at a busy airport, which manages arrivals/departures of numerous airplanes on multiple runways. These skills are needed for the brain to filter distractions, prioritize tasks, set and achieve goals and to control impulses.

Executive function and self-regulation skills allow people to learn, develop, exhibit positive behavior and make healthy choices for ourselves and our families. The three brain operations required for executive function and self-regulation are interrelated and coordinated and include:

- 1) Working memory - ability to retain and use distinct pieces of information over short periods of time
- 2) Mental flexibility - helps individuals to sustain or shift attention, responding to different demand and to be able to apply different rules in different settings
- 3) Self-control – allows people to establish priorities and resist impulsive actions or responses

The graphic of the brain shows the various types of executive function skills that relate to other functions.



Babies are not born with these skills but have the potential to develop them. However, executive function and self-regulation skills would develop only if children receive what they need from their relationship with adults. In environments with toxic stress (neglect, abuse, violence, etc.), the development of these skills is delayed or impaired.

Environments that meet the child's needs promote growth and create the foundation for them to practice the skills with nurturing adults before they can perform them alone as they grow up. The development of a child's executive function and self-regulation can be enhanced by adults who establish routines, model positive social behavior and create supportive, reliable relationships. Children develop their skills through activities that promote creative play and social connections, teach them coping skills and involve exercise.

Children also need the opportunity to direct their own actions with decreasing levels of adult supervision. It is essential that young children develop these skills at home, in early child care or educational settings and in any other environment they experience regularly.

Executive function and self-regulation skills are the mental processes that enable us to plan, focus attention, remember instructions, and juggle multiple tasks successfully. Just as an air traffic control system at a busy airport safely manages the arrivals and departures of many aircraft on multiple runways, the brain needs this skill set to filter distractions, prioritize tasks, set and achieve goals, and control impulses.

<http://developingchild.harvard.edu/science/key-concepts/executive-function/>

Self Regulation and the Executive Functions: The Self as a Controlling Agent (prepared for *Social psychology: Handbook of Basic Principles* (2013, University of Minnesota) describes examples of what happens when people lack effective self-regulation:

“A man squanders his money on gambling. A woman beats her child. A drunk driver causes a crash that destroys three cars and injures several people. A student postpones studying until the night before the test and gets a bad grade. A young couple engages in unprotected sex and creates an unwanted pregnancy. A delinquent shoots an acquaintance during an argument. A dieter eats seven donuts and a pint of ice cream at one sitting. An athlete trains off and on for a year without any improvement in performance. A girl breaks a promise and betrays a friend’s confidence. An old man again neglects to take his daily dose of insulin and goes into diabetic shock.”

Self Regulation also notes that most societal and personal problems have the failure of self-regulation as a root cause. Without these skills, people lack impulse control, resulting in problems such as substance abuse, unsafe sexual behavior, eating disorders, etc. It notes that self-regulation may also be connected to criminality, money problems, and lack of academic achievement.

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.451.3484&rep=rep1&type=pdf>

Newer research findings show little evidence to support older poverty theories. Older theories have suggested that economically disadvantaged people have some kind of deficit or that they have a culture of poverty or lack information about how to move out of poverty (blaming the people who are poor). Recent scientific evidence shows there are physical changes that occur in childhood that can result in a range of cognitive losses throughout a lifetime.

Children who have adverse experiences, including poverty and toxic stress, can grow up with impairments to opportunities throughout their lifetimes. They are less likely to achieve in school, more likely to have additional health problems and face challenges developing the skills needed for work, as described by Harvard’s Center for the Developing Child.

Research demonstrates that poverty can damage neurobehavioral development, as discussed in the American Psychological Associations' *Neurobehavioral effects of poverty* (January 2013). Unfortunately, the need for services to address neurobehavioral problems is typically not identified. Data collected from 1997-2008 found that the children in families living in poverty were more likely to have developmental disabilities, learning disabilities and intellectual disabilities.

When long-term poverty results in chronic stress, specific areas of the brain are smaller (hippocampus and amygdala) that can result in impaired working memory. Another part of the brain (prefrontal cortex) is also affected that lessens the brain's executive function capacity.

<http://www.apa.org/pi/ses/resources/indicator/2013/01/poverty-behaviors.aspx>

At birth, babies do not have executive function and self-regulation skills but do have the potential to develop them up through early adulthood. This involves three types of brain function.

1. Working Memory
2. Mental Flexibility
3. Self-Control

Executive function skills are important throughout life and can benefit the individual and their community. The benefits shown in the graphic promote the well-being of individuals in order to create gains for society (better educated population, stable communities/social cohesion, healthier people and a competent and flexible workforce).



There are important ways that children develop these skills:

- Relationships (at home, teachers, professionals, peers, etc.)
- Activities (to promote emotional, social, cognitive and physical development)
- Places (at home and elsewhere, children need to feel and be safe, have space for exploration and exercise, and be economically and socially stable to reduce anxiety, stress and fear)

If children experience toxic stress from their relationships or environments, their skill development could be significantly impaired or delayed. It is easier and more effective to promote development of these skills at the earliest possible age. Even if they do not develop their executive function capacity early, there is some opportunity to enhance it until early adulthood.

To prevent future generations from experiencing these preventable cognitive impairments, it is important to establish policies that are more effective. For example, policies should emphasize literacy instruction and incorporate professional training in the development of executive functional skills in teachers of young children. Policies should give special attention to young children who face severe adversity, to both reduce sources of toxic stress and promote executive function. These policies should address ways to reduce/prevent abuse, neglect, community violence and persistent poverty and embrace proven interventions (home visitation, parent education and family support programs).

Parents and other adult caregivers need appropriate skills to enhance development in children. These adults can benefit from programs to build their own executive function and self-regulation ability, resulting in greater economic security, improve their ability to model and support such skills in children.

<http://developingchild.harvard.edu/resources/inbrief-executive-function/>

The section above on Toxic Stress and Poverty describes the lasting damage that can result when children experience adverse events and circumstances, such as abuse, neglect and poverty. Social/human service providers can use trauma informed techniques for most types of services provided to improve outcomes.

The perpetuation of poverty becomes generational when the detrimental effects on young children (lower IQ, impaired cognitive development, inability to master age-appropriate developmental tasks in early childhood, increasing maladaptive social and emotional functioning in childhood and high risk behaviors in adolescence) eventually carry forward to future generations. The Columbia University's Mailman School of Public Health issue brief, *Helping the Most Vulnerable Infants, Toddlers, and Their Families* (National Center for Children in Poverty, January 2006) notes that, "Helping the most vulnerable infants, toddlers, and parents is not easy, but if we fail to do so, the consequences will most surely spill over into the next generation."

Helping the Most Vulnerable Infants explains the importance of two-generation supports for higher-risk family circumstances. It emphasized the importance of identifying risks in health care and other settings that serve women and young children. It provides a number of potential strategies to help improve outcomes for young children and families who are at risk.

http://www.nccp.org/publications/pdf/text_669.pdf

Additional information is available online, including the following examples.

Harvard's Center on the Developing Child - <http://developingchild.harvard.edu/>
<http://developingchild.harvard.edu/science/deep-dives/>

Robert Wood Johnson Foundation - <http://www.rwjf.org/en/library/collections/aces.html>

Center for Youth Wellness - <http://www.centerforyouthwellness.org/adverse-childhood-experiences-aces/>

ACEs Too High - <https://acestoohigh.com/>

American Academy of Pediatrics - https://www.aap.org/en-us/Documents/ttb_aces_consequences.pdf

Ted Talks/How childhood trauma affects health across a lifetime/Dr. Nadine Burke Harris -
<https://www.youtube.com/watch?v=95ovIJ3dsNk>

Community Needs Evaluations are available online -

<http://www.nashville.gov/Social-Services/Planning-And-Coordination/Community-Needs.aspx>