The Stresses of Today’s World: Toxic Stress, ACEs, HOPE, and Brain Development in Young Children
Objectives

At the end of today’s webinar, participants will be able to:

• List sources of stress in today’s world
• Describe how the brain responds to stress
• Compare and contrast the three levels of stress
• List potential negative effects of long-term toxic stress (including ACES)
• Explain ways adults can buffer the developing brain from toxic stress
• Describe specific stress-reduction strategies for adults and children
STRESS:
Any external stimulus that threatens the balance of the normal equilibrium in the body.
What Are Stress and Anxiety?

The body’s reaction to any change that requires an adjustment in thinking or action.

A feeling of worry, nervousness, or unease, typically about an imminent event or something with an uncertain outcome.
More about Stress

• It happens to everyone
• It’s a regular part of life
• It’s our body’s job
• It’s unpleasant while it’s happening
• It can be useful
• It can lead to burnout
• It can be debilitating
The Stress Response

- Stressors cause physical and psychological changes
  - Release of cortisol
  - “Fight or flight” response
  - Increased heart rate
  - Increased adrenaline
  - Highly focused attention

- Primitive parts of the brain take over
Parts of the Brain

Limbic system *(inside the brain)*
- Amygdala
- Hippocampus

Brainstem

Cerebellum

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Parts of the Brain

- Cerebral cortex
- Basal Ganglia
- Limbic system (inside the brain)
  - Amygdala
  - Hippocampus
- Brainstem
- Cerebellum

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CHAPTER 1: BRAIN ANATOMY
What Causes Stress in Your Life?

- work
- relations
- children
- money
- aging
- cooking
- pets
- lawn care
- home care
- deadlines
- disorganization
- weddings
- school
- vacation
- health
- insurance
- taxes
- pain
- racism
- sexism
- politics
- The news
- The election
- Social distancing
- Wearing a mask
- Not wearing a mask
- COVID-19
- Disorganization
- Better Brains for Babies
- University of Georgia Extension
Common Signs of Stress

**BODY**
- Pain
- Exhaustion
- Clumsiness
- Nausea
- Dizziness
- Catching germs

**MIND**
- Poor decision-making
- Memory loss
- Loneliness
- Lack of motivation
- Frantic “busyness”

**EMOTIONS**
- Apathy
- Lack of interest
- Loneliness
- Isolation
- Irritability
- Unhappiness
Levels of Stress

3 Levels of Stress:
- Positive Stress
- Tolerable Stress
- Toxic Stress
Toxic Stress Derails Development

Dangers from Prolonged Stress

- Fewer connections in the prefrontal cortex
- Dominance of survival instincts
- Persistent hyper-arousal
- Impulsivity
- Reduced ability to learn
- Reduced self-regulation and cognitive flexibility
The ACEs Study

• Study of the effects of Adverse Childhood Experiences on physical/mental health

• 17,000 participants
  • Kaiser Permanente patients receiving physical exams
  • Completed confidential surveys including childhood experiences
  • 54% female, 75% white
  • 66% ages 50 and up
Types of ACEs Studied

- Abuse
  - Emotional
  - Physical
  - Sexual

- Neglect
  - Emotional
  - Physical

- Household Challenges
  - Mother treated violently
  - Substance abuse
  - Mental illness
  - Separation/divorce
  - Incarcerated household member
What’s Your ACE score?

- Go to https://n.pr/2SL8BG1
- Take the short quiz and note your ACE score
Almost two-thirds of adults surveyed reported at least one Adverse Childhood Experience – and the majority of respondents who reported at least one ACE reported more than one.
ACES can have lasting effects on....

Health (obesity, diabetes, depression, suicide attempts, STDs, heart disease, cancer, stroke, COPD, broken bones)

Behaviors (smoking, alcoholism, drug use)

Life Potential (graduation rates, academic achievement, lost time from work)

ACES have been found to have a graded dose-response relationship with 40+ outcomes to date.

*This pattern holds for the 40+ outcomes, but the exact risk values vary depending on the outcome.

Image source: https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/ace-graphics.html
ACES CAN HAVE LASTING EFFECTS ON BEHAVIOR & HEALTH...

Simply put, our childhood experiences have a tremendous, lifelong impact on our health and the quality of our lives. The ACE Study showed dramatic links between adverse childhood experiences and risky behavior, psychological issues, serious illness and the leading causes of death.

Image source: vetoviolence.cdc.gov

*Having an ACE score of zero does not imply an individual could not have other risk factors for these health behaviors/diseases.*
LIFE EXPECTANCY

People with six or more ACEs died nearly 20 years earlier on average than those without ACEs.

Image source: vetoviolence.cdc.gov
Mechanism by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

Image source: https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/ace-graphics.html
What can Be Done About ACES?

These wide-ranging health and social consequences underscore the importance of preventing ACES before they happen. Safe, stable, and nurturing relationships and environments (SSNREs) can have a positive impact on a broad range of health problems and on the development of skills that will help children reach their full potential. Strategies that address the needs of children and their families include:

- Voluntary home visiting programs can help families by strengthening maternal parenting practices, the quality of the child’s home environment, and children’s development. Example: Nurse-Family Partnership.
- Home visiting to pregnant women and families with newborns.
- Parenting training programs.
- Intimate partner violence prevention.
- Social support for parents.
- Parent support programs for teens and teen pregnancy prevention programs.
- Mental illness and substance abuse treatment.
- High quality child care.
- Sufficient income support for lower income families.

Image source: vetoviolence.cdc.gov
# The HOPE Framework

## Health Outcomes from Positive Experiences

<table>
<thead>
<tr>
<th>Developmental Domain</th>
<th>Child Health Outcomes</th>
</tr>
</thead>
</table>
| **Physical**          | Basic physiological needs met.  
                          | Immunity to common childhood diseases.  
                          | Healthy weight for height and developmental milestones met.  
                          | Adequate physical activity.  
                          | Good physical and dental health. |
| **Cognitive**         | Vocabulary and language development.  
                          | Early literacy and numeracy.  
                          | Problem-solving skills.  
                          | Age-appropriate general knowledge.  
                          | Positive ideas about self.  |
| **Social**            | Secure attachment with a trusting adult.  
                          | Ability to form and sustain healthy relationships.  
                          | Constructive engagement in social institutions and environments.  
                          | Seeking help when needed.  
                          | Social cognition (eg, ability to read nonverbal social cues).  |
| **Emotional**         | Positive feelings about self.  
                          | Ability to display cognitive, behavioral, emotional control.  
                          | Executive function skills.  
                          | Character strengths.  
                          | Comfortable personal, gender, and racial or cultural identity.  
                          | Managing stress and functioning well when faced with stressors, challenges, or adversity. |

Image source: https://www.academicpedsjnl.net/article/S1876-2859(17)30107-9/pdf
## The HOPE Framework

### Health Outcomes from Positive Experiences

<table>
<thead>
<tr>
<th>Category of Positive Experiences</th>
<th>Examples of Key Positive Childhood Experiences</th>
</tr>
</thead>
</table>
| Being in nurturing, supportive relationships | Having:  
Secure attachments.  
Warm, responsive, sustained relationships.  
A physically and mentally healthy parent.  
A parent who can provide supportive care given their unique physical characteristics and circumstances.  
Trusting relationships with peers and other adults. |
| Living, developing, playing, and learning in safe, stable, protective, and equitable environments | Having:  
A safe and stable home.  
Adequate nutrition and sufficient sleep.  
High-quality learning opportunities.  
Opportunities for play and physical activity.  
Access to high-quality medical and dental care. |
| Having opportunities for constructive social engagement and to develop a sense of connectedness | Experiencing:  
Involvement in social institutions and environments.  
Fun and joy in activities and with others.  
Success and accomplishment.  
Awareness of one’s cultural customs and traditions.  
A sense of belonging and personal value. |
| Learning social and emotional competencies | Learning:  
Behavioral, emotional, and cognitive self-regulation.  
Executive function skills.  
Positive character traits.  
Self-awareness and social cognition.  
Functional, productive responses to challenges. |

Image source: [https://www.academicpedsjnl.net/article/S1876-2859(17)30107-9/pdf](https://www.academicpedsjnl.net/article/S1876-2859(17)30107-9/pdf)
Key Factors that Mitigate Stress

- Loving, responsive, consistent relationships
- Safe and secure environments
- Social and emotional skills
- Experience regulating stress in supportive environments
- Resiliency
Responsive adults are...

- Emotionally and physically available
- Sensitive to the child
- Provide opportunities to explore
- Offer positive guidance
- Respect the child’s feelings
- Consistent
When Adults Are Not Responsive

Importance of Consistency

- Predictability minimizes stress
- Repetition reinforces brain connections
- Knowing what to expect builds confidence and competence
- Limits encourage self-regulation
Strategies to Cope with Stress

Physical
- Physical activity
- Movement
- Sleep
- Deep breathing
- Laughter
- Music

Mental & Emotional
- Journaling
- Music
- Literature
- Being with others
- Helping others

Creative
- Creative arts (painting, drawing, sculpture, pottery)
- Journaling
- Guided imagery
- Music
- Dance
Stress Reduction Examples for Children

Deep Breathing Exercises
• Fire-breathing dragon
• Flower and candle

Creative Activities
• Cornstarch and water
• Coloring to music
• Journaling

Key Points about Toxic Stress and the Brain

- What happens in childhood matters in adulthood
  - Physical health
  - Emotional well-being
  - Academic success
  - Productivity
- Children are never “too young” to be affected
- “Difficult” behaviors may be the result of stress (e.g., hair trigger temper, withdrawal, regression)
- Absence of response can also cause stress
- Adults can help mitigate stress
- Building relationships takes time and patience
Stress and Trauma

When you look at children who come out of terrible environments and do well, you find someone in their lives somehow instilled in them the attitude that they aren’t helpless, that they aren’t powerless, that they can do something.

—Dr. Bruce Perry

...You can make a difference!
Some Resources on Toxic Stress

- Brain Architecture Game and Video: [https://dev.thebrainarchitecturegame.com/](https://dev.thebrainarchitecturegame.com/)
Questions? Ideas?

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Simple Stress Reduction Ideas

**Deep Breathing Exercises**

**Fire-breathing Dragon**
Materials needed: Cup, streamers, eyes, tape, scissors
- Make a hole in the bottom of the cup. Attach streamers to the mouth of the cup and eyes to the top.
- Children will blow a deep breath out through a small hole in the bottom of the cup
- The goal is to make fire (streamers) located at the top of the cup fly up like the dragon is breathing fire

**Candle and Flower**
Materials needed: Birthday candles, silk flowers
- Have the child take a slow, deep breath through their nose, pretending to smell the flower
- When they are smelling the flower, have them imagine breathing in good, calm feelings
- Instruct them to hold their breath for 2 seconds
- Have them release the breath by slowly pretending to blow out the candle, imagining breathing out negative feelings
- Repeat three more times

**Blowing a Pinwheel**
Materials needed: Pinwheel
- Have the child take a slow, deep breath
- Instruct them to hold their breath for 2 seconds
- Encourage them to release the breath by blowing the pinwheel

**Hands-on Activities**

**Cornstarch and Water**
Materials needed: Water, cornstarch, optional food coloring
- The mixture is made up of 1 part water to 1.5 – 2 parts cornstarch
- Start with the water in the bowl and add the cornstarch a little at a time
- Use hands to stir until it has a gooey consistency
- Slowly add food coloring if desired

**Other Activity Ideas**
- Sensory activities: Sand table, water table, play dough
- Coloring to music
- Journaling
- Physical activity
More Simple Stress Reduction Ideas

**Stress Reduction Tools**

**Calm-Down Box**
- Should contain items that appeal to the senses
- Can be used to help children calm down from a tantrum, occupy themselves when waiting, or any time they are feeling frustrated angry or sad
- Have children decorate the box themselves
- Examples of what to include:
  - Soft pillow and blanket
  - Squeeze toys
  - Playdough
  - Textured balls
  - Calming music
  - Books
  - Coloring materials
  - Bubbles
  - Deep breathing materials (pinwheel, candle and flower, fire-breathing dragon cup)

**Worry Box**
- Goal is to take worry from the child and place it into a tangible object
- Have children decorate the box
- Children (or parents if children can’t write) write down worries onto strips of paper and put them in the box
- Children can also draw a picture of the worry and add it
- Explain to children that putting worries in the box is a way of letting go of them
- The box can be revisited and worries can be discussed
- Children can add or remove worries as needed.

**Children’s Books about Stress and Emotions**
- *The Invisible String* – Patrice Karst
- *The Kissing Hand* – Audrey Penn
- *Hands Are Not for Hitting* – Martine Agassi
- *When I Feel Sad* – Albert Whitman
- *The Way I Feel* – Janan Cain
- *When Sophie Gets Angry – Really, Really Angry* – Molly Bang
- *When I Feel Sad* – Cornelia Spelman
- *When I Miss You* – Cornelia Spelman
- *My Many Colored Days* – Dr. Seuss
Developing brains need new experiences, consistency, and loving care in order to thrive. Unfortunately, not all babies receive this type of nurturing. Some babies grow up in chaotic and stressful environments. Children who live in unpredictable worlds, who do not have the opportunity to form a secure attachment with a caregiver, or who live in an unsafe physical environment live in a constant state of heightened stress. This severe, chronic stress can have profound and long-lasting negative effects on brain development. Buffering children from toxic stress and helping reduce that stress to more tolerable levels are important ways adults can support early brain development.

➤ What Is Stress?

Stress is the body’s normal reaction to anything that disrupts normal life. The frightening, challenging, difficult, or even exciting events or situations that cause stress are known as stressors. All children experience stress as a normal part of growing and learning. Stress can result from positive events as well as negative ones. Welcoming a new baby, for example, is a happy event that still causes stress because it disrupts the normal patterns of the family’s life. Stress continues to happen throughout life, and small amounts of stress can actually help us be productive and learn to manage stress better. But high levels of stress in young children can have negative effects on early brain development. Overexposure to toxic levels of stress over a long period of time can lead some parts of the brain to be overdeveloped and others to be underdeveloped.

➤ The Stress Response

Whenever we experience stress, our brains and bodies go through specific physical and psychological changes. The brain is flooded with a stress hormone called cortisol, which prepares the body to deal with the stressor. Our attention becomes highly focused on the stressful situation, and we typically respond in one of three ways: by running away, by fighting back, or by freezing in place and not responding. The stress response helps ensure our safety and survival in a stressful situation. But when we are under extreme stress, the brain is focused only on immediate survival and not on higher-order abilities like critical thinking, decision-making, or communication. Most minor or short-term stresses do not harm the developing brain because once they are over, the brain can return to these higher-order abilities. But severe or long-term stresses can cause permanent damage to the developing brain. Chronic stress hurts brain development because the neurons are damaged by overexposure to cortisol and because the child does not have the opportunity to strengthen higher-order thinking skills through practice.

➤ Levels of Stress

Not all stresses are alike. Researchers classify stress into three levels based on the severity and potential for long-term negative consequences.

- **Positive stress** is a short-term, everyday stress experience, such as having another child take away a toy or not receiving a treat. These stresses are called “positive,” not because they are pleasant, but because experiencing positive stress can actually enhance brain
development. Coping with small everyday stresses helps the brain learn how to deal with challenges and prepares the child to handle more serious stresses.

- **Tolerable stress** results from more challenging or longer-term stressors, such as moving to a new home, changing child care providers, parents’ relationship problems, or the birth of a sibling. These stressors are considered tolerable because the child has warm, loving caregivers to support her. Even if caregivers cannot remove the stressor itself, they help keep the stress from becoming toxic to the developing brain by teaching the child how to handle the stress in a healthy way. Without that support system, stressors that start out as tolerable may become toxic.

- **Toxic stress** occurs when a person is overexposed to stress in a way that is damaging to the developing brain. Stress can become toxic when a child experiences long-term stress and does not have the resources to help reduce the effects of the stressor. Difficult events such as a death of a loved one, long illnesses, abuse or neglect, maternal depression, family violence, natural disasters, chronic poverty, and other crises can build to a toxic level without the support of a nurturing adult. But even the most challenging stressors may be reduced to more tolerable levels when adults provide appropriate consistency, emotional support, and secure relationships.

➤ **Why Is Prolonged Stress Dangerous?**

Overexposure to stress, especially high levels of chronic stress, can have long-lasting negative effects on the developing brain. Some common patterns among children exposed to toxic stress include:

- **Fewer synaptic connections.** Children under prolonged stress do not have regular opportunities to practice decision-making, problem-solving, and other higher-order thinking skills to strengthen neuron pathways. Over time, underdeveloped executive function skills may lead to school difficulties, trouble with relationships, behavior problems, and other challenges.

- **Persistent hyper-arousal.** When a child is under stress, the brain stem, cerebellum, and limbic system are highly activated. These parts of the brain control basic survival and unconscious processing of emotions. When these parts of the brain are overused because of chronic stress, children tend to lash out in aggression at any perceived threat, even if the “threat” was just an accidental brush of the arm. Children whose brains are flooded with cortisol may have a hair-trigger temper and fly off the handle inappropriately. Because they are always coping with stress, their developing brains have fewer opportunities to reinforce connections in the cerebral cortex, which is where thoughtful planning occurs.

- **Reduced ability to learn.** Children under chronic stress are focused on their survival and often do not have energy left over to concentrate and learn. Children whose families are undergoing extreme stress may also fall behind their peers in learning. They may miss school regularly and may not be part of important learning experiences at home such as reading aloud and having conversations with adults. Missing these important experiences early in life may keep children from succeeding in elementary and secondary education.

➤ **What Can You Do?**

The key to lessening the toxic effects of stress on the developing brain is to provide children with loving support as they deal with the major stresses in their lives. Toxic stress can become tolerable in the presence of a strong support system. The following are some important ways you can help young children deal with stress:
Be available and responsive. Children under stress are dealing with chaos and need a source of stability in their lives. One of the most important ways to buffer their stress is to be available when they need you. Be sure to respond warmly and sensitively to their needs; respond consistently when your baby cries; reassure children that you are there to help them; keep daily routines as consistent as possible; and prepare children in advance for changes in the regular routine.

Provide a safe environment. Having one place where they know they are safe can make stress tolerable by providing a break when the brain does not need to be on high alert for danger. If a child is experiencing or witnessing violence at home, school or child care may be a place where they know they will not be hurt.

Let children practice managing small stresses. Some caregivers try to protect children from all stresses in order to reduce disappointment or sadness. But stress is a part of life. Children who are so protected that they never experience life’s little ups and downs may not learn how to manage when things go wrong. These children may not have coping skills to get through more challenging stresses. Instead of always “rescuing” children from little disappointments, such as not getting a treat at the store, use these stresses as learning experiences. Help children find ways to cope, and reassure them that they can handle their disappointment. Experience dealing with everyday positive stresses builds children’s competence and confidence for dealing with larger stresses.

Encourage physical activity. Running, swimming, bicycling, playing on the playground, and other physical activities are positive outlets for stress, both for adults and for children. Be sure to build in plenty of time for active play indoors and outdoors, especially when children are experiencing stress. And try being active with children—it will help them recognize that physical activity is important and may reduce your own stress as well.

Model healthy coping skills. Young children learn many important skills by watching the adults around them. Pay attention to the ways you cope with stress, and work to model healthy habits. Teach children simple strategies such as taking a deep breath, taking time to cool down before responding, and listening to others’ viewpoints. If you handle stress in healthy ways, children will follow your example.

Selected References:

For more information about brain development, visit www.bbbgeorgia.org