Module #5: Trauma and Brain Neurobiology

Teaching Script

Acknowledgments: The Center for Adoption Support and Education wishes to thank Dr. Christine Dobson of the Child Trauma Academy for her contribution of expertise in the development of this training module.
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Overview of Module
This Module provides students with an overview of brain neurobiology. Students also will gain knowledge about the impact of developmental trauma and neglect on children. In this Module, we discuss the devastating impact that traumatic experiences can have on the child, altering their physical, emotional, cognitive and social development. Students will gain an understanding of how traumatic events in childhood increase the risk for a host of social, emotional, neuropsychiatric and physical health problems. This Module will address some of the key issues related to the child’s complex set of reactions that often follow traumatic events and how the adults in their lives can help them better understand the traumatic event and the ways that children and youth respond the trauma.

Learning Objectives
Students will be able to:

1. Describe three ways that trauma impacts adopted children
2. Identify at least three tools and techniques to support recovery from adverse beginnings.
3. Describe five factors that affect early brain development.
4. Describe the neurodevelopmental impact of neglect and traumatic stress in childhood.
5. Describe at least three positive and three negative implications of brain neurobiology on child and youth development.
6. Identify at least two clinical skills in using the principles of brain neurobiology in assessment.
7. Identify at least two clinical skills when intervening in response to the neurodevelopmental impact of:
   - Childhood neglect
   - Traumatic stress in childhood
   - Childhood PTSD
8. Identify at least 3 signs/behaviors that can be present in:
   - Adopted children who were previously maltreated
   - Adopted children with neglect-related attachment problems
9. List three 3 critical principles for clinicians and caregivers to implement with children exposed to trauma
10. Describe at least two key processes that characterize the development of the adolescent brain

Materials Needed

- LCD Projector and Screen
- Agenda
- Copy of PowerPoint Slides
- Model of the Human Brain (provided by C.A.S.E.)
- Handouts:
  - Handout #5.1 Templates for Future Relationships
  - Handout #5.2 How the Brain Resonds to a Traumatic Event and Acute Response to Stress
  - Handout #5.3: Childhood Trauma, the Neurobiology of Adaptation, and “Use-dependent” Development of the Brain: How “States” Become “Traits”
  - Handout #5.4 Results From Andrey’s Developmental Assessment Handout #5.5 Sasha’s Case
  - Handout #5.6 Features of Therapeutic Interventions with Children Exposed to Trauma: Work Sheet
  - Handout #5.7 Conditions and Behaviors Seen in Maltreated Children who Have Been Adopted
  - Handout #5.8 Trauma Interventions Rated by the California Evidence Based Clearinghouse for Child Welfare
  - Handout #5.9 Final Points on Treatment For Children Exposed to Trauma from the Child Trauma Academy
Module #5: Trauma and Brain Neurobiology

Pre-Module Assignments

Student Assignment Checklist:

✓ Complete the training, *The Amazing Brain and Human Development* and develop talking points that you would use with the adoptive parent of a child exposed to early trauma.

Students’ Pre-Module Assignments

1. **Pre-Module Assignment #5.1:** Complete the training on the website of the Child Trauma Academy: *The Amazing Human Brain and Human Development* at: [http://www.childtraumaacademy.com/amazing_brain/index.html](http://www.childtraumaacademy.com/amazing_brain/index.html)

Using the knowledge you developed from the Child Trauma Academy training, write at least 6 or 7 talking points that you would use to help an adoptive parent understand the impact of early trauma on her child’s brain development. The child is 13 years old and was chronically neglected from birth to 6 months of age when she entered foster care. The family adopted her at age 6. Now that she is entering adolescence, she is having increasingly serious emotional and behavioral challenges.

**Provide your talking points to your teacher. Bring a copy of your talking points with you to class.**

**OPTIONAL TRAINING:** A training Module, *Psychotropic Medications and Children and Adolescents,* is available on the C.A.S.E. website. You are encouraged to complete this training and/or use it as a resource in your clinical work.
1. **Pre-Module Assignment #5.1**: Students are to complete the training on the website of the Child Trauma Academy: *The Amazing Human Brain and Human Development* at: [http://www.childtraumaacademy.com/amazing_brain/index.html](http://www.childtraumaacademy.com/amazing_brain/index.html)

Students are to use their knowledge to develop at least 6 or 7 talking points that they would use to help an adoptive parent understand the impact of early trauma on her child’s brain development. The child is 13 years old and was chronically neglected from birth to 6 months of age when she entered foster care. The family adopted her at age 6. Now that she is entering adolescence, she is having increasingly serious emotional and behavioral challenges.

Students are instructed to provide their talking points to you and to bring their talking points with them to class.

**Encourage students to complete that OPTIONAL TRAINING, *Psychotropic Medications and Children and Adolescents*, which is available on the C.A.S.E. website. Also highlight how this information can serve as a resource in their clinical work.**
Module #5: Trauma and Brain Neurobiology

Agenda

9:00AM – 9:10AM Welcome

9:10AM – 9:45AM The Fundamental Processes of Neurodevelopment

9:45AM – 10:00AM Key Concepts of Neurodevelopment

10:00AM – 10:15AM Break

10:15AM – 11:15PM The Impact of the Social Environment on Brain Development

11:15PM – 12:30PM Understanding the Impact of Trauma on the Developing Child: A Focus on Neglect -- Assessment (Part 1)

12:30PM – 1:30PM Lunch

1:30PM – 1:50PM Understanding the Impact of Trauma on the Developing Child: A Focus on Neglect -- Assessment (Part 2)

1:50PM – 2:10PM Understanding the Impact of Trauma on the Developing Child: A Focus on Neglect -- Intervention

2:10PM – 3:30PM Understanding the Impact of Trauma on the Developing Child: A Focus on Violence

[Break to be provided]

3:30PM – 4:15PM Adolescent Brain Development

4:15PM – 4:30PM Closing
Module #5: Trauma and Brain Neurobiology

9AM - 9:10AM  Welcome

Large Group Discussion: Before we begin, since our last Module, have you encountered any issues in your practice related to the clinical issues we discussed in our last Module: loss, grief, separation or identity?

9:10AM – 10:00AM  The Fundamental Processes of Neurodevelopment [Learning Objective #1]

Lecture

In this Module, we begin with an overview of brain neurobiology. We will look at the impact of developmental trauma and neglect on children -- the devastating impact that traumatic experiences can have on the child, altering their physical, emotional, cognitive and social development. Through our work together, we will gain an understanding of how traumatic events in childhood increase risk for a host of social, emotional, neuropsychiatric and physical health problems. We will also address some of the key issues related to the child’s complex set of reactions that often follow traumatic events and how the adults in their lives can help them better understand the traumatic event and the ways we respond to the trauma.

The learning objects for this Module are:

Students will be able to:

1. Describe three ways that trauma impacts adopted children
2. Identify at least three tools and techniques to support recovery from adverse beginnings.

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3. Describe five factors that affect early brain development.

4. Describe the neurodevelopmental impact of neglect and traumatic stress in childhood.

5. Describe at least three positive and three negative implications of brain neurobiology on child and youth development.

6. Identify at least two clinical skills in using the principles of brain neurobiology in assessment.

7. Identify at least two clinical skills when intervening in response to the neurodevelopmental impact of:
   - Childhood neglect
   - Traumatic stress in childhood
   - Childhood PTSD

8. Identify at least 3 signs/behaviors that can be present in:
   - Adopted children who were previously maltreated
   - Adopted children with neglect-related attachment problems

9. List three critical principles for clinicians and caregivers to implement with children exposed to trauma.

10. Describe at least two key processes that characterize the development of the adolescent brain.

This morning, we begin with a discussion of the neurobiology of the brain. Likely, none of us in this room is a neurobiologist!

However, you have already learned a lot about the brain and human development from the online training you completed on the website of the Child Trauma Academy. We will talk later about your written assignment when we discuss the impact of trauma on brain development.

Let’s start by looking at a model of the human brain.

*Note to Trainer: Pass around the model of the brain. Reference the following slide without naming the parts of the brain. The objective is to give students an overall impression of the multiple parts and complexity of the brain.*
Before going into more details about the functions and processes of the human brain, let’s see a fun introduction to the parts of the brain – Pinky and the Brain!

http://www.youtube.com/watch?v=Li5nMsXg1Lk


Large Group Discussion: What do you think about Pinky’s introduction to the anatomy of the human brain?

If you are interested in learning more about the anatomy of the brain, an excellent resource is the *The Human Brain Coloring Book* that is available from Amazon and other sources.

Lecture: The Fundamental Processes of Neurodevelopment

Let’s look at the eight fundamental processes of neurodevelopment that will aid in our understanding of how the brain develops and organizes. Having a solid grasp of these concepts is important as we will focus next on key concepts of neuro-development that will build upon this understanding.

As you learned in the online training, the human brain is an amazing organ. While only 3 pounds, it is, quite literally, the organ that allows us our humanity. It allows us to walk, talk, and share our emotions, the ability to be artistic or creative, to love and hate.

To understand the impact of trauma on children we must have a cursory understanding of the key processes that take place during neurodevelopment.

Obviously in the short amount of time we have, we can only provide an overview of primary processes of neurodevelopment. These fundamental processes help us understand the way neurons grow and develop. This understanding of neurodevelopment on the most basic level will help us better recognize how early developmental trauma impacts brain growth and development. Here are the eight fundamental processes of neurodevelopment:

- Neurogenesis
- Migration
- Differentiation
- Apoptosis

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Let’s look at each one.

Neurogenesis is the birth of new cells in the brain. The process begins in-utero during the first trimester. Neurogenesis is most active during the second and third trimesters. This is why drug and alcohol use during this time has such a serious impact on brain development. For example, alcohol is a teratogen (a substance that is toxic to the baby's developing brain). Damage can occur in various regions of the brain. The areas that might be affected by alcohol exposure depend on which areas are developing at the time the alcohol is consumed. Since the brain and the central nervous system are developing throughout the entire pregnancy, the baby’s brain is always vulnerable to damage from alcohol exposure.

Large Group Discussion: Have you worked with children who were prenatally exposed to alcohol? If so, what issues were you aware of in the child’s development and behavior?

Raise the following if not mentioned:

- Sometimes the child’s behavior is misinterpreted as willful misconduct. But for the most part, maintaining good behavior is outside of the child's control, especially in stressful or stimulating situations.
- Behavior problems in children with Fetal Alcohol Spectrum Disorder (FASD) are often blamed on poor parenting skills. While good parenting skills are required, even alcohol exposed children raised in stable, healthy homes can exhibit unruly behavior.
• The most difficult behaviors are seen in children who were prenatally exposed to alcohol and who also suffer from Reactive Attachment Disorder. We will be talking about attachment issues later today and more in depth in a later Module.

• Most children with FASD have some attachment issues, display inappropriate sexual behaviors, show poor judgment, have difficulty controlling their impulses, are emotionally immature, and need frequent reminders of rules. As a result, many will require the protection of close supervision for the rest of their lives.

The process of neurogenesis creates 100 billion neurons, 99% of which are present at birth. During this process other supportive cells, called glial cells are also created. Approximately 1 trillion glial cells are created.

Neurons are immature at birth. The maturation of neurons depends at least in part on experience.

Neuronal plasticity is the changing of neurons, the organization of their networks, and their function via new experiences. Neuronal plasticity is the basis for any therapeutic changes. This malleability is an important factor as we discuss the impact of trauma on the development and organization of the infant’s brain.

Let’s move to the second fundamental process of neurodevelopment: Migration.
Migration is the method by which neurons travel from their place of origin to their final position in the brain. Neurons migrate along glial cells scaffolding with the leading tip of the axon being led by a growth cone.

The process of migration takes place over a fairly long period of time from a neurodevelopmental standpoint. But, it is most active in-utero to the first year of life. It is nearly complete by the time a child is three years old.

Over half the neurons move to the cortex.

What factors play a role in the migration of the neurons?
- Genetics (which may predispose a person to mental health problems)
- Environment (such as nutrition and toxicants)
- Trauma

A Short Review Quiz Together on Neurogenesis and Migration
1. True or False: Neuronal plasticity enables the child to adapt to environmental change and is important as we think about the impact of trauma on brain development and children’s healing.  
   \textit{Answer: True} 

2. The migration of the neurons is most active: 
   A. In utero to the first year of life  
   B. The second year of life  
   C. The third year of life  
   \textit{Answer: A. In utero to the first year of life} 

3. True or False: Trauma can affect the migration of neurons to their final position in the brain.  
   \textit{Answer: True} 

\textbf{Lecture} 

Now, the third fundamental process of neurodevelopment: \textit{Differentiation}. 

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As neurons mature, they change. Differentiation begins during the first trimester and is nearly complete by the age of 3 but it continues at some level throughout life.

These changes take place in response to chemical signals that are influenced by micro-environmental cues.

Micro-environmental cues are signals/stimuli that occur in a specific, localized area of the brain. These cues/signals (e.g., like the increase of the mother’s heart rate in utero, or the increase of stress hormones in the infant) can influence the development of neural systems such as neurotransmitters, cellular adhesion molecules, neurohormones, amino acids and ions (Perry & Pollard, 1998).

Experiences or events that alter these chemicals or micro-environmental signals during development can impact the way neurons differentiate, thus altering functional capacity. Differentiation is sensitive to signals from the environment based on:

- The pattern of micro-environmental cues
- Intensity of micro-environmental cues
- Timing of micro-environmental cues
Differentiation is also very sensitive to changes in neurochemistry. It is important to remember that the experiences of the mother during pregnancy (and even before) can impact the fetus’ neurochemistry. For example, a mother who is in a relationship where domestic violence is present and who herself is hyper-vigilant and in a constant state of fear experiences changes in her own neurochemistry related to the traumatic experiences. The resultant changes in heart rate, blood pressure and other physiological processes can impact the developing fetus and impact the fetus’ differentiation of neurons.

The fourth fundamental process of neurodevelopment is **Apoptosis**.

Apoptosis refers to the death of neurons. Apoptosis begins in the third trimester and is completed by age 3. Not all neurons that are born are needed. Neurons that are not needed have a programmed death. For example, the differentiation of fingers and toes in a developing human embryo occurs because cells between the fingers apoptose; the result is that the digits are separate.

Neurons also die when there is a lack of adequate connection to an active neural network. The brain is a “use it or lose it” organ. The more a neural connection is used, the stronger it becomes. Those neurons that are not used do not survive.

The death of neurons appears to have both genetic and environmental determinants.
The fifth fundamental process of neurodevelopment is **Arborization**. This process involves the branching out of dendritic networks from the neuron. These branching parts resemble a treelike figure as you see on the powerpoint slide. Arborization or the branching out of the neural network allows the neuron to receive, process, and integrate complex patterns of activity that will, in turn, determine its activity.

**A Short Review Quiz Together on Differentiation, Apoptosis and Arborization**

1. True or False: A pregnant mother’s own neurochemistry can affect the fetus’ neural differentiation.
   
   *Answer: True.*

2. True or False: Neurons die when they are not connected to active neural networks.
   
   *Answer: True*

3. True or False: Arborization is important because it allows the neuron to receive, process and integrate activity that determines, in turn, the neuron’s activity.
   
   *Answer: True*
Synaptogenesis is the sixth fundamental process of neurodevelopment. This is the process by which developing neurons make connections with one another. Neuronal communication takes place at specialized connections called synapses. These connections are not random – they are guided by genetic and environmental cues. Patterned repetitive experiences during the first years of life refine and sculpt these connections.

The strength and survival of these connections are based on their use. The more a connection is used, the stronger it becomes.

Think about a child learning to read. What do they do first? Learn the alphabet. How do they learn it? Through various repetitive activities – singing the ABC song, learning what the letter looks like (flash cards), practicing the sound it makes, learning what words begin with each letter first by picture (A is for Apple) then by word. All of these different activities strengthen the connections in various parts of the brain that play a part in reading (language centers, vision, fine motor for writing or tracing the letters).

As Peter Furstenberg says, “Cells that fire together, wire together.”
The next fundamental process of neurodevelopment is **Synaptic Sculpting**. Synaptic connections are constantly changing. Connections are use dependent and are constantly being made and broken.

Here are some important principles of synaptic sculpting:

- The more neurons are used, the closer they grow together.
- As neurons grow closer together, the connections become more efficient.
- Neurons that are not actively used with sufficient activity die.

The creation and loss of synapses:

- During the first 8 months of life, the rate of new synapses created is much higher than resorption (that is, the process of losing substance) of unused synapse.
- From age 1 through childhood, resorption takes place at higher rates than the creation of new synapses.
- By adolescence (at least in the cortex) and through most of our adult lives, the rate of new connections are equal to those that are being resorbed.
Let’s look at the final fundamental process of neurodevelopment: **Myelination.** This is the creation of more efficient electrochemical transduction down the neuron as specialized glial cells wrap around the axons. What does myelination do?

- It enables more rapid and complex functioning
- It allows for more smooth, regulated functioning

Myelination begins at birth and continues through adolescence. It is regionally specific based upon development.

“Regionally specific” means related to the part of the brain that is developing at the time. Myelination (and neuronal growth in general) increases in the language center early in life as the infant hears language. For example, the increase in the language center during the first 5 months of life can be seen as an infant begins to turn his head toward the source of a sound or watches his mother’s face as she speaks.

### A Short Review Quiz Together on Synaptogenesis, Synaptic Sculpting and Myelination

1. **True or False:** The connections of neurons is affected by repetitive patterned experiences in the early years of life.
   
   **Answer:** True
2. True or False: When there is no repetitive, patterned activation of neurons, the connections dissolve and the neurons die. 
   Answer: True

3. In synaptic sculpting:
   A. The more neurons are used, the closer they grow together  
   B. The closer neurons grow together, the more efficient is their connection  
   C. When neurons are not used sufficiently, they die  
   D. All of the above  
   Answer: D. All of the above

4. Myelination:
   A. Enables more rapid and complex functioning  
   B. Allows for more smooth, regulated functioning  
   C. Begins in adolescence  
   D. All of the above  
   E. Only A and B  
   Answer: E. Only A and B

Let’s remember:

- The human brain is a complex organ, composed of more than 180 billion cells. Each of these cells receives up to 15,000 connections from other cells in the nervous system.

- Amazingly, over the course of two years, a single cell (in the form of a fertilized egg) becomes a “walking, talking, learning, loving, and thinking being.”
Large Group Discussion

What are your thoughts about this amazing transformation? Think about the children you have worked with – do you notice the differences in their development based upon the amount or richness of the stimulation they receive? Do any specific cases that stand out in your mind?

Lecture

Let’s look at an example. A child with language development delays makes great strides as a result of language and speech therapy and the quality of caregiving and the quantity of time the parents spend with the child doing what most of us would see as “normal” activities – reading to the child, playing ball, playing chase, talking with them, and naming items as they are used.

9:45AM – 10:00AM  Key Concepts of Neurodevelopment [Learning Objective #2]

Lecture

There are five key concepts of neurodevelopment:

- Neurons change
- Neurodevelopment is sequential
- Change is use-dependent
- Organization is based on experience
- There are critical windows of opportunity
Understanding these key concepts in the context of how neurons grow and develop provides a window into why traumatic experiences have such a profound effect on children.

Concept #1: Neurons change.

Dr. Bruce Perry has found that “the human brain develops more rapidly early in life.” As we talk about the processes of neurodevelopment, we see that:

- From birth, neurons are designed to change
- Neurons change in response to patterned neurochemical stimulation

Concept #2: Neurodevelopment is sequential.

The brain develops from the lowest, most primitive parts of the brain (brainstem) to the most complex areas (the cortex).

The lowest parts of the brain control the most basic regulatory functions – heart rate, blood pressure, body temperature – this part of the brain is mostly developed at birth. As you move up the brain (from the brainstem to the midbrain) the focus is on functions such as appetite, sleep and arousal – the limbic area mediates functions such as motor regulation, emotional reactivity and attachment – the cortex, of course, houses concrete and abstract thought.

As the brain develops from the lowest to the highest, or from the bottom to the top, it also develops from the inside out. A good example is a flower as it opens.
The human brain has a hierarchical organization. The multiple parallel systems in the brain are organized in various brain regions with the most simple in the brainstem and the most complex in the cortex. As you see on this powerpoint, the bottom up development is:

Concept #3: Use-Dependent Development

As we mentioned earlier, the brain is a “use it or lose it” organ. An infant who does not receive normal visual input during a critical developmental window may suffer permanent visual impairment. The same is true for language – language is only learned by experience – you must hear language in order to learn to talk. If this critical window is missed, the child will experience severe language delays and/or deficits.

The more the neural system is activated, the more the system will change in response to activation. This change is in response to “patterned, repetitive behavior.” Let’s look at an example of patterned, repetitive behavior:

If you have ever watched a baby getting ready to crawl, think about what they do first. They push up on all fours and rock . . . and rock . .. and rock. They look like one of those spring loaded cars that come in a Happy Meal. At some point, they stop rocking and start to move. But how does it happen?

When the baby first pushes up, the brain is takin in new signals from the pressure on the hands and knees -- building in new connections. The repetitive, patterned rocking is building in new connections within the motor, somato-sensory and other areas in the baby’s brain that will ultimately support the child as she begins to move forward.

It is important to notice that the child is learning to crawl in the context of a healthy, encouraging, relationship with a loving caregiver. Healthy development requires the presence of an attentive, attuned caregiver – something that we will talk more about next.

Crawling is patterned, repetitive activation in action. Then it is off to another milestone.
Concept #4: The Human Brain Organizes.

The brain organizes as a reflection of early experiences that include:

- Love and nurturing from a primary caregiver
- Exposure to new people, places, things provided in the context of a safe, secure primary relationship
- A variety of stimulation provided in a safe environment – some examples:
  - Access to developmentally appropriate toys
  - Interaction with others, including same age children

To promote the brain’s organization through patterned, repetitive behavior, it is important to include:

- Activities that include all of the senses
- Activities like rocking, singing, stroking/infant massage, skin contact, gazing into the infant’s face – baby gazing back
- Somatosensory bath: stimulation through touch, smell, sight, sound and taste

The somatosensory bath is an important vehicle for brain growth and organization.

Here is how Dr. Bruce Perry describes a somatosensory bath in an interview:

*Note to Trainer: Read the following aloud:*

HELEN BENHAM: You often refer to the "somatosensory bath" as being the core of all human interactions. What exactly is this "bath," and how do people experience it in different ways?

BRUCE PERRY: When in utero, we are literally bathed completely in the mother’s environment. Every sight, sound, touch, scent, and vibration — every sensation is coming from that mother’s world, a bath of sensations. After birth, this "bath" changes. Yet, all of the infant's senses are bathed in a continuous set of sensations, most of which derive from the primary caregivers. And nothing is more soothing, reassuring, or pleasurable than when the infant is bathed by the mother's touch, gaze, scent, and taste — the baby is calm, full, warm, and happy. As we get older, this somatosensory bath takes different forms: the hug, the smile, and the handshake. When someone gazes at you, when somebody puts his or her arm around you, when you dance, or touch, there is a connection back to our original somatosensory bath. These actions serve as
shortcuts to the feelings of our original somatosensory bath. Touch is a wonderful way to communicate. Eye contact. A smile. As you get older, because you've been able to absorb and internalize and essentially create a memory of how wonderful it was to be in that bath, later on a good smile can actually tap into a tiny bit of that and you literally evoke the feelings from that time, and you feel pleasure when someone smiles at you.

Picture a mother holding a new baby, when the child is still small enough to fit on the mother’s arm (head in the mother’s open palm and the baby’s body laying on her forearm). *Model this for the participants*. The mother gazes into the infants face and coos, speaks or sings. She strokes the baby’s cheeks and arms and holds the child close, taking in the sounds and scent of the child. All of these sensory activities, repeated several times a day, are growing neural connections in the infant’s brain.

The human brain organizes in reaction to the strength and type of sensory and perceptual experiences:

- The stronger and more intense the experience, the more likely is the impact on the organization of the brain
- This is why traumatic experiences have such a powerful and detrimental impact on the developing brain: Traumatic experiences “trump” the impact of normal developmental experiences

Trauma in utero or very early in life can lead to disorganization in the lower parts of the brain (brainstem and midbrain). It takes significantly more effort (i.e., – many more repetitions) to reorganize the brain.

As you see on the next powerpoint slide: “Experience can change the mature brain – but experience during the critical periods of early childhood organizes brain systems.”

**Concept #5: Critical Windows of Development**

As the brain organizes, it requires specific patterns of activity to occur at specific times during development.

During these critical periods of development, the organizing brain is extremely sensitive to input from the environment.
These critical windows of development are different for each area of the brain and neural system – and for different functions:

- Key brainstem systems must be organized by birth – therefore, the sensitive/critical period for brainstem-mediated function is during the prenatal period.
- In contrast, the neocortex has systems and functions through childhood and into adulthood.

As previously discussed, language development is a good example. In order to develop language we must hear it. If a child does not hear language during that critical window when the language centers in the brain are developing, the child will have very serious language delays and deficits. In extreme cases, there will be some sounds (phonemes) the child will never be able to make.

In summary: Normal brain development (neurons and the functions they mediate) requires specific patterns of activity and signals at specific times. During these sensitive periods of development, the organizing brain is the most vulnerable to input from the environment, including traumatic experience.

VERY IMPORTANT: If the brainstem and midbrain develop in a less than optimal fashion (for example, because of trauma), the development of the other regions of the brain will be impacted.

Early developmental trauma, especially trauma in utero, impacts key neurotransmitters that originate in the brainstem (norepinephrine, dopamine, serotonin). Early developmental trauma causes particular problem because these neurotransmitters carry information from the disorganized brainstem into all the other parts of the brain (midbrain, limbic and cortex).

A Short Review Quiz Together

1. The vast majority of the neurons a person possesses in her lifetime:
   A. Are “born” during the toddler years
   B. Are present but not organized at birth
C. Are organized and fully functional at birth  
D. None of the above  
E. All of the above  

*Answer:* B. Are present but not organized at birth

2. The brainstem mediates _____ functions?  
A. Basically, all human  
B. Complex or abstract  
C. Simple, regulatory  
D. None of the above  
E. All of the above  

*Answer:* C. Simple regulatory

3. The brain organizes in a hierarchal manner:  
A. From the top to the bottom  
B. From the outside in  
C. From the bottom to the top  
D. From the inside out  
E. Both A and B  
F. Both C and D  

*Answer:* F. Both C and D. From the bottom to the top AND from the inside out

4. True or False: Early developmental experiences are no more powerful than experience later in life in shaping the brain.  

*Answer:* False. Early developmental experiences have the ability to influence the organization of the brain.

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**Large Group Discussion**

Why is it important that clinicians – psychologists, social workers, marriage and family therapists -- understand healthy neurodevelopment?

*Raise the following if not mentioned:*
The most important answer is that unless we understand the key processes of neurodevelopment we can never really understand how the brain is impacted by trauma. If we want to help children get better, we need to understand why they react the way they do following traumatic events.

10:00AM – 10:15AM Break

10:15AM – 11:15PM   The Impact of the Social Environment on Brain Development  [Learning Objectives #3 and #4]

Here is a powerful quote regarding the impact of the social environment on brain development: “For the human brain, the most important information for successful development is conveyed by the social rather than the physical environment.”

- We must always remember: In the case of each and every child we work with, the brain’s functioning is a reflection of the child’s experiences.

- All development occurs in the context of relationships – including brain development.

Because of this, a child’s relationships with his/her primary caregiver plays a significant role in their healthy development. This relationship – or lack of one – also has the power to stifle development or cause significant impairment that can last into adulthood.

IN FACT: The capacity to form emotional relationships is related to the organization and functioning of specific parts of the brain.

Large Group Discussion: What are the qualities of early childhood experiences that are essential to a child becoming a healthy, caring, responsible adult?
Mention the following if not raised:

- Positive
- Predictable
- Consistent
- Nurturing

Lecture

It is in the context of positive, nurturing relationships that healthy development occurs. A healthy, positive caregiver during the first years of life can actually buffer the impact of later trauma. In order for optimal brain growth and development to occur the following things are necessary:

- Healthy attachment to a primary stable, consistent caregiver
- Synchronous, interactive and attuned relationship with a stable caregiver
- A safe, nurturing and enriching environment

Adopted children often present with problems related to issues in this first relationship.

Large Group Discussion: What are some early childhood caregiving situations that adopted children often have experienced?

Mention the following if not raised:

- Chronic neglect
- Abandonment
- Inconsistent caregiving
- Multiple caregivers
- Physical abuse
- Sexual abuse
• Emotional abuse

Adopted children often present with problems related to issues in this first relationship.

For those reasons, it is important for clinicians to understand the impact of early experiences on the brain-mediated capabilities of attachment, bonding and attunement. These are issues that adopted children may struggle with throughout childhood and sometimes throughout life.

Because we will be talking about attachment in great detail in a later Module, we will focus on it in this Module only as it relates to the brain.

From birth, the infant is totally dependent on adults, most specifically their primary caregiver. This absolute dependence puts the infant in a very vulnerable position. If children’s early/primary caregiving experience is less than optimal (i.e., neglectful, painful or frightening), they are at risk for developing a brain that reflects these early experiences. This also puts them at a disadvantage when later exposed to potentially enriching experiences. The disorganized brain does not process information efficiently and thus is not able to effectively learn in typically experience laden environments (e.g., pre-school, in one-on-one relationships with adults or in dyadic/peer relationships).

Large Group Discussion: What is it that creates the “pull” for the primary caregiver (mother) to provide the nurturing loving environment needed by their infant?

Review the following slides after the large group discussion:

• Biologically speaking, infants are “designed” to promote positive caregiving behaviors. Why do you think that babies are so cute?
There is a biological explanation: "We are inherently attracted to a specific set of characteristics, including large, symmetrical heads, large eyes, small mouths, and small noses."

Research studies in the area suggest that mothers of facially deformed infants show less positive, nurturing behavior during interactions than mothers of children without the deformity.

And, within 6 hours of birth, infants are capable of distinguishing their biological mothers from other people merely by scent. The mother also comes to recognize her baby’s cry and scent.

Bonding and attachment are modes of survival. Survival is one of the brain’s prime directives. It is in the context of this primary dependence and the maternal response to this dependence that the relationship develops.

In the newborn, the vast majority of waking experience is provided by the mother or primary caregiver. Thus, the relationships and all of the somatosensory experiences associated with it in the very first weeks of a child’s life begin to create the templates for feeding, soothing, rocking, singing, touching, and all future human social interactions.

The brain makes associations. When a newborn cries (hunger, scared, wet), the stress response system is activated and the baby moves along the arousal continuum – from calm to aroused, aroused to alarmed, from alarm to fear.

Once the caregiver comes and relieves the child’s distress by holding, feeding, changing the diaper, the child moves back down the arousal continuum to a relative states of calm. Think of this as a linear activity with the child moving up and down the arousal continuum many times throughout the day.

When the caregiver consistently and predictably meets the infant’s needs, the infant begins to make the association in her brain between the caregiver and pleasure that comes from having her physiological needs met (feeling full, dry, warm and soothed).

With repeated experiences, associations are made between the pattern of neural activity in reward systems and the pattern of neural activity in the human relational system.

For example, the baby feels joy in just hearing the mother’s voice. This can then generalize to other people.
If you’ve had the experience of watching a newborn when she first begins to recognize her mother’s voice and watching her reaction to the sound of “mommy” you may now understand that reaction differently.

Allowing the infant to experience some stress is healthy – stress that is predictable and moderate builds in resiliency.

For example, a new mother may increase the time between nursing to help regulate feeding. This may be moderately stressful at first but over time, the infant builds in the ability to manage her hunger.

Similarly, there is the experience of putting the child in his crib to put himself to sleep. This is a stressful experience at the beginning but it builds in skills that allow the child to learn the important skills of self-soothing that allow him to fall asleep on his own. These skills are later generalized to other stressful situations.

However, stress that is severe and unpredictable – sometimes called “toxic stress” -- makes a child more vulnerable.

For example: A primary caregivers may meet the infant’s need in a chaotic fashion – for example, she comes quickly once, then leaves the child to cry for an extended period of time then comes, and later is absent and does not meet the infant’s needs at all. This lack of consistency leaves the child feeling that the entire world is unpredictable and devoid of caring. The feeling evoked by this primary caregiver are generalized to other adults the child comes into contact with in other situations throughout childhood.

The brain makes associations between sensory signals that co-occur in any given moment in time. This capacity allows us to survive but it also makes us vulnerable to false associations.

These false associations impact children in a number of ways. They can cause a traumatized child to jump at a loud sound or lash out at a raised voice, either of which may not be threatening at all but increase arousal based upon memories of abuse.

Let’s look at some important points about stress and the relational context:

- The stress response systems are intimately attuned to the social and emotional context.
- Interactions with safe and familiar individuals create calm, well-regulated stress responses.
• Unfamiliar or hostile social interactions increase the tone and reactivity of the stress response systems.

So what is the stress response system?

• The primary role is to sense stress – hunger, thirst, threat – and then act on the information in an effort to promote survival.
• Because infants are not capable of meeting their own needs, they rely on caregivers to become their “external stress regulator”.
• When the caregiver is consistent, predictable, and nurturing, providing patterned, repetitive stimulation, the infant develops an adaptive, flexible stress response system and builds in healthy attachment capabilities.

The stress response systems in the lower parts of the brain are responsible for moving a child up the arousal continuum. The stress response system (the body’s natural alarm system) is usually self-regulating. However, when a child (or any of us) experiences something that is perceived as a threat, the alarm system in the brain (actually the hypothalamus – a tiny region at the base of the brain) goes off. Through a combination of nerve and hormonal signals, it prompts the adrenal glands to release a surge of hormones including adrenaline (which increases heart rate and blood pressure and increases energy supply) and cortisol (which is the primary stress hormone which enhances the brain’s use of glucose which has been increased in the bloodstream; it also curbs nonessential functions like those in the digestive and reproductive systems, growth processes and alters the immune system). When the brain perceives that the threat has passed, the body returns to normal or baseline.

Let’s consider now the impact of developmental trauma on the stress-response systems in the brain:

• If the caregiver is depressed, stressed, high, inconsistent, or absent, these two crucial neural networks (stress-response and relational) develop abnormally.
• The child becomes more vulnerable to stress in the future and becomes less capable of benefitting from the healthy nurturing supports that might help buffer future stressors or trauma.

Often these children live in a constant state of hyperarousal. Because their primary caregiver was not a consistent source of comfort and safety, building in the notion that adults are safe, nurturing caretakers, they are significantly less likely to see other adults as safe, sources of comfort or of being worthy of their trust.
So, as you are working with adoptive children and their families, always remember that this primary caregiver-infant relationship is the first relationship the child experienced and is what provided the template for all future relationships.

Let’s now consider the “template for future relationships” for the following children. In your small groups, discuss the template for future relationships for each of the children in the case examples. (Allow about 10 minutes for the small group work).

**CLARA:** Clara was born when her mom was only 15. She lived with her mom and her mom’s boyfriend for six years. Her mom and the boyfriend used and sold drugs. There were always strangers in and out of the home. Clara often received the brunt of her mother’s anger and frustration. Her mom yelled at her and there were often drunken fights in the apartment. When this happened, Clara retreated to a corner of the basement where she kept a special doll. When Clara was 6, she entered foster care. Her parents’ rights were terminated and at age 10, Clara was adopted by Connie and Dave Brown.

What is Clara’s “template for future relationships”?

**JACOB:** Ruth and Tom adopted Jacob from an orphanage in Russia. He entered the orphanage when he was 2 days old because his mother knew that she could not care for him financially. When she signed the relinquishment papers, she left him a 4 page handwritten letter. While in the orphanage, Jacob received minimal, but adequate caregiving. Within 2 months, he was placed with Ruth and Tom in the U.S. — they are a professional couple who are unable to have children of their own.

Jacob was the second child that had been placed with Ruth and Tom. The first child, a 2 month old little boy in foster care, had been with them for 6 months but was removed when a family member came forward who wanted to raise him. They were hesitant to get too attached to Jacob fearing history might repeat itself. Try as they might to protect themselves, Ruth and
Tom quickly grew to love Jacob. Ruth took him to “mommy and me” classes and both Ruth and Tom showered him with time, touch and love.

What is Jacob’s “template for future relationships”?

SAMANTHA:
Part 1: Samantha was taken to the hospital by a neighbor who lived in the apartment next to her mother. She had a broken femur and collarbone. The ER doctor was not surprised by the results of the x-rays – healing fractures of different ages. Samantha was only 2 ½ years old. She was released by the hospital to a CPS caseworker. When the worker picked up the little girl, Samantha did not cling or look at her. She didn’t make a sound on the 45-minute ride to her new foster family’s home. The caseworker thought she was simply overwhelmed by all that had taken place over the last few weeks.

What is Samantha’s “template for future relationships”?

Part 2: The foster mother who met them at the door was a sweet older woman with a silent joy about her. She gently took Samantha in her arms and held Samantha’s face close to hers whispering softly into her ear that she was safe now. As the caseworker left, Samantha was being slowing rocked in the cradling arms of her foster mother.

How might Samantha’s “template for future relationships” possibly be modified?

Debrief each case example, adding the following points as needed:

CLARA:
• An understanding of family life as chaotic
• An understanding of close relationships as dangerous and unpredictable
• Beliefs that she is “bad” because she evoked her mother’s anger and frustration
• Retreat into self for protection and calm
JACOB:
- An understanding of adults as caregivers
- An understanding of being loved by both birth and adoptive parents
- A sense of a rich, stimulating environment that promotes brain development
- Reciprocal relationships with people

SAMANTHA:
Part 1:
- Experience of caregivers as hurting
- Experience that the world is not safe
- Withdrawal into self for self-soothing
- Experience of relationships as dangerous

Part 2:
- With the foster mother: the beginning of an experience of gentleness, warmth, soothing in the arms of the caregiver

Large Group Discussion: Let’s discuss the talking points that you developed in your pre-Module assignment. How would you describe to an adoptive parent the impact of trauma and chronic neglect on early brain development and the later adolescent functioning of their child?

Lecture

A key point to know and to communicate to adoptive parents is:

*The presence of loving, attentive adoptive parents will NOT remediate these issues on its own.*

Adoptive parents need to understand that the best thing they can do is to help “recreate” the optimal environment their child needed during those first months and years of life.
Scientists believe the most important factor in creating attachment is positive physical contact: hugging, holding, rocking, and other physical contact – even if it feels strange because their child is no longer a newborn.

For adopted children coming from less than optimal homes, the focus becomes re-organizing the brain systems responsible for attachment. This can be a very long, hard process – not what adoptive parents expect or want to hear. This, in fact, is often contrary to what adoptive parents believe or have been told. Often the feeling is that these children simply need a loving, safe, caring family.

It is important, however, to give hope the adoptive parents with whom we work. Change can occur but it will take being very developmentally-focused, often providing experiences that their child missed earlier in life.

**Large Group Discussion:** Does this fit with what you have experienced or heard from adoptive families with whom you have worked?

**Lecture**

The impact of neglectful and/or abusive environments during the first three years of life can be devastating on the development of adopted children in every domain. Despite the genetic potential, it is the nature, quality, pattern and intensity of early life experiences that express genetic potential.

Expressing the full genetic potential of a child requires caregiving that is:

- Predictable
- Responsive
• Nurturing
• Sensory-enriched

The brain systems responsible for healthy emotional relationships will NOT develop in an optimal way without the right kinds of experiences at the right times.

Let’s now look at attunement.

What is attunement? Attunement is being aware of and responsive to another person. A parent’s attunement to her child will focus on:
• How does my child feel?
• Is she happy or sad, interested, engaged, capable of listening?
• Is she in distress, hungry or just needing to be held?
• What is the best way to communicate to my child, whether something I notice in her behavior that is right or wrong, a feeling an idea...in any moment?
• What will engage, encourage and show her feelings of love and care?

Attunement has a lot to do with our abilities in non-verbal communication. In fact, most of our communication with our children and others is non-verbal and a large percentage of what our brains perceive in communication with others is non-verbal signals. Some examples of our day to day signals to our children or others may be the movement of your eye (a warm wink), facial gestures, (the opening of your mouth in surprise, a yawn) your tone of voice, the movement of your hand (a wave, or an A-OK) or the tipping of your head.

And most of the time, we are unaware of any of our non-verbal gestures. We just do them. We even repeat our own parent’s non-verbal gestures to us. It is important to know that a child can literally sense the parent’s interest and sincerity in them, as well their parent’s approval or disapproval of them.

Attunement and attachment are related. Attachment is an emotional bond to another person. According to psychologist John Bowlby, the earliest bonds formed by children with their parents (caregivers) have an important impact that continues throughout their life. Attunement and attachment are related in that, mothers/fathers (caregivers) who are available and attuned to their child, in other words, responsive to their child’s needs beginning in infancy, establish a sense of security within that child. The infant/child learns that their parent (caregiver) is dependable. This attunement creates a strong foundation for which that child can explore the world.
What are the elements of healthy attunement?

- Sensitivity to others
- Attention to non-verbal communication
- Reading and responding to the cues of another
- Synchronicity and interaction

**Large Group Discussion**: Because of issues with attachment and bonding, adopted children may have attunement issues. What issues with attunement might you anticipate?

*After the group discussion, review the following:*

- Adopted children often lack sensitivity to the feelings and needs of others or the personal space of others
- The adopted child may misread the cues of others or may not recognize the non-verbal cues of others

As an example: a child who continues to touch another child even after that child moves away, puts her hand out or says “no”.

Problems in attunement can get better – children can be taught to read the nonverbal, social language of other people.

Let’s summarize what we have discussed in this part of our training today:

- Adopted children who have a history of abuse/neglect have often missed the window of opportunity in attachment – where timing is everything.
There are critical periods during which bonding experiences MUST be present for the brain systems responsible for attachment to development normally. These periods take place during the first year of life and are related to the capacity of the infant/caregiver dyad to develop a positive, interactive relationship.

These realities make the work of adoptive parents challenging.

What happens when the window of opportunity for attachment is missed? The impact varies.

Severe emotional neglect in early childhood can be devastating but this is rare. The absence of touch, stimulation and nurturing can lead to the loss of capacity to form any meaningful relationships.

Children raised in Eastern European orphanages are a primary example from our day. These children may have been raised in cribs with almost no human touch, little interaction and rarely spoken to. These children suffer from global neglect, the impact from which they rarely fully recover.

Millions of children experience some lesser degree of their experiences. Associated problems range from mild interpersonal discomfort to profound social and emotional problems.

The severity of the problem is related to how early in life, how prolonged, and how severe the emotional neglect has been.

So why focus so much on bonding and attachment in early development?

Because healthy brain development and organization occur in the context of a safe, nurturing, attuned relationship. And because early patterns of attachment affect the quality of information processing throughout life. (Critteden, 1992).
a) The organization and functioning of specific parts of the human brain
b) Whether the primary caregiver was available during the first 3 months of the child’s life
c) Whether the child was able to get the attention of his/her caregiver
d) All of the above

Answer: a) The organization and functioning of specific parts of the human brain

2. The systems in the brain that allow us to form and maintain emotional relationships first develop:

a) During infancy and the first years of life
b) During pre-school years, as children begin to engage in more interactive play with peers
c) As children become more involved in school and organized sports activities
d) All of the above
e) None of the above

Answer: a) During infancy and the first years of life

3. True or False: Adoptive parents only need to be loving and nurturing and provide a safe environment in order for their child to get better.

Answer: False. Adoptive parents must be taught activities to aid the child’s brain in re-organizing for attachment. A strong relationships with the caregiver will not just develop over time and will not be easily achieved without targeted, intentional interactions.

4. True or False: Children who have difficulty reading the social and nonverbal cues due to problems in attunement can overcome this problem.

Answer: True. Children can be taught how to read the nonverbal, social language of another with the help of therapist and trained caregivers.
People who work with children have varying beliefs about the etiology of attachment. What are your beliefs about how attachment is impacted by the experiences of children with whom you work? How might those beliefs impact your work with adopted children and their adoptive families?

11:15PM – 12:30PM Understanding the Impact of Trauma on the Developing Child: A Focus on Neglect – Assessment (Part 1) [Learning Objectives #5, #6, #7]

As we discussed this morning, the first three years are when the brain is making the majority of its “primary” associations and the core neural networks organize as a reflection of early experience. Early developmental trauma and neglect have a disproportionate influence on brain organization and later brain functioning.

Children exposed to chronic threat have brains that exist in a constant state of threat. The result is an over-reactive dysfunctional stress response system.

A child who is in a constant state of threat may present in any number of ways ranging from severe hyperarousal to extreme dissociation. An example of a hyperaoused child is one who is constantly attending to his/her surroundings. Every noise, even the smallest movement of a chair across the floor, may cause this child to jump. They may appear fidgety. A teacher once described a child in her classroom as looking as if “he was going to jump out of his skin at any moment”. The slightest touch may cause them to run into a corner. At the other extreme, a child who has learned that he/she cannot escape threat may space out as they feel more stressed or threatened. A child who manifests this adaptive response to threat might “space out” when the classroom becomes overstimulating or when a parent/caregiver raises their voice.
Consider in your small groups the two graphics prepared by Dr. Bruce Perry in Handout #5.2 and discuss the questions that are provided.

**Handout #5.2**

### How the Brain Responds to a Traumatic Event

Bruce D. Perry, MD, Ph.D.

This sequence developed by Dr. Bruce Perry shows how the brain responds to a traumatic event. Notice that with a prolonged alarm reaction, the child will experience an altered neural state. The longer the child remains in a persistent state of fear, the more likely it is that the child’s brain will change to reflect these experiences.

1. How have you encountered altered neural states in children and adolescents with whom you worked? What were these children’s and youth’s histories of trauma?
Acute Response to Threat

The Child Trauma Academy
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<tr>
<th>Sense of Time</th>
<th>Extended Future</th>
<th>Days</th>
<th>Hours</th>
<th>Minutes</th>
<th>Loss of Sense of Time</th>
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<td>Subcortex</td>
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This chart developed by Dr. Perry depicts how we (all of us) respond to threat. When threatened, we all move along the arousal continuum – from calm to aroused, aroused to being alarmed, from alarm to fear and from fear to terror. As we move along this continuum, different areas of our brain are in control. The more threatened we become, the more regressed or primitive our manner of thinking becomes. Not surprisingly, when a traumatized child is in a state of alarm, due to some reminder of past trauma, for example, the child will be less capable of concentrating, will become more anxious and will focus more on non-verbal than verbal cues. As the child continues to become more anxious and fearful, she will become more and more reactive. This become particularly important as we look at the implications for understanding the way a traumatized child is processing information, learning and reacting in a given situation (Perry, 2005).

2. What responses to trauma have you observed in the children and youth with whom you have worked? What changes have you seen in:
   a. Cognition
   b. Affect
   c. Behavior
   d. Physiology either through:
      Hypervigilance: the child’s sensory sensitivity accompanied by an exaggerated intensity of behaviors with the purpose of detecting threats;
accompanied by a state of increased anxiety, high responsiveness to stimuli, and a constant scanning of the environment for threats. *Dissociation:* the child’s withdrawal of attention from the outside world and focus on the inner world

**Report Out** *(allow about 10 minutes for debriefing)*

1. What have been your experiences in working with children and youth with altered neutral states in children and adolescents? What were these children’s and youth’s histories of trauma?
2. What responses to trauma have you observed in the children and youth with whom you have worked? What changes have you seen in:
   a. Cognition
   b. Affect
   c. Behavior
   d. Physiology: Hypervigilance and/or dissociation

*Make the following points after the reporting out:*

To briefly summarize:

- Traumatized children spend most of their lives in a state of low-level fear – even though outwardly they may look calm and relaxed.
- While in this state, it takes very little to move them up the arousal continuum.
- They will respond by using either a dissociative or hyperarousal adaptation. Their functioning on every level (emotional, behavioral, cognitive) will reflect this state.
Let’s spend some time considering hyperarousal. How do we know that a child is hyperaroused?

The next time you are with a child with a severe trauma history, take the child’s heart rate. Just find the pulse in their wrist and count the number of beats in a 15 second period. Multiply by 4 and you will have the beats per minute.

You may be surprised to find that their heart rate is high even though they are showing no outward signs of hyperarousal. Average heart rate is 80bpm. It varies, of course, by age – you can find charts that give heart rate by age for children online if you are interested. Don’t be surprised if you have children whose resting heart rates are 100 or higher. Remember, a prolonged exposure to trauma can and will alter systems in the brain – here the brainstem. The most basic regulatory process (heart rate, blood pressure, respiration) are controlled by the brainstem.

When you talked about the histories of traumatized children with whom you have worked, you discussed the two major types of traumatic experiences that many adopted children have endured:

- Neglect
- Violence

**Lecture: Neglect**

Let’s first look at neglect.

**Large Group Discussion:** What is neglect?

*After allowing discussion, address the following:*
• From a child’s protective services standpoint, neglect is frequently defined in terms of deprivation of adequate food, clothing, shelter, medical care or supervision.

• From a neurodevelopmental view, neglect is seen as a lack of a specific sensory input during development that results in the abnormal development of some part or parts of the brain. This abnormal development occurs in those systems which sense, perceive, process, “interpret” and “act on” information related to that specific sensory deprivation.

This is why neglect has such a devastating impact on the developing child.

**Large Group Discussion:** Let’s look at the next slide which provides images of a CT scan of a normal 3-year-old child’s brain and that of a 3-year-old exposed to significant neglect. What do you see?

*After the discussion, clarify as follows:*

These images illustrate the negative impact of neglect on the developing brain. In the CT scan on the left is an image from a healthy three year old with an average head size. The image on the right is from a three year old child suffering from severe sensory-deprivation neglect. This child’s brain is significantly smaller than average and has abnormal development of cortex (Perry & Pollard, 1997).

**Lecture**

Let’s look at the case of Andrey, adopted from an Eastern European orphanage at the age of 3. The family adopted Mira, an infant girl, age 2 and half months, at the same time from the same orphanage. This case is based on an actual case seen by the clinicians of the Child Trauma Academy.
Look at the picture on the slide which is similar to Andrey’s adoptive parents’ description of where he spent his first years of life.

Andrey’s adoptive parents brought him to a specialty mental health clinic for traumatized children when he was eight years old. Let’s look at the list of presenting problems:

- Night waking
- Speech and language difficulties
- Awkward gait, clumsy
- Problems with peer relations
- ADHD behaviors in the classroom
- Touch averse
- Staring spells

Andrey’s parents were overwhelmed. His younger sister Mira did not have all of the difficulties that Andrey had. She made friends easily. She responded to affection. She was engaging and bright.

**Large Group Discussion**: Why might we be seeing differences between Andrey and Mira despite their coming from the same orphanage?

*Raise the following if not mentioned:*

- Mira was adopted at 2 and half months while the window of opportunity for attachment and bonding were still open.
- Andrey was adopted at 3 years when many of the fundamental processes of neurodevelopment were at or nearing completion.
Let’s look in more detail at Andrey’s behaviors. He did not enjoy getting or giving hugs. He did not respond to affection. He spent a significant part of each day staring into space. He struggled with peers and did not have friends. His first grade teacher complained that he would not sit still and was disruptive in class.

His parents were confused and distraught. They wanted to find someone who could explain their son to them.

Small Group Discussion

In your small groups, discuss the following:

1. Andrey’s parents meet with you. What is your first course of action?
2. What might be some sources of information that you would want to have?

Report Out

First, what did you decide would be your first course of action?

Raise the following points if not mentioned:

The first course of action when assessing a traumatized child is to gather as much history as possible. What you would want to know:

- Genetic history
- Prenatal history
- History of primary caregiving
- History of adverse events during childhood
- Placement history

Make the following points:

As we learned in the online training, generally such extensive information is not available in international adoptions.
This case illustrates this very challenge in international adoptions. Andrey’s parents were given almost no information on him and no information on his birth parents. For Andrey, the parents had only the date he entered the orphanage and little more.

What might be some sources of information that you would want to have?

*Raise the following points if not mentioned:*

1. **Review of records** (including previous testing, school records, case files, etc.)

2. **Observation of the child:** When little early history is available, we often get clues about early developmental experiences from the child themselves (i.e., from their behavior/symptoms). For example, a child who is touch averse likely did not receive the tactile stimulation they needed as an infant.

3. **Information from the parents about the conditions of the orphanage:**

   Allowing the adoptive parents to share their story versus asking them to fill out a questionnaire/intake form can provide a wealth of information.

In this case, the parents described the orphanage where Andrey lived as rooms filled with rows of cribs with only 2 or 3 caregivers. These caregivers primarily moved from bed to bed putting a bottle in a child’s mouth and changing diapers. No holding, no rocking, minimal direct contact with any child.

Andrey’s parents also shared the following about their last visit with Andrey at the orphanage before bringing him home: They were walking with Andrey around the orphanage building. They described him talking excitedly but because he was speaking Russian, they did not understand what he was saying. They asked their interpreter to translate for them. Her answer surprised them: “He’s not saying anything. It’s just baby talk – babbling.”
From other parents adopting from the same orphanage they learned some startling information. A parent who spoke to individuals who worked in the orphanage through an interpreter learned that the “babbling” was actually a form of communication. It was a language learned by the children to communicate to each other through the bars of their cribs.

Absent consistent and meaningful verbal interactions with adult caregivers, these children were biologically drawn to communicate and on their own created a means of connecting to the only other humans in their midst.

**Large Group Discussion:** What would this information suggest to you about Andrey’s early experience?

Following the discussion, point students to the next powerpoint:

Let’s look at the portrait that Andrey drew of his family during assessment – when he was 8 years old. Now let’s look at the next slide, had you not known that Andrey was 8 when he drew this picture, how old would you have said the child artist was and why?

*Raise the following if not mentioned:* This picture appears as one drawn by a child of 3 ½ or 4 years of age. He includes the things that have meaning and importance to him, his mother and father. His drawing is an example of a very young child’s work - a large head mounted on two legs.

**Small Group Work**

Return to your small groups and discuss, based on what you have heard so far about Andrey, what steps you would take in assessing him:

1. What domains are important to assess?
2. How might you assess him across these domains?
3. Which of the following that Andrey’s parents identified are signs of trauma that you would want to address?
   - Night waking
   - Speech and language difficulties
   - Awkward gait, clumsy
   - Problems with peer relations
   - ADHD behaviors in the classroom
   - Touch averse
   - Staring spells

**Report Out:** Let’s discuss your assessment of Andrey.

1. **What domains did you identify as important to assess?**

   *After discussion, make the following points:*

   - Although Andry was 8 years old chronologically, he was not 8 developmentally, emotionally, cognitively, or socially. Assessment must begin with an understanding that trauma impacts children across all developmental domains. In order to have an accurate picture of a child, we must assess in some form or fashion across all of these domains.

   - This concept is also important for the parents to understand. Often parents, family (and teachers) get hung up on the chronological age (or size) of the child expecting them to behave in age appropriate ways. Helping reframe their expectations based upon these different developmental ages will help them better provide the appropriate environment and activities to help them progress.

2. **How would you assess Andrey across all of these domains?**

   *Note to trainer: Listen for types of assessments participants would use – are these assessments based upon his chronological age of 8 or on the standard battery of tests generally given to children who present with ADHD-like symptoms? Or do they focus the assessment on understanding him developmentally? If the former, ask why they choose the tests they did and what insight they feel they would gain from their choice of psychometrics.*

   *After discussion, review the following:*
The clinicians at the Child Trauma Academy used the following:

- Semi-structured interview with Andrey’s parents
  - Gathering as much history as possible
  - Current concerns
  - Strengths

- Developmental Assessment
  - Battelle Developmental Inventory
    - Appropriate for ages birth to 8 years

- Standard Psychometrics
  - IQ and Achievement Testing
  - Child Depression Inventory, Reynolds Children Manifest Anxiety Scale,
    Trauma Symptom Checklist for Children, Child Behavior Checklist (by parents)

As clinicians, we may not have the expertise to administer developmental assessment and standard psychometrics. It is important that we develop collaborative relationships with skilled professionals who can provide these services for children so that we have the benefit of the results of these inventories and assessments in our clinical work.

We know that the best assessment information is obtained when the child feels safe and is comfortable with the clinician – relationship is key. For this reason, the clinicians at the Child Trauma Academy assessed Andrey over 3-4 Modules. The first Module was play based spending time getting to know him in a room that had many different activities from which he could choose to participate (sand box, coloring).

3. **Which of the following problems that Andrey’s parents identified are signs of trauma that you would want to address?**
   - Night waking
   - Speech and language difficulties
   - Awkward gait, clumsy
   - Problems with peer relations
   - ADHD behaviors in the classroom
   - Touch averse
   - Staring spells

*After discussion, state that the Child Trauma Academy clinicians focused initially on two of these problems:*
Sleep disorders – Sleep impairment following trauma and neglect is the rule rather than the exception (50-90% of neglected/abused children and those with PTSD also have sleep problems)

- This is caused by the impact of developmental trauma on the fundamental brainstem/diencephalon (mid-brain) monoamine networks (e.g. norepinephrine and serotonin) given the major role they play in normal sleep regulation.
- It was determined that Andrey was likely waking after each REM cycle during which time he wandered around the house.

Staring spells -- It was determined through clinical observation and through parent and teacher report that Andrey dissociated many times throughout the day. This occurred typically during times of challenge, either at home when he was asked to complete a task like tying his shoes or while he was working on his homework. At school, the teacher noticed that it occurred most frequently when he was overwhelmed by some activity. This was also observed during testing in the clinical setting.

Children who have been traumatized often develop a “sensitized” hyperarousal or “sensitized” dissociative pattern. In the dissociative pattern, the child will often use this freezing mechanism when they feel overwhelmed or anxious. It is sometimes labeled Oppositional-Defiant behavior by teachers/other adults. (Perry, et. al, 1995)

Please be certain to read Handout #5.3 after this class. It provides excellent information on how a child will adapt to trauma through dissociative and hyperarousal patterns.

Handout #5.3: Childhood Trauma, the Neurobiology of Adaptation, and “Use-dependent” Development of the Brain: How “States” Become “Traits”
Let’s look at some issues related to dissociation.

- When faced with a terrifying situation, the brain makes a quick assessment: Can I escape or am I trapped and cannot get away?

- If the answer is “I’m trapped and there is no chance of escape,” the brain responds in a manner that during the event is very adaptive: it **dissociates**.

- As an adaptive response, dissociation:
  - Mobilizes the body to hide (freeze) or to camouflage itself – this includes pulling blood from the extremities into the core of the body, slowing the heart rate, blood pressure and respiration – this way, if the extremity is cut, the individual will not bleed to death
  - Increases the chances of survival
  - Allows the brain to maintain mature cognition and behavior

- It allows the child to disengage from the “external” world while attending to elements of the “inner” world

Think about cases of rape where the victim describes disengaging from the act of rape and thinking about other things, imagining herself in another place. This is dissociation. In the case of children who experience early, pervasive neglect, imagine the child who cries/screams in an effort to bring the caregiver (so the child can be fed, changed, held, made to feel safe, etc.). Over time, when the caregiver doesn’t come, the child eventually stops crying – the child stops attending to the external world which is not caring or safe and tunes into the internal world.

Let’s look at additional problems that are signs of trauma:

- **ADHD behaviors**
Andrey was found to meet criteria for PTSD, not ADHD.

- Unfortunately, because PTSD symptoms mirror some ADHD symptoms children are often misdiagnosed.
  
  Similar symptoms include: behavioral impulsivity, hypervigilance and hyperactivity

- And, we know that use of psycho-stimulants often prescribed for ADHD actually exacerbate PTSD symptoms.
  
  Fortunately, Andrey’s parents refused to have their pediatrician prescribe meds for ADHD as the school requested.

PTSD and ADHD can co-occur – as may be the case if a child receives the ADHD diagnosis prior to experiencing a traumatic event. However, it is important to be able to distinguish between the two. The most important information will come during the history gathering.

**Let’s briefly look at PTSD:** PTSD is the development of symptoms following direct personal exposure to an extreme traumatic event and the response to the event involves an intense horror, fear and a sense of helplessness.

What are the precipitating factors for PTSD?

- Nature of the trauma (Did the child have a sense of control over the situation?)
- Developmental age of child (not chronological age)
- Duration of the threat (e.g. short explosive abuse event or chronic neglect taking place over several years)
- Frequency of the threat (e.g., abuse that occurred every time Dad drank)
- Presence of post-traumatic support (was there a support system in place following the event)
  - Family
  - Community

PTSD is not a *one size fits* all disorder. Two children who experienced the same traumatic event can present with very different symptoms.

What are the main categories of PTSD symptoms?

1. Re-experiencing the traumatic event
2. Avoidance and numbing related to the stimuli associated with the event
3. Persistent state of arousal
Large Group Discussion: Have you worked with a child or adolescent who was experiencing PTSD? What were some of the precipitating factors? What was the main category of symptoms?

Lecture

Let’s look at some additional information on PTSD:

The specific symptoms of PTSD are:

- anxiety
- behavioral impulsivity
- aggressive
- hypervigilance
- hyperactivity
- apathetic or depression
- sleep difficulties
- tachycardia or hypertension

Other DSM-IV diagnoses that may occur with PTSD are:

- Attention deficit-hyperactivity disorder
- Conduct disorders
- Anxiety disorders
- Mood disorders
- Psychotic disorders
- Developmental disorders
We will break for lunch and finish up our assessment with Andrey and his family after lunch and then move to work on neglect and exposure to violence and clinical interventions.

12:30PM – 1:30PM  Lunch

1:30PM – 1:50PM Understanding the Impact of Trauma on the Developing Child: A Focus on Neglect – Assessment (Part 2)  [Learning Objectives #5, #6, #7]

Let’s now return to Andrey and our assessment work with him.

Return to your small groups and review the results of Andrey’s developmental assessment in Handout #5.4.

What might be some implications of this developmental assessment for your work with Andrey and his parents?

Handout #5.4:
Results from Andrey’s developmental assessment showed delays in every domain due to early, pervasive sensory neglect.

1. Speech and language was severely delayed (expressive and receptive)
   • Because Andrey did not consistently hear speech (i.e., he wasn’t talked to and interacted with by the adults around him), he missed the critical window related to language development
   • NOTE: the only way we learn language is by hearing it and because Andrey didn’t hear sound as he should have some sounds he would never be able to make

2. Fine and gross motor delays
• Because he spent most of this early life in a crib, without access to open spaces where he could crawl, walk and run, Andrey’s gross motor skills were underdeveloped
• Fine motor skills like holding a pencil were also delayed due to lack of opportunity

3. Delayed social and emotional development
• Andrey lacked a secure, safe, healthy attachment to a primary caregiver during his years in the orphanage so deficits in these areas are not surprising.
• His diminished self-regulatory capabilities only further added to his problems with peers (social development) who labeled him as weird.

Report Out
Ask each group to share two or three points from their discussions about these developmental assessment results.

1:50PM -- 2:10PM Understanding the Impact of Trauma on the Developing Child: A Focus on Neglect -- Intervention [Learning Objectives #5, #6, #7]

Let’s look at the treatment that was developed for Andrey – treatment that was multifaceted and highly coordinated. While there would be some damage that no amount of treatment/therapy could undo over the course of 2 years, Andrey made significant gains.

First, treatment began with patterned, repetitive activities to smooth out his stress response system.

• The focus was on brainstem/mid-brain mediated activities that were taught to the parents and resource teachers at school
• The key was building the activity into his daily routine – 15 minutes 4-5 times a day.
• Activities included patterned, repetitive activities that Andrey enjoyed doing like rocking in the rocking chair, swinging, jogging/running
Large Group Discussion: Why did the treatment begin with brainstem/mid-brain mediated activities?

Raise the following if not mentioned:

- It is very important to remember that you cannot change a part of the brain you are not activating.
- And providing reparative activities in the order they occur in normal development is key.

Lecture

- Other “state regulation” (brainstem) activities included massage therapy
  - Beginning slowly with hand massages, then to arm, ultimately to shoulder, neck and back which also helped decrease sensitivity to touch.
- Andrey saw a physical therapist to deal with the fine motor and gross motor problems
- He also participated in speech therapy.
  - The school-based speech therapy 2 times week for 30 minutes was not enough to help Andrey recover from his severe language delays so his parents added another 3 days of speech therapy outside of what the school offered.

Remember – parents can be taught/trained to provide many of these activities at home. Not all parents have the resources this family had. The key is providing the patterned, repetitive, reparative activities on a consistent basis – everyday, several times a day for short periods of time (15 minutes or so).
Large Group Discussion: Why was massage therapy so important for Andrey?

Raise the following if not mentioned:

Therapeutic massage was important for a number of reasons:

- Touch is vital for the development of attachment behavior and social development. Elaine Schneider suggests that “nurturing touch between a parent/caregiver and an infant enriches physiological, social-emotional, and mind/body/spirit connections for the infant being massaged, as well as for the parent” (http://www.healthyfamily.org/cs/user/print/article/2). With Andrey, replacing the missed opportunity of touch was of vital importance.

- It provided time for social interaction between Andrey and his caregiver (usually his mother). It was a way to develop and then deepen the bond between Andrey and his new parents.

- It was a way to help Andrey unwind after a stressful day of school and over-stimulation. This form of nurturing touch was also very rewarding for the caregivers as they saw that they were able to help calm their child.

- Regularly using therapeutic touch helped improve communication between Andrey and his parents. It helped both adoptive parents learn to read Andrey’s cues (e.g., when he was getting stirred up) and gave them confidence in their ability to help him calm down.

- The patterned, repetitive use of massage helped re-regulate Andrey’s stress-response system so that over time he felt calmer. He also got to a point where he recognized when he was starting to become aroused and would ask for a back or neck rub.

Lecture

Physical therapy was also part of Andrey’s initial treatment.

- This focused on integrating somatosensory activities into his daily routine.
• Ultimately, Andrey got involved in a dance class with an instructor he grew close to which continued to improve his somatosensory development
• As he got a little older, his dance also became an outlet for his feelings/emotions and a way to interact with other children close to his same age.

The unifying thread to what helped Andrey was Relationships:

➢ He was lucky enough to have invested adults in his life
  ● Patient, nurturing and loving adoptive parents who wanted nothing more but for him to be happy and successful at whatever he chose to do in life (whether banker or janitor)
  ● An amazing teacher who was understanding and kind and willing to go the extra mile to help Andrey find successes
    • She even fought to keep him in her class when his parents decided to hold him back a year so he would begin the year knowing the routine – he was the teacher’s helper all year
  ● A dance teacher who worked with him to help him become less clumsy and ultimately better coordinated and graceful
  ● Dedicated therapists who worked with him for several years

➢ Built into every environment were the patterned, repetitive activities consistently provided at regular intervals. Every one of the adults in his life learned how to recognize when he was becoming overwhelmed and learned how to help him calm down. Ultimately, Andrey learned to do this himself.

➢ Andrey will always have some speech problems and his gate is still a bit awkward but he is happy. He has friends and a family that’s devoted to him. He has said many times, “I’m a really lucky boy”. And he is.

2:10PM – 3:30PM Understanding the Impact of Trauma on the Developing Child: A Focus on Violence [Learning Objectives #7 and #8]

Note to Trainer: Feel free to give a stretch break during this segment as needed.
As we mentioned earlier, there are two categories of experiences that traumatized children who are adopted experience. We have talked about neglect and looked at treatment through the lens of Andrey’s case. Now, let’s turn to violence.

Large Group Discussion: How do we define child abuse?

Raise the following if not mentioned:

From a child protection standpoint, child abuse includes:

- Physical injury that results in substantial harm to the child or genuine threat of substantial harm from physical injury
- Mental or emotional injury to a child that results in an observable and material impairment in the child’s growth, development or psychological functioning;
- Sexual conduct harmful to a child’s mental, emotional, or physical welfare, failure to protect a child from harm

Intrafamilial abuse and domestic battery account for the majority of physical and emotional violence suffered by children.

Violence, threats of violence and witnessing violence all have the ability to wreak havoc on the developing brain, including the stress response systems.

“Often the end result of exposure to such violence is a child who develops as if the entire world is chaotic, unpredictable, violent, frightening and devoid of nurturing.”

Let’s look at Sasha’s case — a case that the clinicians at the Child Trauma Academy also handled.
In your small groups, review Handout #5.5 Sasha’s Case. Discuss the following:

- If Sasha were brought to you for assessment and treatment, where would you begin? What questions would you ask? What data would you like to see? How would you make decisions about treatment?

- What types of assessments might you conduct?

- What would you like to know from Sasha’s foster care records?

**Handout #5.5 Sasha’s Case**

Sasha was adopted from the foster care system through a private agency when she was 2 years old. Her adoptive parents already had a son, age 5 and a half. Sasha was removed from her home at the age of 9 months due to physical abuse of her 4 year old sister, Kendra. Her mother and her boyfriend were arrested and ultimately convicted for causing life threatening injuries to Kendra. Once in custody, it was discovered that Sasha had also sustained injuries. She was found to have multiple fractures in various stages of healing.

Sasha and Kendra were placed in a foster/adoptive home. The plan was that as soon as their mother’s parental rights were terminated, the girls would be adopted by the family who had already been caring for them.

Unfortunately, Kendra had serious behavioral problems and the parents were unable to control her. While they still wanted to adopt Sasha, they were no longer interested in Kendra. Because CPS was committed to keeping the siblings together, they were both removed from home.
By the time the biological mother’s rights had been terminated just 6 months later, Kendra was in a psychiatric hospital and Sasha was in her third placement.

Finally, after 14 months in foster care Sasha was finally placed with an adoptive family. She was now 25 months old.

Sasha was not quite what her adoptive parents expected. She is a beautiful little girl whose eyes speak volumes. Her mother describes how she follows people with her eyes – always watchful. She rarely smiles. Her mother described an experience shortly after Sasha came to live with them. The mom was laying on the floor with Sasha playing with a stuffed puppy, tickling Sasha and making barking sounds. Sasha just stared at her intently. Then out of nowhere, Sasha grabbed the animal, threw it, then screamed and ran into another room. They described her as very suspicious. Even when they tried to rock her to sleep, she wouldn’t close her eyes.

While Sasha has grown more comfortable in her environment she still struggles with trusting her new parents.

Sasha was brought to the clinic following her expulsion from pre-school. Sasha had been with her adoptive family for less than a year and her new parents realized that they neither understood or were equipped to handle her behaviors. Age at intake – 33 months.

Presenting problems:
- Night terrors
- Impulsive behaviors, hoarding foot, stealing
- Easily startled and always “on edge”
- Sometimes seems to not hear what they are saying
- Aggressive/violent with parents and other children
- Didn’t smile or seem to enjoy toys

- If Sasha were brought to you for assessment and treatment, where would you begin? What questions would you ask? What data would you like to see? How would you make decisions about treatment?

- What types of assessments might you conduct?

- What would you like to know from Sasha’s foster care records?
Report Out: Debrief the small group discussions as follows:

If Sasha were brought to you for assessment and treatment, where would you begin? What questions would you ask? What data would you like to see? How would you make decisions about treatment?

Raise the following if not mentioned:
- Learn about how Sasha experienced early developmental trauma – living in a home where there was domestic violence, where both she and her sister were physically abused, multiple caregivers, bouts of homelessness.
- Review any reports that that adoptive parents have from Sasha’s stay in foster care.

What types of assessments might you conduct?

After discussion, review the following:

The clinicians at the Child Trauma Academy used:

- Semi-structured interview with Sasha’s parents
  - Gathering history
  - Current concerns
  - Strengths
- Developmental assessment
  - Ages & Stages Questionnaire
  - Battelle Developmental Inventory
  - Wechsler Preschool & Primary Scale of Intelligence (3\textsuperscript{rd} Ed)

What would you like to know from Sasha’s foster care records?

After discussion, review the following:

Here is what the clinicians at the Child Trauma Academy learned:
- Semi-structured Interview
The adoptive parents parent bought the information provided to them at the time the child was placed with them.

- They also took good notes when they were given the opportunity to read Sasha’s case record (although they admitted they didn’t understand much of what they read).
- Parents reported that they were told that all Sasha really needed was a loving, nurturing and safe home.
- The were offered only minimal post-adoptive services and Sasha received no mental health services while in foster care or post placement.

Here is what the clinicians also learned about Sasha’s history:

- Her biological mother had an extensive drug history
- Since Sasha and Kendra had been removed, she had another child who was born drug exposed and removed from her care
- Sasha and her sister had lived with multiple family members while in their mother’s care
- The family had been homeless on at least one occasion
- The mother had a history of violent relationships that resulted in her being seriously injured on multiple occasions

Understanding the epigenetic factors is also important. Research has shown that experiences before pregnancy can impact the egg and sperm, thus impacting the child that the parents will one day have. Epigenetic factors that can cause changes to the egg and sperm include drug use, severe stress and starvation to name a few. If you are interested in learning more about the impact of epigenetics there is a great NOVA documentary called *Ghost in Your Genes* - [www.pbs.org/wgbh/nova/genes/issa.html](http://www.pbs.org/wgbh/nova/genes/issa.html)

Here is what the parents reported:
Sasha appears to be bright but this is based upon mere glimpses of her completing tasks when they are watching from afar.

Most of the time she just seems scared – never truly at ease or calm

- This occurs even though she has a very clearly followed routine every day
- And she gets lots of love and attention

Here is what developmental assessments showed:

- **IQ Testing**
  - Sasha’s Full Scale IQ score was 102
  - Notable Verbal/Performance split was noted
    - Sasha scored significantly better on the Performance (non-verbal) section than on the Verbal

- **Developmental assessment**
  - Sasha was found to have delays in multiple domains
    - Language
    - Fine Motor
    - Social/emotional

**Large Group Discussion:** What do you think the verbal/performance split might mean in connection with Sasha’s early experiences?

*Review the following after discussion:*

The Verbal/Performance Split was a very telling sign of Sasha’s early experiences. Sasha's brain had learned to pay more attention to non-verbal cues (which was protective in her environment) than verbal cues. Unfortunately, this is a fairly common finding for traumatized children.
Return to your small groups and discuss, based on the findings overall, what you might conclude about the basis for Sasha’s problems.

**Report Out:** Review the following after the small groups report out:

- Many of the problems Sasha’s parents reported, combined with the finding of the developmental assessment, suggest that she also suffers from PTSD and has several deficits due to her chaotic first two years of life.
  - Hoarding food, stealing and other impulsive behaviors are classic signs of severe neglect early in life.
  - Although the reason for her entrance into foster care was officially “physical abuse,” information provided by her parents suggest a very chaotic and neglectful home environment.

- Recall from Andrey’s case that sleep disorders are common in traumatized children.
  - This includes Night Terrors which usually occur during a phase of deep non-REM sleep (usually within the first hour of sleep)
  - Includes sudden awakening from sleep, persistent fear or terror that occurs at night, screaming, sweating, confusion, rapid heart rate, inability to explain what happened, usually no recall of "bad dreams" or nightmares, may have a vague sense of frightening images but have no memory of the event on awakening the next day.  
    

- The remainder of Sasha’s symptoms can be attributed to her persistent state of hyperarousal
  - Hyperarousal is a multi-dimensional process, characterized by both mental and physical changes.
  - These include an increase in the activity of those parts of the central and peripheral nervous system responsible for the perception and processing of potentially threatening information.
  - The many physiological changes during hyperarousal will influence the way a person thinks, feels and acts.
  - It appears that Sasha used a combination of hyperarousal and dissociation
We have talked about dissociation but what about hyperarousal?

Remember the question the brain asks itself when faced with a terrifying situation? “Can I escape or am I trapped and cannot get away?”

When the response to that question is that the child must fight or flee to stay alive, the brain makes a different adaptive choice than to dissociate. The brain then responds in a manner that during this event is very adaptive – it becomes *hyperaroused*.

Hyperarousal is an adaptive response to trauma. It includes:

- The mobilization of the body for defense
  This includes sending blood from the core of the body to the extremities, it increase heart rate, blood pressure and respiration – sending oxygen into the muscles.
  - It is preparing the body to fight or flee.
- It is another way the brain works to increase the chances of survival based upon the situation.

Again, let me refer you to Handout #5.3 for an excellent discussion of hyperarousal.

**Handout #5.3:** Childhood Trauma, the Neurobiology of Adaptation, and “Use-dependent” Development of the Brain: How “States” Become “Traits”

It involves the adaptive responses of fight, flight or freeze:

- The neurophysiological responses to either a real or perceived threat involve a TOTAL body mobilization that involves: the CNS, ANS and HPA axis and the immune system.
“The brainstem nuclei and neurotransmitter systems involved in these critical adaptive responses play a major role in the symptom expression of PTSD.”

“This set of responses is intact and active in young children. The hormones and neurotransmitters involved in the stress response play a key role in modulating the process of neuronal differentiation.”

**Large Group Discussion**

Let’s look again at Sasha’s presenting problems:

- Night terrors
- Impulsive behaviors, hoarding foot, stealing
- Easily startled and always “on edge”
- Sometimes seems to not hear what they are saying
- Aggressive/violent with parents and other children
- Didn’t smile or seem to enjoy toys

Based on what we have just learned about hyperarousal, what do you see underlying these behaviors?

**After the discussion, review the following:**

*Fear inhibits exploration:*

- As was clearly evident in Sasha’s case – a threatened child will rarely explore
- Children who experienced chronically threatening situations early in their development will be less likely to explore, discover, master or find pleasure in play
- SAFE environments and living groups facilitate cognitive growth and creativity

This is why it is important to stress safety: safety in the physical sense but also feeling safe in relationships. This does not happen overnight but through repeated exposure to caring, nurturing adults. Traumatized children cannot be pushed into relationships. As a clinician, it may take many Modules of parallel play before the child feels comfortable enough to join in. Allowing children to move at their own pace is key to building a trusting relationship. This goes for parents/caregivers as well.
Small Group Work

Return to your small groups and discuss the treatment approach for Sasha:

1. What is the goal of the treatment for Sasha? Why this goal?
2. What would be some important neurodevelopment considerations to take into account when designing the treatment for Sasha?
3. What is your treatment approach?

Report Out

1. What is the goal of the treatment for Sasha? Why this goal?

After discussion, cover the following as the goals and approaches used by the Child Academy Academy:

The goal of treatment for Sasha was to recreate a safe, nurturing environment for her. Treatment for Sasha had to be relationally based.

- The majority of Sasha’s developmental deficits required her new parents to provide the physical, emotional and cognitive stimulation and experiences she missed out on during her first year.
- Because that first caregiving relationship is the primary context in which children learn language, social behaviors, and a host of other key behaviors required for healthy development, Sasha’s lack of consistent and enriched experiences in early childhood resulted in delays in motor, language, social and cognitive development.
Recommendations included providing replacement experiences that should have taken place during their infancy – rocking, touch, singing (the somatosensory bath)

2. What would be some important neurodevelopment considerations to take into account when designing the treatment for Sasha?

After the discussion, review the following as needed:

- Treatment is taking place at an age when Sasha’s brain is harder to modify and change.
- Her parents will need to provide even more bonding experiences to help develop attachment.

3. What is your treatment approach?

After the discussion, share the following from the Child Trauma Academy’s work with Sasha and her parents:

Here is what the Child Trauma Academy found to benefit Sasha:

- Her parent’s understanding that although she was almost 3 years old inside she was still an infant
- Participation in infant massage (which was also taught to her parents)
- Music and Movement
  Sasha and her mother attended classes 2 times a week but spent time each day singing some of the songs from their class
- Sasha’s parents developed a daily schedule that provided the predictability she needed to progress

It is ok to be very prescriptive if necessary. In this case, a calendar with daily activities at designated times was developed. Sasha needed structure and knowing what to expect from her days helped provide another layer of safety. This also works with older children who have difficulty transitioning.
Lecture: Let’s review some important facts about the impact of trauma on children:

1. **Trauma alters neurodevelopment.**
   - This includes a variety of complex physical, emotional, behavioral, cognitive and social sequelae
     - Altered cardiovascular regulation
     - Behavioral impulsivity
     - Increased anxiety
     - Increased startle response
     - Sleep abnormalities
     - Altered cognition and perception

   In a state of “fear,” lower areas of the brain are “in control.” Children in a state of persistent arousal will have a difficult time storing and retrieving information from higher cortical areas.

   Remember how states become traits? The longer the brain is in the prolonged alarm state, the more likely it is that its neuroarchitecture will change to reflect these experiences.

2. **Trauma and fear impact learning.**
   - Traumatized children have a set of problems in the classroom. These include difficulties with attending, processing, storing and acting on their experiences in an age-appropriate fashion.

   “Childhood trauma, including abuse and neglect, is probably the single most important public health challenge in the United States.”

3. **Children exposed to trauma may react in a variety of ways.**
   - Some of these ways are:
     - Aggressive behavior
• Staring episodes/dissociation
• Sleep disturbances
• Problems concentrating
• Exaggerated startle response
• Irritable
• Angry outbursts
• Hypervigilance
• Restricted range of emotion

4. Children exposed to developmental trauma are often misdiagnosed.

Why is this?
• Due to a failure to properly obtain the child and their family’s history (either due to lack of knowledge of the importance of early experience or because no information is available)
• Because the focus is on the presenting behaviors, which can often be confusing

“Infant and children who experience multiple forms of abuse often experience developmental delays across a broad spectrum, including cognitive, language, motor, and socialization skills.” As such, “they tend to display very complex disturbances with a variety of different often fluctuation presentations.” Van der Kolk, 2005

Diagnoses based purely on behaviors are often incorrect. A child who has experienced the loss of a parent or sibling may also appear hyperactive and have difficulty sitting still or attending to the teacher. However, the etiology of these behaviors is hyperarousal, not ADHD.

Lecture: Let’s now focus on: Working with Children Impacted by Developmental Trauma and Neglect. What are the implications for clinical work with children, their families and those in their community?
Large Group Discussion: Why is it important to empower caregivers to help? What can caregivers do to provide their children with positive reparative experiences?

After group discussion, review the following:

Caregivers have the ability to provide positive reparative experiences by:
- Doing their best to understand the child’s behaviors before implementing punishment or consequences
- Being consistent, predictable and repetitive
- Teaching and modeling appropriate social behaviors
- Listening and talking to their children

Children, especially traumatized or emotionally or behaviorally disordered children, need safe, predictable, patterned environments.
- Rituals, routines and schedules
  Examples: Greeting or parting with the child with the same positive, patterned responses or activities (this lets the child know that his “world” has not changed and is safe and stable)
- Limit Setting
  Limits are set to keep the child safe (and other children in the home, environment, classroom), the adult safe and to protect property.
  The adult’s ability to set limits, structure and soothe will help the child learn methods to contain and calm themselves later in life.

Large Group Discussion: How can we as therapists work with the teachers of children exposed to trauma?

After discussion, review the followings:
Clinician should be advocates for the traumatized child. Often times, teachers are unaware of the experiences that are impacting the child’s behavior or lack an understanding of how trauma impacts a child’s ability to learn.

Opening a dialog with the child’s teachers will help provide structure for the child across the environments in which they spend their time. Most teachers appreciate any ideas that will help keep their classrooms safe for all children.

Work together on Handout #5.6. Fill in together how you would incorporate each of the key features of therapeutic interventions with children exposed to trauma into your work with adopted children who have trauma histories.

**Handout #5.6  Features of Therapeutic Interventions with Children Exposed to Trauma: Work Sheet**

Therapeutic interventions with children exposed to trauma should:

- Be based on the unique strengths and vulnerabilities of each child

  How we do this:

  - Have the primary objective of therapeutic activities to ensure that experiences are “relevant, relational, repetitive and rewarding” (Perry)

  How we do this:

  - Ensure that activities are provided within the context of healthy relationships with safe, predictable and nurturing adults
How we do this:

- Are provided in a sequence that closely resembles normal development.

Facilitate a discussion the small groups’ ideas on incorporating each of the following features into their clinical work with adopted children who have been traumatized:

- Be based on the unique strengths and vulnerabilities of each child
- Have the primary objective of therapeutic activities to ensure that experiences are “relevant, relational, repetitive and rewarding” (Perry)
- Ensure that activities are provided within the context of healthy relationships with safe, predictable and nurturing adults
- Are provided in a sequence that closely resembles normal development.

Make the following points after the discussion:

- It is VERY important that the activities used in the therapeutic interventions are things that the child enjoys. It is also helpful if they are activities that the caregivers can also engage in with the child to ensure that the number of repetitions is high. The more the repetitions throughout the day, the greater the amount of change.

- “If a child starts with attachment problems and has few opportunities to develop other relationships they will be unprepared to meet the challenges of the adult world.”
• Teaching parents about healthy development gives them a better understanding of what their child missed while living in a neglectful or abusive environment. They will likely be able to pinpoint where their child is developmentally – say a 4-year-old whose language development is more on par with a 2-year-old or whose fine motor skills are more like that of a 3-year-old.

Look at Handout #5.7 which lists a number of conditions and behaviors that may be observed in children who are maltreated and later adopted.

Review this list and think of one of your cases in which a child demonstrated one or more of these conditions and behaviors.

Allow 2-3 minutes for students to review the list and then ask for a couple of examples from students of cases involving these conditions/behaviors.

There is a growing body of research that supports a range of trauma interventions for children and youth. Look at Handout #5.8: Trauma Interventions Rated by the California Evidence Based Clearinghouse for Child Welfare.

Allow 2-3 minutes for students to review the interventions and then ask if students have used/are using any of these interventions or participated in any training on any of these interventions.
Lecture

An additional intervention is Dr. Peter’s Levine’s Somatic Experiencing.

Somatic Experiencing® is a body-awareness approach to trauma being taught throughout the world. It is the result of over forty years of observation, research, and hands-on development by Dr. Levine. Based upon the realization that human beings have an innate ability to overcome the effects of trauma, Somatic Experiencing has touched the lives of many thousands. SE® restores self-regulation, and returns a sense of aliveness, relaxation and wholeness to traumatized individuals who have had these precious gifts taken away. Peter has applied his work to combat veterans, rape survivors, Holocaust survivors, auto accident and post surgical trauma, chronic pain sufferers, and even to infants after suffering traumatic births. For more information:  http://www.traumahealing.com/somatic-experiencing/index.html

Let’s look at a video with Dr. Peter Levine on trauma and somatic experiencing using a slinky!

Dr. Peter Levine: Trauma and Somatic Experiencing
http://www.youtube.com/watch?v=ByalBx85iC8

Large Group Discussion: What are your thoughts about Somatic Experiencing?
Lecture: Reactive Attachment Disorder (RAD): Common Diagnosis for Adopted Children

Finally, let’s look very briefly at Reactive Attachment Disorder (RAD). Here is what we know from the research on RAD:

- There is a lack of research on prevalence of RAD – a 1994 study suggests prevalence at less than 1% of the general population meets criteria for RAD (Richters & Volkmar, 1994).
- However, one study focusing on the high-risk populations of children in foster care suggested that 38% had signs of RAD (Zeanah et. al., 2004).
- Another study of institutionalized children in Bucharest, Romania found 40% had clinically significant signs of RAD with another 33% showing some signs of the disorder (Smyke et. al., 2002; Zeanah et al., 2002).
- This should lead us to be very careful about labeling adopted children as RAD.

Large Group Discussion: Is this a diagnosis you see regularly in your work with adopted children? How do you feel about the diagnosis?

Lecture

Some people feel strongly that most adopted children (especially those who have experienced trauma and maltreatment are truly RAD). The clinicians at the Child Trauma Academy focus more on better understanding the child in the context of their early experience and how to help build strong, healthy relationships with their current caregivers and ultimately with others (extended family, peers, etc.).
Look at Handout #5.9 which provides some final points on treatment for children exposed to trauma which have been developed by the Child Trauma Academy and provides additional web-based resources on neurodevelopment.

**Handout #5.9  Final Points on Treatment For Children and Youth Exposed to Trauma  
Child Trauma Academy**

**For Clinicians and Caregivers**

- Nurture, nurture, nurture
  - These children need to be held and rocked and cuddled
  - Be aware of what touch may have meant to these children in the past (pain, torture, abuse)
  - Be “attuned” to their responses to your nurturing and act accordingly
  - In many ways you are providing *replacement* experiences that should have taken place during infancy but you are doing it at a time when their brains are harder to modify
    - Therefore, they will need even more bonding experiences to help develop attachments

*Having relationships with attuned adults is an important factor in children’s growth following early developmental trauma. Attuned caregivers learn to read cues* (e.g., I don’t want you to hug me – or I’m not ready for you to hug me) and learn to adjust (e.g., ok – you’re not ready for me to hug you -- how about I brush your hair? Or pat your hand or stroke your back?) *They are patient – unwilling to give up no matter how long it takes. The same goes for clinicians.*

- Try to understand behavior before dispensing punishment or consequences
The more you can learn about the impact of trauma on relationships, bonding, normal development and abnormal development the better you will be able to develop useful behavioral and social interventions.

- Provide parenting based on the child’s emotional age
  - Abused and neglected children will often be emotionally and socially delayed
  - Stay “in-tune” with the child and meet him/her where he or she is.

- Be consistent, predictable and repetitive
  - Maltreated children with (and often without) attachment problems are very sensitive to transitions, surprises, chaotic social situations, changes in schedules, and in general any new situation
  - When children feel safe and secure they can benefit from the nurturing, enriching emotional and social experiences provided to the.

- Model and teach appropriate social behaviors
  - Coaching, teach social skills based upon appropriate developmental level

**Always, always, always** remember to provide treatment based upon the developmental age of the child. A child may be 10 chronologically but 3 socially. Placing this child in a large group activity would be setting them up to fail. Think about what kind of interaction would be appropriate for a 3 year old – dyadic relationships – so a group with one (or two at the most) other children will be most effective.

- Listen and play with these children
  - When you are quiet and interactive with them, you find that they will begin to show you and tell you about what is really inside of them
  - They will sense that you are there just for them – they will feel how you care

- Have realistic expectations of these children
  - Comprehensive evaluations can be very helpful in beginning to define the skill areas of a child and the areas where progress will be slower

- Be patient with the child’s progress and with yourself

- Take care of yourself and take advantages of other resources

**Encourage parents to actively seek respite and participate in self-care strategies.** They will be a better parent if they are more relaxed and less stressed out. Caring for a traumatized child is exhausting, difficult work. Validate their struggles and help remind them of the good job they are doing. Help them identify other safe, caring, nurturing adults (whether family members or close friends) who can also be a source of support for their child and the family; someone the child is comfortable with and who can provide some time for the
parent(s) to have a quite dinner out, go to a movie or just sleep. Clinicians must also practice good self-care so that they can continue to do this important work.

Resources for neurodevelopment information:

- [www.childtrauma.org](http://www.childtrauma.org)
  - [http://www.childtrauma.org/ctamaterials/Neuroarcheology.asp](http://www.childtrauma.org/ctamaterials/Neuroarcheology.asp)
- [http://www.traumacenter.org/about/about_bessel.php](http://www.traumacenter.org/about/about_bessel.php)
- [www.trauma-pages.com](http://www.trauma-pages.com)
- [www.bbailey.com](http://www.bbailey.com)

3:30PM – 4:15PM  Adolescent Brain Development [Learning Objective #10]

We have looked closely at adolescent brain development in early childhood. Now, let’s look at the neurobiological processes that take place during adolescence. There are dramatic changes in the brain during adolescence that are second only to the brain development processes in early childhood. Like in early childhood, there are rich opportunities for youth to be supported in developing cognitively, socially and emotionally.

Over the past decade, a growing body of research has documented what parents have long suspected: an adolescent brain’s is not fully cooked! It is not an adult brain. Emerging scientific evidence shows that adolescence and young adulthood are periods of gradual and continuing brain development that begins in puberty and continues through the mid-20s – or, for some young people – particularly those who have experienced trauma – may be even later.

During adolescence, the brain is undergoing extensive rewiring, resembling a network and wiring upgrade.
As an introduction, let’s look at a video, The Wiring of the Adolescent Brain, which features one of the leading neuroscientists in the area of adolescent brain development.

Video: The Wiring of the Adolescent Brain
http://www.pbs.org/wgbh/pages/frontline/shows/teenbrain/view/

[Note to Trainer: Go to this page and click on 2. The Wiring of the Adolescent Brain. Stop the video the next segment on Mood Swings begins.]

Let’s look at three key processes that are happening in the adolescent brain, beginning at puberty and continuing through young adulthood. Dr. Giedd references each of these in the video.

First, the prefrontal cortex is gradually developing during adolescence. Here is where the prefrontal cortex is located:

The prefrontal cortex governs reasoning, decision making, judgment and impulse control. The prefrontal cortex is one of the last regions of the brain to reach maturation. This delay may help to explain why some adolescents act the way they do. The so-called “executive functions” of the human prefrontal cortex include:

- Focusing attention
- Organizing thoughts and problem solving
- Foreseeing and weighing possible consequences of behavior
- Considering the future and making predictions
• Forming strategies and planning
• Ability to balance short-term rewards with long term goals
• Shifting/adjusting behavior when situations change
• Impulse control and delaying gratification
• Modulation of intense emotions
• Inhibiting inappropriate behavior and initiating appropriate behavior
• Simultaneously considering multiple streams of information when faced with complex and challenging information

Beginning in puberty, the prefrontal cortex undergoes dramatic changes that become increasingly evident throughout adolescence. Through adolescence, young people begin to rely less on the limbic system – the emotional center of the brain – and gradually more on the frontal lobes, the seat of judgment and impulse control. You can see in this graphic how the prefrontal cortex is becoming more and more developed through adolescence (more blue in this area).

**Age 12**
During adolescence, the brain is undergoing a lot of changes. Gray matter diminishes as neural connections are pruned.

**Age 16**
Because the brain is still developing, it is more sensitive to drugs.

**Age 20**
The changes drugs cause are more likely to ‘stick’ and become hardwired as addiction by adulthood.
The second process is shifting levels of dopamine in the adolescent brain.

Dopamine is a chemical that links action to pleasure and its redistribution can raise the threshold of stimulus that is needed to feel pleasure. As a result, adolescents may not longer find activities that they previously enjoyed – such as family, neighborhood friends, or school time – exciting. Here is graphic of the dopamine pathways in the brain.

Because of shifting levels of dopamine, adolescents may seek new excitement through increasingly risky behaviors. As a general rule, adolescents and young adults are more likely than adults over 25 to binge drink, smoke cigarettes, have casual sex partners, engage in violent and other criminal behavior, and have fatal or serious automobile accidents, the majority of which are caused by risky driving or driving under the influence of alcohol. Many forms of risk behavior initiated in adolescence elevate the risk for the behavior in adulthood (e.g., drug use), and because some forms of risk-taking by adolescents put individuals of other ages at risk (e.g., reckless driving, criminal behavior).

There is, however, healthy risk taking. During adolescence stage, young people may experiment with many aspects of life, take on new challenges, investigate how sectors interconnect, and they use these processes to define and shape both their identities and their knowledge of the world. During this stage the adolescent learns how to think and act. Their developing cognitive skills play a major role as they take risks and learn to understand and value the consequences of their behavior. Sequentially, experimenting with new behaviors and feelings can encourage more complex thinking, increase confidence, and help to develop their ability to assess and undertake risks.
in the future. The shifts in dopamine prime adolescents for risk taking—and these risks that they are primed to take can lead to healthy growth and development.

**The third process is the combined pruning and myelination of neurons.** Just as early childhood, there is considerable activity in the synapses—the chemical junctures that allow neurons to communicate with one another. Synapses that are used most heavily grow stronger through a process of myelination—the white matter of the brain (myelin) insulates them and speeds up conductivity and connections. Here is an illustration of the myelin sheath coating the axon of a neuron and making it stronger and more efficient.

![Illustration of myelin sheath](image)

The synapses that are used little begin to wither and die off—through the process of pruning. This is popularly referred to as the “use it or lose it” principle. As explained in the National Campaign to Prevent Teen Pregnancy’s *The Adolescent Brain: A Work in Progress*: "If a teen is doing music, sports, or academics, those are the connections that will be hard-wired. If they’re lying on the couch or playing video games, those are the cells and connections that are going to survive."

**Small Group Discussion**

Return to your small groups and discuss the following:
1. How would you explain to adoptive parents the role of shifting levels of dopamine in their adolescent’s risk taking behaviors?
2. How would you explain the difference between unhealthy and healthy risks as they related to adolescent brain development?
3. What preventive steps could you guide adoptive parents in taking in supporting their adolescent’s healthy brain development?

(Allow 7-8 minutes for this discussion).

Ask the groups to share the ways that would explains the issues in Questions #1 and #2. If time permits, ask for volunteers to role play a discussion between a therapist and adoptive parents on these issues.

Ask for reporting out of preventive steps that a therapist could guide adoptive parents in taking.

Review the following:

Adolescents should be educated about their developing brain. Three themes are important: (1) how the “judgment” part of the brain (pre-frontal cortex) is slower to mature but is gradually developing during adolescence, (2) their brains are primed for risk taking – which can be negative and potentially dangerous or positive and supportive of healthy growth and development; and (3) adolescence is a time of “use it or lose it” so actively engaging in positive interests and pursuits lays down strong brain circuits for the future. Neurodevelopmental education can help young people improve their understanding of themselves and possibly make better decisions for themselves.

Because parents are vital in prevention efforts, they should also be educated about the findings from this emerging science. Here are 6 ways that principles of neurodevelopment can reinforce prevention efforts by parents:

- **P** = Promote activities that capitalize on the strengths of the developing brain (e.g., sports and music)
- **A** = Assist your youth when faced by challenges that require a lot of planning.
- **R** = Reinforce the value in seeking advice and input from you and other adults.
- **E** = Educate your youth that risk taking can have negative consequences not foreseen.
N = Never minimize the developing brain’s susceptibility to negative risk taking.
T = Tolerate the “oops” behaviors that may be the result of an immature brain.
These are taken from the resource by Mentoring USA which is provided in your reading list.

We have come to the close of our Module today on trauma and neurodevelopment. Please ask yourselves whether you can:

1. Describe three ways that trauma impacts adopted children?
2. Identify at least three tools and techniques to support recovery from adverse beginnings?
3. Describe five factors that affect early brain development?
4. Describe the neurodevelopmental impact of neglect and traumatic stress in childhood?
5. Describe at least three positive and three negative implications of brain neurobiology on child and youth development?
6. Identify at least two clinical skills in using the principles of brain neurobiology in assessment?
7. Identify at least two clinical skills when intervening in response to the neurodevelopmental impact of:
   - Childhood neglect
   - Traumatic stress in childhood
   - Childhood PTSD
8. Identify at least 3 signs/behaviors that can be present in:
   - Adopted children who were previously maltreated
   - Adopted children with neglect-related attachment problems
9. List three critical principles for clinicians and caregivers to implement with children exposed to trauma?

10. Describe at least two key processes that characterize the development of the adolescent brain?

As a result of this Module, you should be able to answer “yes” to each of these questions. If not, please feel free to talk with me after the Module and please review the Module materials.

An optional Module is provided to you on psychotropic medication. We encourage you to use these materials and familiarize yourself with this information. In recent years, the use of psychotropic medications among children and adolescents – especially those in the child welfare system – has become a high priority concern. Studies show that between 13% and 52% of children in foster care are prescribed psychotropic medications. Studies also show:

- Children in foster care are more likely to be prescribed psychotropic medications as they grow older, with 3.6 percent of two to five year-olds taking psychotropic medication at a given time. This increases to 16.4 percent of 6-11 year olds and 21.6 percent of 12-16 year olds. The likelihood that a child will be prescribed multiple psychotropic medications also increases with age.

- Males in foster care are more likely to be receiving psychotropic medications (19.6 percent) than their female counterparts (7.7 percent).

- Children scoring in the clinical range on the Child Behavioral Checklist, a common tool for assessing both internalizing and externalizing behavioral issues among children and youth, are much more likely than those with subclinical scores to receive psychotropic medications.

Your reading list also provides you with resources on these issues. Please take advantage of the materials that we have provided to you to expand your knowledge of psychotropic medications and their use with children and youth.

In your email inbox, you will find a message with a link to a brief online survey for you to provide feedback on today’s Module. It will ask you to rate the quality and relevance of the Module content and the effectiveness of the learning activities, to identify the strengths of the training Module, and to recommend ways that the training can be improved. Please follow the link in the email and provide the feedback right ways while the Module experience is fresh in your memory.

You will also receive an email directing you to the “test” on this Module. This “test” is designed to help you and me assess what you have learned from the Module today.
The next Module will build on our work today that looked at attachment from the perspective of neurodevelopment and that will examine attachment-focused interventions with a focus on Developmental Dyadic Psychotherapy (DDP). You will find your pre-Module assignments on the website.

Thank you for your attention. See you next ________ (week, month)!
Module #5  Trauma and Brain Neurobiology

Reading List

Web-Based Resources


Other Resources


Resources on Adolescent Brain Development


Resources on Psychotropic Medications


Handout #5.1 Templates for Future Relationships

CLARA: Clara was born when her mom was only 15. She lived with her mom and her mom’s boyfriend for six years. Her mom and the boyfriend used and sold drugs. There were always strangers in and out of the home. Clara often received the brunt of her mother’s anger and frustration. Her mom yelled at her and there were often drunken fights in the apartment. When this happened, Clara retreated to a corner of the basement where she kept a special doll. When Clara was 6, she entered foster care. Her parents’ rights were terminated and at age 10, Clara was adopted by Connie and Dave Brown.

What is Clara’s “template for future relationships”?

JACOB: Ruth and Tom adopted Jacob from an orphanage in Russia. He entered the orphanage when he was 2 days old because his mother knew that she could not care for him financially. When she signed the relinquishment papers, she left him a 4 page hand written letter. While in the orphanage, Jacob received minimal, but adequate caregiving. Within 2 months, he was placed with Ruth and Tom in the U.S. -- they are a professional couple who are unable to have children of their own.

Jacob was the second child that had been placed with Ruth and Tom. The first child, a 2 month old little boy in foster care, had been with them for 6 months but was removed when a family member came forward who wanted to raise him. They were hesitant to get too attached to Jacob fearing history might repeat itself. Try as they might to protect themselves, Ruth and Tom quickly grew to love Jacob. Ruth took him to “mommy and me” classes and both Ruth and Tom showered him with time, touch and love.

What is Jacob’s “template for future relationships”?

SAMANTHA:
Part 1: Samantha was taken to the hospital by a neighbor who lived in the apartment next to her mother. She had a broken femur and collarbone. The ER doctor was not surprised by the results of the x-rays – healing fractures of different ages. Samantha was only 2 ½ years old. She was released by the hospital to a CPS caseworker. When the worker picked up the little girl, Samantha did not cling or look at her. She didn’t make a sound on the 45-minute ride to her new foster family’s home. The caseworker thought she was simply overwhelmed by all that had taken place over the last few weeks.

What is Samantha’s “template for future relationships”? 

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Part 2: The foster mother who met them at the door was a sweet older woman with a silent joy about her. She gently took Samantha in her arms and held Samantha’s face close to hers whispering softly into her ear that she was safe now. As the caseworker left, Samantha was being slowing rocked in the cradling arms of her foster mother.

How might Samantha’s emerging “template for future relationships”? 
How the Brain Responds to a Traumatic Event

Bruce D. Perry, MD, Ph.D.

This sequence developed by Dr. Bruce Perry shows how the brain responds to a traumatic event. Notice that with a prolonged alarm reaction, the child will experience an altered neural state. The longer the child remains in a persistent state of fear, the more likely it is that the child’s brain will change to reflect these experiences.

1. How have you encountered altered neutral states in children and adolescents with whom you worked? What were these children’s and youth’s histories of trauma?
This chart developed by Dr. Perry depicts how we (all of us) respond to threat. When threatened, we all move along the arousal continuum – from calm to aroused, aroused to being alarmed, from alarm to fear and from fear to terror. As we move along this continuum, different areas of our brain are in control. The more threatened we become, the more regressed or primitive our manner of thinking becomes. Not surprisingly, when a traumatized child is in a state of alarm, due to some reminder of past trauma, for example, the child will be less capable of concentrating, will become more anxious and will focus more on non-verbal than verbal cues. As the child continues to become more anxious and fearful, she will become more and more reactive. This become particularly important as we look at the implications for understanding the way a traumatized child is processing information, learning and reacting in a given situation (Perry, 2005).

2. What responses to trauma have you observed in the children and youth with whom you have worked? What changes have you seen in:
   a. Cognition
   b. Affect
   c. Behavior
   d. Physiology either through:
      
      Hypervigilance: the child’s sensory sensitivity accompanied by an exaggerated intensity of behaviors with the purpose of detecting threats;
accompanied by a state of increased anxiety, high responsiveness to stimuli, and a constant scanning of the environment for threats. 

*Dissociation*: the child’s withdrawal of attention from the outside world and focus on the inner world.
Handout #5.3: Childhood Trauma, the Neurobiology of Adaptation, and “Use-dependent” Development of the Brain: How “States” Become “Traits”

[this article is in pdf format and is posted on the C.A.S.E. website]
Handout #5.4  Results From Andrey’s Developmental Assessment

Results from Andrey’s developmental assessment showed delays in every domain due to early, pervasive sensory neglect.

Speech and language was severely delayed (expressive and receptive)
- Because Andrey did not consistently hear speech (i.e., he wasn’t talked to and interacted with by the adults around him), he missed the critical window related to language development
  - NOTE: the only way we learn language is by hearing it and because Andrey didn’t hear sound as he should have some sounds he would never be able to make

Fine and gross motor delays
- Because he spent most of this early life in a crib, without access to open spaces where he could crawl, walk and run, Andrey’s gross motor skills were underdeveloped
- Fine motor skills like holding a pencil were also delayed due to lack of opportunity

Delayed social and emotional development
- Andrey lacked a secure, safe, healthy attachment to a primary caregiver during his years in the orphanage so deficits in these areas are not surprising.
- His diminished self-regulatory capabilities only further added to his problems with peers (social development) who labeled him as weird.
Handout #5.5 Sasha’s Case

Sasha was adopted from the foster care system through a private agency when she was 2 years old. Her adoptive parents already had a son, age 5 and a half. Sasha was removed from her home at the age of 9 months due to physical abuse of her 4 year old sister, Kendra. Her mother and her boyfriend were arrested and ultimately convicted for causing life threatening injuries to Kendra. Once in custody, it was discovered that Sasha had also sustained injuries. She was found to have multiple fractures in various stages of healing.

Sasha and Kendra were placed in a foster/adoptive home. The plan was that as soon as their mother’s parental rights were terminated, the girls would be adopted by the family who had already been caring for them.

Unfortunately, Kendra had serious behavioral problems and the parents were unable to control her. While they still wanted to adopt Sasha, they were no longer interested in Kendra. Because CPS was committed to keeping the siblings together, they were both removed from home.

By the time the biological mother’s rights had been terminated just 6 months later, Kendra was in a psychiatric hospital and Sasha was in her third placement.

Finally, after 14 months in foster care Sasha was finally placed with an adoptive family. She was now 25 months old.

Sasha was not quite what her adoptive parents expected. She is a beautiful little girl whose eyes speak volumes. Her mother describes how she follows people with her eyes – always watchful. She rarely smiles. Her mother described an experience shortly after Sasha came to live with them. The mom was laying on the floor with Sasha playing with a stuffed puppy, tickling Sasha and making barking sounds. Sasha just stared at her intently. Then out of nowhere, Sasha grabbed the animal, threw it, then screamed and ran into another room. They described her as very suspicious. Even when they tried to rock her to sleep, she wouldn’t close her eyes.

While Sasha has grown more comfortable in her environment she still struggles with trusting her new parents.

Sasha was brought to the clinic following her expulsion from pre-school. Sasha had been with her adoptive family for less than a year and her new parents realized that they neither understood or were equipped to handle her behaviors. Age at intake – 33 months.
Presenting problems:
- Night terrors
- Impulsive behaviors, hoarding foot, stealing
- Easily startled and always “on edge”
- Sometimes seems to not hear what they are saying
- Aggressive/violent with parents and other children
- Didn’t smile or seem to enjoy toys

- If Sasha were brought to you for assessment and treatment, where would you begin? What questions would you ask? What data would you like to see? How would you make decisions about treatment?

- What types of assessments might you conduct?

- What would you like to know from Sasha’s foster care records
Handout #5.6 Features of Therapeutic Interventions with Children Exposed to Trauma: Worksheet

Therapeutic interventions with children exposed to trauma should:

- Be based on the unique strengths and vulnerabilities of each child
  
  How we do this:

- Have the primary objective of therapeutic activities to ensure that experiences are “relevant, relational, repetitive and rewarding” (Perry)
  
  How we do this:

- Ensure that activities are provided within the context of healthy relationships with safe, predictable and nurturing adults
  
  How we do this:

- Are provided in a sequence that closely resembles normal development.
  
  How we do this:
Handout #5.7 Conditions and Behaviors Seen in Maltreated Children who Have Been Adopted

- **Developmental delays** – the bond between the young child and caregiver provides the major vehicle for their development
  Lack of consistent and enriched experiences in early childhood can result in lags in physical, motor, language, emotional, social and cognitive development
- **Atypical eating behaviors** – atypical eating behaviors are common, especially in children with severe neglect and attachment problems
  May hoard food, hide food in their rooms, eat as if it is their last meal
- **Soothing behavior** – child may be very primitive, immature and have seemingly bizarre soothing behaviors
  May scratch or cut themselves, bite themselves, head bang, rock, or chant (these symptoms increase during times of stress)
- **Inappropriate Modeling** – children model adult behavior – even if it is inappropriate
  May have learned that abusive behavior is the “right” way to interact with others
- **Aggression** – a major problem with neglected, poorly attached children is aggression and cruelty.
  The result of two major problems in neglected children:
  - Lack of empathy
  - Poor impulse control
- **Psychological or Behavioral Problems**
  **Conscience Development**
  - May not show normal anxiety following aggressive or cruel behavior
  - May not show guilt on breaking laws or rules
  - May project blame on others
  **Impulse Control**
  - Exhibits poor control; depends upon others to provide control
  - Exhibits lack of foresight
  - Poor attention span
  **Self-Esteem**
  - Unable to get satisfaction from tasks well done
  - Sees self as undeserving
  - Sees self as incapable of change
  - Has difficulty having fun
- **Problems in interpersonal reactions**
  - Lacks trust in others
  - Demands affection but lacks depth in relationships
• Exhibits hostile dependency
• Needs to be in control of all situations
• Has impaired social maturity

➢ *Emotional functioning challenges*
• Has trouble recognizing own feelings
• Difficulty expressing feelings appropriately: especially anger, sadness and frustration
• Has difficulty recognizing feelings in others
Handout #5.8 Trauma Interventions Rated by the California Evidence Based Clearinghouse for Child Welfare

Scientific Rating 1: Well Supported by Research Evidence

**EMDR**

The information in this program outline is provided by the program representative and edited by the CEBC staff. The *Eye Movement Desensitization and Reprocessing (EMDR)* program has been rated by the CEBC in the area of: Trauma Treatment (Child & Adolescent).

**Types of Maltreatment:** Physical Abuse, Sexual Abuse, Physical Neglect, Emotional Abuse, Exposure to Domestic Violence

**Target Population:** Children and adults who have experienced trauma. Research has been conducted on Post-Traumatic Stress Disorder (PTSD), post-traumatic stress, phobias, and other mental health disorders.

*EMDR* is an 8-phase psychotherapy treatment that was originally designed to alleviate the symptoms of trauma. During the *EMDR* trauma processing phases, the client attends to emotionally disturbing material in brief sequential doses that include the client’s beliefs, emotions, and body sensations associated with the traumatic event while simultaneously focusing on an external stimulus. Therapist directed bilateral eye movements are the most commonly used external stimulus but a variety of other stimuli including hand-tapping and audio bilateral stimulation are often used.

**TF-CBT**

The information in this program outline is provided by the program representative and edited by the CEBC staff. The *Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT)* program has been rated by the CEBC in the areas of: Anxiety Treatment (Child & Adolescent) and Trauma Treatment (Child & Adolescent).

**Types of Maltreatment:** Sexual Abuse, Exposure to Domestic Violence

**Target Population:** Children with a known trauma history who are experiencing significant Post-Traumatic Stress Disorder (PTSD) symptoms, whether or not they meet full diagnostic criteria. In addition, children with depression, anxiety, and/or shame related to their traumatic exposure. Children experiencing Childhood Traumatic Grief can also benefit from the treatment.

*TF-CBT* is a conjoint child and parent psychotherapy model for children who are experiencing significant emotional and behavioral difficulties related to traumatic life events. It is a components-based hybrid treatment model that incorporates trauma-sensitive interventions with cognitive behavioral, family, and humanistic principles.
The overall goal of **TF-CBT** is to address symptoms resulting from a specific traumatic experience or experiences. This includes:

- Improving child PTSD, depressive and anxiety symptoms
- Improving child externalizing behavior problems (including sexual behavior problems if related to trauma)
- Improving parenting skills and parental support of the child, and reducing parental distress
- Enhancing parent-child communication, attachment, and ability to maintain safety
- Improving child's adaptive functioning
- Reducing shame and embarrassment related to the traumatic experiences

*Scientific Rating of 2: Supported by the Research Evidence*

**CPP**

The information in this program outline is provided by the program representative and edited by the CEBC staff. The *Child-Parent Psychotherapy (CPP)* program has been rated by the CEBC in the areas of: Domestic/Intimate Partner Violence: Services for Women and their Children, Infant and Toddler Mental Health (0-3) and Trauma Treatment (Child & Adolescent).

- **Types of Maltreatment:** Physical Abuse, Sexual Abuse, Physical Neglect, Exposure to Domestic Violence
- **Target Population:** Children age 0-5, who have experienced a trauma, and their caregivers.

**CPP** is a treatment for trauma-exposed children aged 0-5. Typically, the child is seen with his or her primary caregiver, and the dyad is the unit of treatment. **CPP** examines how the trauma and the caregivers’ relational history affect the caregiver-child relationship and the child’s developmental trajectory. A central goal is to support and strengthen the caregiver-child relationship as a vehicle for restoring and protecting the child’s mental health. Treatment also focuses on contextual factors that may affect the caregiver-child relationship (e.g., culture and socioeconomic and immigration related stressors). Targets of the intervention include caregivers’ and children’s maladaptive representations of themselves and each other and interactions and behaviors that interfere with the child’s mental health. Over the course of treatment, caregiver and child are guided to create a joint narrative of the psychological traumatic event and identify and address traumatic triggers that generate dysregulated behaviors and affect.

**PE-A**

The information in this program outline is provided by the program representative and edited by the CEBC staff. The *Prolonged Exposure Therapy for Adolescents (PE-A)*
program has been rated by the CEBC in the areas of: Anxiety Treatment (Child & Adolescent) and Trauma Treatment (Child & Adolescent).

**Types of Maltreatment:** Physical Abuse, Sexual Abuse

**Target Population:** Adolescents who have experienced a trauma (e.g., sexual assault, car accident, violent crimes, etc). The program has also been used with children 6 to 12 years of age and adults who have experienced a trauma.

*PE-A* is a therapeutic treatment where clients are encouraged to repeatedly approach situations or activities they are avoiding because they remind them of their trauma (in vivo exposure) as well as to revisit the traumatic memory several times through retelling it (imaginal exposure). Psychoeducation about common reactions to trauma as well as breathing retraining exercises are also included in the treatment. The aim of in vivo and imaginal exposure is to help clients emotionally process their traumatic memories through imaginal and in vivo exposure. Through these procedures, they learn that they can safely remember the trauma and experience trauma reminders, that the distress that initially results from confrontations with these reminders decreases over time, and that they are capable of tolerating this distress.

The overall goal of *Prolonged Exposure Therapy for Adolescents (PE-A)* is to promote the client’s ability to emotionally process their traumatic experiences and consequently diminish PTSD and other trauma-related symptoms.

**Scientific Rating of 3: Promising Research Evidence**

- **Alternatives for Families: A Cognitive-Behavioral Therapy (AF-CBT)**
  - *Abuse-Focused Cognitive Behavioral Therapy*
    - Topics: Trauma Treatment (Child & Adolescent)
    - Caregivers who are aggressive and physically, emotionally, or verbally abuse their children and their children who experience behavioral dysfunction, especially ...

- **Cognitive Behavioral Intervention for Trauma in Schools (CBITS)**
  - Topics: Anxiety Treatment (Child & Adolescent), Trauma Treatment (Child & Adolescent)
  - 3rd through 8th grade students who screened positive for exposure to a traumatic event and symptoms of post-traumatic stress disorder ...

- **I Feel Better Now! Trauma Intervention Program**
  - Topics: Trauma Treatment (Child & Adolescent)
  - At-risk children ages 6-12 with a history of trauma or loss.

- **Sanctuary Model**
  - Topics: Higher Level of Placement, Trauma Treatment (Child & Adolescent)
  - This program is not a client-specific intervention, but a full-system approach that targets the entire organization.

- **Seeking Safety for Adolescents**
  - Topics: Substance Abuse Treatment (Adolescent), Trauma Treatment (Child & Adolescent)
  - Adolescents with a history of trauma and/or substance abuse.
• SITCAP-ART
  o Topics: Trauma Treatment (Child & Adolescent)
  o At-risk and adjudicated youth, ages 12-17, with a history of trauma and/or loss.
• Trauma-Focused Coping (TFC)
  o Topics: Trauma Treatment (Child & Adolescent)
  o Children and adolescents in schools who have suffered a traumatic exposure (e.g.,
    disaster, violence, murder, suicide, fire, accidents)
Handout #5.9 Final Points on Treatment For Children Exposed to Trauma from the Child Trauma Academy

For Clinicians and Caregivers

- Nurture, nurture, nurture
  - These children need to be held and rocked and cuddled
  - Be aware of what touch may have meant to these children in the past (pain, torture, abuse)
  - Be “attuned” to their responses to your nurturing and act accordingly
  - In many ways you are providing replacement experiences that should have taken place during infancy but you are doing it at a time when their brains are harder to modify
    - Therefore, they will need even more bonding experiences to help develop attachments

Having relationships with attuned adults is an important factor in children’s growth following early developmental trauma. Attuned caregivers learn to read cues (e.g., I don’t want you to hug me – or I’m not ready for you to hug me) and learn to adjust (e.g., ok – you’re not ready for me to hug you -- how about I brush your hair? Or pat your hand or stroke your back?) They are patient – unwilling to give up no matter how long it takes. The same goes for clinicians.

- Try to understand behavior before dispensing punishment or consequences
  - The more you can learn about the impact of trauma on relationships, bonding, normal development and abnormal development the better you will be able to develop useful behavioral and social interventions

- Provide parenting based on the child’s emotional age
  - Abused and neglected children will often be emotionally and socially delayed
  - Stay “in-tune” with the child and meet him/her where he or she is.

- Be consistent, predictable and repetitive
  - Maltreated children with (and often without) attachment problems are very sensitive to transitions, surprises, chaotic social situations, changes in schedules, and in general any new situation
  - When children feel safe and secure they can benefit from the nurturing, enriching emotional and social experiences provided to the.

- Model and teach appropriate social behaviors
Coaching, teach social skills based upon appropriate developmental level

**Always, always, always** remember to provide treatment based upon the developmental age of the child. A child may be 10 chronologically but 3 socially. Placing this child in a large group activity would be setting them up to fail. Think about what kind of interaction would be appropriate for a 3 year old – dyadic relationships – so a group with one (or two at the most) other children will be most effective.

- Listen and play with these children
  - When you are quiet and interactive with them, you find that they will begin to show you and tell you about what is really inside of them
  - They will sense that you are there just for them – they will feel how you care
- Have realistic expectations of these children
  - Comprehensive evaluations can be very helpful in beginning to define the skill areas of a child and the areas where progress will be slower
- Be patient with the child’s progress and with yourself
- Take care of yourself and take advantages of other resources

Encourage parents to actively seek respite and participate in self-care strategies. They will be a better parent if they are more relaxed and less stressed out. Caring for a traumatized child is exhausting, difficult work. Validate their struggles and help remind them of the good job they are doing. Help them identify other safe, caring, nurturing adults (whether family members or close friends) who can also be a source of support for their child and the family; someone the child is comfortable with and who can provide some time for the parent(s) to have a quite dinner out, go to a movie or just sleep. Clinicians must also practice good self-care so that they can continue to do this important work.

Resources for neurodevelopment information:

- [www.childtrauma.org](http://www.childtrauma.org)
  - [http://www.childtrauma.org/ctamaterials/Neuroarcheology.asp](http://www.childtrauma.org/ctamaterials/Neuroarcheology.asp)
- [http://www.tramacenter.org/about/about_bessel.php](http://www.tramacenter.org/about/about_bessel.php)
- [www.trauma-pages.com](http://www.trauma-pages.com)