WHY DO WE CARE?
THE NEUROBIOLOGY OF CHILD MALTREATMENT AND ITS CONSEQUENCES

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NO FINANCIAL DISCLOSURES

- (there’s no money in Child Abuse!...😊)
OBJECTIVES

- Define neurobiology and its relationship to healthy and maladaptive childhood environments
- Describe epigenetics and the processes by which the developing brain adapts to experiences
- Provide an overview of the Adverse Childhood Experiences (ACE) studies and the effects of ACE on adult physical and mental health
- Discuss Attachment Theory and qualities of maladaptive and resilient children
**NEUROBIOLOGY AND CHILD MALTREATMENT**

- The brain changes with experience throughout the lifespan
- Neuroscience research is helping uncover the mechanisms by which maltreatment during childhood puts individuals at risk
  - physical and mental health problems
  - educational and social difficulties
- The hope is to develop more effective prevention and intervention strategies to support families in raising children.
STUDYING THE BRAIN

- **Historically**
  - Accidents of nature: disease or trauma that have resulted in focal injury
  - The brain lesion usually discovered at autopsy

- **Imaging**
  - Head CTs and MRIs of the Brain have allowed the ability to assess points of injury in living patients
  - fMRI and PET scans have added to functional knowledge in “real time”

- **EEG**
  - Computers now allow us to appreciate subtle differences in function including sub-clinical seizures and alterations in cerebral dominance

- **Electron microscopy and chemical analysis**
  - Further insights into brain function at the cellular and neurochemical level
Multiplexing Signal Acquisition in fMRI
The brain responds to experience in specific ways during different parts of the life cycle

Brain plasticity
- the ability of the brain to respond to experience by modifying its structure and function during development and throughout life
- the major concept guiding the integration of neurobiology and psychology

Maltreatment during childhood may be viewed as some of the experiences that contribute to brain development
- potentially leading to differences in brain anatomy and functioning
Prenatal brain development is controlled by gene expression, and by mechanisms of interaction among the developing parts of the brain.

- Both animal and human studies suggest that fetal exposure to maternal stress can influence later stress responsiveness.
- In animals, this effect has been demonstrated in the offspring of the studied pregnancy AND in subsequent generations.
- The precise biological mechanisms that explain these findings remain to be elucidated, but epigenetic modifications of DNA appear to play a role.
EPIGENETICS

- Waddington, C.H. *Endeavor*, 1942
  - “the branch of biology which studies the interactions of genes and their environment that bring the phenotype into being”

- The study of changes in gene function that occur without a change in DNA sequence
EPIGENETICS

- Studies of maternal care in rats show that differences in the quality of nurturing affect brain functioning at the neuronal level in rat pups.
- This can negatively affect cognition and the expression of psychopathology later in life.
- Rats whose mothers showed increased levels of licking and grooming during their first week of life showed less exaggerated stress responses as adults.
- The behavior of mother-pup interactions in the pups has been demonstrated to be passed on to the next generation.
EPIGENETICS

- Significant stress in the lives of young children is a risk factor for the later development of health-threatening behaviors
  - This is a catalyst for physiologic responses that lay the groundwork for chronic, stress-related diseases later in life
  - ACE Studies (later...)

From Genes to Proteins - Traditional View
Histone modifications

- Chromatin = histone proteins wrapped with DNA
  - Nucleosome, subunits of chromatin
- Histone modifications
  - change how the DNA is wrapped
  - influence binding of other proteins
  - Can profoundly influence transcriptional activity
NUCLEOSOME

- DNA wrapped around 8 histone proteins
- Histones H2A, H2B, H3 and H4 are colored
- These proteins' basic amino acids bind to the acidic phosphate groups on DNA
- DNA is gray
Epigenetic Modification

- Methylation of a histone or DNA usually turns a gene off

- Acetylation of a histone usually turns a gene on

- Ubiquitination increases transcription
  - Ubiquitination is a post-translational protein modification (an addition to a protein after it has been made) where ubiquitin is attached to a substrate protein, changing its activity
UBIQUITIN
DNA methylation

Only occurs at cytosine which are found next to guanines (CpG repeats)
DNA methylation and Life stage

• Methylation patterns change during life.
  – Changes appear to related to both constitutive factors and environment
    • Identical twins have greater concordance of methylation than fraternal twins
    • Correlation in methylation patterns among identical twins decreases with age
Diet can change DNA methylation patterns: Epigenetically labile phenotype in genetically identical animal twins

Less methylated

More methylated

PS1A gene codes for Fur color

Folic acid, B12, choline, betaine

Genistein - major phytoestrogen in soy

Waterland et al., 2003 Mol Cell Biol 23:5293-5300

Dolinoy et al., 2006 Env Health Persp 114:567-572
The two main components of the epigenetic code

DNA methylation
Methyl marks added to certain DNA bases repress gene activity.

Histone modification
A combination of different molecules can attach to the “tails” of proteins called histones. These alter the activity of the DNA wrapped around them.
Epigenetic Influences Across Generations

• Epigenetic changes can occur in utero
• Changes affect postnatal development of infant/child and occur in germ cells (sperm or ovum)
• Changes can be secondary to environmental influence and passed on to subsequent generations
• Trans-generational effects may emerge in 1-2 generations
Historical Evidence

- Retrospective data from national famines reveal presumed effects from intrauterine nutritional deficiency
- Data from Dutch famine in World War II and Chinese famine in 20th century show connection between mental illness and maternal intrauterine environment
- Children conceived had a 2-fold risk of schizophrenia
WHAT’S NEXT FOR EPIGENETICS?

- Epigenetics marks can be modified
- There’s potential to target specific marks in specific cells for modification
- Current treatments may work via this method
  - For example AZT in HIV treatment
  - Drug development has focused mainly on histone acetyltransferase (HAT) and histone deacetylase (HDAC), and has included the introduction to the market of the new pharmaceutical vorinostat, an HDAC inhibitor. HDAC has been shown to play an integral role in the progression of oral squamous cancer.
The epigenetic code involves three main modifications:

1. **Histone modification**
2. **DNA methylation**
3. **RNA modifications**
Experiences seem to confer a “signature” on the genome to authorize certain characteristics and behaviors and to prohibit others

- Epigenetics is the likely mechanism

After birth, early trauma can result in alterations to the developing brain and bias the child’s response to stressful events

- The child can develop an altered psychological response to external stimuli by altering the developing neural circuits controlling the neuroendocrine responses
ALTERATIONS VS. ADAPTATIONS

- Useful to view these alterations as adaptations
  - adaptation to an unusual, unhealthy environment
  - adaptation (to an abusive environment) can not often be generalized to more conventional environments - this gives rise to problem behaviors
    - The child is asked to function in a world that is different from the one their brain is adapted to
    - This then challenges parents, teachers and medical professionals
PRINCIPLES OF NEURODEVELOPMENT

- The human brain is adaptable
  - There is an evolutionary advantage for it being so
  - The newborn brain allows for “customization”
  - It’s a lifelong process
  - The most dramatic changes are in the first few years
PROPOSED THEORY OF ADAPTABILITY

- Common attachment behaviors and emotions, displayed in most social primates (including humans) are adaptive.
- Evolution has involved selection for social behaviors that make individual or group survival more likely.
  - The commonly observed attachment behavior of toddlers staying near familiar people would have had safety advantages in the environment of early adaptation, and has similar advantages today.
- Attachment disorders can arise out of maladaptation to a traumatic / stress-filled environment.
SEQUENTIAL PROCESSES OF NEURODEVELOPMENT

- Myelination
  - Fatty coating to axons and dendrites of developing neurons to insulate them from neighboring cells.
  - Promotes rapid and efficient conduction of the nerve impulse
  - Relies on good nutrition
    - high quality long-chain fatty acids such as found in human milk
  - Appears over the first 6 months of life
    - Newborn movements become more coordinated and purposeful
Sequential Processes of Neurodevelopment

- Synaptogenesis
  - The development of axonal connections (synapses) between neurons leading to effective neural communication
  - This plethora of potential connections gives the young child’s brain its remarkable ability to learn quickly and retain information well
Sequential Processes of Neurodevelopment

- Apoptosis
  - Infant brains have a much larger number of neuronal connections than is needed for efficient brain functioning
    - Involution (destruction) of neural cells, referred to as “pruning”
      - Adults have much lower synapse counts than do children
      - This is necessary to refine our perceptions and higher cerebral functions
    - A new neuronal connection seems to be maintained or pruned based on experience
      - Ex: if the visual tract of a newborn is obstructed for a while, the visual cortex will be unable to process visual stimuli, even if the obstruction is removed
      - There seems to be a critical time (period of vulnerability) for this input to occur
        - For kittens it is the first three months
        - For children it may well be the first few years
**Brain Experience**

- “Experienced” neural regions
  - Show change in glial cell numbers
    - Support neural growth and function
  - Contain more blood vessels
  - Have increased sensitivity of neuronal receptors

- Synthesis of neurotransmitters varies with experience
  - For example: we see neurotransmitter increases in the cerebellum when babies are held, carried and rocked
NEURODEVELOPMENT

- Neurodevelopment is brains doing what brains do best: LEARNING

- Younger brains learn more

- Older brains still learn (and modify) throughout life

“Neurons that fire together, wire together”
Psychopathogenesis and Neurodevelopment

- **Trauma in infancy** triggers psychobiological alterations that effect **affect, cognition, and behavior**.

- Traumatic events that occur **in a critical period of growth of the emotion-regulating limbic system** negatively impact the experience-dependent maturation of the systems that regulate affect
  - This induces styles of coping that act as traits for regulating stress in the future
The limbic system is a group of forebrain structures that has the hypothalamus, the amygdala, and the hippocampus. These are involved in motivation, emotion, learning, and memory. The limbic system is where the subcortical structures meet the cerebral cortex. The limbic system operates by influencing the endocrine system and the autonomic nervous system.
**Stress Response**

- **Transient increases** in stress hormones are protective and essential for survival
  - excessively high levels or prolonged exposures can be quite harmful or frankly toxic
- The **dysregulation** of these physiologic mediators (e.g., too much or too little cortisol; too much or too little inflammatory response) can lead to a **chronic “wear and tear” effect** on multiple organ systems, including the brain.
  - ACE Studies (later...)
Stress and the Brain
The Happy Child

Stress → releases ACTH → Pituitary → releases CRF → Amygdala

ACTIVATING EVENT: yelling, threat, crying, hunger...

Hippocampus → slows down modulates

Calm → CRF - Corticotropin Releasing Factor
ACTH - Adrenocorticotropic Hormone

LeDoux, 1996
Psychopathogenesis and Neurodevelopment

- Studies show that adverse social experiences during early critical periods result in permanent alterations in opiate, corticosteroid, corticotropin releasing factor (CRF), dopamine, noradrenaline, and serotonin receptors.

- Receptor alterations are a central mechanism by which early adverse developmental experiences leave behind a permanent physiological reactivity in limbic areas of the brain.
Psycopathogenesis and Neurodevelopment

- The interaction between corticosteroids and excitatory transmitters is now thought to mediate programmed cell death (apoptosis, “pruning”)
  - This is thought to be a primary etiology for the pathophysiology of neuropsychiatric disorders
CURRENT RESEARCH AND THEORY

- Perry et al. (1995) contend that early traumatic environments:
  - Induce atypical patterns of neural activity
  - Interfere with the organization of cortical-limbic areas
  - Compromise brain-mediated functions such as attachment, empathy, and affect (mood) regulation

- These functions are mediated by the frontolimbic areas of the cortex
  - Because of their dysfunction, affective disturbances (mood disorders) are a hallmark of early trauma

- Teicher (1996) reports that children with early physical and sexual abuse show EEG abnormalities in frontotemporal and anterior brain regions.
  - Concludes that stress alters the development of the prefrontal cortex
INFANT RESPONSE TO TRAUMA

- Perry, Pollard, Blakely, Baker, & Vigilante (1995)
- demonstrate that the human infant’s psychobiological response to trauma is comprised of two separate response patterns—hyperarousal and dissociation.
HYPERAROUSAL

- In the initial stage of a threat a startle reaction is initiated
  - the sympathetic component of the autonomic nervous system is suddenly and significantly activated
  - This results in increased heart rate, blood pressure, respiration, and muscle tone and
  - hypervigilance

- Distress is expressed in crying and then screaming.
HYPERAROUSAL (CONT.)

- The infant is in a state of “frantic distress”
  - Mediated by sympathetic hyperarousal
  - Perry terms this “fear-terror”
  - Also know as “fright, flight or fight reaction”

- Reflects excessive levels of the major stress hormone **corticotropin releasing factor** (CRF) that regulate catecholamine activity in the sympathetic nervous system
Noradrenaline is also released from the locus coeruleus. 
- **locus coeruleus** is a nucleus in the pons (part of the brainstem) involved with physiological responses to stress and panic.

The result is **rapid elevation of noradrenaline and adrenaline levels** that trigger a hypermetabolic state within the brain.

In such “kindling” states very large amounts of CRF and glutamate, the major excitatory neurotransmitter in the brain, are expressed in the limbic system.

The result is that early traumatic experiences, such as childhood abuse, literally “kindle” limbic areas.

While baseline cortisol levels in abuse victims may be normal or even low, **the victim’s hypothalamic-pituitary axis often becomes hyper-responsive to stressful stimuli**
WHAT HYPERAROUSAL LOOKS LIKE

- A child adopting a hyperarousal response may display defiance; easily misinterpreted as willful opposition.
- These children may be resistant or even aggressive
  - They are locked in a persistent “fight or flight” state.
- They often display hypervigilance, anxiety, panic, and / or increased heart rate.
- They get labeled “a bad kid!”
**TRANSITION**

- Ultimately, the child will transition out of hyperexcitation-protest into hyperinhibition-detachment and with the termination of protest (screaming)
  - they will become silent
- They will shift out of the hyperarousal, and they will dissociate
Dissociation

- a parasympathetic regulatory strategy that occurs in helpless and hopeless stressful situations
  - the individual becomes inhibited and strives to avoid attention in order to become “unseen”
  - A state of conservation-withdrawal

- This state is a primary hypometabolic regulatory process, used throughout the lifespan in which the stressed individual passively disengages

- It is this parasympathetic mechanism that mediates the “profound detachment” of dissociation.
WHAT DISSOCIATION LOOKS LIKE

- The child disengages from stimuli in the external world and attends to an “internal” world.
- The child’s dissociation in the midst of terror involves numbing, avoidance, compliance and restricted affect.
- Traumatized infants are observed to be staring off into space with a glazed look.

- “when the infant’s attempts to respond fail to repair the interaction, the infant often loses postural control, withdraws, and self-comforts” described by Tronick and Weinberg.
ADVERSE CHILDHOOD EXPERIENCES (ACE) STUDIES

Vincent J. Felitti MD, FACP, et al; Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults: The Adverse Childhood Experiences (ACE) Study

ADVERSE CHILDHOOD EXPERIENCES (ACE) STUDY

- A questionnaire about adverse childhood experiences (ACE) was mailed to 13,494 adults who had completed a standardized medical evaluation at a large HMO; 9,508 (70.5%) responded.
- Seven categories of adverse childhood experiences were studied:
  - psychological abuse
  - physical abuse
  - sexual abuse
  - violence against mother
  - or living with household members who were
    - substance abusers
    - mentally ill or suicidal
    - or ever imprisoned
- The number of categories of these adverse childhood experiences was then compared to measures of adult risk behavior, health status, and disease.
RESULTS: ADULT PHYSICAL HEALTH

- 50% of respondents reported at least one ACE
- 25% reported ≥2 categories of childhood exposures
- The number of categories of adverse childhood exposures showed a graded relationship \((P < .001)\) to the presence of adult diseases:
  - ischemic heart disease
  - cancer
  - chronic lung disease
  - skeletal fractures
  - liver disease
RESULTS: ADULT HEALTH RISK BEHAVIORS

- Persons who had experienced **four or more categories** of childhood exposure (compared to those who had experienced none)
  - had 4- to 12-fold increased health risks for alcoholism, drug abuse, depression, and suicide attempt
  - a 2- to 4-fold increase in smoking
  - poor self-rated health
  - ≥50 sexual intercourse partners
  - 3 fold increase in sexually transmitted diseases
  - and a 1.4- to 1.6-fold increase in physical inactivity and severe obesity
CONCLUSIONS

- The authors found a strong graded relationship between the breadth of exposure to abuse or household dysfunction during childhood and multiple risk factors for several of the leading causes of death in adults.

**Note:** these data do not prove causality

- They do provide “clear and compelling evidence” that ACE have long-term consequences on adult health and well-being
### Indicator 6.11: Adverse childhood experiences

<table>
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<tr>
<th></th>
<th>No adverse family experiences</th>
<th>One adverse family experience</th>
<th>Two or more adverse family experiences</th>
<th>Total %</th>
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<td>42.5</td>
<td>26.4</td>
<td>31.1</td>
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<td></td>
<td>(39.3 - 45.8)</td>
<td>(23.4 - 29.4)</td>
<td>(27.8 - 34.4)</td>
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<td>n</td>
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<td>Pop. Est.</td>
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<tr>
<td>nationwide</td>
<td>52.1</td>
<td>25.3</td>
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<td></td>
<td>(51.3 - 52.8)</td>
<td>(24.7 - 26.0)</td>
<td>(22.0 - 23.2)</td>
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<tr>
<td>n</td>
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<td>21,877</td>
<td>19,115</td>
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<td>Pop. Est.</td>
<td>37,833,101</td>
<td>18,395,284</td>
<td>16,430,694</td>
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</tbody>
</table>

C.I. = 95% Confidence Interval. Percentages are weighted to population characteristics.

n = Cell size. Use caution in interpreting Cell sizes less than 50.
ARIZONA CHILDREN LEAD THE NATION IN EXPERIENCING ONE OR MORE ADVERSE CHILDHOOD EXPERIENCES

LIVING WITH SOMEONE WHO IS MENTALLY ILL OR SUICIDAL
EXPERIENCING DIVORCE OR PARENTAL SEPARATION
LIVING WITH SOMEONE WHO HAS AN ALCOHOL OR DRUG PROBLEM
BEING A VICTIM OR WITNESS OF NEIGHBORHOOD VIOLENCE
EXPERIENCING SOCIOECONOMIC HARDSHIP
WITNESSING DOMESTIC VIOLENCE
HAVING A PARENT IN JAIL
BEING TREATED OR JUDGED UNFAIRLY DUE TO RACE/ETHNICITY
EXPERIENCING THE DEATH OF A PARENT

Phoenix Children’s Hospital & Stop Bullying AZ
Data from the 2011-2012 National Survey of Children’s Health
MENTAL HEALTH

- Relationship Between Multiple Forms of Childhood Maltreatment and Adult Mental Health in Community Respondents: Results From the Adverse Childhood Experiences Study
  - Valerie J. Edwards, Ph.D.; George W. Holden, Ph.D.; Vincent J. Felitti, M.D.; Robert F. Anda, M.D., M.S.
    - doi:10.1176/appi.ajp.160.8.1453

- The prevalences of sexual abuse, physical abuse, and witnessing of maternal violence were 21.6%, 20.6%, and 14.0%, respectively, when the maltreatment types were considered separately.
MENTAL HEALTH

- Among respondents reporting any of the maltreatment types, **34.6% reported more than one type of maltreatment.**

- **Lower mean mental health scores were associated with higher numbers of abuse categories**
  - Mental Health Score: 78.5 for no abuse type
  - 75.5 for one abuse type
  - 72.8 for two abuse types
  - 69.9 for three abuse types
CONCLUSIONS

- Childhood physical and sexual abuse, as well as witnessing of maternal battering, were common among the adult members of an HMO in this study.
- Among those reporting any maltreatment, more than one-third had experienced more than one type of maltreatment.
- A dose-response relation was found between the number of types of maltreatment reported and mental health scores.
Attachment, Attachment Theory and Disorders of Attachment
**Attachment Theory**

- Explains how much the parents' relationship with the child influences development.

- Immediately after World War II, homeless and orphaned children presented many social and civil difficulties, and psychiatrist and psychoanalyst John Bowlby was asked by the UN to write a pamphlet on the issue which he entitled “Maternal Deprivation”

- Attachment theory grew out of his subsequent work on the issues raised.
Attachment Theory

- Describes the dynamics of long-term relationships between humans

- An infant needs to develop a healthy relationship with at least one primary caregiver for social and emotional development to occur normally
JOHN BOWLBY’S ATTACHMENT THEORY

Sensitive Responsiveness:

- Infants **become attached to individuals who are sensitive and responsive** in social interactions with them, **and who remain as consistent caregivers** for some months during the period from about six months to two years of age.

- When the infant begins to crawl and walk they begin to **use attachment figures (familiar people) as a secure base to explore from and return to**

- Caregivers' **responses** lead to the development of patterns of attachment. These, in turn, **lead to internal working models which will guide the individual's perceptions, emotions, thoughts and expectations in later relationships**
SENSITIVITY PERIOD

- There is a sensitive period during which it is highly desirable that selective attachments develop
  - remember the Mommy duck and Baby duckling experiments?
    - Ducklings imprint on a moving object in the first 13 to 16 hours after hatching
  - For humans the **time frame is broader and the effect less fixed and irreversible** than first proposed.
  - With further research it is seen that **social development is affected by later as well as earlier relationships**
TYPES OF ATTACHMENT

- Secure attachment
  - Behavior of the caregiver is predictable and nurturing
  - The child perceives the world as safe and predictable and feels free to explore
  - Neural pathways develop that associate the caregiver with feelings of security
  - When a supportive parent recognizes and meets a child’s needs the infant learns patience and self-regulation
Attachment and Abuse or Neglect

- Attachment is a function of the child’s brain development
  - The brain cannot develop its capabilities in isolation
    - The Romanian orphanage studies showed that children, even when given the appropriate calories and physical care (i.e., changing diapers) did not grow or develop milestones as they would if given appropriate attention and loving care.
      - Psychosocial dwarfism
    - They also lacked the ability to form a trusting attachment to other human beings
    - Neuroimaging shows decreased metabolism in the pre-frontal cortex (executive functioning) and in the temporal lobes (speech language and emotional communication)
TYPES OF ATTACHMENT (CONT.)

- Insecure attachment
  - Behavior of the caregiver is NOT perceived as ever-present and supportive
  - The child must devote more time and effort to securing his own security
  - Neural pathways develop differently, associating the caregiver with anxiety or distress
  - May result in a range of behaviors from continual attention-seeking to complete indifference to caregivers
    - Can result in angry - and sometimes dangerous- responses, or deliberate neglect from a stressed parent
  - Impairs the child’s freedom to learn from his/her world
  - A cycle of abuse or neglect can be initiated which will serve to reinforce the child’s maladaptive behavior
TYPES OF ATTACHMENT

- Disorganized Attachment
  - The most concerning pattern for abused children
  - About 80% of maltreated infants are likely to be classified as disorganized
    - 12% found in non-maltreated samples.
    - Only about 15% of maltreated infants are likely to be classified as secure.
  - Children with disorganized attachment in infancy tend to show markedly disturbed patterns of relationships.
  - Subsequently their relationships with peers can often be characterized by a “fight or flight” pattern of alternate aggression and withdrawal.
  - Affected maltreated children are also more likely to become maltreating parents.
REACTIVE ATTACHMENT DISORDER (RAD)

- Severe and relatively uncommon disorder that can affect children.
  - Characterized by developmentally very inappropriate ways of relating socially in most contexts.
- Inhibited form
  - a persistent failure to initiate or respond to most social interactions in a developmentally appropriate way
    - very “flat affect”
- Disinhibited form
  - indiscriminate sociability, such as excessive familiarity (and physical affection) with relative strangers
TREATMENT

- Therapy
  - Trauma-specific therapy, a cognitive-behavioral approach, is the most effective
  - Directed toward reshaping the child victim’s perceptions and emotional responses

- Counseling
  - Provides a new perspective for child victims and their guardians to understand the child’s behavior and guide the caregivers to a more effective response
  - to begin to break the cycle of destructive feedback
TREATMENT

- Parenting education
  - The amount of support received from parents and guardians is one of the most important factors for increasing a child’s **resilience**

- Medications can help manage the more troublesome physiological symptoms, especially hyperarousal
  - Sleep disturbances, nightmares, high anxiety
    - Adrenergic blocking agents
  - Concentration and mood disorders
    - Stimulants, serotonin reuptake inhibitors
MOST IMPORTANTLY:

- These interventions must be designed to make sure
  - the child has a **safe environment to live in**
  - to **develop positive interactions with caregivers**
  - and that **environment improves their relationships with their peers**.
FACTORS FOR RESILIENCE

- Resilient children who experience chronic adversity fare better
  - when they have a positive relationship with a competent adult
  - if they are good learners and problem-solvers
  - if they are engaging to other people
  - If they have areas of competence that are valued by themselves or society
SIX CORE STRENGTHS FOR CHILDREN
- DR. BRUCE PERRY

- ATTACHMENT:
  - being able to form and maintain healthy emotional bonds and relationships

- SELF-REGULATION:
  - containing impulses and the ability to notice and control primary urges as well as feelings such as frustration

- AFFILIATION:
  - being able to join and contribute to a group

- ATTUNEMENT:
  - being aware of others,
  - recognizing the needs, interests, strengths and values of others

- TOLERANCE:
  - understanding and accepting differences in others

- RESPECT:
  - finding value in differences, appreciating worth in oneself and others
Any Questions?

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- Office #: 480-412-7641
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