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The Biology of Stress and the Development of Resilience— How Relationships Matter

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Disclosures

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Reframing the Diagnostic History

- From Deficit Model to Strengths Model
- From pathology to stress
- To include Who and What matters to you along with Who or What pains you?
- Stressful early life experiences affect physiology and behavior
 - From the molecular structure of our DNA
 - To gene action and behavior



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Proximal Sources of Parental and Childhood Stress

- Emotional abuse
- Physical abuse
- Sexual abuse
- Emotional neglect
- Physical neglect
- Violence toward parent
- Family substance abuse and/or mental illness
- Parental separation or divorce
- Incarcerated parent



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Contextual Sources of Parental and Childhood Stress

- Poverty
- Community violence
- Prolonged or repeated separation from a parent
 - e.g. multiple foster care placements
- Peer victimization/bullying
- School underachievement
- Natural Disaster
- Environmental Injustice
- Discrimination
 - racism, xenophobia, disability, sexual identity
- Single acute events sustained over time
 - e.g. death of a parent and community violence

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Susceptibility

- All races, economic classes and geographic regions are susceptible
- Poverty associated with higher prevalence rates of exposure with multiple sources



Pathophysiology of Stress

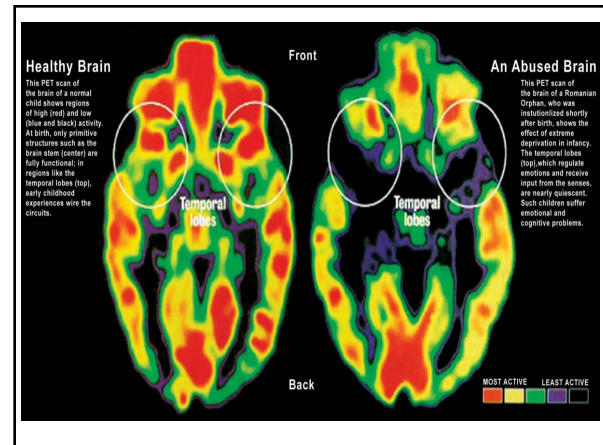
- Positive and necessary stress
 - Healthy coping mechanisms
 - Problem-solving skills
- Tolerable stress
 - Significant but short-lived and countered by supportive relationships
- Toxic stress
 - Strong, frequent or prolonged adversity in the absence of adequate adult support

Biology of Stress

- Biological and behavioral genetics
 - Inborn foundations
- Epigenetics – non-inherited environmental factors chemically mark genes and control their function – the epigenome

Epigenesis

Trauma, stress, positive nurturing shape brain architecture and alter brain chemistry



Impact on Brain Structure and Function

- The brain adapts to experience – turning on or off genes that control
 - Effective learning and memory
 - Stress response activation set too high or too low
 - e.g. cortisol receptors
- Hope for the therapeutic effect of early intervention - New research into reversibility of epigenetic modifications to brain chemistry and gene expression

The ACE Study

- CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study is one of the largest investigations of childhood abuse and neglect and later-life health and well-being.
- Conducted 1995-1997 with two waves of data collection – published in 1998
- 17,337 adults in San Diego, California
- Middle class, employed, 56-58 years of age
- Large majority white and college-educated
- Robert Anda, MD and Vincent Felitti, MD

9 ACEs in Original Study

1. Emotional abuse
2. Physical abuse
3. Sexual abuse
4. Emotional neglect
5. Physical neglect
6. Violence toward parent
7. Family substance abuse and/or mental illness
8. Parental separation or divorce
9. Incarcerated parent

Study Results

- 64% had at least one ACE
- 40% had multiple ACEs
- Persons with ≥ 4 ACEs
 - risk of depression, substance abuse, other mental health disorders, even cancers, heart disease and autoimmune disorders increased 2-6 fold
 - Substance abuse increased 7-11 times
 - Emphysema or chronic bronchitis by 400 percent
 - Suicide by 1200 percent

Study Results

Those with ACE scores ≥ 7 who didn't drink or smoke, weren't overweight or diabetic, and didn't have high cholesterol *still had a 360 percent higher risk of heart disease than those with an ACE score of 0.*

Research Confirms Compounding Effects of ACEs (Stressors)

The more ACEs and the more intense the ACEs ...

...The more adult emotional, mental, and physical health illness.

$$1 + 1 = 3$$

Factors that Influence How Children Experience Trauma

- The number and severity of the traumatic episodes
- Proximity to the event
- The personal significance of the traumatic event for the child
- The extent to which the child's support system is disrupted after the trauma


Other Factors

- Child's:
 - age and developmental stage
 - perception of the danger faced
 - relationship to victim and/or perpetrator
- Presence and availability of adults who can offer help and protection
- Genetic predisposition
- Previous history of traumatic experiences

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Teen Suicidal Ideation and ACEs


Children with adverse childhood experiences tend to think more about killing themselves.



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Adult Suicide Attempts and ACEs

Adverse Childhood Experiences compound the risk of suicide attempts in adulthood.



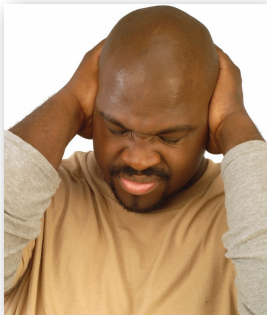
(Dube et al, 2001)

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Adult Mental Illness and ACEs

ACEs increase incidence of mental illness in adulthood.

- Depressive disorders
- Sleep disorders
- Anxiety disorders
- Post traumatic Stress Disorder




(Edwards et al, 2003), (Chapman et al, 2004)

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Teens and ACEs

- The more ACEs, earlier initiation of use and increase in use of substances
- ACEs increase the likelihood of sexual intercourse by age 15 increasing the likelihood of AIDS and other STIs
- Increased fetal deaths



(Hillis et al, 2001; Anda et al, 2002; Dube, et al 2003 (b))

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Adult Health Problems and ACEs

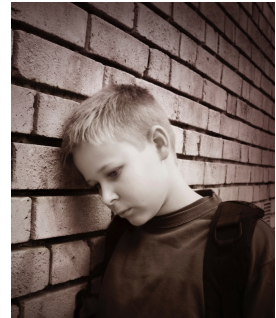
Increased physical health problems	54% of depression
• Ischemic heart disease	58% of suicide attempts
• Obesity	39% of ever smoking
• Chronic lung disease	26% of current smoking
• Liver disease	65% of alcoholism
Increased health risks for	50% of drug abuse
• Alcoholism	78% of IV drug abuse
• Drug abuse	48% of promiscuity (>50 partners)
• Smoking	
• > 50 sexual intercourse partners	

(Dube et al, 2003a)

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Lasting Health Effects of ACEs

Attributed to the neurological and biological effects of "toxic stress" on children.



(Dube et al, 2003a)

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Explanation for Lifetime Effect of ACEs

- Increases in:
 - heart rate, blood pressure, serum glucose, stress hormones, "fight or flight", c-reactive protein, inflammation
- Related to long-term disruptions in:
 - brain architecture, immune systems, metabolic regulation, cardio-vascular function

(Center on Developing Child, Harvard University)

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ACE Pyramid

Mechanism by Which Adverse Childhood Experiences Influence Health and Well-being Throughout the Lifespan

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Expanding the Number and Relative Impact of ACEs

- A 2013 study using a national database of children (NSCH) found that more than half of all U.S. children (49% in Florida) experienced one or more ACEs
- 11% (9% in Florida) experienced ≥ 3 ACEs
- Economic hardship, divorce, alcohol abuse in family and incarcerated family member were most prevalent in Florida

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New ACEs Research

A number of additional ACEs, identified by youth themselves, are under investigation for relative impact on life course health:

- Family relationships
- Community stressors
- Personal victimization
- Economic hardship
- Peer relationships
- Discrimination
- School
- Health
- Child welfare/juvenile justice
- Media/technology

University of New Hampshire and University of Tennessee

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Life Course Trajectory A Balance of Risk and Protective Factors

0-3 ACEs
More likely to have:

- Good mental health
- Normal growth and development
- Less chronic disease
- Less tobacco use
- Less drug abuse
- School readiness & success
- Employment

ACE

4 or more ACEs
Increased risk for:

- Tobacco and drug use
- Obesity
- Promiscuity, teen pregnancy
- Pathological gambling
- Risk-taking behaviors
- Lack of social networks
- School failure
- Gang membership
- Unemployment
- Incarceration

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The Protective Factors Framework

- Nurturing Relationships
- Parental Resilience
- Social Connections
- Knowledge of Parenting and Child Development
- Concrete Support in Times of Need
- Social and Emotional Development

strengthening families
A National Technical Assistance Center

Promoting Resilience in Parents and Children

- Avoiding isolation – relationships that provide concrete assistance when needed and opportunities to give back
- Ability to manage stress and solve problems depends on the availability of trusted relationships, including with child
- Information and knowledge helps parents understand their children and see them in positive light – challenging when parent was raised harshly or endured adverse experiences during childhood

Specific Clinical Strategies

- Suspect and investigate potential adverse stressful social experiences and their emotional impact on the child and family
- Treat behavior as symptoms of underlying stress
 - may not be sufficient to prescribe changes in diet, activity, or medication.
- Attend to healing the root causes of toxic stress
 - e.g. relationships, economic security (income, food, transportation, housing), trauma (chronic PTSD), discrimination
- Train staff to practice trauma-informed care
- Engage with community agents to strengthen structural conditions that promote social, economic, educational and environmental foundations for children's healthy development

Early Relationship Experience and Lifespan Behavior and Development

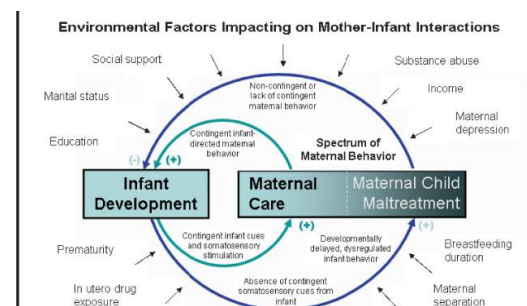
- Parenting behavior critically shapes human infants' current and future behavior. The parent–infant relationship provides infants with their first social experiences, forming templates of what they can expect from others and how to best meet others' expectations.

Biological Basis of Parenting

- All mammals have a prolonged infancy/dependency.
- Maternal/parental behaviors necessary for survival and long-term health and development.
- Normal parental neurochemical and behavioral responses to infant interactions get hijacked by social stress and mental illness, including depression, addiction and OCD.

Attachment Theory

- Bowlby studied association between maternal deprivation and juvenile delinquency resulting in theory of an evolutionary innate biological system that promotes proximity-seeking behavior between infant and primary attachment figure.
- Universal need and effort, whether to a loving or harsh parent, resulting in different attachment patterns and outcomes – secure, insecure, disorganized.



Parental Emotion and Infant Behavior

- Parents who are immersed in feelings of love for baby are more responsive and sensitive to infant cues. Infants reciprocate with increasing elicitation, satisfaction and self-regulation.
- Parents wounded by past emotional trauma or neglect are less sensitive and responsive to infant cues, have more irritable, less readable infants who are more likely to fail to thrive.

Special Cases

- Prior relationship with other children
- Family and social relationships and support
- Multiple births
- Adoption
- Atypical infant behavior
 - SGA
 - Neonatal Abstinence Syndrome

Vulnerable Child Syndrome

- Overprotective or overindulgent parenting
- Child grows to internalize helplessness and anxiety and dependency
- Starts early with difficult situations that are or are perceived as life threatening
 - As serious as neonatal infection or apnea
 - As innocent as neonatal jaundice
- Occurs often with professional highly educated new parents

Breastfeeding and Attachment

- Release of oxytocin
- Brain areas activated by oxytocin receptors associate with maternal social and parenting behaviors
- Reduced maternal anxiety and attenuated stress responses

Post-Partum Depression and Anxiety

- 10-15% of all pregnancies
 - >50% among MIECHV mothers
- 60% occur within first six weeks
- Mothers risk less sensitive attunement, less affirming, more negative
- Remission within 3 months predicts fewer psychiatric symptoms in children – argument for early intervention but treating maternal mood without parent-infant therapy rarely effective.

Bonding vs. Attachment

- No equivalence
- No predictive power of bonding
- Attachment is strong predictor of child emotional and social outcomes
- Attachment is individualized – differs for each relationship

Infant Crying

- Benefits of consistent, rapid response with soothing:
 - Less crying
 - Self-soothing
 - Faster infant response to soothing
 - Fosters secure, organized attachment relationship
- Anticipatory guidance re: typical organization of crying behavior over first two three months

Role of Social Determinants

- The social support system for parents and infants strengthens or weakens parental energy, satisfaction, pride and joy.
- External stressors have primary impact on parenting success:
 - Material resources/income
 - Social isolation
 - Maltreatment
 - Discrimination

Clinical Examples and Issues

- Difficult Infant Behavior
 - Preterm
 - Floppy/poor suck
 - Jittery
 - Low sensory thresholds

Clinical Examples and Situations

- ACEs
- Victimized
 - All classes
- Poor sense of agency
 - Even (especially) among successful professionals

Prerequisites to a Healthy Personality

- Intrinsic worth – I matter
- Connected to others who value me – I belong
- Sense of agency – I can

Role of Caring Community

- Advocacy for family friendly policies
- Advocacy for economic equity
- Advocacy for healthcare equity
- Example of Marmot Councils in Europe:
 - Universal free healthcare
 - Universal early care and education
 - Livable minimum wage

Wonderful Yet Humble Benefits of MIECHV in a Grossly Inequitable Society

- Children live in families and families live in communities – not in programs
- Conditions, far more than services, determine the outcomes we hope to influence.
- Health is less an outcome of healthcare (10% effect) than of the circumstances in which people live – social, economic, educational and environmental foundations for children's healthy development.

Primary Sources of Health

- Personal Dignity
- Equity/Justice
- Community
- The U.S. must ultimately join other wealthy and just nations in supporting the needs and rights of all children and families to thrive.
- Not a disparities reduction model but a rights-based model
- Home visitation for all young children and families – no stigma attached to needs.

Analyzing and Managing Personality Conflicts

- What am I feeling?
 - Personalizing racial, cultural or personality issues
- What am I reacting to?
 - Understanding the source of parental conflicts
- How can I manage my therapeutic relationship?
 - Depersonalize
 - Set realistic limits on expectations

Home Visitation in Holland

- The Buurtzorg Model – Neighborhood Care
- Grown from one team of six nurses in 2007 to nearly 1000 teams and 10,000 nurses
- Worldwide recognition for results:
 - improve quality care and health outcomes
 - highest patient and employee satisfaction
 - 40% reduction in healthcare costs

What's different about this model?

- Empowerment of nurses/home visitors
 - Teams are self-steering
 - Make all clinical decisions
 - Develop their own annual team budgets
 - No management or back office staff other than for clinical consultation when asked
- Home visitors foster client independence and family and neighbor responsibility for care

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Resources

- [Strengthening Families Program](#)
- [Center on the Developing Child at Harvard University](#)
- [National Child Traumatic Stress Network](#)
- [Child Welfare Information Gateway](#)
- [Substance Abuse Mental Health Services Administration](#)
- [California Evidence-based Clearinghouse for Child Welfare](#)