Recovery From Addiction

THE EFFECT OF TOXIC STRESS ON CHILDREN'S BRAIN AND BEHAVIOR

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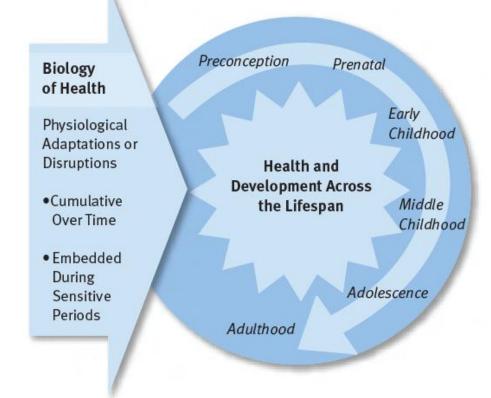




The Foundations of Lifelong Health are Built in Early Childhood



Early Life Stress Impacts Life-long Health



The Biology of Adversity: Three Levels of Stress

Positive

Brief increases in heart rate, mild elevations in stress hormone levels.

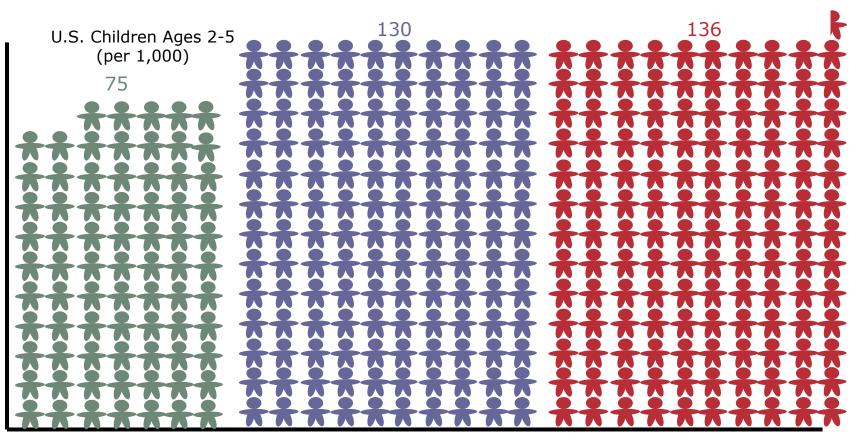
Tolerable

Serious, temporary stress responses, buffered by supportive relationships.

Toxic

Prolonged activation of stress response systems in the absence of protective relationships.

Sources of Toxic Stress in Young Children



Maltreatment

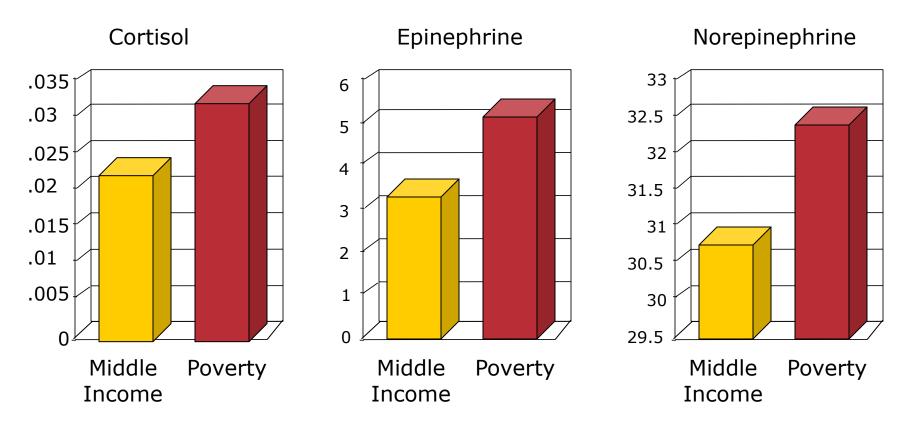
Source: Finkelhor et al. (2005)

Postpartum Depression

Source: O-Hara & Swain (1996)

Parental Substance Abuse Source: SAMHSA (2009)

Poor Children Experience Elevated Stress

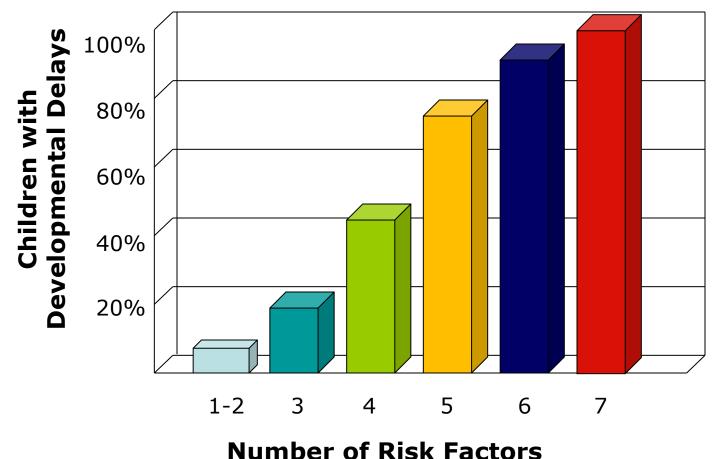


Overnight levels in rural 9-year-old white children

Source: Evans, GW and English, K. (2002)

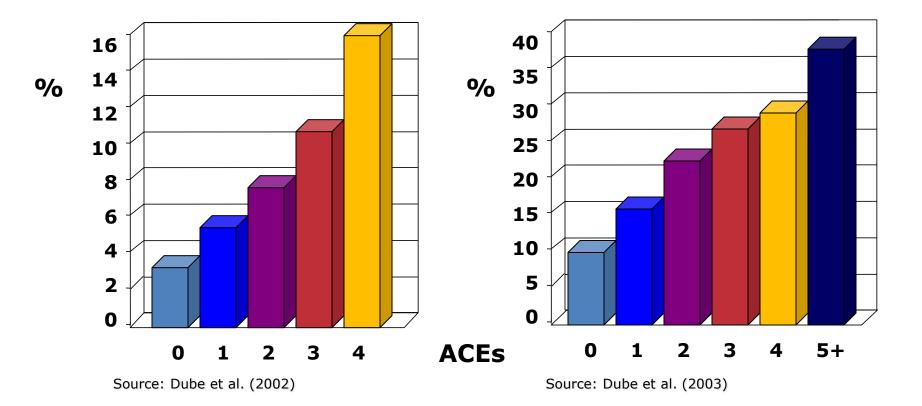
What are the Long-term Impacts of Toxic Stress in Early Life?

Significant Adversity Impairs Development in the First Three Years

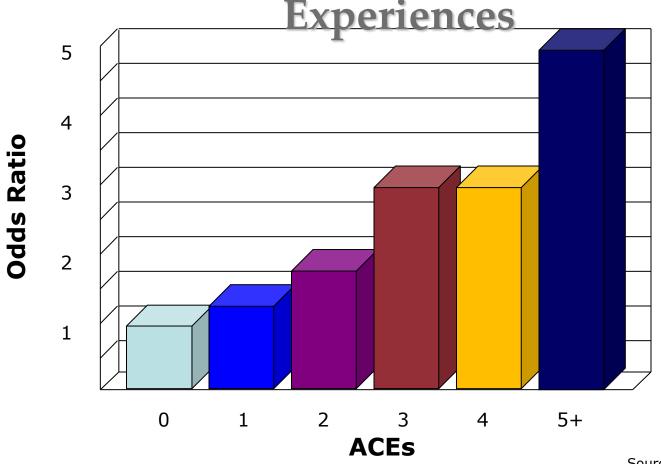


Source: Barth, et al. (2008)

Risk Factors for Adult Substance Abuse Are Embedded in Adverse Childhood Self-Report: Alcoholism Self-Report: Illicit Drugs

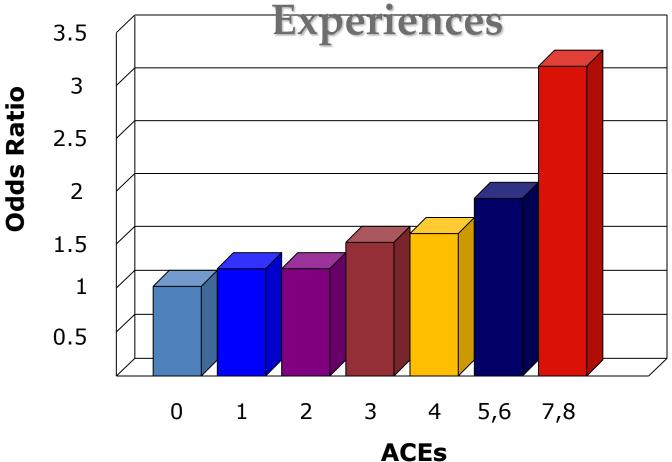


Risk Factors for Adult Depression are Embedded in Adverse Childhood

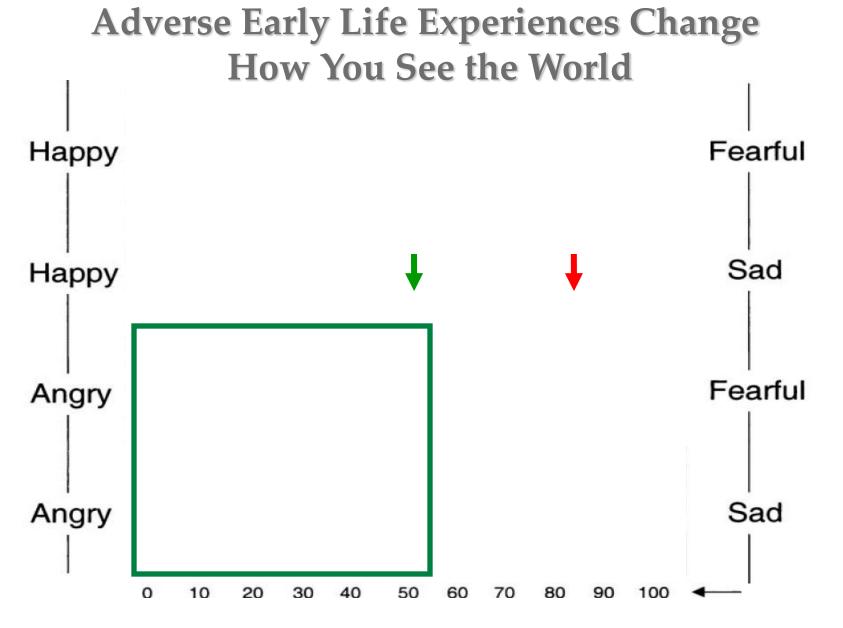


Source: Chapman et al. (2004)

Risk Factors for Adult Heart Disease are Embedded in Adverse Childhood



Source: Dong et al. (2004)

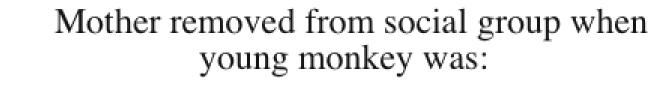


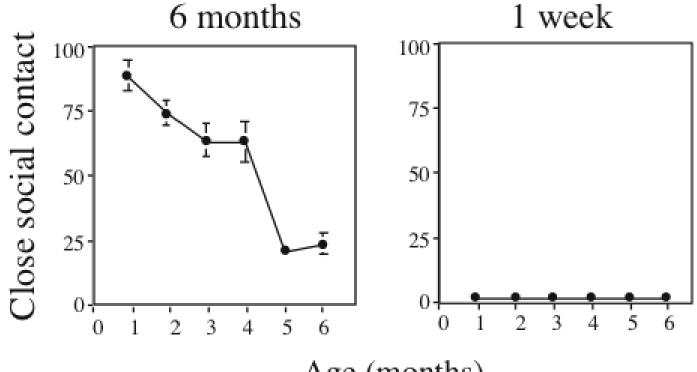
Source: Pollak & Kistler (2002)

How **Does Stress Impact the Brain**?

Studies in monkeys show that early life experiences have lasting effects on brain development

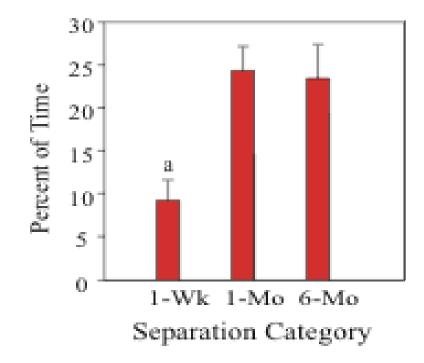






Age (months)

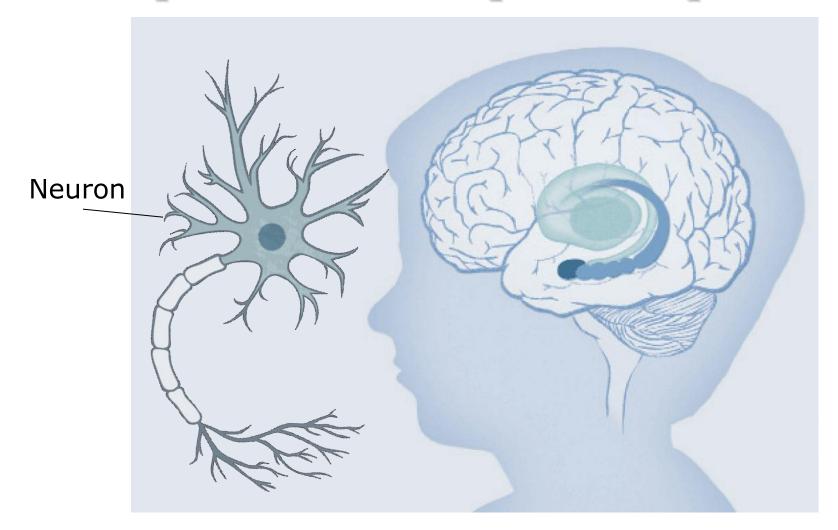
Social Behavior Remains Decreased In Adulthood



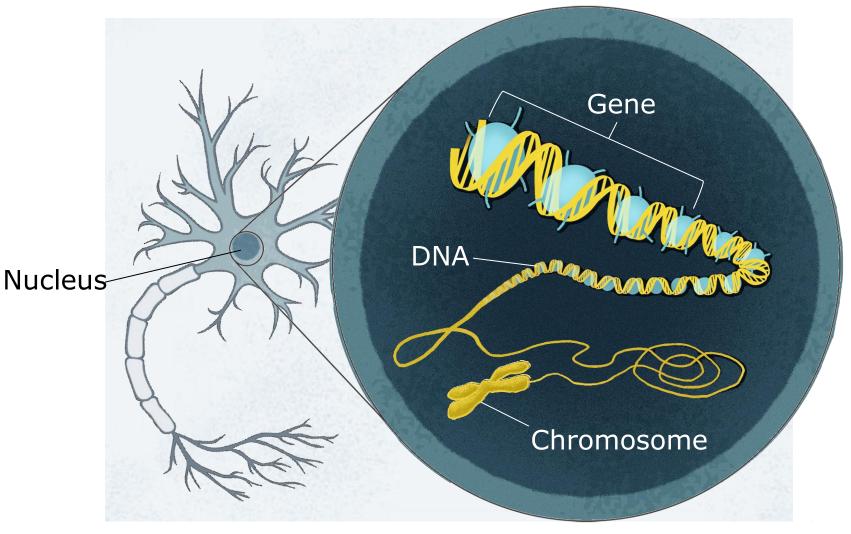
Amygdala Microarray Studies

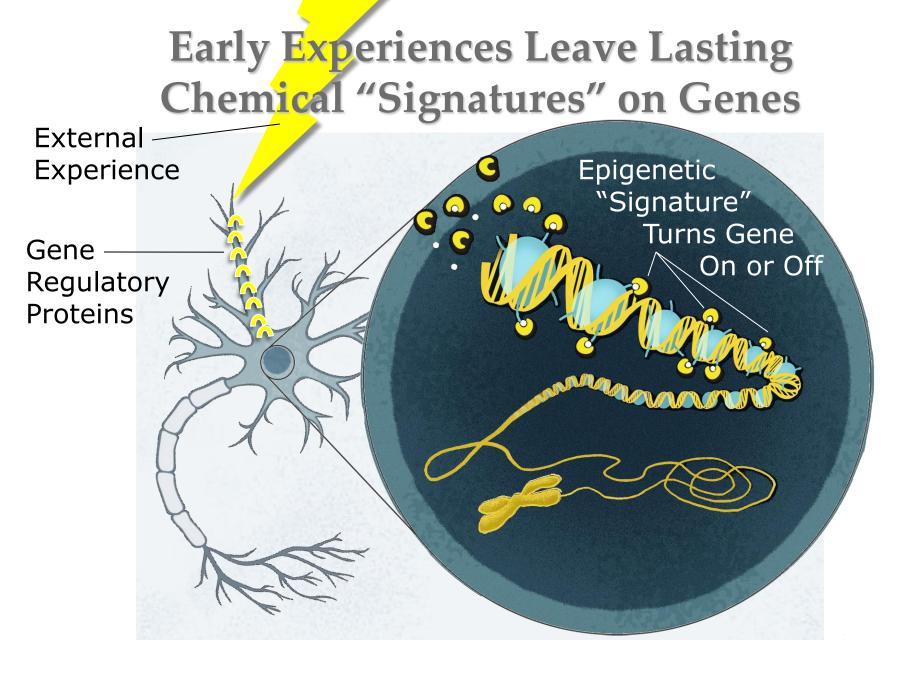
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2 4 (b 7) AB6/28716 * "BOND SAPER'S MERA FOR RUNADOS PROFEN, PARTMA, CDS"
4 (0.5) HAY (00474 / "HONO SAPER'S TWET HONOLOO (ACROCEPHALOS YNDACTYLY 3, SAETHRE-CHOTZEY SYNDRONE) (DROSOPHILA) (TWET), MRIVA
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4 6 (0 7) AF452637 **** HONO SAPER'S URA I-INTERACTIVO PROTEIN I (LIPI) MRHA, COMPLETE CDS***
2 8 (0 7) HY_004592 (*** HONO SAPENS SPECTOR, AROTHESER PERKIES GROPRESSOR OF WHITE-APRICOT HONOLOO, DROSOPHILA) GRESS, MRHA
4 (0 7) DE1776 * "HUMAN MEXA FOR KWAB191 0EM, PARTAL CDS"
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How Early Experiences Alter Gene Expression and Shape Development



Genes Carry Instructions that Tell Our Bodies How to Work

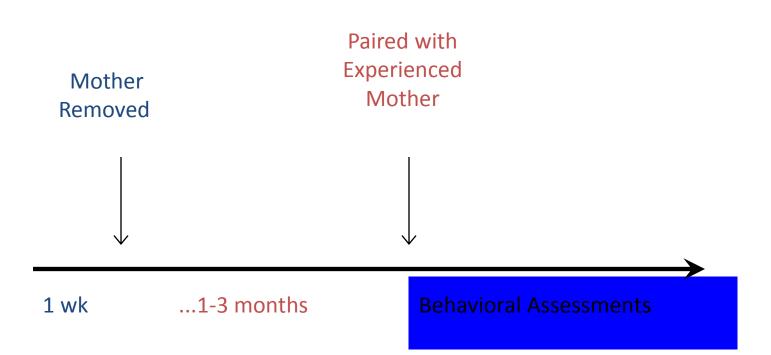




Can We Prevent Long-term Health Impacts of Early Life Stress?

- •Can pairing a separated infant with a very attentive mother reverse the effects of early social bond disruption?
- Does the timing of therapy matter?

Intervention Design



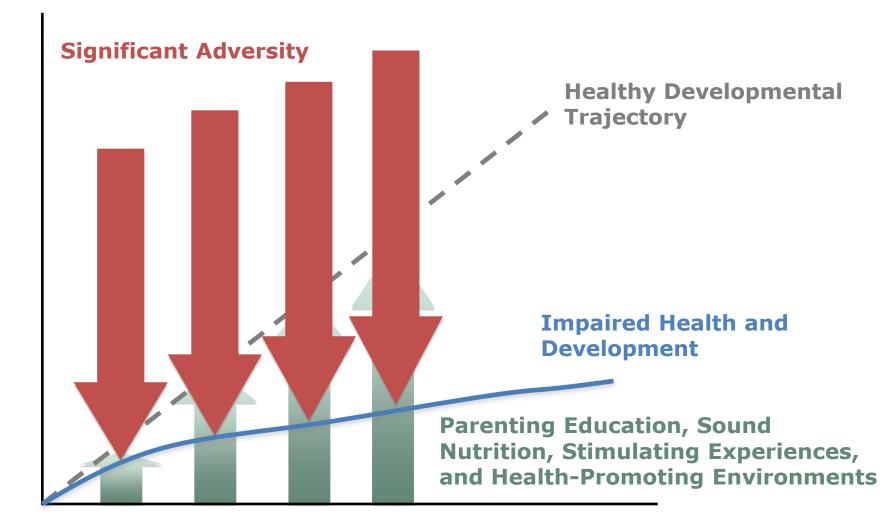
Percent Time Sitting Alone 10075 -50250 \odot ы ŵ 00 σ \mathbf{O} $^{\circ}$ \mathbf{T} IO. E1e 9 Months of Life Pairing with an experienced mother is effective when *initiated early*.

(arrows show introduction of experienced mother)

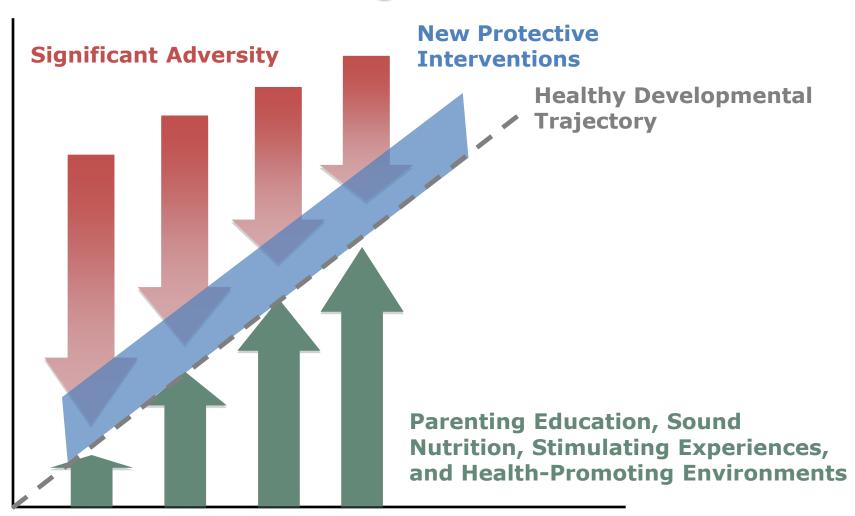
Conclusions: Early Life Experiences on Social Development

- The *timing* of early stressful life experience plays a critical role in determining the outcome of stress exposure on behavior.
- Early social bond disruption can lead to changes in *brain anatomy* and *gene expression* in the brain.
- *Early intervention can prevent long-term consequences* of social bond disruption, but the timing of intervention is important.

Current Conceptual Framework



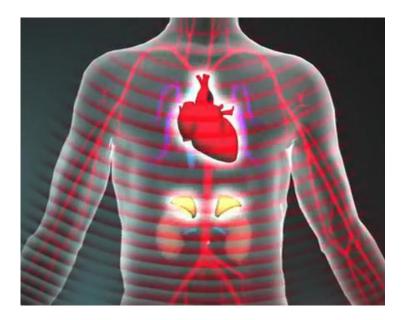
Protective Interventions Can Improve Life-long Health



Relationships Buffer the Effects of Stress

Learning how to cope with moderate, short-lived stress can build a healthy stress response system.

Toxic stress—when the body's stress response system is activated excessively—can weaken developing brain architecture.



Without caring adults to buffer children, toxic stress associated with extreme poverty, neglect, abuse, or severe maternal depression can have long-term consequences for learning, behavior, and both physical and mental health.

Further Information:



Knudsen El, Heckman JJ, Cameron JL, Shonkoff JP.

Economic, neurobioligcal and behavioral perspectives on building America's future workforce.

World Economics 7: 17-41, 2006

http://www.developingchild.net

Center on the Developing Child 🔡 HARVARD UNIVERSITY

NATIONAL SCIENTIFIC COUNCIL ON THE DEVELOPING CHILD NATIONAL FORUM ON EARLY CHILDHOOD PROGRAM EVALUATION Judy Cameron, Ph.D. jcameron@pitt.edu