

A neurodevelopmental perspective of trauma and resilience and implications for intervention

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Disclosures

I have no commercial disclosures.

Non-commercial disclosures: context for *my* perspective

“There is no greater insight into the future than recognizing...when we save our children, we save ourselves.”

Margaret Mead



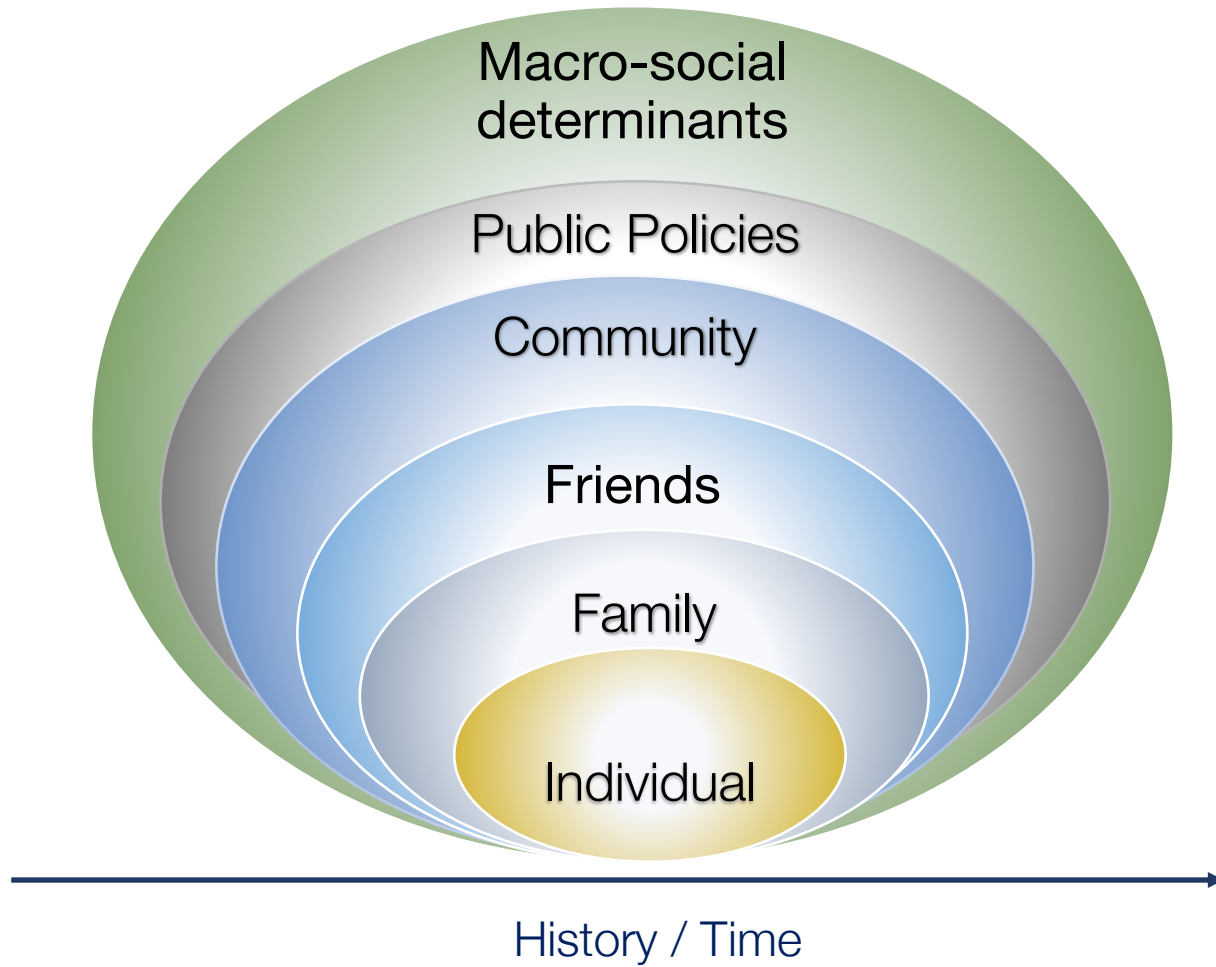
- Pre-pandemic exposure to a criterion A traumatic experience for US adolescents?
- What does 'resilience' mean to you?



1. Potentially traumatic experiences for US children and youth
2. Neurodevelopmental impact of trauma
3. Building resilience

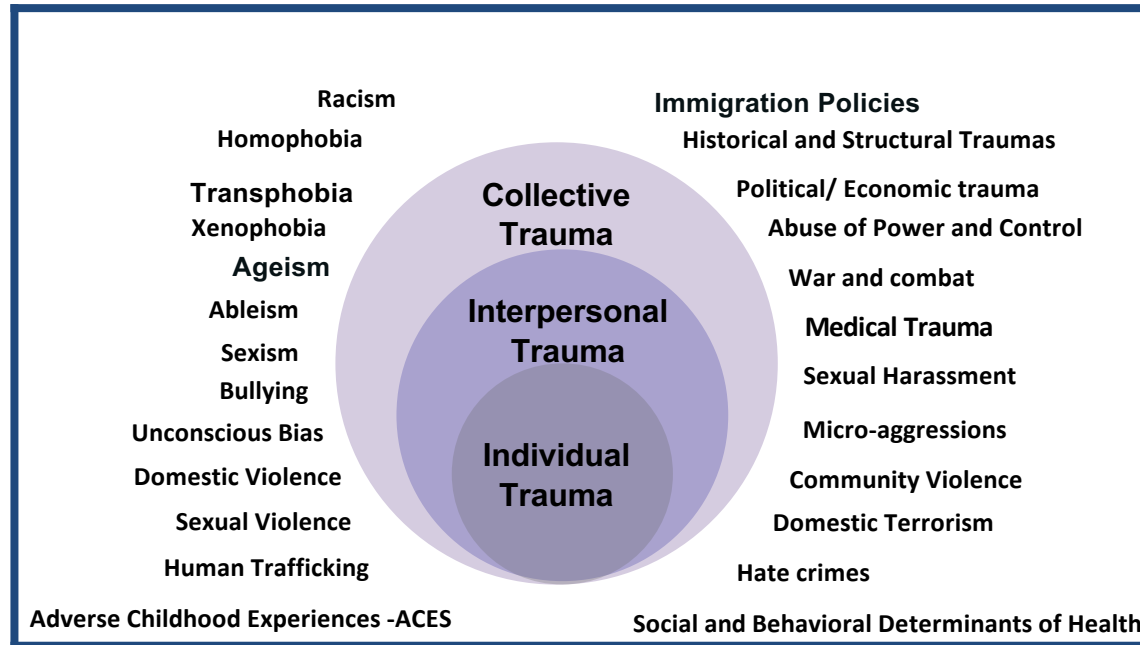
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“ A traumatic event is an experience that causes physical, emotional, psychological distress, or harm. It is an event that is perceived and experienced as a threat to one's safety *or to the stability of one's world.* ”



Basu, A (2020) Conceptual model adapted from Brofrenbrenner (1977)

What is Trauma?



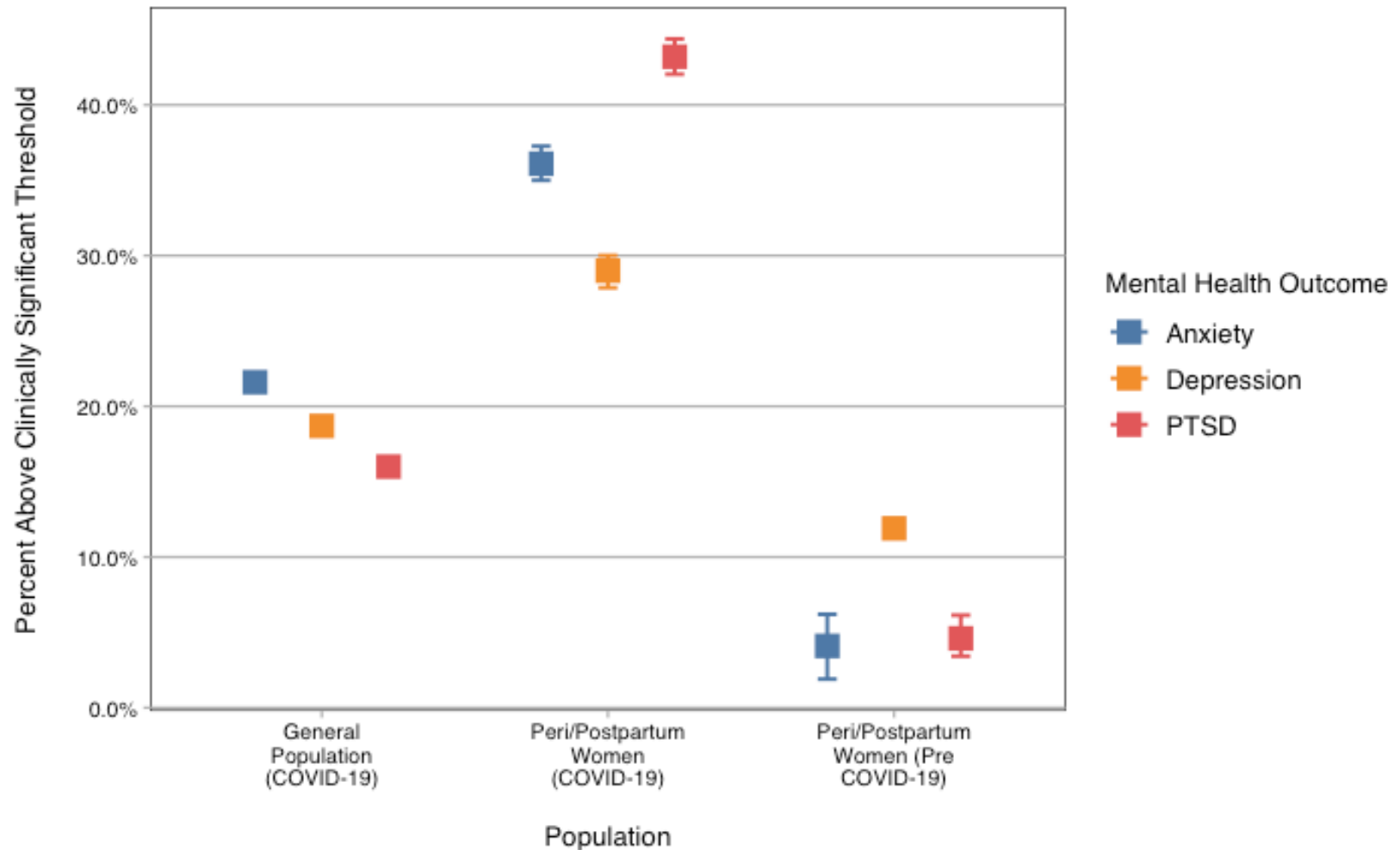
© Lewis-O'Connor, A. 2015 © Rittenberg, E 2015 © Grossman, S. 2015 UPDATED, 2019

COVID-19 pandemic impact

- Significant increase in mental health claims for adolescents: FAIR Health Report (March, 2021)
- Parent reported worsening of child mental health: C.S. Mott Children's Hospital National Poll, University of Michigan
- Older teens and young adults: rates of anxiety and depression have doubled since pre-pandemic
- Kaiser Family Foundation/ESPN "The Undefeated" Survey
 - Economic uncertainty
 - Isolation

**Longitudinal studies suggest a decline in youth mental health functioning for years
– *now exacerbated by the pandemic***

Perinatal Anxiety, depression and PTSD before and during the COVID-19 pandemic



PANDEMIC SURVEY

Parents' Mental, Physical Health Impacted Since Start of Pandemic



say they could have used more emotional support than they received.



received treatment from a mental health professional.

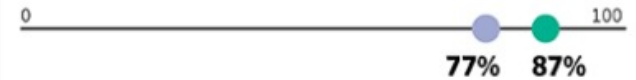


were diagnosed with a mental health disorder since the pandemic started.

Mothers are more likely than fathers to say their mental health has worsened compared with before the pandemic (**39%** vs. **25%**), but fathers are more likely to report behavioral and physical changes:

■ MOTHERS ■ FATHERS

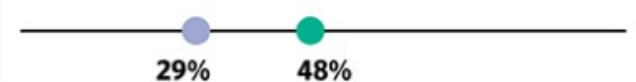
% REPORT SLEEPING MORE OR LESS THAN THEY WANTED



% REPORT UNWANTED WEIGHT CHANGES



% REPORT DRINKING MORE ALCOHOL TO COPE WITH STRESS

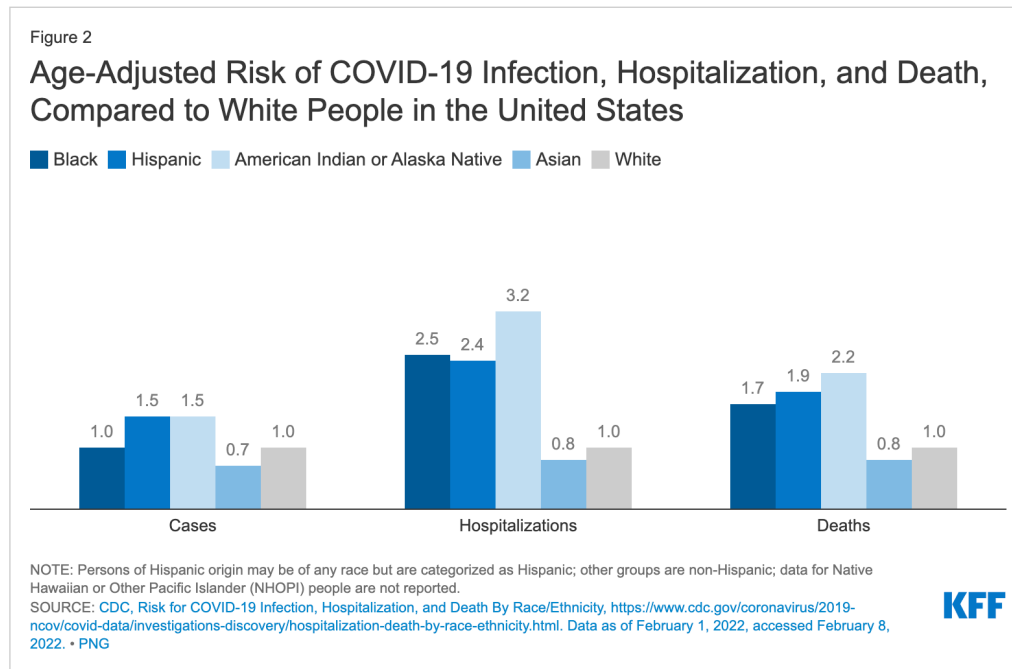


Infants and young children

- Paucity of data
- Small sample size
- Early childhood measures are not deterministic of later functioning but show impact on current functioning
 - Cognitive
 - Motor
 - Social emotional

Disproportionate impacts

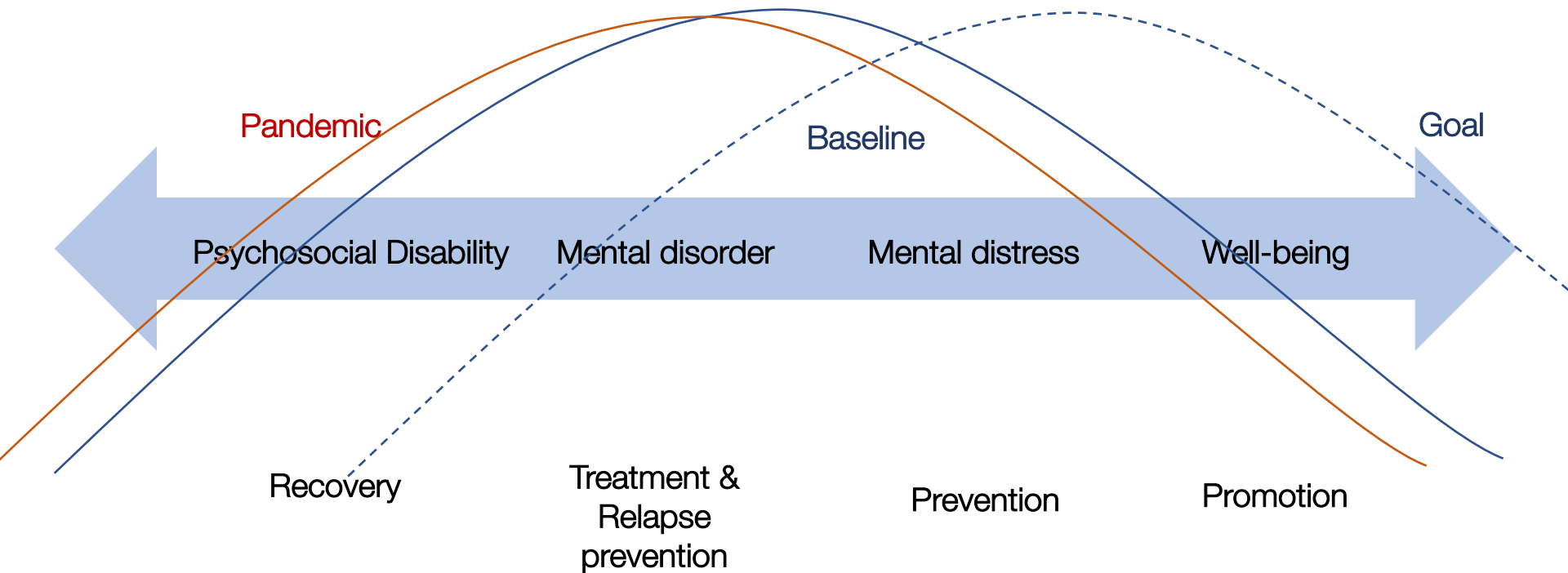
- Greatest burden of COVID viral impact and death and disability borne by Hispanic, AIAN, and Black individuals



Disproportionate impacts

- More likely to have front line jobs or pre-existing health conditions
- Greater economic losses (including childhood poverty)
- Fewer buffers that promote coping
 - E.g., reliable internet; access to green and blue spaces in urban areas; access to (affordable, trustworthy, culturally attuned) health care

Figure 1: Population mental health conceptual model

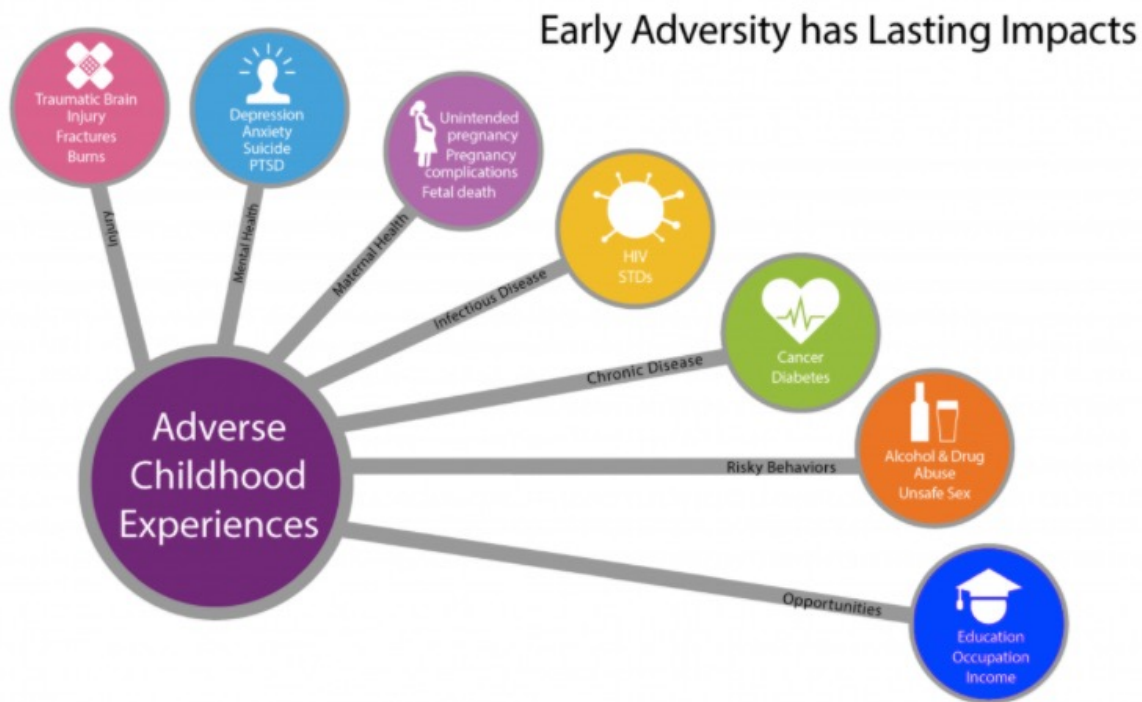


Basu, A. (2020) Adapted from slide courtesy of Shekhar Saxena MD. Patel V, Saxena S et al. The Lancet Commission on global mental health and sustainable development. Lancet. 2018 Oct 27;392(10157):1553-1598. doi: 10.1016/S0140-6736(18)31612-X. Epub 2018 Oct 9. Erratum in: Lancet. 2018 Oct 27;392(10157):1518. PMID: 30314863.

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Trauma has broad spectrum impact

CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study

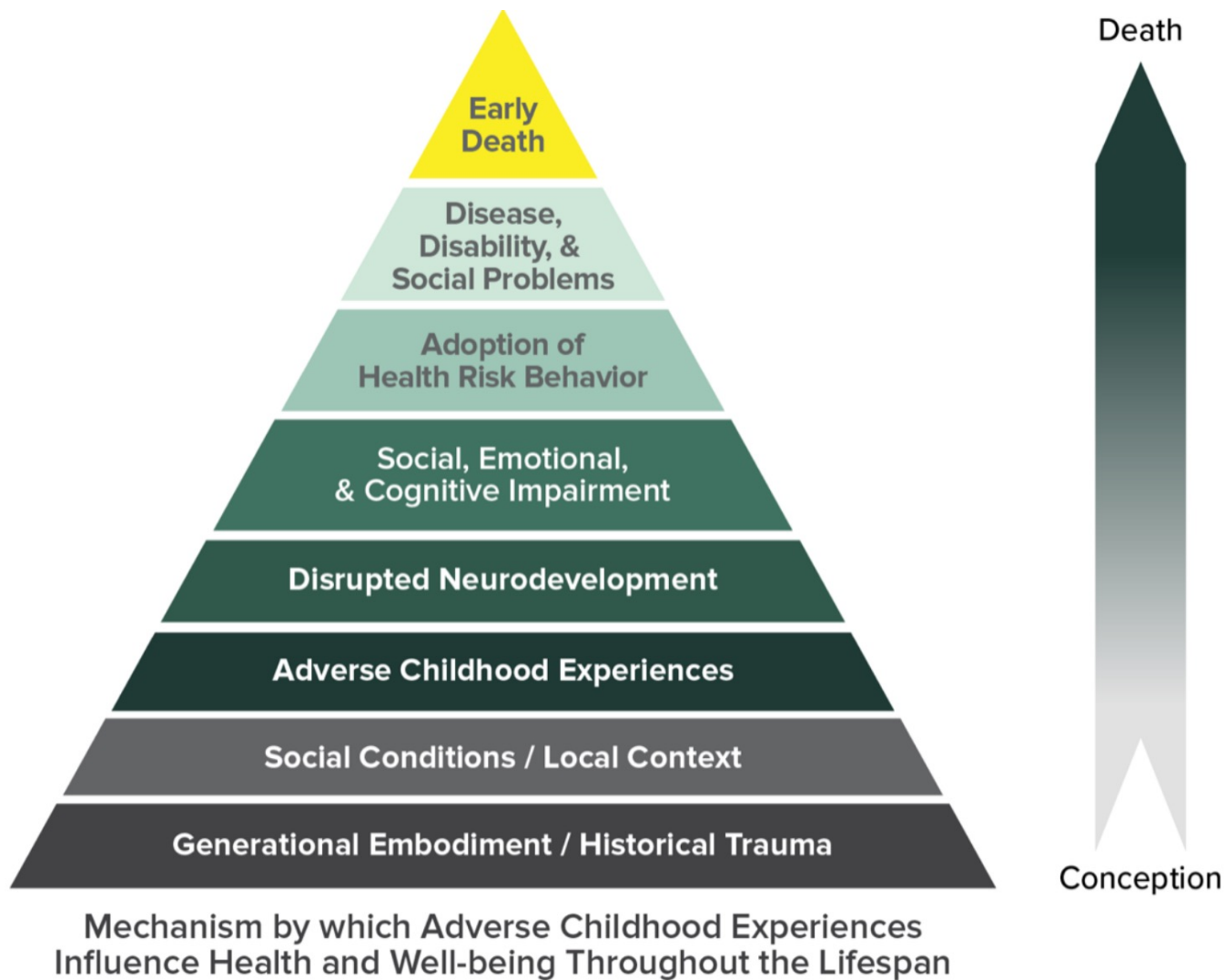


Nadine Burke Harris' TED talk



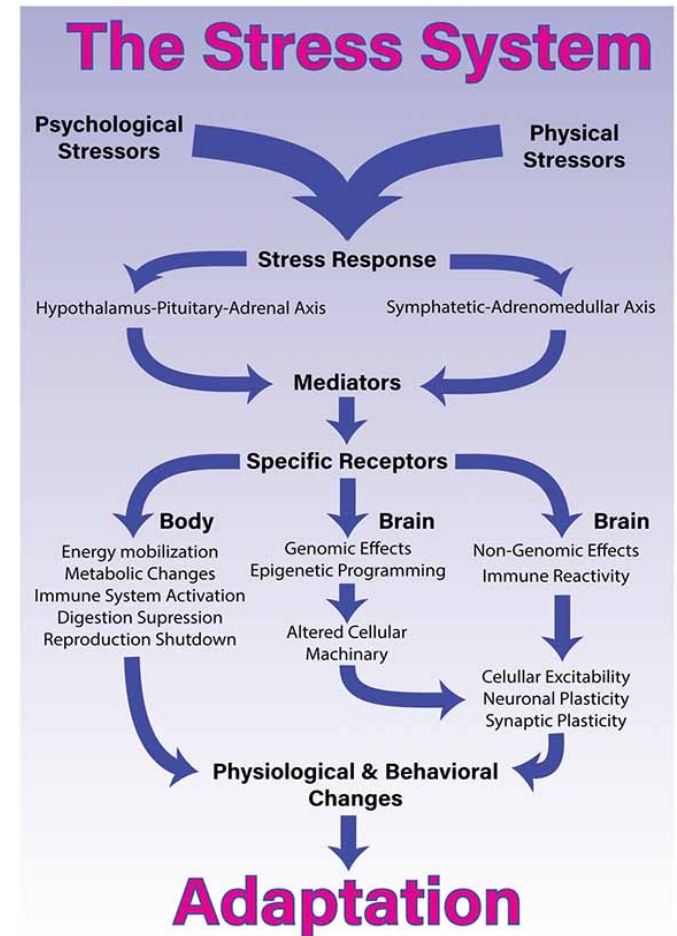
Nadine Burke Harris
How childhood trauma affects health across a lifetime

Posted Feb 2015



Early experiences 'get under the skin'

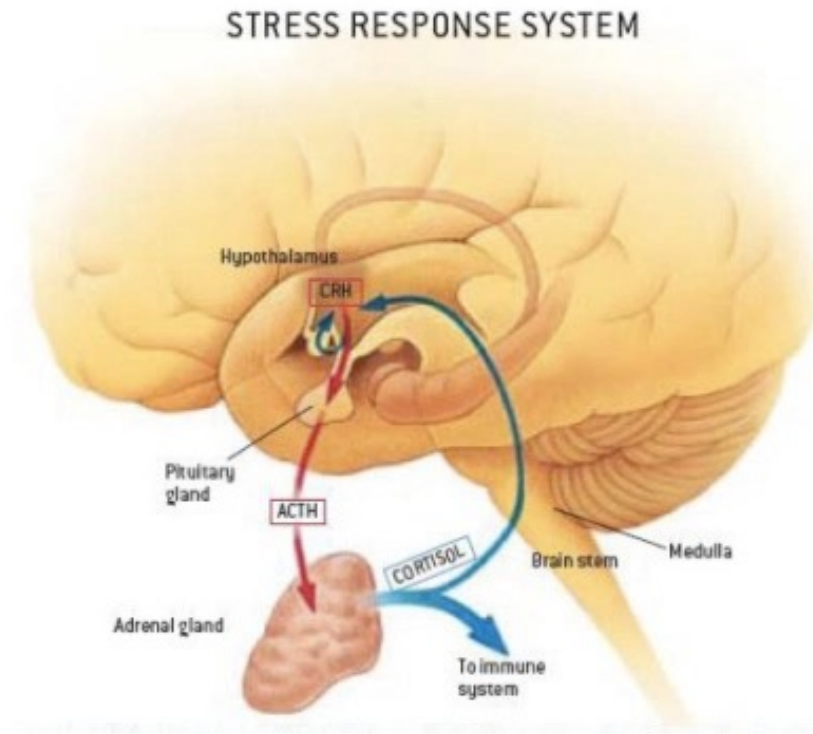
- Survival is the most important evolutionary task
 - Allostasis: adaptation and physiological stability
 - Short term stressors are tolerable
- Chronic stress associated with biological 'wear and tear':
allostatic load / overload



Sterling, P., and Eyer, J. (1988). Allostasis A New Paradigm to Explain Arousal Pathology. Handbook of Life Stress Cognition and Health. Oxford: Oxford University Press
McEwen, B. S., and Stellar, E. (1993). Stress and the individual: mechanism leading to disease. Arch. Intern. Med. 153, 2093–2101. doi: 10.1001/archinte.153.18.2093

Figure : Godoy LD, Rossignoli MT, Delfino-Pereira P, Garcia-Cairasco N, de Lima Umeoka EH. A Comprehensive Overview on Stress Neurobiology: Basic Concepts and Clinical Implications. Front Behav Neurosci. 2018 Jul 3;12:127. doi: 10.3389/fnbeh.2018.00127. PMID: 30034327; PMCID: PMC6043787.

Hypothalamic-pituitary-adrenal axis



The Biology of Adversity and Resilience Explains How Excessive Stress Undermines the Foundations of Healthy Development



Genetic Variation

X

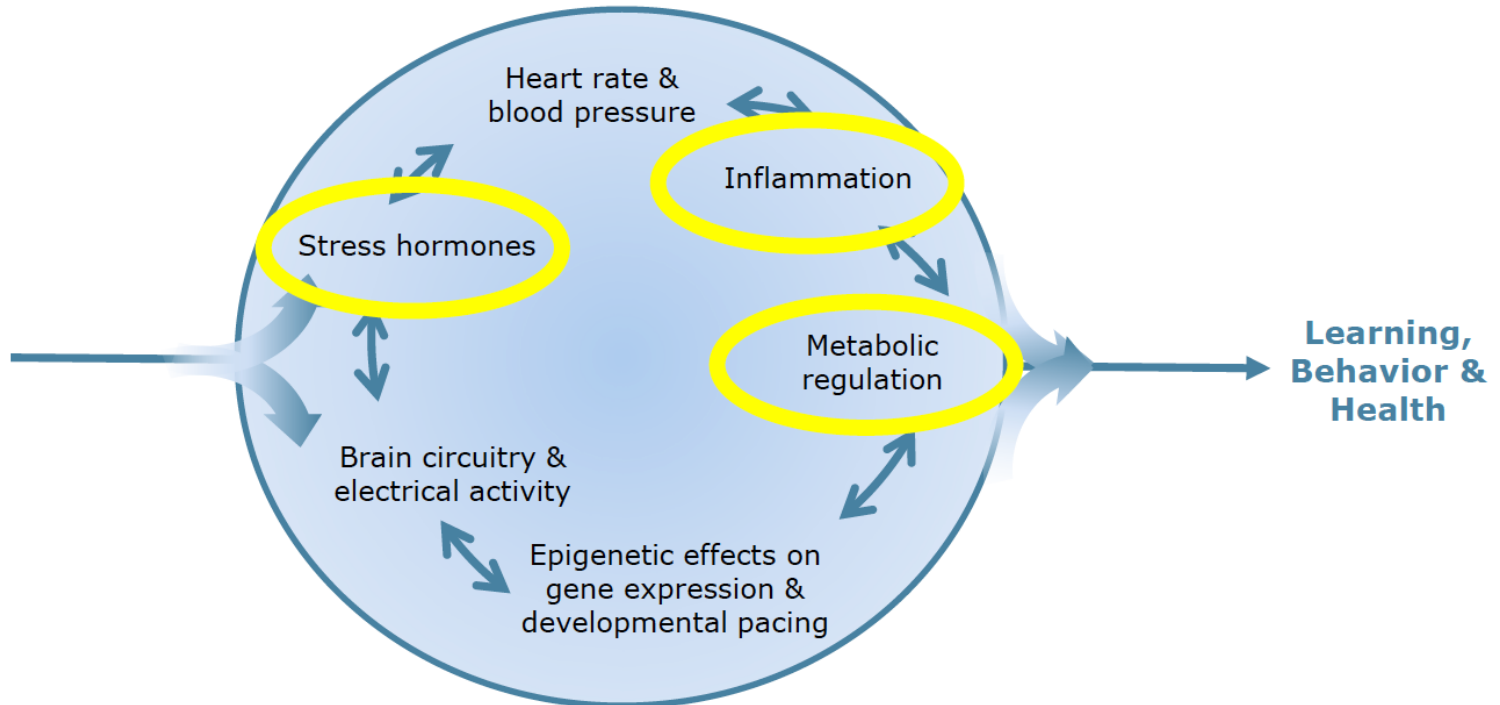


Environmental Stressor

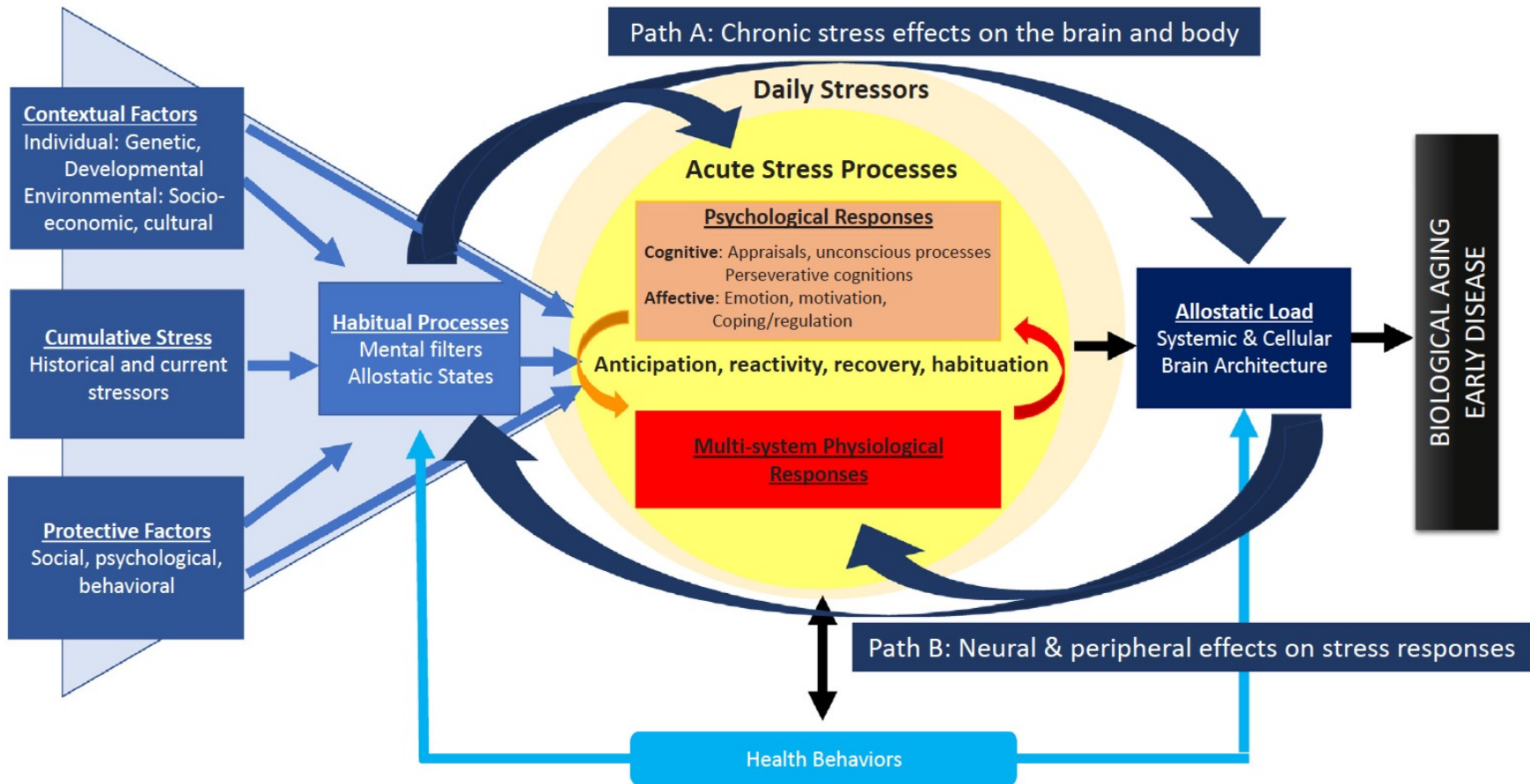
X



Time



Transdisciplinary model of stress: Integrating contextual, historical, habitual, and acute stress processes



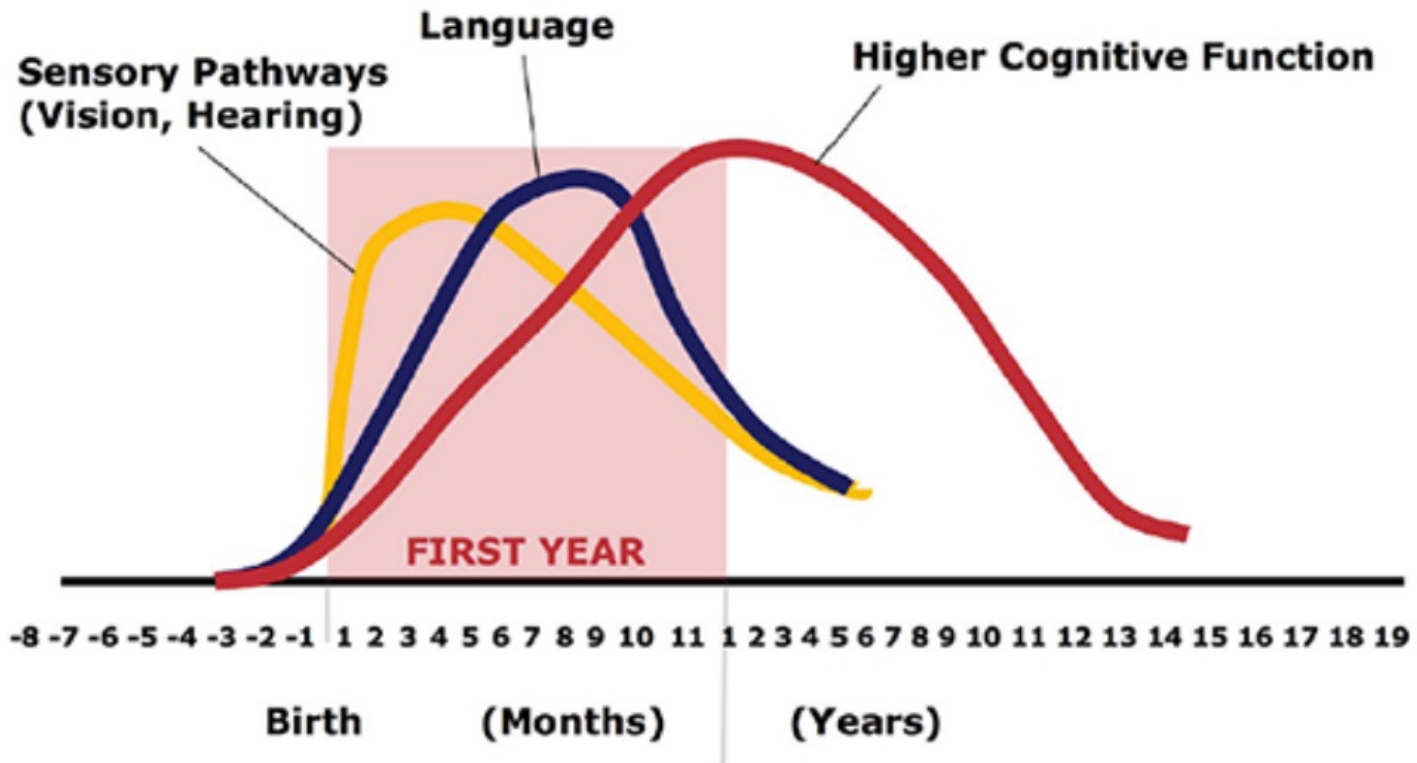
Epel ES, Crosswell AD, Mayer SE, Prather AA, Slavich GM, Puterman E, Mendes WB. More than a feeling: A unified view of stress measurement for population science. *Front Neuroendocrinol.* 2018 Apr;49:146-169. doi: 10.1016/j.yfrne.2018.03.001. Epub 2018 Mar 15. PMID: 29551356; PMCID: PMC6345505.

Sensitive periods of neurodevelopment

- 'Time-sensitive' windows of dynamic development
 - Brain more 'open' to experiential and environmental inputs
 - High risk – high reward periods
- Pregnancy - early childhood: biological systems exhibit considerable plasticity and adapt based on experiential inputs within a given genetic context
- Adolescence

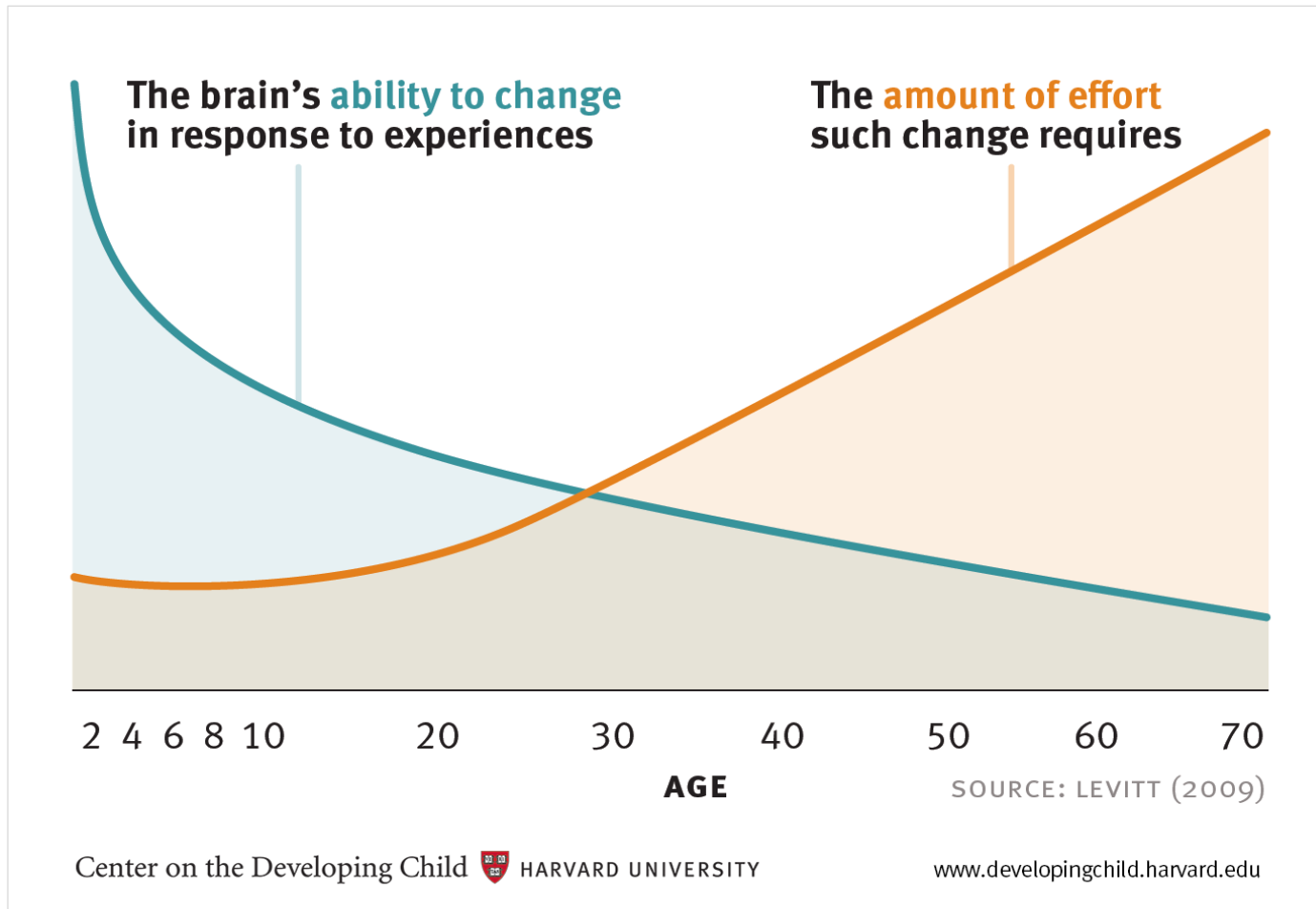
Human Brain Development

Neural Connections for Different Functions Develop Sequentially

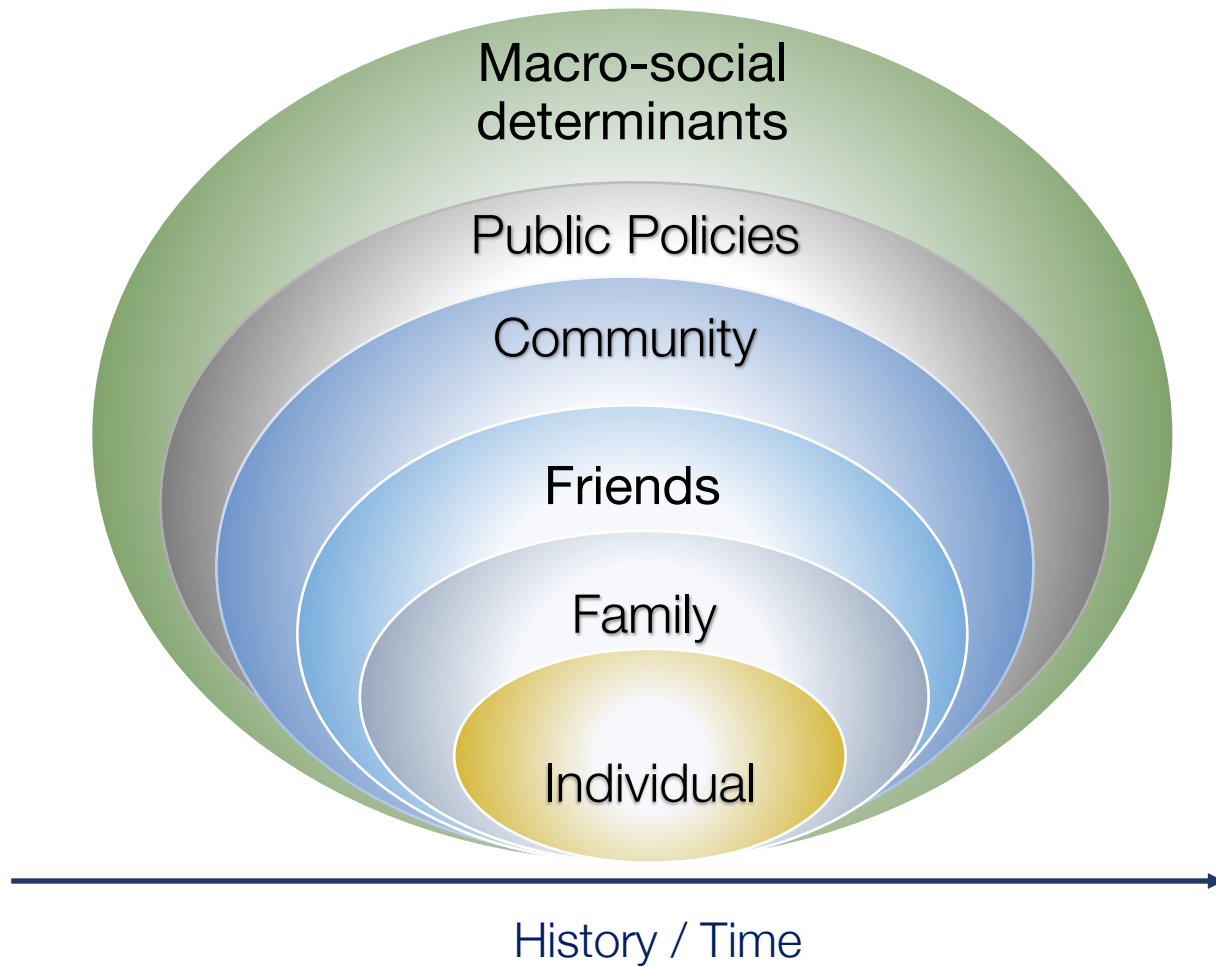


Source: C.A. Nelson (2000). Credit: Center on the Developing Child

Background

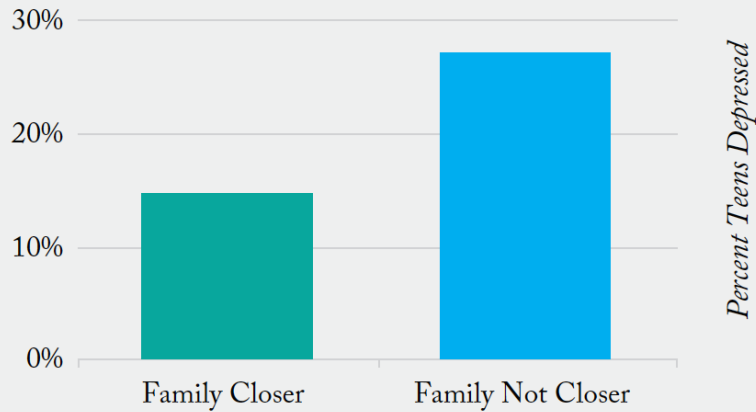


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3. **Building Resilience**



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Figure 3. Percent of Teens Depressed, among those agreeing their families had become closer during the pandemic vs. those not agreeing



Source: Teens in Quarantine

Institute for Family Studies/Wheatley Institution

Figure 5. Percent of U.S. Teens Depressed during Quarantine, food secure vs. food insecure



Source: Teens in Quarantine

Institute for Family Studies/Wheatley Institution

Building Resilience

- Individual differences
 - Biological factors
 - Cognitive, emotion, and behavior regulation
 - Temperament (and environmental fit)
- Parents/ caregivers
 - Safe, supportive, and consistent relationships with caregiver(s) are the most powerful buffer for children of all ages
 - Parental adjustment is one of the most robust predictors of children's adjustment.
- Schools
 - having a sense of connection and belonging in school and in the community
- Safe stable environments
 - E.g., economic stability, safe communities, food security
- Access to (affordable, trustworthy, culturally attuned) healthcare

Building Resilience

1. Context matters

- Intergenerational context: Who is in family, what is their experience, and what is their communities experience, what is their view of their health?

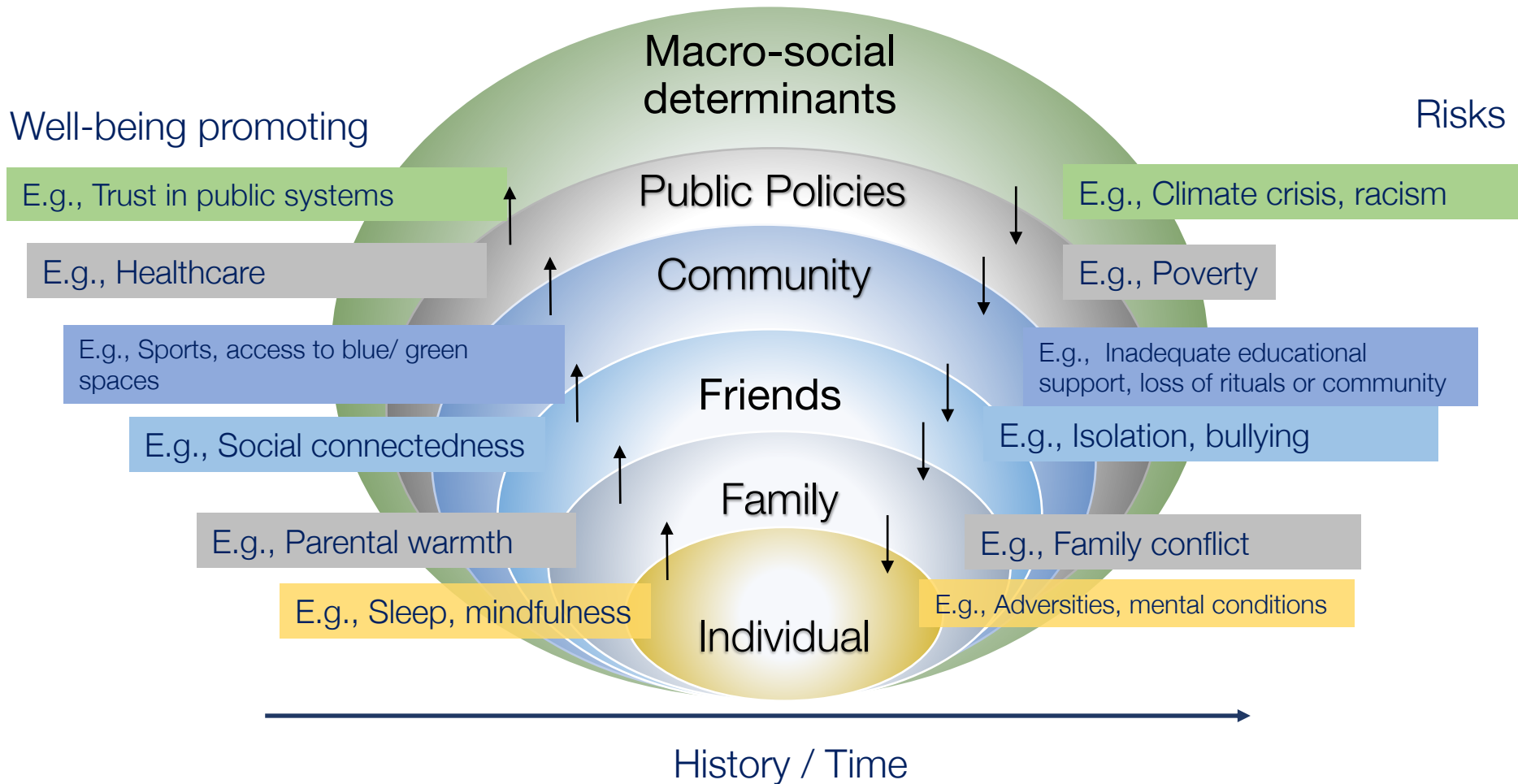
2. Interventions

- Supports are needed where children live, grow, and play.
- Individual, family, and community-based interventions (e.g., schools, community).
 - Trauma focused treatments and trauma-informed approaches
- Training and capacity building
- Affordability
- Stigma: education and awareness

Building Resilience

3. Policies: “All policies are healthcare policies”
 - Kivoski et al., (2022) *Pediatrics*. Tax credits associated with lower rates of child maltreatment.
 - Brito et al., (2022) *Child Development*. Paid maternal leave associated with more “mature patterns” of infant brain function (EEG) at 3 months of age
 - Prevention and early intervention: challenging in a tertiary care system (e.g., preventive billing)

4. Understanding and integrating strengths at multiple levels (cultural, historical, communal, familial, and individual)



Basu, A (2020) Conceptual model adapted from Brofenbrenner (1977)



THANK YOU

Youth and young adults – and those who hold children in their minds

Indian Health ECHO Program members and attendees

MGB Trauma Informed Care Initiative (Annie Lewis O'Connor, Nomi Levy-Carrick, Samara Grossman, Eve Rittenberg)

HSPH colleagues (Karestan C Koenen)

MGH Colleagues (Nancy Rotter)