



Early Adversity and Lifelong Health: Risk & Resilience

Sarah Enos Watamura, Ph.D.



UNIVERSITY *of*
DENVER



SEED

Stress Early Experience & Development
Research Center



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Research Center



Angela Narayan, Ph.D.
History of parental experiences, resilience



Elysia Davis, Ph.D.
Effects of prenatal stress, prenatal depression intervention



Galena Rhoades, Ph.D.
Romantic relationship health, domestic violence prevention



Sarah Watamura, Ph.D.
Stress physiology & buffering birth to age 8; parenting intervention



Pilyoung Kim, Ph.D.
Brain imaging; new parents, infants & middle childhood



Omar Gudiño, Ph.D., ABPP
Risk & resilience in youth, mental health treatment & access



Anne DePrince, Ph.D.
Trauma and gender-based violence



Julia Dmitrieva, Ph.D.
Genetics, methodology adolescents & emerging adults

*Our mission is to advance **SEED Science**, an approach to understanding stress, early experiences and development that promotes intergenerational health, wellbeing and resilience by fostering rigorous interdisciplinary, policy-relevant research with collaborative community partners.*

Plan for Today

- 1) Early adversity can have life-long consequences for individuals and society
- 2) Intergenerational transmission of adversity
- 3) Resilience, relationships & the Toxic Stress Framework
- 4) The power of parents
- 5) Sensitive periods across the lifespan
- 6) Prevention

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Long-term Effects of Chronic Stress

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 - cardiovascular disease (Smith & Ruiz, 2002)
 - diabetes (Mooy, 2000)
 - infectious illness (Cohen & Williamson, 1991)

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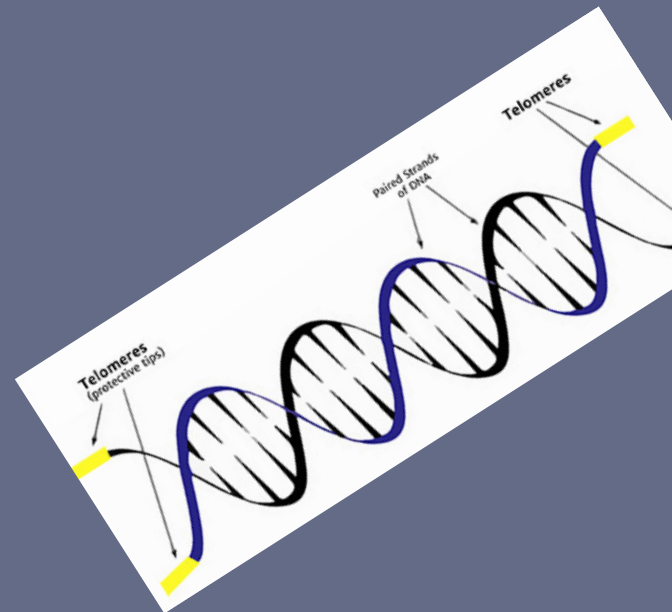
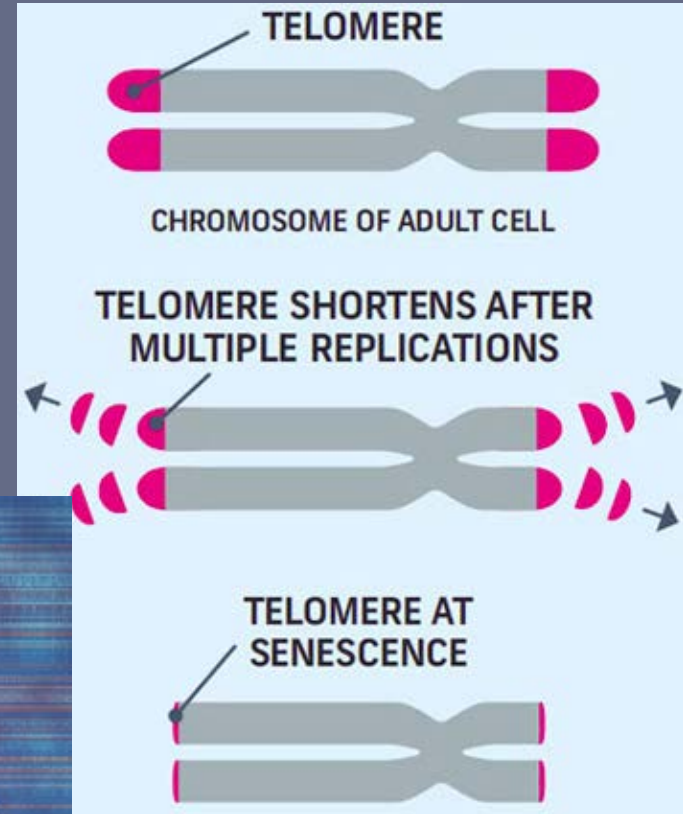
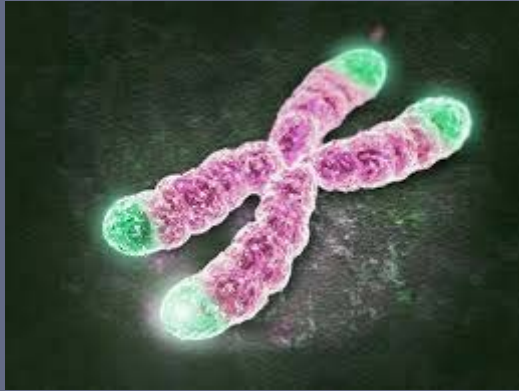
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 - anxiety (Eisenberg, 2007)
- **can accelerate aging:**
 - shorter telomere length, less telomerase activity (Epel et al., 2004)

Cellular Aging



Risk Factors' Effect on Life Expectancy

- Smoking 10 years¹
- Obesity 6-7 years^{2, 3}
- High blood pressure 5 years⁴
- Diabetes 7-8 years⁵

¹ Doll R, Peto R, Boreham J, Sutherland I. Mortality in relation to smoking: 50 years' observations on male British doctors. *BMJ* 2004; 328: 1519–27.

² Haslam DW, James WP (2005). "Obesity". *Lancet* 366 (9492): 1197–209.

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⁴ Franco OH, Peeters A, Bonneux L, de Laet C. Hypertension. 2005 Aug;46(2):280-6.

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- **Childhood Stress 20 years**

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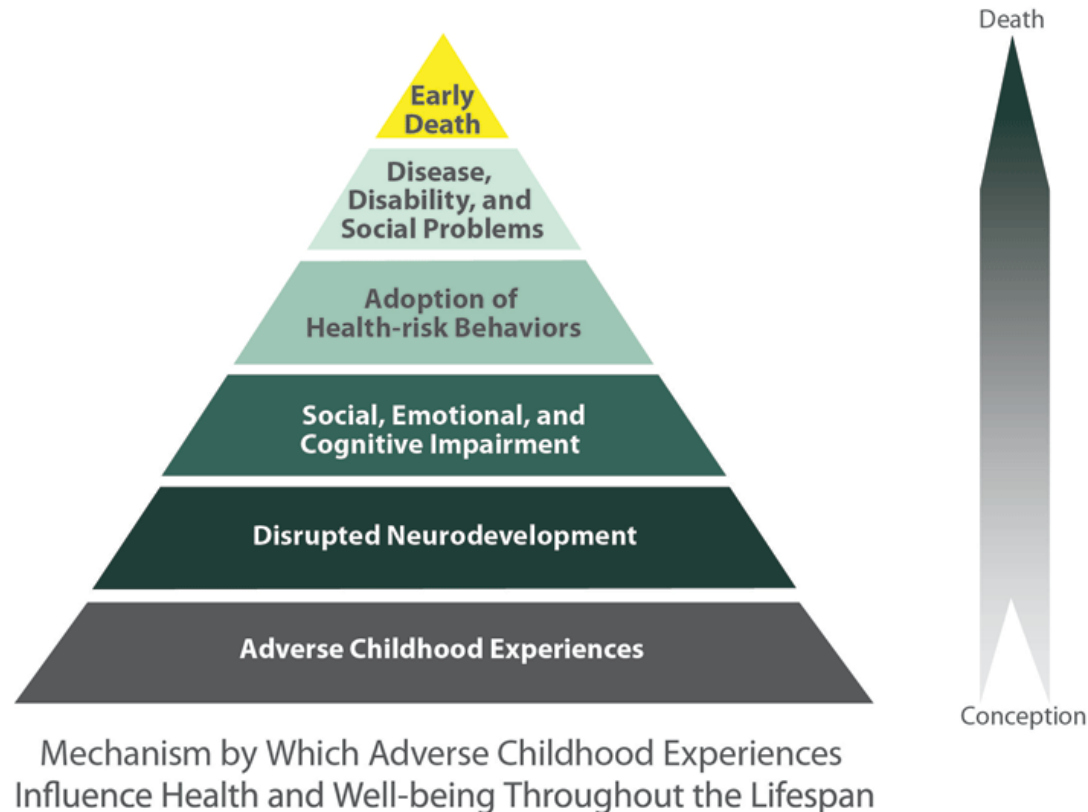
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Childhood Stress Effects: Evidence from the ACE Study



For more information: <http://www.cdc.gov/ace/>

Adverse Childhood Experiences (ACEs) Summit: BC and Beyond

Location:

Sheraton Wall Centre
1088 Burrard Street
Vancouver, BC V6Z 2R9

Date:

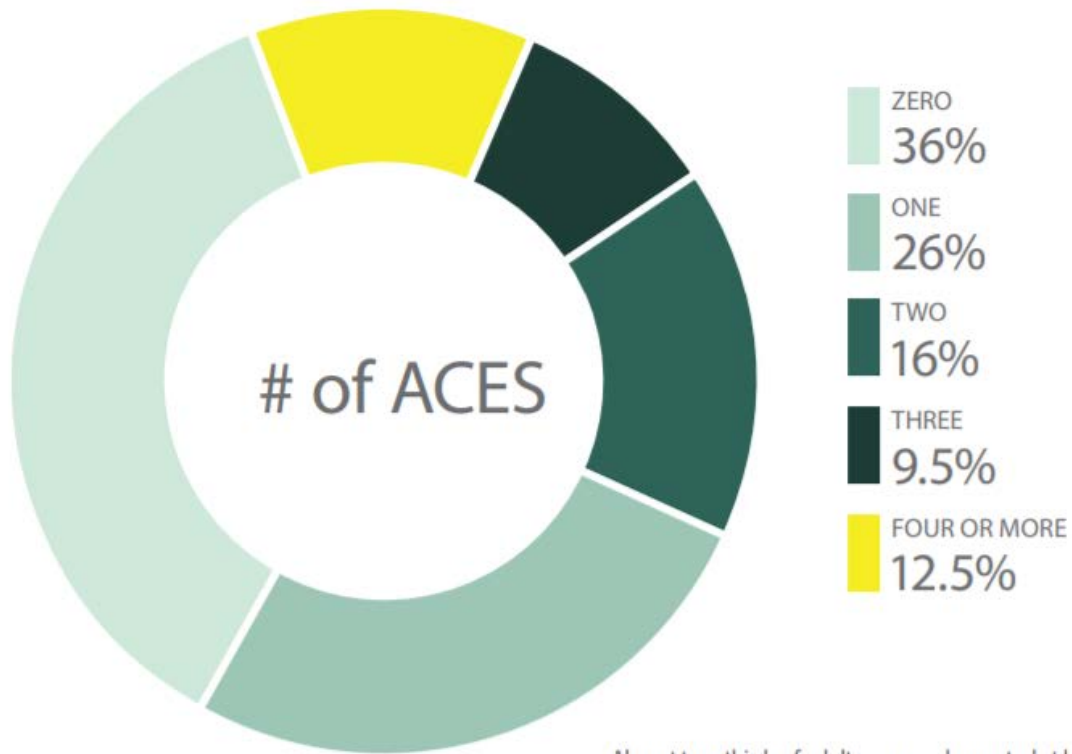
November 14, 2017 to November 15, 2017

 [ADD TO CALENDAR](#)



The Summit, organized by the Shared Care Committee (a partnership of Doctors of BC and the BC government) looks at taking action to address Adverse Childhood Experiences with improved policies and practices.

HOW COMMON ARE ACES?



Almost two-thirds of adults surveyed reported at least one Adverse Childhood Experience – and the majority of respondents who reported at least one ACE reported more than one.

Table 5. Prevalence of each adverse childhood experience and reporting of additional ACEs

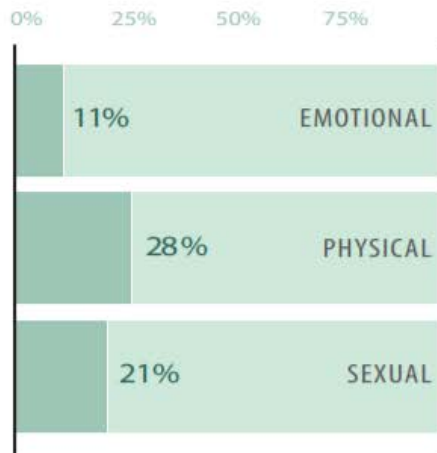
Adverse childhood experience	n	Prevalence (%)	Additional ACEs							
			0		≥1		≥2		≥3	
			n	%	n	%	n	%	n	%
Abuse										
Emotional abuse	198	16.9	18	9.0	180	91.0	151	76.2	110	55.5
Physical abuse	128	11.0	9	6.9	119	93.1	107	83.7	85	66.4
Sexual abuse	174	14.9	33	19.0	141	81.0	110	63.1	75	43.0
Household dysfunction										
Domestic violence	153	13.1	8	5.2	145	94.8	122	79.8	99	64.8
Household substance abuse	242	20.7	37	15.3	205	84.7	158	65.2	109	45.1
Mental illness in household	241	20.6	40	16.7	201	83.3	151	62.6	103	42.7
Physical illness in household	190	16.3	79	41.6	111	58.4	77	40.4	51	26.8
Parental separation or divorce	205	17.6	47	23.0	158	77.0	117	57.0	79	38.6
Median				16.0		84.0		64.2		44.1
Range				5.2-41.6		58.4-94.8		40.-83.7		26.8-66.4

Exposure rates may be lower in Canada, but are still alarmingly high. McDonald, S., Kingston, D., Bayrampour, H., & Tough, S. (2015). Adverse Childhood Experiences in Alberta, Canada: a population based study. *Medical Research Archives*, (3).

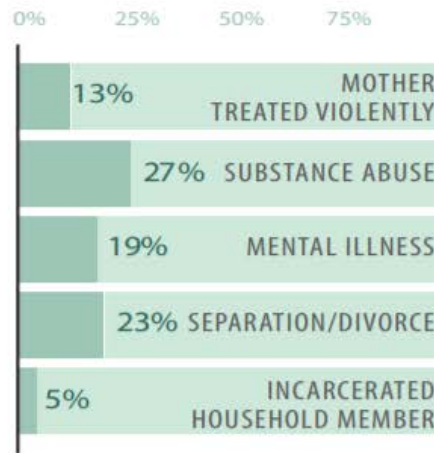
TYPES of ACES

The ACE study looked at three categories of adverse experience: **childhood abuse**, which included emotional, physical, and sexual abuse; **neglect**, including both physical and emotional neglect; and **household challenges**, which included growing up in a household where there was substance abuse, mental illness, violent treatment of a mother or stepmother, parental separation/divorce or had a member of the household go to prison. Respondents were given an **ACE score** between 0 and 10 based on how many of these 10 types of adverse experience to which they reported being exposed.

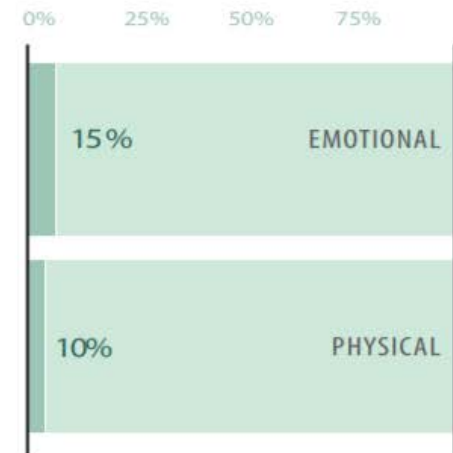
ABUSE



HOUSEHOLD CHALLENGES



NEGLECT



As ACEs increase, so does risk for:

- Alcoholism and alcohol abuse
- Chronic obstructive pulmonary disease
- Depression
- Fetal death
- Health-related quality of life
- Illicit drug use
- Ischemic heart disease
- Liver disease
- Poor work performance
- Financial stress
- Risk for intimate partner violence
- Multiple sexual partners
- Sexually transmitted diseases
- Smoking
- Suicide attempts
- Unintended pregnancies
- Early initiation of smoking
- Early initiation of sexual activity
- Adolescent pregnancy
- Risk for sexual violence
- Poor academic achievement

Table 7. Multivariable logistic regression models for diagnosed adult health outcomes

ACE risk profile category ^a	Mental health condition/Addiction	Circulatory condition	Respiratory condition	Chronic pain condition
Low risk abuse, high risk household dysfunction aOR (95% CI) ^b uOR (95% CI)	2.64 (1.49, 4.67) 3.56 (2.16, 5.87)	1.18 (0.69, 2.02) 0.89 (0.58, 1.37)	1.53 (0.96, 2.44) 1.44 (0.93, 2.22)	3.22 (1.91, 5.42) 2.76 (1.73, 4.39)
High risk abuse, low risk household dysfunction aOR (95% CI) ^b uOR (95% CI)	3.20 (1.94, 5.28) 3.41 (2.18, 5.34)	0.85 (0.54, 1.34) 1.04 (0.72, 1.49)	1.30 (0.86, 1.96) 1.46 (0.99, 2.12)	3.02 (1.92, 4.74) 3.09 (2.07, 4.62)
High risk abuse and high risk household dysfunction aOR (95% CI) ^b uOR (95% CI)	4.13 (2.53, 6.74) 4.70 (3.06, 7.24)	1.04 (0.65, 1.67) 0.99 (0.68, 1.43)	1.66 (1.10, 2.51) 2.31 (1.61, 3.32)	5.19 (3.31, 8.14) 4.90 (3.33, 7.21)
Omnibus p-value for ACE risk profile variable (adjusted model ^b)	<0.001	0.786	0.051	<0.001

^a Reference group: Low risk abuse, low risk household dysfunction

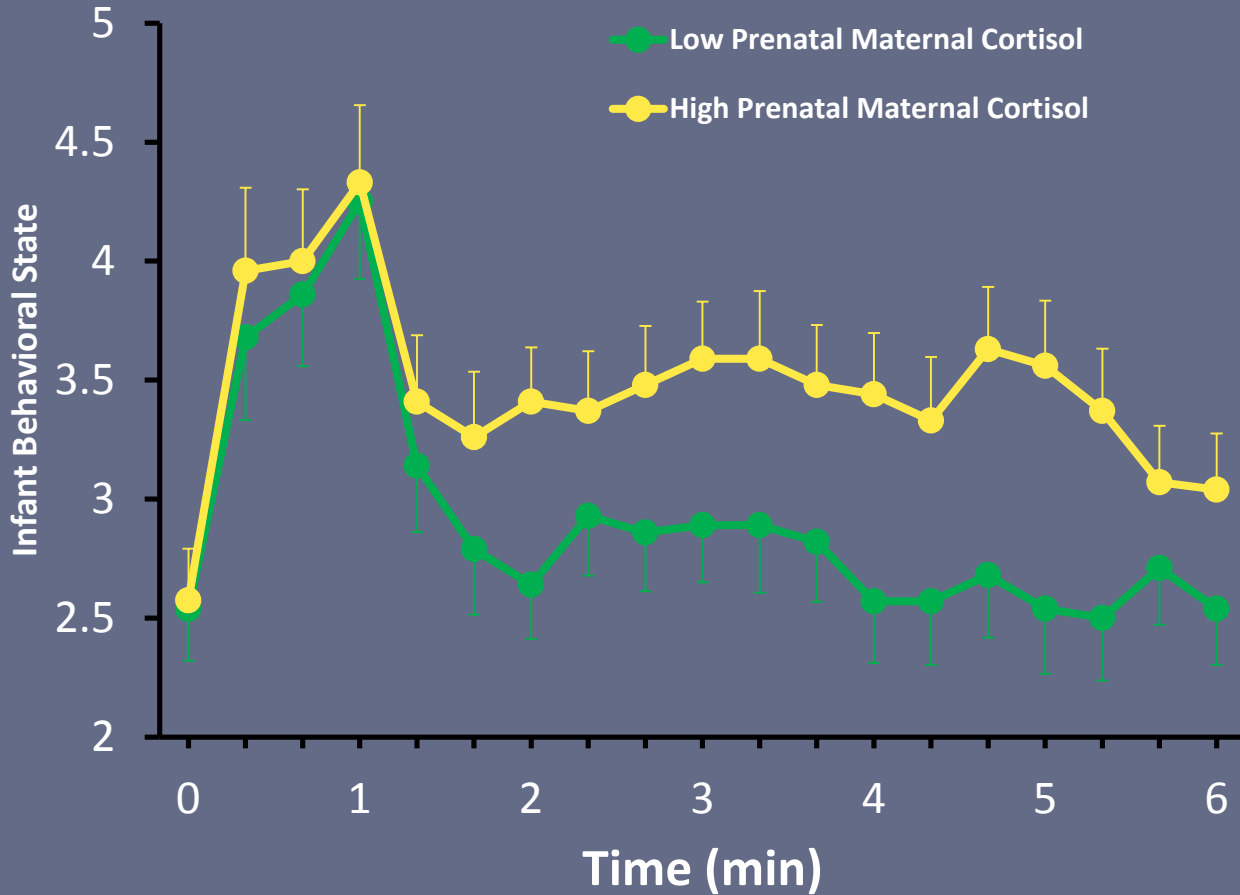
^b Adjusted for income, education, employment status, marital status, number of children in household, born in Canada, ethnicity, community type, gender, and age.

Plan for Today

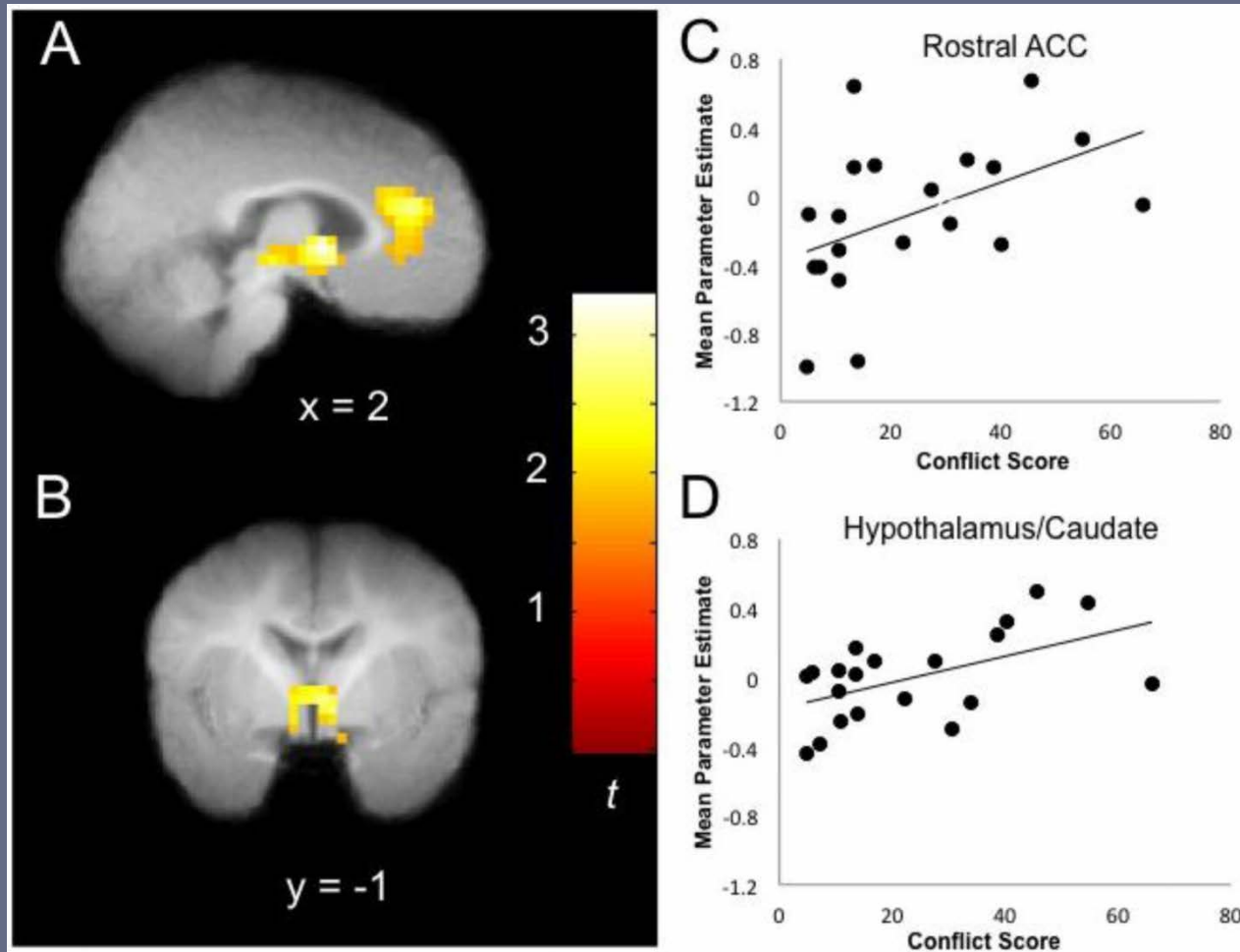
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Prenatal Stress Hormone Exposure & Newborn Stress Responsivity

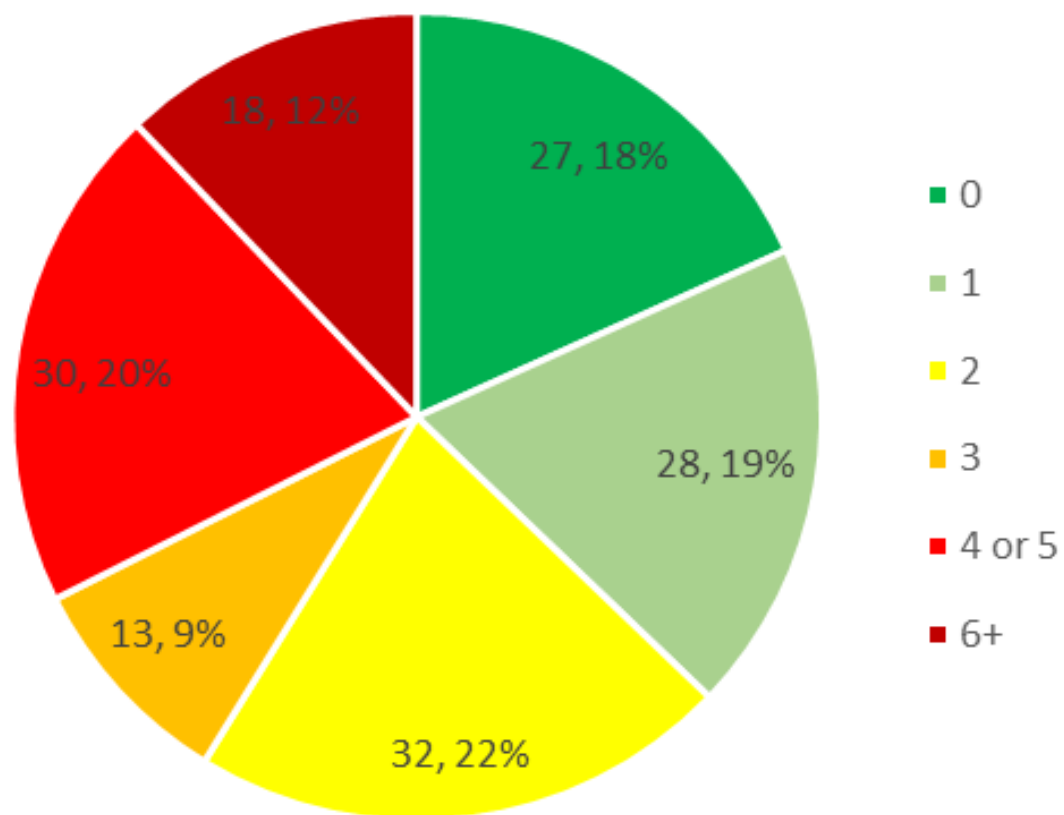


Even While Sleeping, Infants Track Family Conflict



Graham, A. M. Fisher, P. A. & Pfeifer, J. H. (2013). What Sleeping Babies Hear: An fMRI Study of Interparental Conflict and Infants' Emotion Processing. *Psychological Science*, 24(5): 782-789.

Maternal ACE Score in Early Head Start Sample



Percentage of Parents Reporting Child Needs Mental Health Services

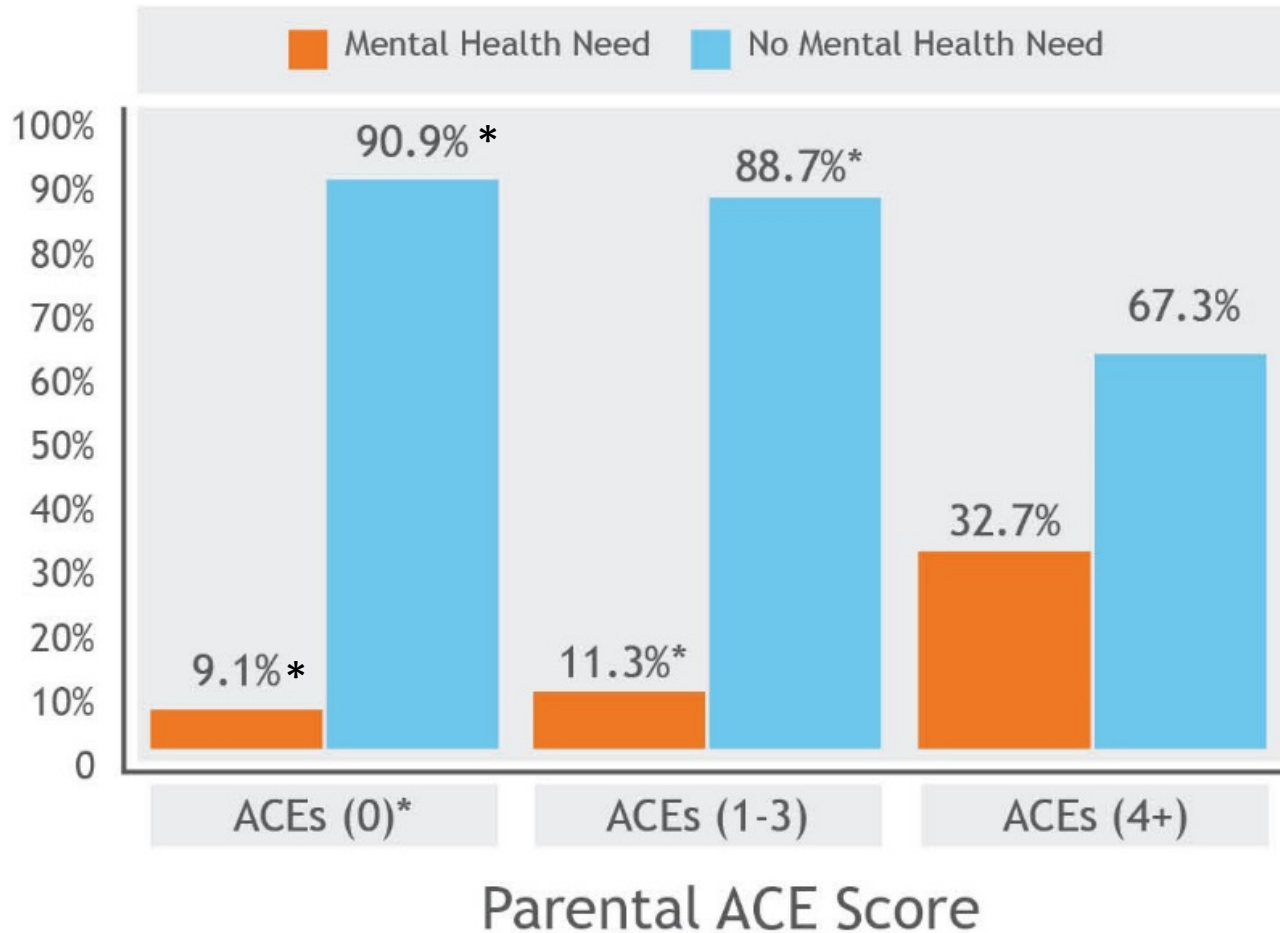


Figure 11. Percentage of Parents Reporting Child Needs Mental Health Services. *Note.* *statistically significant

Odds of ADD/ADHD and Externalizing Behavior Problems by Parental ACE

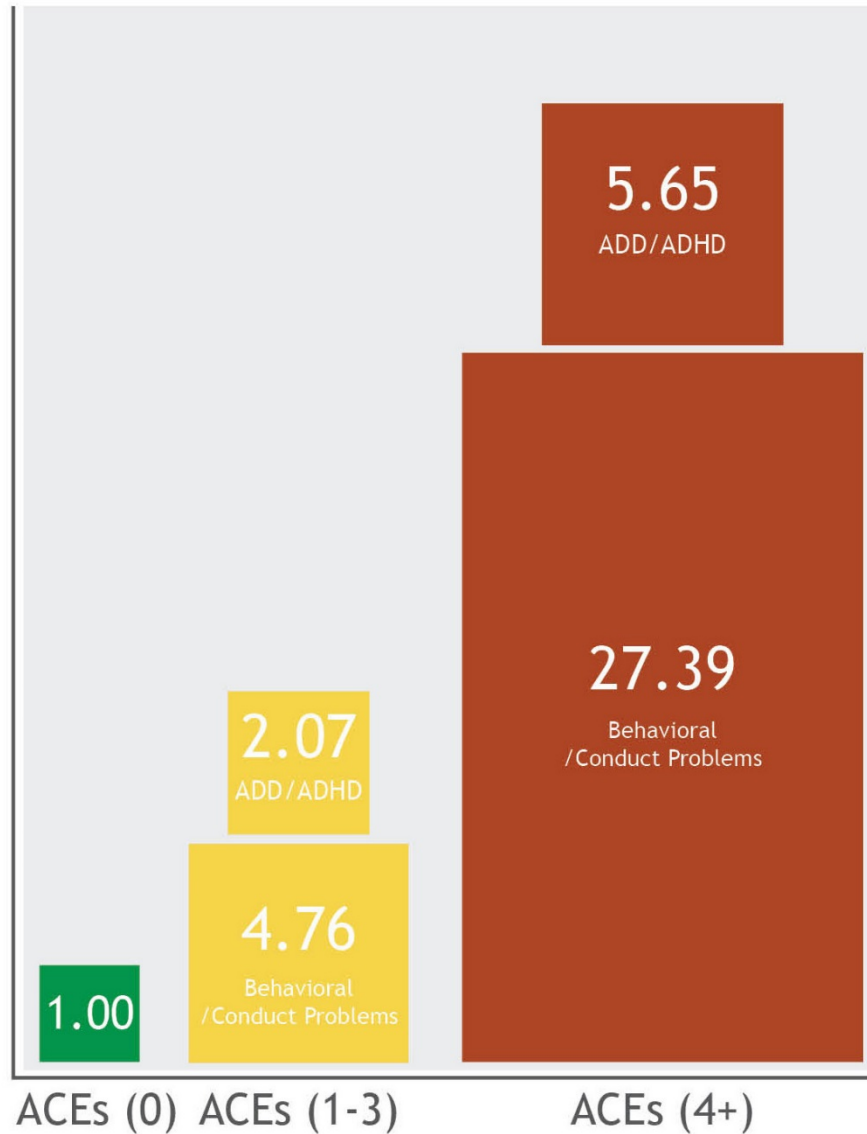


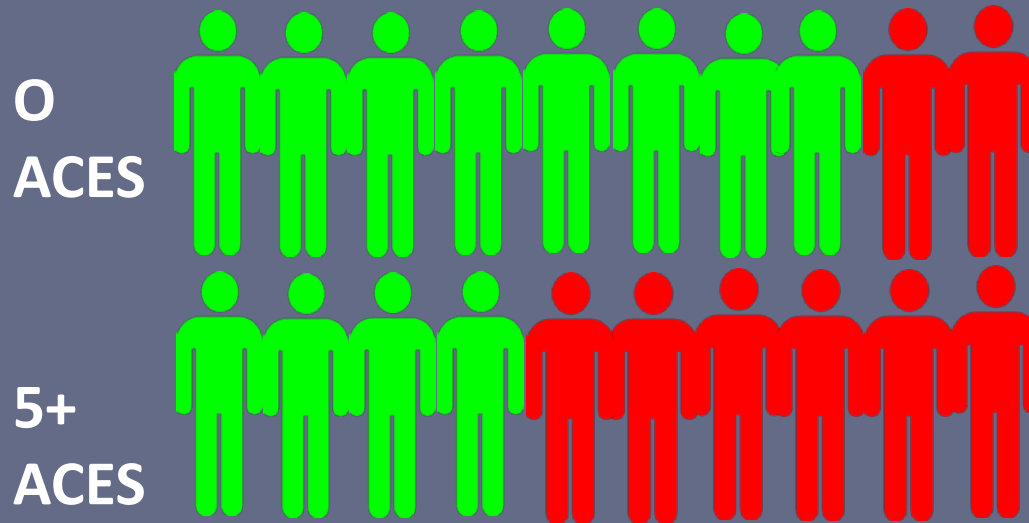
Figure 13. Odds of ADD/ADHD and Externalizing Behavior Problems by Parental ACE Score.

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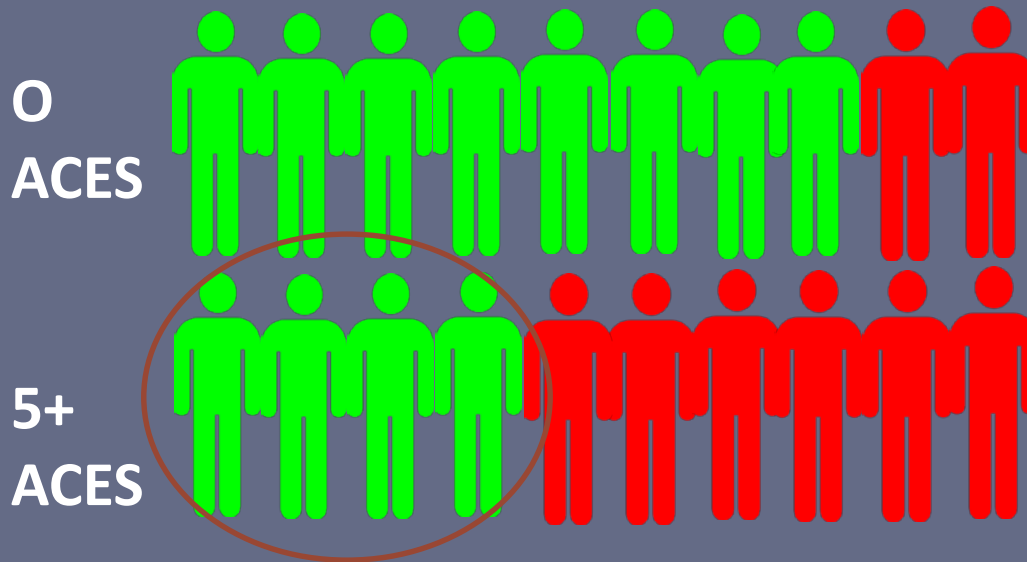
The ACE Story

Lifetime prevalence of depression by ACE Score



The Other Side of the ACE Story

Lifetime prevalence of depression by ACE Score



Resilience

Better than expected outcomes, given assessments of risk



THE MOST IMPORTANT RESOURCE?

- Buffering Relationships



The “Toxic Stress” Framework

- A framework offered by:
 - pediatrician Jack Shonkoff
 - pediatrician and researcher Tom Boyce
 - basic science researcher Bruce McEwen
 - (Shonkoff, Boyce & McEwen, 2009)



Positive, Tolerable, Toxic

- **Positive Stress**: Moderate, short-lived increases in heart rate, blood pressure, and stress hormone levels

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Positive, Tolerable, Toxic

- **Positive Stress**: Moderate, short-lived increases in heart rate, blood pressure, and stress hormone levels
- **Tolerable Stress**: A physiological state that could potentially disrupt brain architecture but is buffered by supportive relationships that facilitate adaptive coping.
- **Toxic Stress**: Strong, frequent, and/or prolonged activation of the body's stress-response systems in the absence of the buffering protection of adult support.

What is “Toxic Stress”?

- When chronic or significant stressors happen (particularly in childhood)....



AND, buffering relationships are not available



ACEs & Toxic Stress



How to Talk About Toxic Stress?



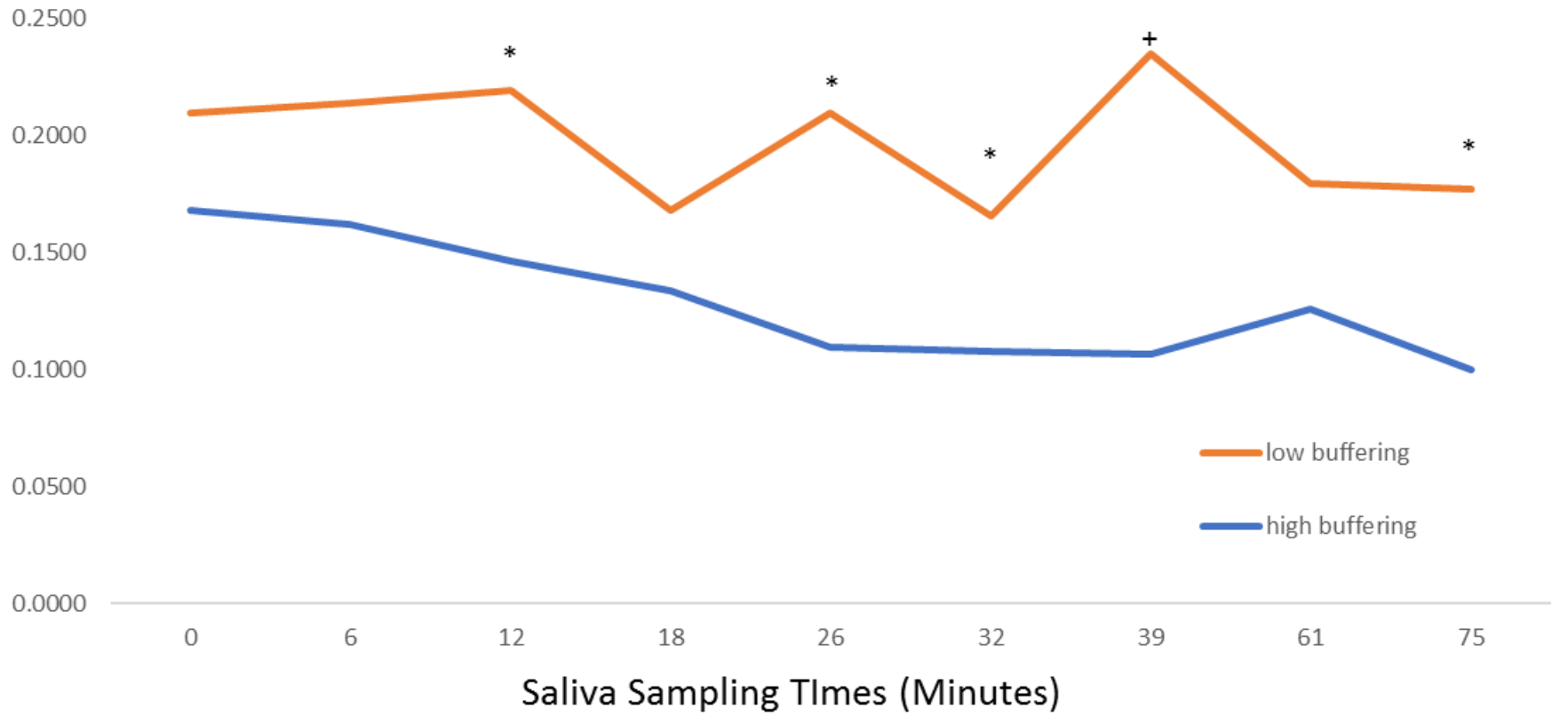
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The Power of Parents



Child Stress Reactivity & Parental Buffering

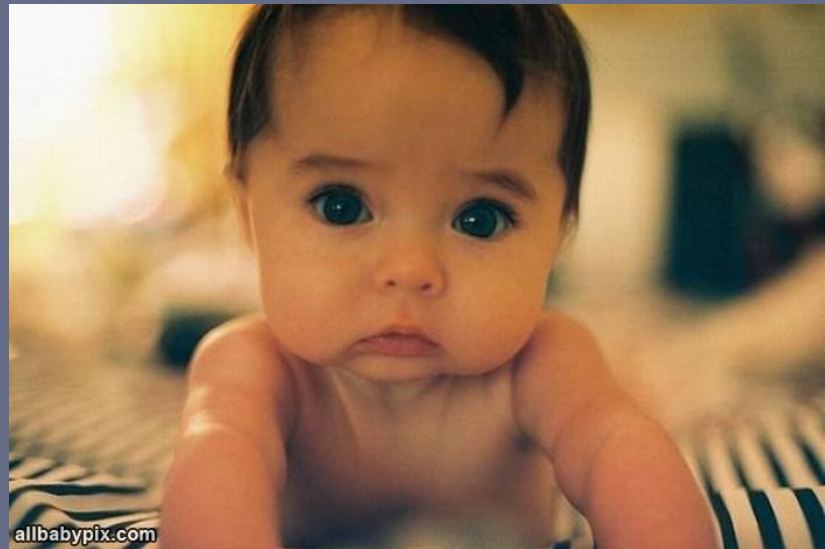


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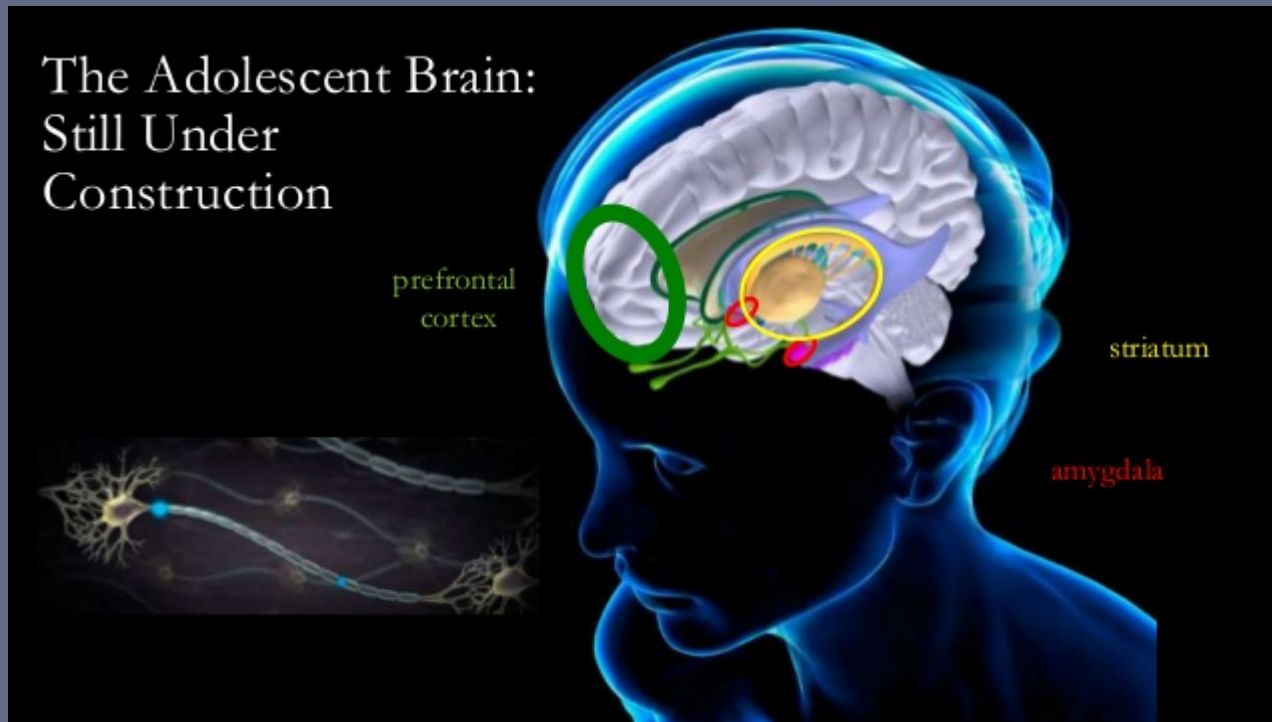
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Investing in Children

- Early life is the first and likely most important sensitive period
- Early adversity is linked to life-long well-being
- Because we have good ROI data
- Because it is intuitive



Recognition of the Importance of Brain Development in Adolescence



Substantial structural and functional remodeling within:

- Limbic and cortical regions
- Hippocampus
- Amygdala

Focus is often on Limitations.....

- Decision making
- Risk taking
- Emotion regulation...



Focus is often on Limitations.....BUT!

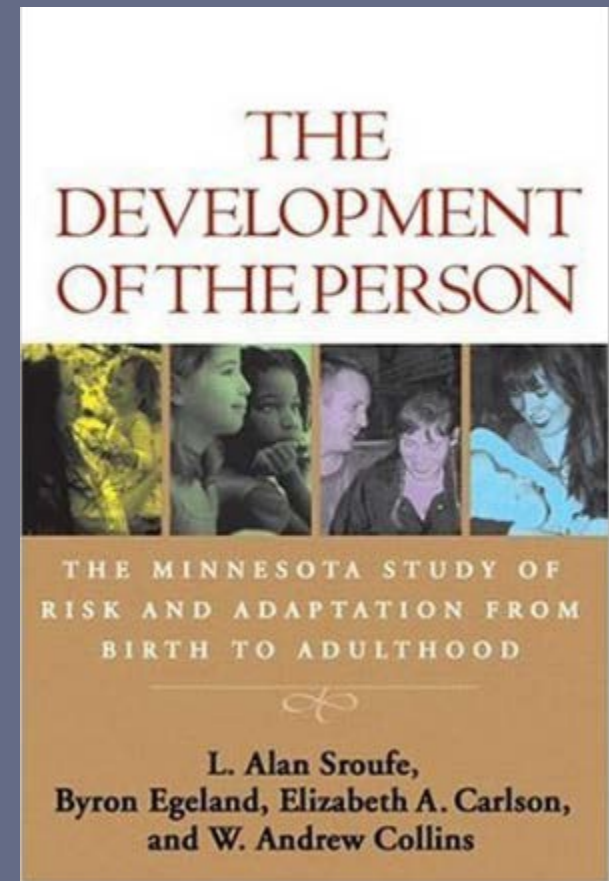
- Decision making
 - Risk taking
 - Emotion regulation...
-
- Adolescence is also a positive, sensitive period!



Stress in Early Life & Adolescence: Adulthood Health

- Minnesota Longitudinal Project of Risk and Adaptation
- Age 32 health especially impacted when stress occurred both in early life and in adolescence
- Positive parenting reduced these effects

Farrell, A. K., Simpson, J. A., Carlson, E. A., Englund, M. M., & Sung, S. (2016). The Impact of Stress at Different Life Stages on Physical Health and the Buffering Effects of Maternal Sensitivity.



Parenting Changes Your Brain!



Neural Changes in Support of Parenting



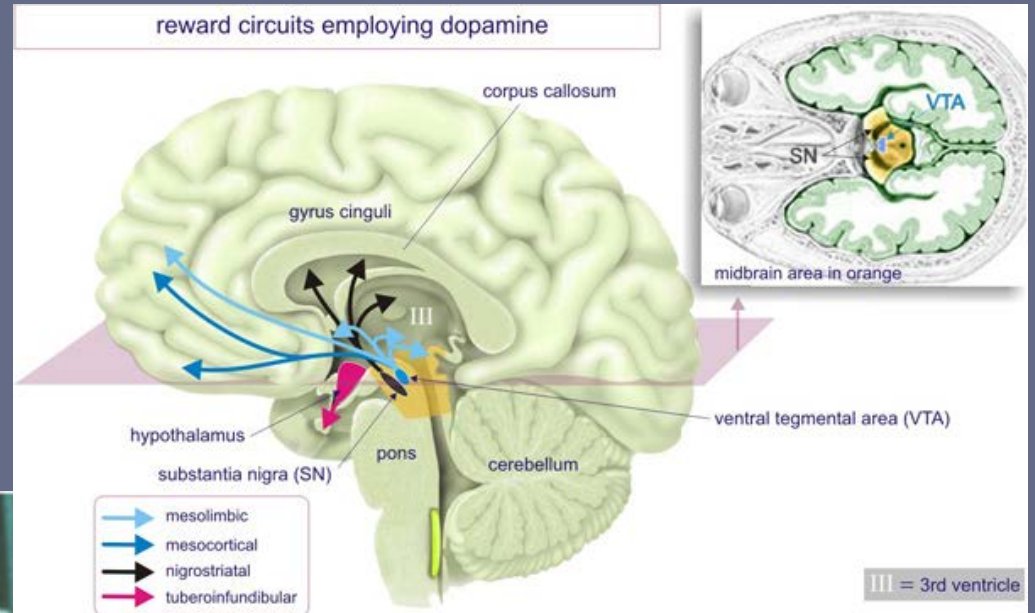
- Work from animal models and human mothers and fathers reveals major structural and important functional neural changes that:
 - Change the way stress is handled
 - Promote positive emotions and bonding
 - Increase parental motivation
 - Promote caregiving behaviors



Pilyoung Kim, Ph.D.

- Changes have been documented in the reward circuit, the emotion regulation circuit and the social information processing circuit

Example: Changes in the Reward Circuit

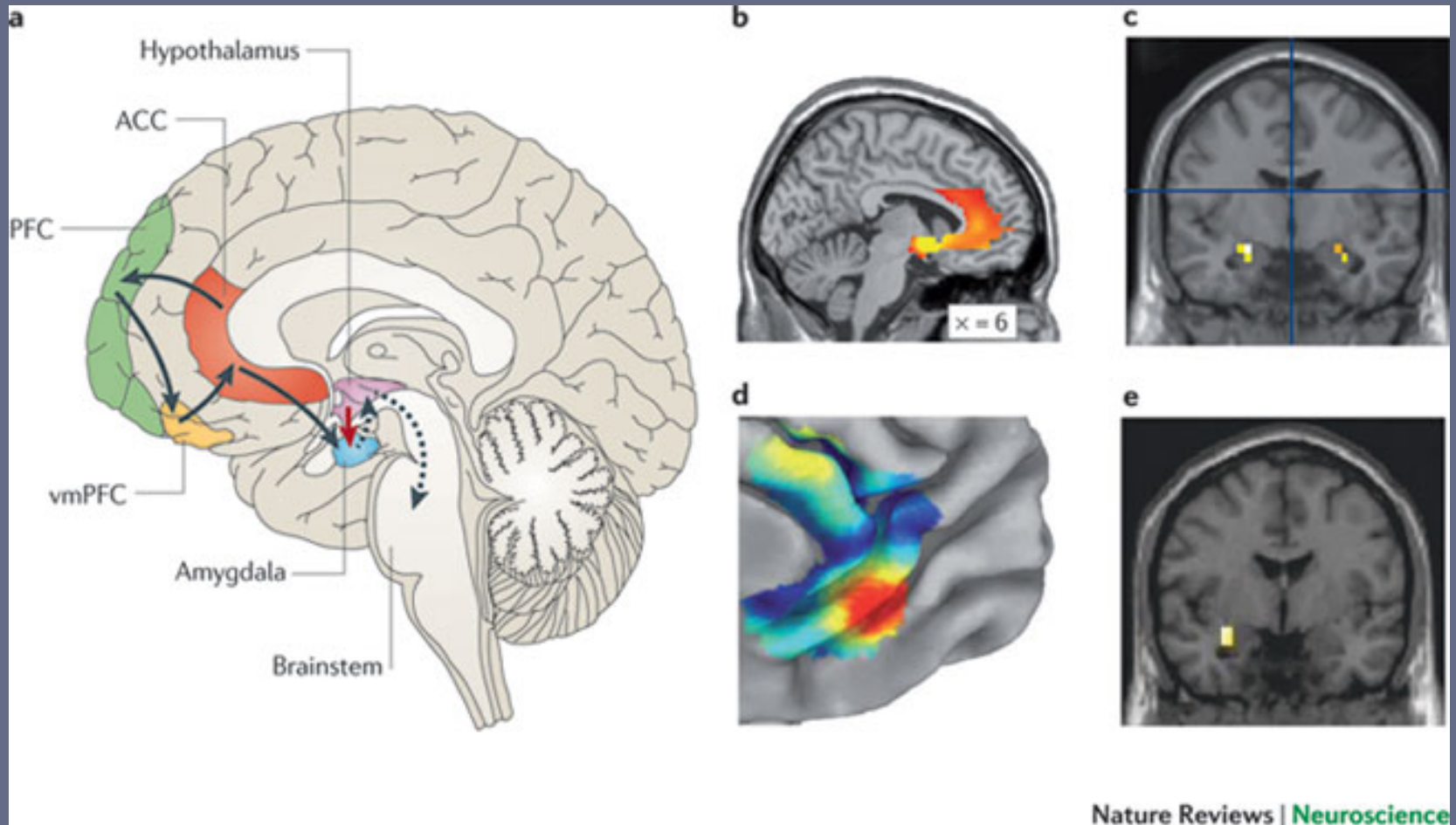


Changes in the Reward Circuit

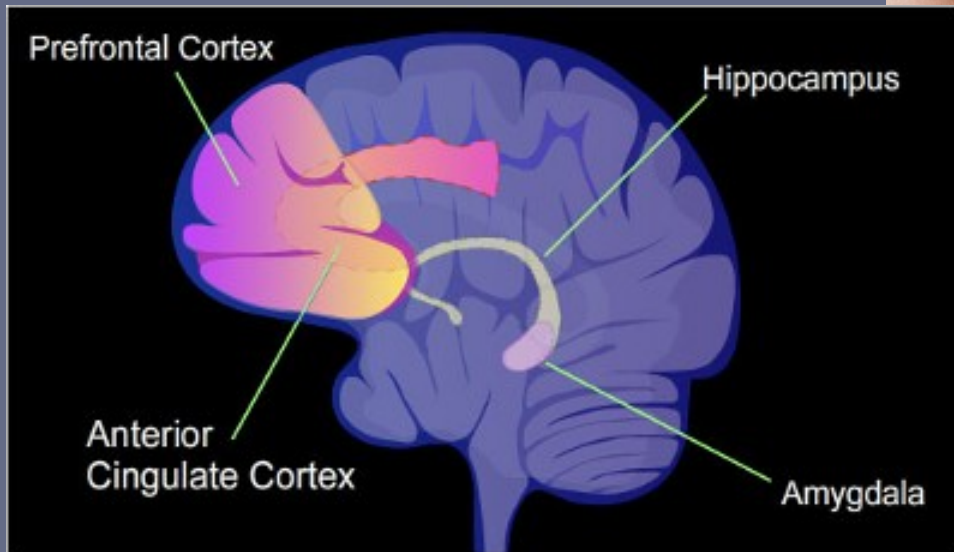
- New mothers and fathers during the first few months postpartum exhibit structural growth of the reward circuit
- The amount of the growth is associated with positive feelings mothers reported about their baby (e.g. beautiful, perfect)
- More functional brain activity in this region also occurs when looking at pictures of one's own vs. other infants



The Social Information Circuit



Emotion Regulation Circuits



Changes in the Emotion Regulation Circuits

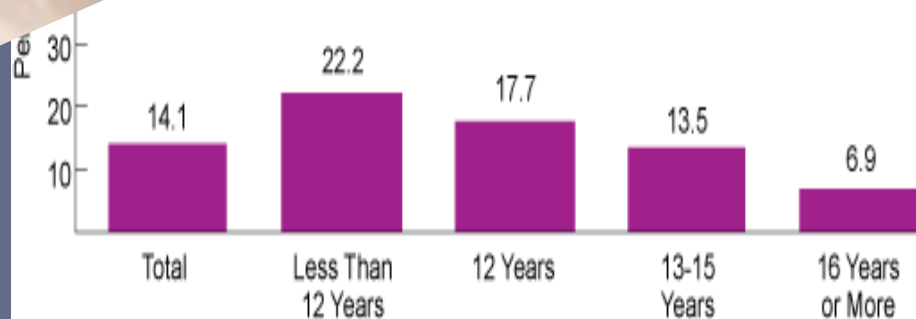


Neural Associations in Stressed Parents

- Decreased responses to infant cries and images is associated with chronic stress, depression and substance abuse among parents



Prevalence of Depressive Symptoms Among Women with a Recent Live Birth by Maternal Education Level, 2006–2008**



Interaction of Early & Later Adversity Exposure

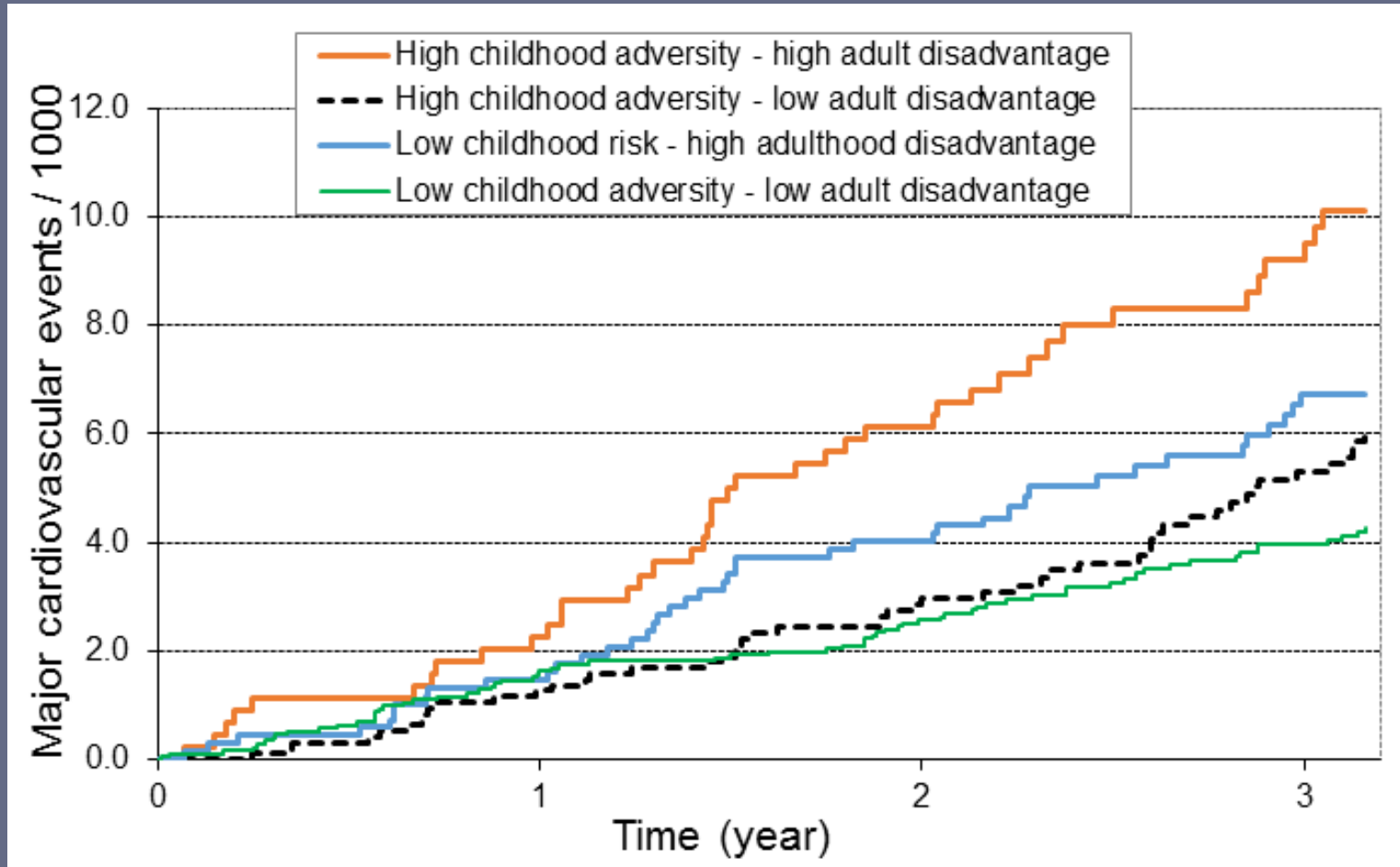
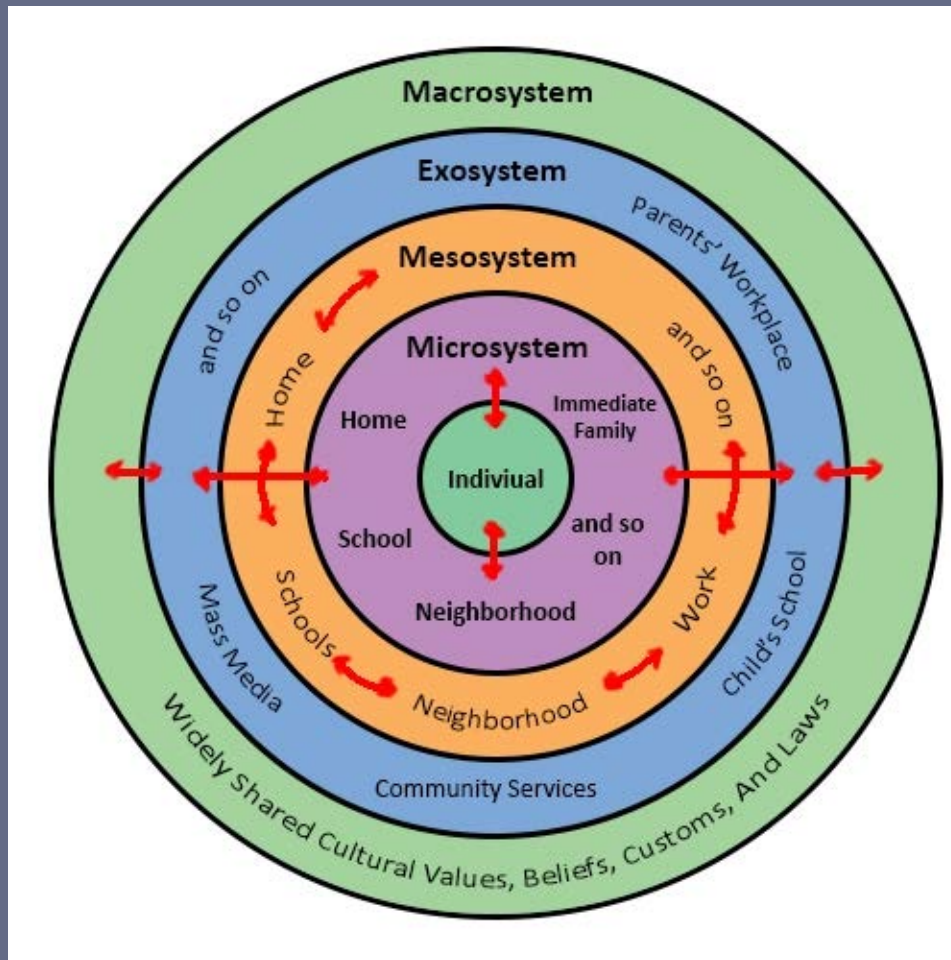


Fig. 2. Cumulative risk over time of cardiovascular disease events by the level of exposure to childhood psychosocial adversity and adult neighbourhood disadvantage.

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WHAT DOES IT TAKE TO STOP THE INTERGENERATIONAL TRANSMISSION OF TOXIC STRESS?



Apply a Public Health Lens

- Solutions to public health problems need:
 - Community buy-in and understanding
 - Effective policy
 - Government support and perhaps regulation
 - Business and legal support
 - Practical solutions (CBOs/NGOs)
 - Targeted prevention & intervention programs
 - Knowledgeable screening and referral by front line supports to families
 - An active, flexible, innovative research community
 - ALL OF US





Topic Contents

- [Topic Overview](#)
- [Symptoms](#)
- [What Happens](#)
- [What Increases the Risk](#)
- [When to Seek Help](#)
- [Examinations and Tests](#)
- [Treatment Overview](#)
- [Prevention](#)
- [How Child Abuse Is Reported](#)
- [Other Places To Get Help](#)
- [Related Information](#)
- [References](#)
- [Credits](#)
- [View All Content](#)

Child Abuse and Neglect

British Columbia Specific Information

Physical, verbal, or sexual abuse at any time, at any age, or in any relationship is not ok.

Call **9-1-1** or your local emergency number if you or someone you know is in immediate danger from assault or abuse. To speak to someone confidentially and to get more information, call HealthLink BC at **8-1-1** or contact one of the services below.

■ Helpline for Children

If a child anywhere in B.C. needs help, call the Helpline at 310-1234 any time of the day or night to speak to a social worker, no area code is needed. If you are deaf or hearing impaired, call 1-866-660-0505 for TTY services. This is a toll-free service, and there is no charge to call the operator if you need to call from a pay phone. This helpline is available for children, parents, and other community members to report abuse. For more information, visit [Helpline for Children](#).

■ Kids Help Phone

Children and teens can call the Kids Help Phone to speak to a counsellor day or night at 1-800-668-6868. Counsellors are available to speak to anonymously about concerns with abuse and can help children and teens call the police or child protective services. For more information about the resources and support available visit [Kids Help Phone](#).

■ VictimLink BC

If you or someone you know are a victim of crime and need more information or support, call VictimLink BC at 1-800-563-0808 for toll-free, confidential, multilingual service available 24 hours a

Want More Information?

HealthLink BC, your provincial health line, is as close as your phone or the web any time of the day or night, every day of the year.

Call **8-1-1** toll-free in B.C. or for deaf and hearing-impaired, call **7-1-1**.

You can speak with a health service navigator, who can also connect you with a:

- registered nurse any time, every day of the year;
- registered dietitian from 9am to 5pm PT, Monday to Friday;
- qualified exercise professional from 9am to 5pm PT, Monday to Friday;
- pharmacist from 5pm to 9am PT, every day of the year.

Translation services are available in more than 130 languages.

Prevention Recommendations: BC, Canada

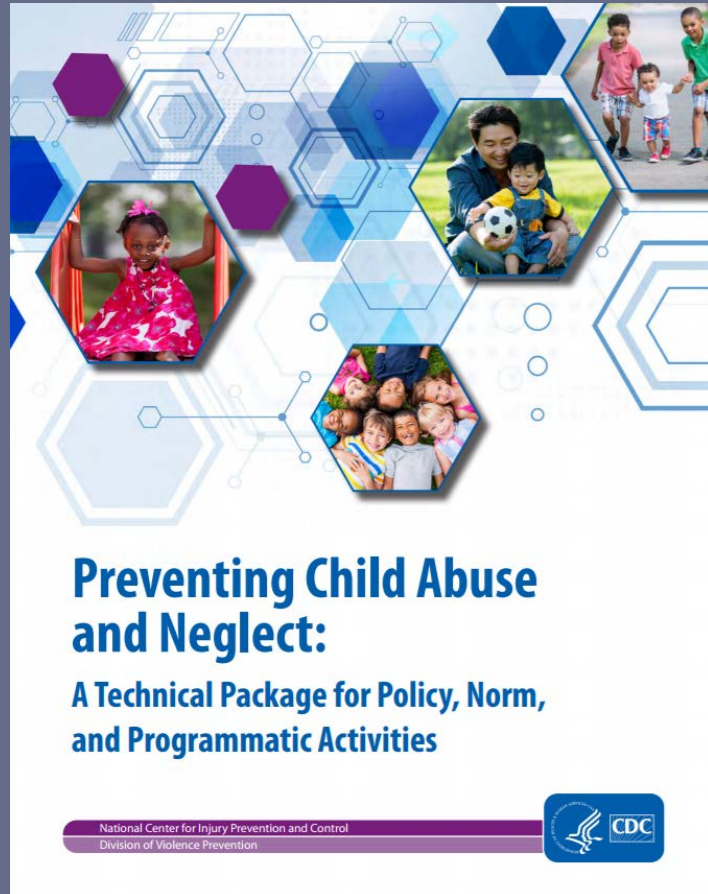
Prevention tips for parents and caregivers

- **Learn how to handle children when they misbehave.** Avoid using physical punishment. Parenting classes are offered in most communities. Ask your doctor or call a local hospital for more information.
- **Learn healthy ways to resolve conflicts and manage stress.** For more information, see the topic [Stress Management](#).
- **Ask for help when you need it.** Call a family member or friend to give you a break if you feel overwhelmed. Find out about community resources that can help you with child care or other services. Call a doctor or local hospital for information.
- **Get treatment if you were ever a victim of abuse.** Treatment can help problems like [depression](#), [alcohol or drug use problems](#), or [violent behaviour](#).
- **Remove firearms** and other dangerous weapons from your home.
- **Learn more about how children grow** at different stages in their lives. For example, lack of knowledge about [why babies cry](#) can make the crying a trigger for shaken baby syndrome. For

Prevention tips for everyone

- **Get to know the children in your neighbourhood.** Learn their names, and show you care simply by waving to them or asking about how they're doing at home and school.
- **Give parents a break.** Relieve a friend, neighbour, or relative who is feeling overwhelmed with child care and other issues.
- **Learn the signs** of child abuse and neglect.
- **Encourage your community to offer services** to help families who are at risk for abuse or neglect.
- **Volunteer** in child abuse programs.

First, Prevention (CDC Recommendations, U.S.)



CDC Prevention Strategies

Economic supports for families

Changing social norms: support families & positive parenting

Provide early high quality care & education

Enhance parenting skills

Intervene to lessen harms & prevent future risk

Sector involvement

Monitoring & Evaluation

<https://www.cdc.gov/violenceprevention/pdf/CAN-Prevention-Technical-Package.pdf>

Solutions Should Tackle Stressors AND Buffers

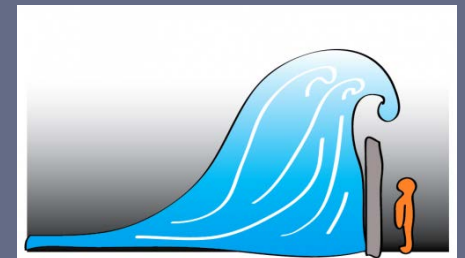
- 1) Can you reduce the adversity, particularly the structural inequity?
 - Cash transfer
 - Neighborhood safety
 - Workforce development
 -

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 - Support goal-setting, planning

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- 2) Can you reduce the uncontrollability or unpredictability of the stressors (make threat into challenge)
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 - Support goal-setting, planning
- 3) Can you increase social/relational buffering
 - Of parents
 - By parents



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Brian Wolff
Samantha Brown

Questions?



Now, or later – I'm easy to find!

Sarah Enos Watamura
University of Denver
swatamura@psy.du.edu
303.871.4130