Resilience to Adversity and the Early Origins of Disease

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Overview of Topics

• The rural South as a developmental context for African Americans
• Testing “weathering” hypotheses with indicators of allostatic load and epigenetic aging
• A cautionary note: Is resilience “just skin deep”?  
• Health benefits of family-centered prevention programs
Counties Comprising the Southeastern “Black Belt”
Where We Conduct Research
TESTING THE WEATHERING HYPOTHESIS
Allostatic Load

- Allostatic Load
  - A marker of chronic physiologic stress and cumulative wear and tear on the body
  - Indexed by elevated physiologic activity across multiple systems (McEwen, 2000)
    - Sympathetic adrenomedullary system: epinephrine/norepinephrine
    - Hypothalamic-pituitary-adrenal (HPA) axis: cortisol
    - Lipid metabolism: body mass index
    - Indices of inflammation and immune functioning: C-reactive protein

- Forecasts chronic diseases
  - Hypertension
  - Cardiac disease
  - Diabetes
  - Stroke
Epigenetic Aging

• Measures of epigenetic aging
  • Reflect the disparity between an individual’s biological and chronological ages
  • Faster epigenetic aging rates have been documented in tumor-derived cells from more than 20 cancers, as well as liver biopsies from obese patients
  • Predicted higher risks for all-cause mortality in four large cohorts
• Two epigenetic metrics calculated:
  • Horvath’s clock (2013), which aggregated normalized methylation values from 353 CpG sites
  • Hannum’s clock (2013), which was estimated by summing weighted methylation values from 71 CpG sites using coefficients validated for peripheral blood mononuclear cells (PBMC)
Foreshadowing a Counterintuitive Pattern in the Health Disparities Literature During Adolescence

The Great Recession and Health Risks for African American Youths: A Natural Experiment

Neighborhood Dynamics and Allostatic Load

Discrimination, Allostatic Load, and Buffering

Discrimination and Accelerated Aging: A Replication Across Two Longitudinal Studies—Study 1: SHAPE

Study 2: AIM

Epigenetic Aging of Immune System Cells (age 22)

- Low Supportive Family Environments
  \( b = 2.808, SE = 0.847, p = 0.001 \)

- High Supportive Family Environments
  \( b = 0.089, SE = 0.859, p = 0.917 \)
Is Resilience Only Skin Deep?
A Cautionary Note

• Widespread assumption in the resilience literature

  • Children have successfully negotiated adversities, “beaten the odds,” and become resilient if
    • Their externally observable behaviors are characteristic of good adjustment, for example,
      • They excel academically
      • They have high self-esteem
Young Adult Allostatic Load

Preadolescent Self-Control/Competence

- low SES-related risk (-.032)
- high SES-related risk (.046*)
Skin-Deep Resilience: Self-Control Forecasts Better Psychosocial Outcomes But Fosters Epigenetic Aging

Lower Self-Control  Higher Self-Control

Epigenetic Age Acceleration (Hannum Method)

Low SES Risk  Medium SES Risk  High SES Risk

Epigenetic Age Acceleration (Horvath Method)

Low SES Risk  Medium SES Risk  High SES Risk
Does the Skin-Deep Resilience Pattern Predict Chronic Disease?

Can Upward Mobility Cost You Your Health?

By GREGORY E. MILLER, EDITH CHEN, and GENE H. BRODY

http://opinionator.blogs.nytimes.com/2014/01/04/can-upward-mobility-cost-you-yourhealth/?ref=opinion
FAMILY-CENTERED PREVENTION EFFECTS ON HEALTH OUTCOMES


Family Risks, SAAF, and Youth Catecholamine Levels

Nonsupportive Parenting, AIM, and Diminished Telomere Length

PREVENTION REDUCES EPIGENETIC AGING AMONG OFFSPRING OF PARENTS WITH DEPRESSION

**Depression Group Euthymia Group**

**Decrease in Harsh Parenting (age 11 to 16)**

\[ F(1, 374) = 5.205, \quad p = .023 \]

**Epigenetic Aging (age 20)**

\[ F(1, 387) = 5.712, \quad p = .017 \]
Harsh Parenting Age 11

Harsh Parenting Age 16

Latent Different Score

Path A
-0.516* (-0.015)

Path B
0.615* (0.167)

Intervention, SAAF Age 11

-1.991* without changes in parenting in the model
-1.578 with changes in parenting in the model
(0.049 without changes in parenting in the model)
(0.079 with changes in parenting in the model)

Epigenetic Aging Age 20

-0.599*** (-0.759***)

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NEW EXPLORATIONS OF FAMILY-CENTERED PREVENTION AND BRAIN MATURATION

Left Amygdala Volume (age 25)

Years in Poverty (ages 11-18)

Control (b = -34.615, se = 12.744, p = .008)
SAAF (b = 3.516, se = 13.329, p = .792)

Left CA2/CA3 Volume (age 25)

Years in Poverty (ages 11-18)

Control (b = -6.420, se = 2.418, p = .009)
SAAF (b = 0.599, se = 2.529, p = .813)
Left CA4/GCL Volume (age 25)

Years in Poverty (ages 11-18)

- Control (b = -14.201, se = 5.222, p = .008)
- SAAF (b = 1.577, se = 5.462, p = .773)
Recent Studies at the Center for Family Research Have

- Linked contextual challenges to allostatic load and accelerated epigenetic aging for rural African Americans
- Illustrated the buffering effects of supportive family environments for allostatic load and epigenetic aging for rural African Americans
- Demonstrated that implementing programs that cultivate resilience through strengthening family relationships has a potentially important role in improving public health
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- National Institute on Drug Abuse
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