Childhood Antecedents of Adult Health & SES Attainments

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Social and Economic Policies

Institutions (education, med care, etc.)

Neighborhoods and Communities

Living Conditions

Social Relationships

Individual Risk Factors

Genetic/Constitutional Factors

Pathophysiologic pathways

Individual/Population Health

Life course

Environment
Are we looking in the wrong place?
Life Course Approach to Health and Health Inequalities

- Parental
- Gestational
- Infancy
- Early Childhood
- Middle Childhood
- Adolescence
- Early Adulthood
- Middle Age
- Old Age
Large Long-term Effects of Prenatal Shocks

Example: 1918 Influenza Pandemic

- High school graduation rate falls 13-15% for the children of influenza-infected moms (roughly one-in-three moms infected)
- Wages 5-9% lower for children of infected
### Maternal Smoking History Measures:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Effect Estimate</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother smoked cigarettes near/during pregnancy</td>
<td>0.0485***</td>
<td>0.0147</td>
</tr>
<tr>
<td>Mother previously smoked cigarettes but quit prior to this pregnancy</td>
<td>-0.0210</td>
<td></td>
</tr>
<tr>
<td>Mother first began smoking sometime after birth of this child</td>
<td>-0.0388</td>
<td>0.0343</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fixed Effects?</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
</tr>
<tr>
<td>yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Individuals</th>
<th>2,310</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Mothers</td>
<td>1,624</td>
</tr>
</tbody>
</table>

Standard errors in parentheses (clustered)

*** p<0.01, ** p<0.05, * p<0.10 (two-tailed test), + p<0.10 (one-tailed test)

### Table A1. The Effects of Maternal Smoking During Pregnancy on the Risk of Low Birth Weight.
Table A2. The Effects of Maternal Smoking During Pregnancy on Educational Attainment.

<table>
<thead>
<tr>
<th>Maternal Smoking History Measures:</th>
<th>Dependent variable:</th>
<th>Probit ($dP/dx$)</th>
<th>LPM</th>
<th>years of education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother smoked cigarettes near/during pregnancy</td>
<td>whether graduated from high school</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.0626***</td>
<td>-0.0708***</td>
<td>-0.0538**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0151)</td>
<td>(0.0161)</td>
<td>(0.0230)</td>
</tr>
<tr>
<td>Mother previously smoked cigarettes but quit prior to this pregnancy</td>
<td></td>
<td>-0.0373</td>
<td>0.0493</td>
<td>0.0228</td>
</tr>
<tr>
<td>Reference category: Mother never smoked cigarettes</td>
<td></td>
<td>(0.0244)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother first began smoking sometime after birth of this child</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Fixed Effects?</td>
<td></td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Number of Individuals</td>
<td></td>
<td>3,244</td>
<td>3,211</td>
<td>3,839</td>
</tr>
<tr>
<td>Number of Families</td>
<td></td>
<td></td>
<td>1,586</td>
<td></td>
</tr>
<tr>
<td>Standard errors in parentheses</td>
<td></td>
<td>*** p&lt;0.01, ** p&lt;0.05, * p&lt;0.10(two-tailed test), + p&lt;0.10 (one-tailed test)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table A3. The Effects of Maternal Smoking During Pregnancy on Adult Health & Earnings.

<table>
<thead>
<tr>
<th>Maternal Smoking History Measures:</th>
<th>Dependent variable:</th>
<th>Interval Regression Model:</th>
<th>Ln(annual earnings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother smoked cigarettes near/during pregnancy</td>
<td>general health status in adulthood</td>
<td>100pt-scale, 100=perfect health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td></td>
<td>-0.7039**</td>
<td>-0.7125**</td>
<td>-0.7569+</td>
</tr>
<tr>
<td></td>
<td>(0.3327)</td>
<td>(0.3440)</td>
<td>(0.5141)</td>
</tr>
<tr>
<td>Mother previously smoked cigarettes but quit prior to this pregnancy</td>
<td></td>
<td></td>
<td>-0.0422</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.9518)</td>
</tr>
<tr>
<td>Reference category: Mother never smoked cigarettes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother first began smoking sometime after birth of this child</td>
<td></td>
<td></td>
<td>-0.1469</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.5331)</td>
</tr>
<tr>
<td>Family Fixed Effects?</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Men only Sample?</td>
<td>no</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Number of Person-year observations</td>
<td>31,874</td>
<td>31,480</td>
<td>15,561</td>
</tr>
<tr>
<td>Number of Individuals</td>
<td>3,646</td>
<td>3,606</td>
<td>1,985</td>
</tr>
<tr>
<td>Number of Families</td>
<td>1,128</td>
<td></td>
<td>1,213</td>
</tr>
</tbody>
</table>

Standard errors in parentheses (clustered on individual)

*** p<0.01, ** p<0.05, * p<0.10 (two-tailed test), + p<0.10 (one-tailed test)
Prevalence of Health Problems in Children

- Any limiting chronic condition
- Asthma prevalence
- Ear disease
- Injury
- Physical inactivity

Percentage

SES (lowest to highest)

Psych Bull. 2002;128:295-329
Fact 1:

- SES gradients can be seen in preclinical indicators of disease, for example:
  - blood pressure
  - cortisol levels and patterns
  - central adiposity
  - carotid atherosclerosis
Topic: Effects of School Desegregation on Educational Attainment, Adult Earnings, Adult Health, & Intergenerational Mobility

• 1st estimates of court-ordered school desegregation impacts on adult earnings, health, & intergenerational mobility

• Use variation in timing of court deseg orders among districts subject to orders 60s-80s

• Desegregation orders generate significant long-run improvements in adult health for blacks
  — Due in part to improvements in...
    • School quality
    • Racial integration for blacks
    • Increases in education spending

which in turn impact socioeconomic mobility prospects
Research design

• 1,057 school districts implemented school deseg plans between 1954-1990

• Most desegregation orders between 1968 and 1978 (some earlier, later)

• Identification comes from random timing of court orders
  – differences in childhood exposure to school integration based on school district of upbringing

• Compare adult attainment outcomes of those who grew up in...

  schools under court-ordered desegregation plan during childhood vs.
  school districts that implemented desegregation after age ≥18
Data

*PSID individuals born between 1950-1975 followed up to 2007*
  
  • general health status in adulthood (1984-2007);
  • Data linked to census block in childhood

Resulting Sample:
• 73,087 person-year observations
• from 7,111 individuals
• from 2,275 families
• from 1,599 neighborhoods in 299 counties
• Mean age = 38, range [20,57], 37% black

• Matched to detailed Neighborhood-level and School-level characteristics that prevailed when individuals were growing up

The Effect of Court-Ordered Desegregation on Adult Health, by Race

Change in Adult Health Status Index

Year Aged 17 - Year of Initial Court Order

90%CI-U, Blacks 90%CI-L, Blacks Predicted, Blacks Predicted, Whites
The Effect of Court-Ordered Desegregation on Educational Attainment, by Race

The Effect of Court-Ordered Desegregation on Men's Wages, by Race

The Effect of Court-Ordered Desegregation on the Annual Incidence of Adult Poverty, Blacks

The Effect of Court-Ordered Desegregation on Adult Health, by Race
Fact 2:

- HI is critical once disease develops,
  - but only ~10% of premature mortality is due to inadequate health care

- SES has large affects on care utilization
  - Even among insured, (e.g. Medicare or UK NHS pops)

- SES is a *major determinant* of disease emergence in the first place.
“The physiological toll on the body and its regulatory systems from chronic exposure to fluctuating or heightened neural or neuroendocrine responses to life’s real (or imagined) demands.”
Salient Features of Allostatic Load

- **Cumulative effects** across multiple systems and over time.
- **Dysregulations** can manifest in resting levels and/or profiles of response to stimulation.
- **Contributions to wear and tear** can result even from modest excursions outside optimal operating ranges.
Initial Operationalization of Allostatic Load

• Cardiovascular:
  • Resting Systolic, Diastolic BP

• HPA Axis:
  • Ur. cortisol (12 hr), DHEA-S

• Symp. Nerv. Sys:
  • Ur. NE, EPI (12hr)

• Metabolism:
  • Gly. Hemoglobin, HDL/total Cholesterol, WHR
Allostatic Load by Education

Educational Attainment

- <HS
- HS
- 13+
WLS: Cumulative Adversity ($) & Allostatic Load (% AL=3+)

Economic Adversity (childhood + adult Household Income)
Allostatic Load Summary

Adverse conditions (e.g., lower socio-economic status, lack of positive social connections, lack of control) have been associated with increased HPA, SNS and cardiovascular activity.

These effects are seen in children, and in younger and older adults.

Where cumulative exposure to adversity has been assessed - greater cumulative exposure is associated with negative biological/health outcomes (e.g., economic status in Alameda, WLS data; job control - Whitehall).
Summary: How does SES get under the skin?

• Growing evidence on biological pathways activated by SES stress:
  – Adverse cardiovascular function
  – Immunosuppression, dulled reactivity...
  – Brain adaptations: dendritic atrophy...
  – Cellular aging: telomere shortening
Reducing Inequality

• Improve access to quality education:
  – Early childhood, K-12, college, job training

• Income support, especially during crucial early childhood period
...but health benefits of many social policies still unquantified

Key question for health policy researchers:

- How much would health improve from specific upstream policy interventions?

- How much health care savings could be achieved by effective prevention through social policy?

- What is cost-effectiveness of upstream policies?
Data Constraints

Solutions to lack of large-sample longitudinal data:

1. Collect more data,
   – but costly and time-consuming
     (have to wait for cohorts to become adults)

2. Add retrospective q’s to existing data collections

3. Merge new info to existing datasets
   Example: add ecological info to vital statistics data (e.g. pollution measures)

4. Merge admin data from several sources using personal identifiers
Data Constraints: power

• Looking for measures of both early childhood and adult outcomes
• Variable-rich datasets tend to have smaller sample sizes
• Less true in Norway
  – Effect of 1% increase in birth weight increases HS completion by .1 percentage points
  – Under reasonable assumptions will need a sample size of at least 4,000 to detect this
• Need to be creative to find suitable data
Looking Ahead: Data Collection

• Need more longitudinal data to accurately estimate health production function parameters
  • Health outcomes often result of early life events
    – Cross-sectional data limiting
    – Need for biomarker data
Looking Ahead: Research Focus

• Move from correlations to causality
  – Better modeling techniques

• Impact of wealth on health
  – May be more crucial than income
Economic crises: Why, When and Where they (MIGHT) matter for population health