Childhood Exposure to Violence and Nurturing Relationships: The Long-Run Effects on Black Men

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Cleveland Fed

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NYU

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Minneapolis Fed · OIGI

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The views stated herein are those of the authors and are not necessarily those of the Federal Reserve Bank of Cleveland or the Board of Governors of the Federal Reserve System.
Residential Segregation in the US

Percent Black by Neighborhood SES

- 0-10%
- 10-20%
- 20-30%
- 30-40%
- 40-100%

Share

Neighborhood SES

2014-2018 ACS
Safety in the US

Gun Homicides by Neighborhood SES

Gun Homicides by Nbd SES and Percent Black

≥20% Black

<20% Black

“Of all the problems besetting the poor inner-city black community, none is more pressing than that of interpersonal violence and aggression.”

—*Code of the Street* · Elijah Anderson
“Of all the problems besetting the poor inner-city black community, none is more pressing than that of interpersonal violence and aggression.”

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Black young males exposed to greater violence

- $8 \times$ homicides (15-24 · 25-34)  
  NCHS 1977-2021
- $4 \times$ witnessing a shooting (0-11)  
  NLSY97
Safety of Black Children in the US

“Of all the problems besetting the poor inner-city black community, none is more pressing than that of interpersonal violence and aggression.”

–*Code of the Street* · Elijah Anderson

- **Black young males exposed to greater violence**
  - $8 \times$ homicides (15-24 · 25-34)
  - $4 \times$ witnessing a shooting (0-11)

- **Short-run effects on Black males**
  - Engaging in violent behavior
  - Academic attainment
  - Academic achievement

  - Bingenheimer et al. (2005)
  - Aliprantis (2017)
  - Torrats-Espinosa (2020)
  - Casey et al. (2018) · Sharkey et al. (2014)
Childhood exposure to violence

- Long-run effects
  - Do long-run correlations persist or fade out?
  - Do correlations reflect causality or selection?
  - Robustness by race/ethnicity
  - Mechanisms and interpretation of exposure
This Paper

Childhood exposure to violence
- Long-run effects
  - Do long-run correlations persist or fade out?
  - Do correlations reflect causality or selection?
  - Robustness by race/ethnicity
  - Mechanisms and interpretation of exposure

Adolescent exposure to violence
- Long-run effects
  + interaction with nurturing relationships
- Measurement: How to use many vars in NLSY97?
  - Sum
  - Item Response Theory or Principal Components
  - Item-Anchored Scale
Rubin Causal Model

Treatment

$D_i \in \{0, 1\}$ is exposure to violence
Rubin Causal Model

**Treatment**

\[ D_i \in \{0, 1\} \] is exposure to violence

**Potential Outcomes**

\[ Y_i(D) \]
Rubin Causal Model

**Treatment**

$D_i \in \{0, 1\}$ is exposure to violence

**Potential Outcomes**

$Y_i(D)$

**Treatment Effects**

$\triangle^{ATE} \equiv \mathbb{E}[Y(1) - Y(0)]$
Rubin Causal Model

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\[ D_i \in \{0, 1\} \] is exposure to violence

**Potential Outcomes**

\[ Y_i(D) \]

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\[ \Delta^{ATE} \equiv \mathbb{E}[Y(1) - Y(0)] \]

**Observed characteristics**

\[ W_i \in \mathbb{R}^{d_w} \cdot \mathcal{W} \equiv \text{supp}(W) \]
Rubin Causal Model

Treatment

$D_i \in \{0, 1\}$ is exposure to violence

Potential Outcomes

$Y_i(D)$

Treatment Effects

$\triangle^{ATE} \equiv \mathbb{E}[Y(1) - Y(0)]$

Observed characteristics

$W_i \in \mathbb{R}^{d_w}$. $\mathcal{W} \equiv \text{supp}(W)$

Selection into Treatment

Random Selection

$Y(0), Y(1) \perp \perp D$

Selection on Observables

$Y(0), Y(1) \perp \perp D \mid W$
Rubin Causal Model

**Treatment**  
\( D_i \in \{0, 1\} \) is exposure to violence

**Potential Outcomes**  
\( Y_i(D) \)

**Treatment Effects**  
\[ \Delta^{ATE} \equiv \mathbb{E}[Y(1) - Y(0)] \]

**Observed characteristics**  
\( W_i \in \mathbb{R}^{d_w} \cdot \mathcal{W} \equiv \text{supp}(W) \)

**Selection into Treatment**

**Random Selection**  
\( Y(0), Y(1) \perp \perp D \)

**Selection on Observables**  
\( Y(0), Y(1) \perp \perp D \mid W \)

**Propensity Score**  
\[ \pi(W) = Pr(D = 1 \mid W) \]
Data: NLSY97

National Longitudinal Survey of Youth, 1997 (NLSY97)

- Nationally-representative sample (N=8,984)
  - Born between 1980 and 1984

- Frequent interviews
  - Annual (1997-2011)

- We focus on subsample of non-Hispanic Black males
  - N=1,169

- Observed characteristics $W$
  - Mother’s ed: not determined, dropout, GED, HS, AA, BA
  - Parent(s)’ Income in 1996
  - HH: Parent(s) (2 bio, 1 bio, single), Grandparent(s), Other

Descriptive Stats
Data: NLSY97

Treatment $D$: Childhood or adolescent exposure to violence

“did you ever see someone get shot or shot at with a gun?”

<table>
<thead>
<tr>
<th>Age</th>
<th>% Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-11</td>
<td>26</td>
</tr>
<tr>
<td>12-18</td>
<td>31</td>
</tr>
<tr>
<td>0-18</td>
<td>47</td>
</tr>
</tbody>
</table>

| 0-18  | 47        |

| 0-18  | 47        |
Common Support

Estimated Propensity Scores
Black and White Males Before Age 12

Percent (by Race)

π(W)

White

Black
### Treatment Effects of Exposure to Violence

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Violent Behavior</td>
<td>17</td>
<td>20</td>
<td>20</td>
<td>9</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>(% at 15)</td>
<td></td>
<td>[0.00]</td>
<td>[0.00]</td>
<td></td>
<td>[0.00]</td>
<td>[0.00]</td>
</tr>
<tr>
<td>Violent Behavior</td>
<td>63</td>
<td>–16</td>
<td>–15</td>
<td>64</td>
<td>–13</td>
<td>–13</td>
</tr>
<tr>
<td>(% by 26)</td>
<td></td>
<td>[0.00]</td>
<td>[0.00]</td>
<td></td>
<td>[0.00]</td>
<td>[0.00]</td>
</tr>
<tr>
<td>HS Diploma</td>
<td>7</td>
<td>–2</td>
<td>–2</td>
<td>8</td>
<td>–4</td>
<td>–4</td>
</tr>
<tr>
<td>(% by 26)</td>
<td></td>
<td>[0.25]</td>
<td>[0.26]</td>
<td></td>
<td>[0.06]</td>
<td>[0.02]</td>
</tr>
<tr>
<td>ASVAB Pctl</td>
<td>25</td>
<td>–5</td>
<td>–5</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>[0.00]</td>
<td>[0.01]</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Treatment Effects of Exposure to Violence

<table>
<thead>
<tr>
<th>Outcome in 2018</th>
<th>ATE by Selection Assumption</th>
<th>Childhood Exposure Random on Obs.</th>
<th>Adolescent Exposure Random on Obs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HH Earnings ($1,000s)</td>
<td>48</td>
<td>−13</td>
<td>−12</td>
</tr>
<tr>
<td></td>
<td>[0.00]</td>
<td></td>
<td>[0.00]</td>
</tr>
<tr>
<td>Ind. Earnings ($1,000s)</td>
<td>34</td>
<td>−7</td>
<td>−7</td>
</tr>
<tr>
<td></td>
<td>[0.02]</td>
<td></td>
<td>[0.02]</td>
</tr>
<tr>
<td>0 Earnings (%)</td>
<td>20</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>[0.02]</td>
<td></td>
<td>[0.03]</td>
</tr>
<tr>
<td>Hours Worked (Weekly Avg)</td>
<td>33</td>
<td>−5</td>
<td>−5</td>
</tr>
<tr>
<td></td>
<td>[0.03]</td>
<td></td>
<td>[0.04]</td>
</tr>
<tr>
<td>Ever Incarcerated (%)</td>
<td>26</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>[0.02]</td>
<td></td>
<td>[0.03]</td>
</tr>
</tbody>
</table>
Are Black People Inherently More Violent?

“The charges of white privilege and systemic racism that are tearing the country apart float free of reality. Two known facts, long since documented beyond reasonable doubt, need to be brought into the open and incorporated into the way we think about public policy: American whites, blacks, Hispanics, and Asians have different violent crime rates and different means and distributions of cognitive ability. The allegations of racism in policing, college admissions, segregation in housing, and hiring and promotions in the workplace ignore the ways in which the problems that prompt the allegations of systemic racism are driven by these two realities.

We have been unwilling to say openly that different groups have significant group differences. Since we have not been willing to say that, we have been left defenseless against the claims that racism is to blame. What else could it be? We have been afraid to answer. We must. Facing Reality is a step in that direction.”

–Facing Reality: Two Truths about Race in America · Charles Murray
Are Black People Inherently More Violent?

Males Engaging in Violent Behavior
At Age 15

Engaging in Violence (%)

Black: 23%
White: 19%
Hispanic: 18%
Are Black People Inherently More Violent?

Males Engaging in Violent Behavior
At Age 15 by Childhood Exposure to Violence
Are Black People Inherently More Violent?

Males Engaging in Violent Behavior
At Age 15 by Childhood Exposure to Violence
Controlling for HH Structure, Parental Income, and Mother's Ed

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Exposed</th>
<th>Not Exposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>35%</td>
<td>15%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>25%</td>
<td>10%</td>
</tr>
<tr>
<td>White</td>
<td>40%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Effects of Violence or of Broader Nbd Context?

Black Individuals' Exposure to Gun Homicides by Neighborhood SES and Racial Composition

F(x) vs. Neighborhood SES

All Nbds vs. Black Nbds

Effects of Violence, Not of Broader Nbd Context

Black Men's Household Earnings in 2018
by Childhood Exposure to Violence and Neighborhood SES

Earnings (1,000s of 2018 $s)

Not Exposed
Exposed

Neighborhood SES in 1997

Table · Nbd SES in 1997
Effects of Exposure Mediated by Incarceration?

- Incar. critical for labor market outcomes in recent decades
  - Especially true for Black men
  

- A single spell flattens the earnings of young men
  - True for Black or white
  
  Neelakantan et al. (2022) · Raphael (2011)
Effects of Exposure Not Mediated by Incarceration

Household Earnings of Black Men in the NLSY97 by Age, Ever Incarcerated, and Childhood Exposure to Violence

Average Earnings (Thousands of 2018 $s)

Age

Not Exposed

Never Incarcerated

Exposed

Incarcerated

Not Exposed

Exposed
Mechanisms?

Candidates

- Selection on observables
- Selection on unobservables
- Broader neighborhood effects
- Incarceration
- Gangs
- Toxic stress from trauma itself
Mechanisms?

Candidates

- Selection on observables
- Selection on unobservables
- Broader neighborhood effects
- Incarceration
- Gangs
- Toxic stress from trauma itself

Shonkoff and Garner (2012)
Adverse Childhood Experiences (ACEs) · Felitti et al. (1998)
Toxic Stress

Biological Response to Stress $= f_i(\text{event}, \text{social buffers})$
Toxic Stress

Biological Response to Stress = \( f_i(\text{event}, \text{social buffers}) \)

Stressful event
Short, mild

+ Buffer
w/ caring adult

\( \implies \) Stress Response
Positive

via Shonkoff and Garner (2012)
Toxic Stress

Biological Response to Stress = $f_i(\text{event, social buffers})$

<table>
<thead>
<tr>
<th>Stressful event</th>
<th>+ Buffer</th>
<th>$\implies$ Stress Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short, mild</td>
<td>w/ caring adult</td>
<td>Positive</td>
</tr>
<tr>
<td>Longer, more severe</td>
<td>w/ caring adult</td>
<td>Tolerable</td>
</tr>
</tbody>
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Toxic Stress

Biological Response to Stress = \( f_i(\text{event, social buffers}) \)

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</tr>
<tr>
<td>Longer, more severe</td>
<td>w/ caring adult</td>
<td>Tolerable</td>
</tr>
<tr>
<td>Extended, severe</td>
<td>w/out caring adult</td>
<td>Toxic</td>
</tr>
</tbody>
</table>

“From a neuroscience perspective, then, what is the antidote to early childhood adversity and toxic stress? It is safe, stable, and nurturing relationships.”

—*Thinking Developmentally* · Andrew S. Garner · Robert A. Saul
“From a neuroscience perspective, then, what is the antidote to early childhood adversity and toxic stress? It is safe, stable, and nurturing relationships.”

–Thinking Developmentally · Andrew S. Garner · Robert A. Saul

“Nurturing relationships turn off the body’s stress machinery in a timely manner,” before that machinery can generate biological changes that are maladaptive and health harming over the long run.

–Statement of Am. Acad. Pediatrics · Andrew S. Garner · Michael Yogman
Variables in the NLSY97

NLSY97 is full of relevant variables during adolescence
Variables in the NLSY97

NLSY97 is full of relevant variables during adolescence

### Exposure to Violence

<table>
<thead>
<tr>
<th>Ages 12-18</th>
<th>At 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>saw someone shot or shot at</td>
<td>% of peers belong to gang</td>
</tr>
<tr>
<td>had home broken into</td>
<td>got into a physical fight at school</td>
</tr>
<tr>
<td>victim of repeated bullying</td>
<td>something of value stolen at school</td>
</tr>
<tr>
<td>victim of a violent crime</td>
<td>threatened to be hurt at school</td>
</tr>
<tr>
<td>siblings or friends were in a gang</td>
<td>felt unsafe at school</td>
</tr>
<tr>
<td></td>
<td>days/week typically hear gunshots</td>
</tr>
</tbody>
</table>
Variables in the NLSY97

NLSY97 is full of relevant variables during adolescence

Nurturing Relationships

<table>
<thead>
<tr>
<th>Parental NRs</th>
<th>Non-Parental NRs</th>
</tr>
</thead>
<tbody>
<tr>
<td>about both the resident mother and father, whether each is residing with the respondent</td>
<td>whether school’s teachers are interested in the students good</td>
</tr>
<tr>
<td>respondent thinks highly of them</td>
<td></td>
</tr>
<tr>
<td>respondent thinks they want to be like them</td>
<td>whether other students get in the way of learning</td>
</tr>
<tr>
<td>respondent really enjoys spending time with them</td>
<td></td>
</tr>
<tr>
<td>they often criticize the respondent or their ideas</td>
<td>percent of peers who cut class or skip school plan to go to college</td>
</tr>
<tr>
<td>respondent thinks they are supportive</td>
<td></td>
</tr>
<tr>
<td>they often help the respondent</td>
<td></td>
</tr>
<tr>
<td>they blame the respondent for their problems</td>
<td></td>
</tr>
<tr>
<td>they often cancel plans with the respondent</td>
<td></td>
</tr>
<tr>
<td>they know a lot about the respondent’s friends</td>
<td></td>
</tr>
<tr>
<td>they know the parents of the respondent’s friends</td>
<td></td>
</tr>
<tr>
<td>they know details when respondent not at home</td>
<td></td>
</tr>
<tr>
<td>they often praise the respondent</td>
<td></td>
</tr>
</tbody>
</table>
Indexes of Exposure to Violence

Sum: \( \theta_i^{Sum} = \sum_{j=1}^{J} V_{ij} \)
Indexes of Exposure to Violence

Sum: \[ \theta_i^{Sum} = \sum_{j=1}^{J} V_i^j \]

Item Response Theory (IRT): \[ V_i^j = \begin{cases} 1 & \text{if } \alpha_j(\theta_i^{IRT} - \beta_j) - \epsilon_i^j \geq 0 \\ 0 & \text{if } \alpha_j(\theta_i^{IRT} - \beta_j) - \epsilon_i^j < 0 \end{cases} \]
Indexes of Exposure to Violence

Sum: \[ \theta_{i}^{\text{Sum}} = \sum_{j=1}^{J} V_{i}^{j} \]

Item Response Theory (IRT): \[ V_{i}^{j} = \begin{cases} 1 & \text{if } \alpha_{j}(\theta_{i}^{\text{IRT}} - \beta_{j}) - \epsilon_{i}^{j} \geq 0 \\ 0 & \text{if } \alpha_{j}(\theta_{i}^{\text{IRT}} - \beta_{j}) - \epsilon_{i}^{j} < 0 \end{cases} \]

1st Principal Component (PC) of J questions: \[ \theta_{i}^{\text{PC}} \]
Indexes of Exposure to Violence

Sum: $\theta_{i,\text{Sum}}^i = \sum_{j=1}^{J} V^j_i$

Item Response Theory (IRT): $V^j_i = \begin{cases} 
1 & \text{if } \alpha_j(\theta_{i,\text{IRT}}^i - \beta_j) - \epsilon_i^j \geq 0 \\
0 & \text{if } \alpha_j(\theta_{i,\text{IRT}}^i - \beta_j) - \epsilon_i^j < 0
\end{cases}$

1st Principal Component (PC) of $J$ questions: $\theta_{i,\text{PC}}^i$

Item-Anchored: $Y_i = \beta^1 V^1_i + \cdots + \beta^J V^J_i + \epsilon_i \implies$

$\theta_{i,\text{Anchored}}^i = \mathbb{E}[Y_i | V^1_i, \ldots, V^J_i] = \beta^{1,\text{OLS}} V^1_i + \cdots + \beta^{J,\text{OLS}} V^J_i$
Indexes of Treatments

Nurturing Relationships and HS Graduation
Black Men by Index Type

HS Diploma by 26 (%) vs. Nurturing Relationships Index (Percentile)

- Anchored
- Sum
- IRT
- PC

BA · HH Earnings · Incarceration
Indexes of Treatments

IRT and PC perform comparably to simple sum score

More Details: IRT · Anchoring · Comparison

- Surprising
  - Wide variation in item-level responses
  - Many results sensitive to scale
    - B-W test score gap over age
    - B-W test score gap over time
    - M-F variation in test scores
    - Identification of skills

Bond and Lang (2013)
Nielsen (2015)
Domicolo and Nielsen (2022)
Agostinelli and Wiswall (2016)
Indexes of Treatments

IRT and PC perform comparably to simple sum score

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    - M-F variation in test scores
    - Identification of skills

- Not Surprising
  - Similar results for health frailty index
    - 1st PC ~ sum of adverse indicators
Indexes of Treatments

IRT and PC perform comparably to simple sum score

More Details: IRT · Anchoring · Comparison

- Surprising
  - Wide variation in item-level responses
  - Many results sensitive to scale
    - B-W test score gap over age
    - B-W test score gap over time
    - M-F variation in test scores
    - Identification of skills

- Not Surprising
  - Similar results for health frailty index
    - 1st PC $\sim$ sum of adverse indicators

- Good news
  - Robustness of lit using ACE scores
Potential Outcomes

Define $D_i^V = \mathbf{1}\{\theta_i^{Anchored} \geq \pi_{50}(\theta^{Anchored})\}$
Potential Outcomes

Define \( D_i^V = 1\{\theta_i^{Anchored} \geq \pi_{50}(\theta^{Anchored})\} \)

Implement \( D^V, D^{NR} \perp \perp Y(D^V, D^{NR}) \mid W \) by estimating

\[
\begin{align*}
\hat{\beta}^{OLS}_{L,L} & \text{ on the } D^V = L, \ D^{NR} = L \ \text{subsample} \\
\hat{\beta}^{OLS}_{L,H} & \text{ on the } D^V = L, \ D^{NR} = H \ \text{subsample} \\
\hat{\beta}^{OLS}_{H,L} & \text{ on the } D^V = H, \ D^{NR} = L \ \text{subsample} \\
\hat{\beta}^{OLS}_{H,H} & \text{ on the } D^V = H, \ D^{NR} = H \ \text{subsample}
\end{align*}
\]

to obtain

\[
\mathbb{E}[Y(D^V, D^{NR})] = \mathbb{E}[\hat{\beta}^{OLS}_{V,NR}W] \quad \text{for full sample}
\]

Imbens (2015)
Potential Outcomes

High School Graduation

HS Diploma by 26 (%)

Low

High

Low

High

Exposure to Violence

Nurturing Relationships
Potential Outcomes

BA Attainment

<table>
<thead>
<tr>
<th>Exposure to Violence</th>
<th>BA by 26 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

Nurturing Relationships
Potential Outcomes

Incarceration

Ever Incarcerated by 35-39 (%)

- Exposure to Violence
  - High
  - Low

- Nurturing Relationships
  - High
  - Low
Potential Outcomes

Household Earnings (Aged 34-38)

HH Earnings (Thousands of $s)

Exposure to Violence

Nurturing Relationships
## Treatment Effects

**Given High Exposure to Violence and Low Nurturing Relationships**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>$D^V$</th>
<th>$D^{NR}$</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS Diploma (% by 26)</td>
<td>14.5</td>
<td>14.5</td>
<td>40.3</td>
</tr>
<tr>
<td>BA Attainment (% by 26)</td>
<td>8.7</td>
<td>4.2</td>
<td>11.2</td>
</tr>
<tr>
<td>Ever Incarcerated (% by 2019)</td>
<td>−19.6</td>
<td>−6.5</td>
<td>−21.3</td>
</tr>
<tr>
<td>Household Earnings (1,000s of 2018 $s)</td>
<td>16.6</td>
<td>10.5</td>
<td>31.6</td>
</tr>
</tbody>
</table>
## Inputs into Policy Maker’s Decision Problem

<table>
<thead>
<tr>
<th></th>
<th>Compliers</th>
<th>10%</th>
<th>NRs</th>
<th>$3.7B</th>
<th>25%</th>
<th>$9.1B</th>
<th>Safety</th>
<th>$13.1B</th>
<th>Both</th>
<th>$29.9B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ind. Earnings</td>
<td></td>
<td></td>
<td>NRs</td>
<td>$3.7B</td>
<td></td>
<td></td>
<td>Safety</td>
<td>$13.1B</td>
<td>Both</td>
<td>$29.9B</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$5.2B</td>
<td>25%</td>
<td></td>
<td></td>
<td>$13.1B</td>
<td></td>
<td>$29.9B</td>
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<tr>
<td>Incarceration</td>
<td></td>
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<td>NRs</td>
<td>$1.4B</td>
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<td>Safety</td>
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<td></td>
</tr>
</tbody>
</table>

### Cost of Program:

- **B. Males 12-18**: Boys and Girls Clubs - $2.2B
- **B. Males 12-18**: Big Bros/Sisters - $3.0B
- **All K-12 Title I Students**: Wrap-Around Services - $5.2B
- **All K-12 Title I Students**: School-Wide Tutoring - $5-$16B
- **B. males 12-18**: High-Dosage Tutoring - $9.5-11.7B
- **B. males 12-18**: Student Supports - $19.0B

Cost Sources: Boys Girls Clubs (2023) · Alfonso et al. (2019) · Say Yes Cleveland · Kraft and Falken (2021) · Guryan et al. (2023) · Oreopoulos et al. (2017) · whitehouse.gov (2022)
Conclusion: Childhood Exposure to Violence

Childhood exposure to violence

- Large long-run effects on Black men
- Effects not from selection on observables
- Effects unlikely from selection on unobservables
- Effects on violent behavior similar across race/ethnicity
Conclusion: Childhood Exposure to Violence

Childhood exposure to violence

- Large long-run effects on Black men
- Effects not from selection on observables
- Effects unlikely from selection on unobservables
- Effects on violent behavior similar across race/ethnicity

Key mechanism appears to be trauma / toxic stress

- Not mediated by incarceration
- Not simply a measure of overall neighborhood environment
- Consistent with literature on ACEs / toxic stress
Conclusion: Nurturing Relationships

- Large effects in adolescence
  - Chang et al. (2023)
  - Nielsen (2023)
  - Carneiro et al. (2021)
  - Wodtke et al. (2016)
  - Wodtke et al. (2011)
Conclusion: Nurturing Relationships

- Large effects in adolescence
  - Chang et al. (2023) · Nielsen (2023) · Carneiro et al. (2021) · Wodtke et al. (2016) · Wodtke et al. (2011)

- Importance of nurturing relationships
  - Providing NRs \sim as beneficial as shielding from violence
  - Both is good (shielding from violence and providing NRs)
  - Our results driven by parents; we speculate not just parents
    - Bethell et al. (2019a) · Pierre et al. (2020)
Conclusion: Nurturing Relationships

- **Large effects in adolescence**  
  Chang et al. (2023) · Nielsen (2023) · Carneiro et al. (2021) · Wodtke et al. (2016) · Wodtke et al. (2011)

- **Importance of nurturing relationships**
  - Providing NRs \(\sim\) as beneficial as shielding from violence
  - Both is good (shielding from violence and providing NRs)
  - Our results driven by parents; we speculate not just parents
  Bethell et al. (2019a) · Pierre et al. (2020)

- \(\implies\) NRs as basis for effective interventions
  - Tutoring, mentoring, and community-building
  - Targeting children and adolescents
  Kraft and Falken (2021) · Oreopoulos et al. (2017) · Lavecchia et al. (2020) · Guryan et al. (2021)
**Observed characteristics $W$**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Means for Males</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Black</td>
</tr>
<tr>
<td>Mother’s Ed</td>
<td></td>
</tr>
<tr>
<td>Not Determined</td>
<td>9</td>
</tr>
<tr>
<td>Dropout</td>
<td>20</td>
</tr>
<tr>
<td>GED</td>
<td>6</td>
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<tr>
<td>HS Grad</td>
<td>48</td>
</tr>
<tr>
<td>AA</td>
<td>8</td>
</tr>
<tr>
<td>BA</td>
<td>9</td>
</tr>
<tr>
<td>Parent(s)’ Income in 1996</td>
<td></td>
</tr>
<tr>
<td>Mean (Thousands of 2018 $s$)</td>
<td>39</td>
</tr>
<tr>
<td>HH Structure</td>
<td></td>
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<tr>
<td>Two Parent (Both Bio)</td>
<td>26</td>
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<tr>
<td>Two Parent (One Bio)</td>
<td>14</td>
</tr>
<tr>
<td>Single Parent</td>
<td>50</td>
</tr>
<tr>
<td>Grandparent(s)</td>
<td>6</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
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</table>
## Data: NLSY97

### Outcomes Y

<table>
<thead>
<tr>
<th>Earlier Surveys</th>
<th>Means for Males (Black)</th>
<th>Means for Males (White)</th>
<th>Most Recent Survey</th>
<th>Means for Males (Black)</th>
<th>Means for Males (White)</th>
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</thead>
<tbody>
<tr>
<td>Violent Beh. at 15</td>
<td>22</td>
<td>18</td>
<td>HH Earnings</td>
<td>51</td>
<td>95</td>
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<tr>
<td>Violent Beh. at 21</td>
<td>14</td>
<td>10</td>
<td>($1,000s)</td>
<td></td>
<td></td>
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<tr>
<td>ASVAB Percentile</td>
<td>26</td>
<td>56</td>
<td>Ind. Earnings</td>
<td>37</td>
<td>68</td>
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<tr>
<td>HS Grad by 26</td>
<td>61</td>
<td>78</td>
<td>($1,000s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA by 26</td>
<td>9</td>
<td>24</td>
<td>0 Ind. Earnings</td>
<td>22</td>
<td>9</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Hours (Weekly Avg)</td>
<td>33</td>
<td>39</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Ever Incarcerated</td>
<td>26</td>
<td>12</td>
</tr>
</tbody>
</table>

Western and Wildeman (2009)
Admin + Survey + Census Data via Pettit and Western (2004)
Codebook for $D$

National Longitudinal Survey of Youth, 1997 (NLSY97)

Treatment ($D$): Childhood exposure to violence

R04441.00 [YSAQ-519] PRIMARY VARIABLE

R SEE SOMEONE SHOT WITH GUN < 12 YEARS OLD?

Before you turned age 12, did you ever see someone get shot or shot at with a gun?

UNIVERSE: R >= 18 at end of prev year

975 1 Yes (Go To R04442.00)
7859 0 No

8834

Refusal(-1) 14
Don’t Know(-2) 9
Invalid Skip(-3) 126
TOTAL =========> 8983 VALID SKIP(-4) 1 NON-INTERVIEW(-5) 0

Min: 0 Max: 1 Mean: .11

Lead In: R04440.00[Default]
Default Next Question: R04443.00
Codebook for Components of $s_v$

$s_v(a) = 1$ if carried a hand gun in the past year (1/4)
Codebook for Components of $s_v$

$s_v(a) = 1$ if been in a gang in the past year (2/4)

```
R03607.00 [YSAQ-387] PRIMARY VARIABLE

R BELONG TO GANG IN LAST 12 MONTHS?
Have you been a member of a gang in the past 12 months?

UNIVERSE: R has belonged to a gang

<table>
<thead>
<tr>
<th>Code</th>
<th>Value</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>232</td>
<td>Yes</td>
<td>1</td>
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<tr>
<td>239</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>471</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Refusal(-1) 1
Don't Know(-2) 0
TOTAL =========> 472  VALID SKIP(-4) 8512  NON-INTERVIEW(-5) 0

Min: 0  Max: 1  Mean: .49

Lead In: R03606.00[Default]
Default Next Question: R03608.00
```
Codebook for Components of $s_v$

$s_v(a) = 1$ if charged with an assault in the past year (3/4)

R03807.00 [YSAQ-456.01]  
PRIMARY VARIABLE  

POLICE CHARGE ASSAULT? ARREST 01

Did the police charge you with assault, that is, an attack with a weapon or your hands, such as battery, rape, aggravated assault, or manslaughter?

UNIVERSE: R has been arrested; has been charged with offense by police

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>108</td>
<td>1 Yes</td>
</tr>
<tr>
<td>265</td>
<td>0 No</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>373</td>
<td></td>
</tr>
</tbody>
</table>

Refusal(-1) 0  
Don't Know(-2) 0  
TOTAL =========> 373  VALID SKIP(-4) 8611  NON-INTERVIEW(-5) 0

Min: 0  Max: 1  Mean: .29

Lead In: R03786.00[1:1]  
Default Next Question: R03824.00
$s_v(a) = 1$ if attacked someone in the past year (4/4)
Assessing Robustness via Age Profiles

What if correlation in outcomes were due to selection?
Assessing Robustness via Age Profiles

What if correlation in outcomes were due to selection?

Personality traits = common cause of exposure + poor outcomes

Personality traits $\rightarrow$ behaviors $\rightarrow$ exposure, but:
- Most “street” behaviors occur in adolescence
- Adolescent exposure only 5pp > than childhood
- $\approx 2/3$ of those exposed in ad. not exposed in childhood

<table>
<thead>
<tr>
<th>Age</th>
<th>% Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-11</td>
<td>26</td>
</tr>
<tr>
<td>12-18</td>
<td>31</td>
</tr>
<tr>
<td>0-18</td>
<td>47</td>
</tr>
</tbody>
</table>
Assessing Robustness via Age Profiles

Individual Street Behaviors of Black Males
By Age

- Property Crime
- Attacked Someone
- Carried a Handgun
- Sold Drugs
- Belonged to Gang
- Stolen Something
- Charged with Assault

Percent

Age

11 12 13 14 15 16 17 18 19 20
Assessing Robustness via Age Profiles

Any Street Behaviors of Males
By Age and Cumulative

- Black
- White
- Hispanic

Any Behavior Cumulative

Any Behavior By Age
Selection Assumptions

Selection on $c$-Dependent Unobservables

\[ \sup_{y_d \in \text{supp}(Y(D)|W=w)} \left| \mathbb{P}(D = 1| Y(D) = y(d'), W = w) \right| - \mathbb{P}(D = 1| W = w) \leq c \quad \forall \ w \in \mathcal{W} \]
Selection Assumptions

Selection on $c$-Dependent Unobservables

$$\sup_{y_d \in \text{supp}(Y(D) | W = w)} \left| \mathbb{P}(D = 1 | Y(D) = y(d), W = w) \right| - \mathbb{P}(D = 1 | W = w) \leq c$$

$\forall w \in \mathcal{W}$

$\implies$ bounds on treatment effects given $c$

Selection Assumptions

Selection on c-Dependent Unobservables

\[ \sup_{y_d \in \text{supp}(Y(D)|W=w)} \left| P(D = 1| Y(D) = y(d), W = w) - P(D = 1| W = w) \right| \leq c \quad \forall \ w \in \mathcal{W} \]

\[ \implies \text{bounds on treatment effects given } c \]


\[ \implies \text{inference of +/- effect often breaks down at some } c^* \]

Selection Assumptions

An Example: ATE bounds by the strength of $c$-Dependence
Selection Assumptions

Q: How to judge if breakdown frontier $c^*$ is “large” or “small”?

A: Use selection on observables to define “large” and “small”

Altonji et al. (2005) · Oster (2019)
Selection Assumptions

Q: How to judge if breakdown frontier $c^*$ is “large” or “small”?
A: Use selection on observables to define “large” and “small”

Altonji et al. (2005) · Oster (2019)

Where does $c^*$ lie in the distribution of leave-one-out changes?

Masten, Poirier, and Zhang (2020)

$$
\triangle_k \equiv \left| \pi(w) - \pi(w_{-k}) \right|
$$

$$
\pi(w) = \pi((w_{-k}, w_k)) = \mathbb{P}(D = 1|W = (w_{-k}, w_k))
$$

$$
\pi(w_{-k}) = \mathbb{P}(D = 1|W_{-k} = w_{-k})
$$
Assessing Robustness with $c$-Dependence

Leave One Out $\Delta$ in Propensity Scores and Obs. Breakdown Point in Masten et al. (2023)

$c^*$ Observational

$F(x)$

$\Delta_k$ and $c^*(Y)$

- Red: Earnings in 1975
- Blue: Education
- Green: Age
- Black: Black
Assessing Robustness with c-Dependence

Leave One Out $\Delta$ in Propensity Scores and Exp. Breakdown Point in Masten et al. (2023)

$c^*$

$F(x)$

$\Delta_k$ and $c^*(Y)$
Assessing Robustness w c-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

$F(x)$ vs $\Delta_k$ and $c^*(Y)$

- All Indicators for Mother's Ed
- Dropout
- GED
- HS
- AA
- BA

Violent Behavior at Age 15
Assessing Robustness w $c$-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

- $c^*$
- Ever Incar.
- HH Earn.
- 0 Ind. Earnings

$F(x)$ vs $\Delta_k$ and $c^*(Y)$

- All Indicators for Mother's Ed
- Dropout
- GED
- HS
- AA
- BA
Assessing Robustness with c-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

$F(x)$

$\Delta_k$ and $c^*(Y)$

- All Indicators for Mother's Ed
- Dropout
- GED
- HS
- AA
- BA
Assessing Robustness w $c$-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

$F(x)$

$\Delta_k$ and $c^*(Y)$

- All Indicators for Mother's Ed
- Dropout
- GED
- HS
- AA
- BA
Assessing Robustness w c-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

$F(x)$

$\Delta_k$ and $c^*(Y)$
Assessing Robustness w/ c-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

- All Indicators for HH Structure
- 2-Parent (Both Bio)
- 2-Parent (One Bio)
- Single Parent
- Grandparent
Assessing Robustness with c-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

$F(x)$

$\Delta_k$ and $c^*(Y)$

- All Info on Parental Income
- Linear Term
- Quadratic Term
Assessing Robustness with c-Dependence

Leave One Out $\Delta$ in Childhood Propensity Score and Outcome-Specific Breakdown Points

$F(x)$

$\Delta_k$ and $c^*(Y)$
### Effects of Violence, Not of Broader Nbd Context

**Coefficient w/out and w/ Indicators for Deciles of Nbd SES**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Without</th>
<th>With</th>
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<tbody>
<tr>
<td>HH Earnings in 2018 ($1,000s)</td>
<td>-17.4</td>
<td>-16.8</td>
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<tr>
<td></td>
<td>(4.6)</td>
<td>(4.5)</td>
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<tr>
<td>HS by 26</td>
<td>-17.6</td>
<td>-16.5</td>
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<td></td>
<td>(3.2)</td>
<td>(3.2)</td>
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<tr>
<td>BA by 26</td>
<td>-5.6</td>
<td>-4.9</td>
</tr>
<tr>
<td></td>
<td>(1.9)</td>
<td>(1.9)</td>
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<tr>
<td>Ever Incarcerated (% by 2019)</td>
<td>10.5</td>
<td>10.3</td>
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<tr>
<td></td>
<td>(2.9)</td>
<td>(2.9)</td>
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</tbody>
</table>
Measuring Neighborhood SES in 1997

Neighborhood SES
Estimated and Imputed for 1997-2017
### Household Earnings in 2018

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Coefficient in Earnings Regression</th>
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<tr>
<td>Childhood Exposure</td>
<td>(-17.4) [0.00] (-15.2) [0.00]</td>
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<tr>
<td>Ever Incarcerated</td>
<td>(-33.8) [0.00] (-33.3) [0.00]</td>
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\(R^2\) 0.02 0.06 0.07
Effects of Violence or of Gang Activity?

Conditional Distributions of Peers in a Gang by Having Seen Someone Shot in Childhood

Did Not See Someone Shot

Saw Someone Shot

Percent

<10%

>90%

Percent of Peers in a Gang
# Effects of Violence or of Gang Activity?

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Ref. Mean</th>
<th>Seen Shot</th>
<th>≈ 25%</th>
<th>≈ 50%</th>
<th>≈ 75%</th>
<th>&gt; 90%</th>
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</thead>
<tbody>
<tr>
<td>Violent at 15 (%)</td>
<td>16</td>
<td>17</td>
<td>−1</td>
<td>−0</td>
<td>4</td>
<td>21</td>
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<td></td>
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<td>[0.99]</td>
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<td>HS Diploma (%)</td>
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<td>−16</td>
<td>6</td>
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<td></td>
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<td>[0.00]</td>
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<td>[0.54]</td>
<td>[0.06]</td>
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<tr>
<td>BA (%)</td>
<td>12</td>
<td>−5</td>
<td>0</td>
<td>−5</td>
<td>−6</td>
<td>−10</td>
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<td></td>
<td>[0.02]</td>
<td>[0.08]</td>
<td>[0.08]</td>
<td>[0.09]</td>
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<td>Incarcerated (%)</td>
<td>21</td>
<td>9</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>16</td>
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<td>[0.00]</td>
<td>[0.20]</td>
<td>[0.20]</td>
<td>[0.32]</td>
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<td>Earnings ($1,000s)</td>
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<td>−10</td>
<td>−2</td>
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<td>[0.01]</td>
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<td>[0.11]</td>
</tr>
<tr>
<td>HH Earnings ($1,000s)</td>
<td>61</td>
<td>−15</td>
<td>−4</td>
<td>−18</td>
<td>−18</td>
<td>−29</td>
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<td>[0.00]</td>
<td>[0.01]</td>
<td>[0.01]</td>
<td>[0.05]</td>
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Back
## Exposure and Acute Effects

<table>
<thead>
<tr>
<th>Age</th>
<th>Black</th>
<th>White</th>
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<tbody>
<tr>
<td>0-11</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>12-18</td>
<td>29</td>
<td>10</td>
</tr>
<tr>
<td>0-18</td>
<td>43</td>
<td>16</td>
</tr>
</tbody>
</table>

Back · NLSY97 · Aliprantis (2017) · Graham (2018)
## Non-Violent Adversity

### Black Male Adolescents (12-18)

<table>
<thead>
<tr>
<th>Non-Violent Adversity</th>
<th>Percent</th>
<th>Cumul.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incarcerated Parent</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Homeless</td>
<td>1.6</td>
<td>2.8</td>
</tr>
<tr>
<td>Unemployed Parent</td>
<td>6.4</td>
<td>9.0</td>
</tr>
<tr>
<td>Death of parent or sibling</td>
<td>15.0</td>
<td>23.6</td>
</tr>
<tr>
<td>Any Non-Violent Adversity</td>
<td>23.6</td>
<td>23.6</td>
</tr>
</tbody>
</table>
Potential Outcomes

High School Graduation

Non-Violent Adversity

Nurturing Relationships
Potential Outcomes

BA Attainment

BA by 26 (%)

Low
High
Low
High

Non-Violent Adversity

Nurturing Relationships

IRT
Comparing Indexes
Nbd SES
Incarceration
Gangs
Non-Violent Adversity

NLSY97
Selection

00
000000
Potential Outcomes

Incarceration

Ever Incarcerated by 35-39 (%)

**Non-Violent Adversity**

- High: 28%
- Low: 17%

**Nurturing Relationships**

- High: 36%
- Low: 24%
## Treatment Effects

<table>
<thead>
<tr>
<th></th>
<th>( D^{NV} )</th>
<th>( D^{NR} )</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Given High Non-Violent Adversity and Low Nurturing Relationships</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HS by 26 (%)</td>
<td>4.4</td>
<td>12.3</td>
<td>32.3</td>
</tr>
<tr>
<td>BA by 26 (%)</td>
<td>4.8</td>
<td>4.3</td>
<td>9.2</td>
</tr>
<tr>
<td>Ever Incarcerated (% by 2019)</td>
<td>-5.6</td>
<td>-6.6</td>
<td>-14.0</td>
</tr>
<tr>
<td>HH Earnings in 2018 ($1,000s)</td>
<td>16.7</td>
<td>18.1</td>
<td>28.0</td>
</tr>
</tbody>
</table>
Item Response Theory

Binary response item $j$ depends on latent index $\theta_i^V$

$$ACE_{i,j}^{V} = \begin{cases} 
1 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j \geq 0 \\
0 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j < 0.
\end{cases}$$
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Assuming $\epsilon_i$ follows a type-1 extreme value distribution:

$$Pr(ACE_{i,j}^{V} = 1|\alpha, \beta, C, \theta_i^V) = \logit[\alpha_j(\theta_i^V - \beta_j)]$$
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Maximize the marginal LL

$$\mathcal{L}_i(\alpha, \beta) = \int_{-\infty}^{\infty} Pr(ACE_{i}^{V} | \alpha, \beta, \theta_i) d\Phi(\theta_i^V)$$
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$$\mathcal{L}_i(\alpha, \beta) = \sum_{q=1}^{Q} Pr(PCE_i|\alpha, \beta, \theta_q) \hat{\varphi}(\theta_q)$$
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Note: Can be generalized to ordered responses
Empirical Bayes estimates of each $i$’s latent index:

$$
\bar{\theta}_i = \int \frac{\theta Pr(ACE_i^V|\hat{\alpha}, \hat{\beta}, \theta) \varphi(\theta)}{Pr(ACE_i^V|\hat{\alpha}, \hat{\beta}, \theta) \varphi(\theta)} d\theta
$$
Item Response Theory

Violent Adverse Child Experiences Item Info Functions

Ages 12-18
- Bullied
- Victim Crime
- Seen Shot
- Broken Into
- Sib/Friends Gang
Item Response Theory

Violent Adverse Child. Experiences Item Info Functions

- Home (1997)
- Hear Shot(s)
- Peers Gang (%)
- School (1997)
- Threatened
- Stolen
- In Fight(s)
- Unsafe
Item Response Theory

Nurturing Relationships Item Info Functions

Information vs. $\theta^{NR}$

Father
- Praise
- Think Highly
- Enjoy
- Be Like
- Know Friends

Mother
- Praise

Graph shows the information functions for different nurturing relationships with respect to $\theta^{NR}$.
Item Response Theory

Nurturing Relationships Item Info Functions

Information

Teachers
Good
Interested
Peers
Disrupt
Plan College
Cut Class

$\theta^{NR}$
IRT-Based Treatment

Empirical Bayes estimates of each $i$’s latent index:

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$$

Note: Assuming $\theta_i \sim \mathcal{N}(0, 1)$

How to deal w scale and location issues?

Cunha et al. (2010) · Agostinelli and Wiswall (2022, 2016)
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Let’s use the $\hat{\theta}_i$ to create a discrete treatment
## Binary Treatment: Non-Violent Adversity

### Black Male Adolescents (12-18)

<table>
<thead>
<tr>
<th>Non-Violent Adversity</th>
<th>Percent</th>
<th>Cumul.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incarcerated Parent</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Homeless</td>
<td>1.6</td>
<td>2.8</td>
</tr>
<tr>
<td>Unemployed Parent</td>
<td>6.4</td>
<td>9.0</td>
</tr>
<tr>
<td>Death of parent or sibling</td>
<td>15.0</td>
<td>23.6</td>
</tr>
<tr>
<td>Any Non-Violent Adversity</td>
<td>23.6</td>
<td>23.6</td>
</tr>
</tbody>
</table>
IRT Ordering Is Robust to Dist. Assumptions

Discrete IRT-Based Treatment $D^V$ based on $\theta^V$

- Ordering of individuals that synthesizes many variables
IRT Ordering Is Robust to Dist. Assumptions

Discrete IRT-Based Treatment $D^V$ based on $\theta^V$
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Seemingly innocuous normalizations $\Rightarrow$ biased estimates

Agostinelli and Wiswall (2016) · Del Bono et al. (2022)
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So let’s estimate IRT model under different distributional assumptions and compare orderings
IRT Ordering Is Robust to Dist. Assumptions

Estimates of $\theta^v$ and Tercile Cutpoints by Distributional Assumption

Assuming $\theta^v \sim U[-5,5]$

Assuming $\theta^v \sim N(0,1)$
IRT Ordering Is Robust to Dist. Assumptions

Ordering does not depend on distributional assumption on $\theta^V$

<table>
<thead>
<tr>
<th>Difference in Discrete Treatments</th>
<th>$D_U^V - D_N^V$</th>
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<tbody>
<tr>
<td>Frequency</td>
<td>Frequency</td>
</tr>
<tr>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Percent</td>
<td>Percent</td>
</tr>
<tr>
<td>1.4</td>
<td>97.1</td>
</tr>
<tr>
<td>11</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Anchoring Coefficients

Weights for Items Anchored to HS Graduation

Exposure to Violence for Adolescent Black Males

- Fight at School
- Victim Violent Crime
- Seen Shot
- Gangs (Sib/Friends)
- Unsafe at School
- Home Broken Into
- Threatened at School
- Days Hear Shots
- Stolen at School
- Bullied
- Gangs (% Peers)
Anchoring Coefficients

Weights for Items Anchored to HS Graduation
Nurturing Relationships for Adolescent Black Males

Father (Knows Friends)
Father (Knows Parents)
Father (Think Highly Of)
Mother (Want to Be Like)
Father (Knows Plans)
Mother (Knows Parents)
Mother (Enjoy Being Around)
Teachers (Care)
Father (Enjoy Being Around)
Father (Does Not Criticize)
Father (Does Not Blame)
Mother (Living With)

Regression Coefficient

-0.6 -0.5 -0.4 -0.3 -0.2 -0.1 0
Anchoring Coefficients

Weights for Items Anchored to HS Graduation

Nurturing Relationships for Adolescent Black Males

- Father (Living With)
- Mother (Think Highly Of)
- Father (Praises Often)
- Teachers (Good)
- Mother (Helps)
- Mother (Does Not Blame)
- Mother (Knows Teachers)
- Mother (Does Not Criticize)
- Father (Want to Be Like)
- Mother (Does Not Cancel)
- Peers (Plan for College)
- Father (Helps)
- Mother (Knows Friends)
- Mother (Knows Plans)
- Father (Does Not Cancel)
- Father (Knows Teachers)
- Peers (Not Disruptive)
- Peers (Do Not Cut Class)
Descriptive Analysis

Outcomes by Item-Anchored Index

Exposure to Violence

Probability

$\theta^V$

HS
Descriptive Analysis

Outcomes by Item-Anchored Index
Nurturing Relationships

Probability

Ever Incar.

HS

BA

θ^{NR}

Back
Descriptive Analysis

Outcomes by Item-Anchored Index
Nurturing Relationships

Thousands of $s

θ^v

Household Earnings
Descriptive Analysis

Outcomes by Item-Anchor Index

Nurturing Relationships

Household Earnings

Thousands of $s

0 20 40 60 80 100

0.0 0.2 0.4 0.6 0.8 1.0

$^{\theta}$
Indexes of Exposure to Violence

Exposure to Violence and BA Attainment
Black Men by Index Type

BA by 26 (%) vs. Index of Exposure to Violence (Percentile)
Indexes of Exposure to Violence

Exposure to Violence and Household Earnings
Black Men by Index Type

HH Earnings in 2018 (Thousands)

Index of Exposure to Violence (Percentile)
Indexes of Exposure to Violence

Exposure to Violence and Incarceration
Black Men by Index Type

Ever Incarcerated by 2019 (%)

Index of Exposure to Violence (Percentile)
Indexes of Nurturing Relationships

Nurturing Relationships and BA Attainment
Black Men by Index Type

BA by 26 (%) vs. Nurturing Relationships Index (Percentile)

- Anchored
- PC
- Sum
- IRT

Comparing Indexes
Indexes of Nurturing Relationships

Nurturing Relationships and Household Earnings
Black Men by Index Type

HH Earnings in 2018 (Thousands)

Nurturing Relationships Index (Percentile)

Anchored
PC
Sum
IRT

Back
Indexes of Nurturing Relationships

Nurturing Relationships and Incarceration
Black Men by Index Type

Ever Incarcerated by 2019 (%) vs. Nurturing Relationships Index (Percentile)

IRT PC Sum Anchored