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

Dionissi Aliprantis
Cleveland Fed

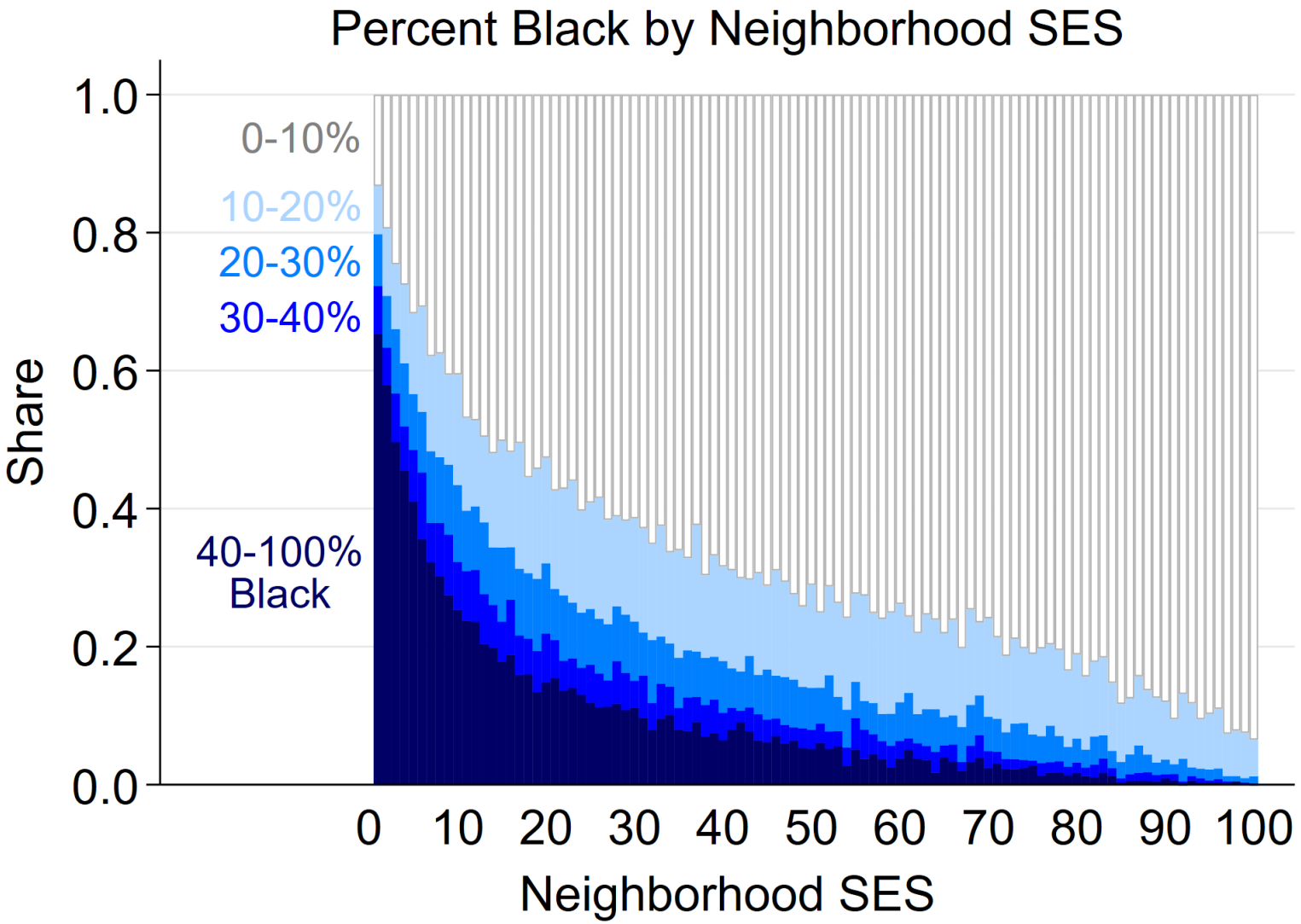
Kristen Tauber
NYU

2023 Institute Research Conference
Minneapolis Fed · OIGI

October 5, 2023

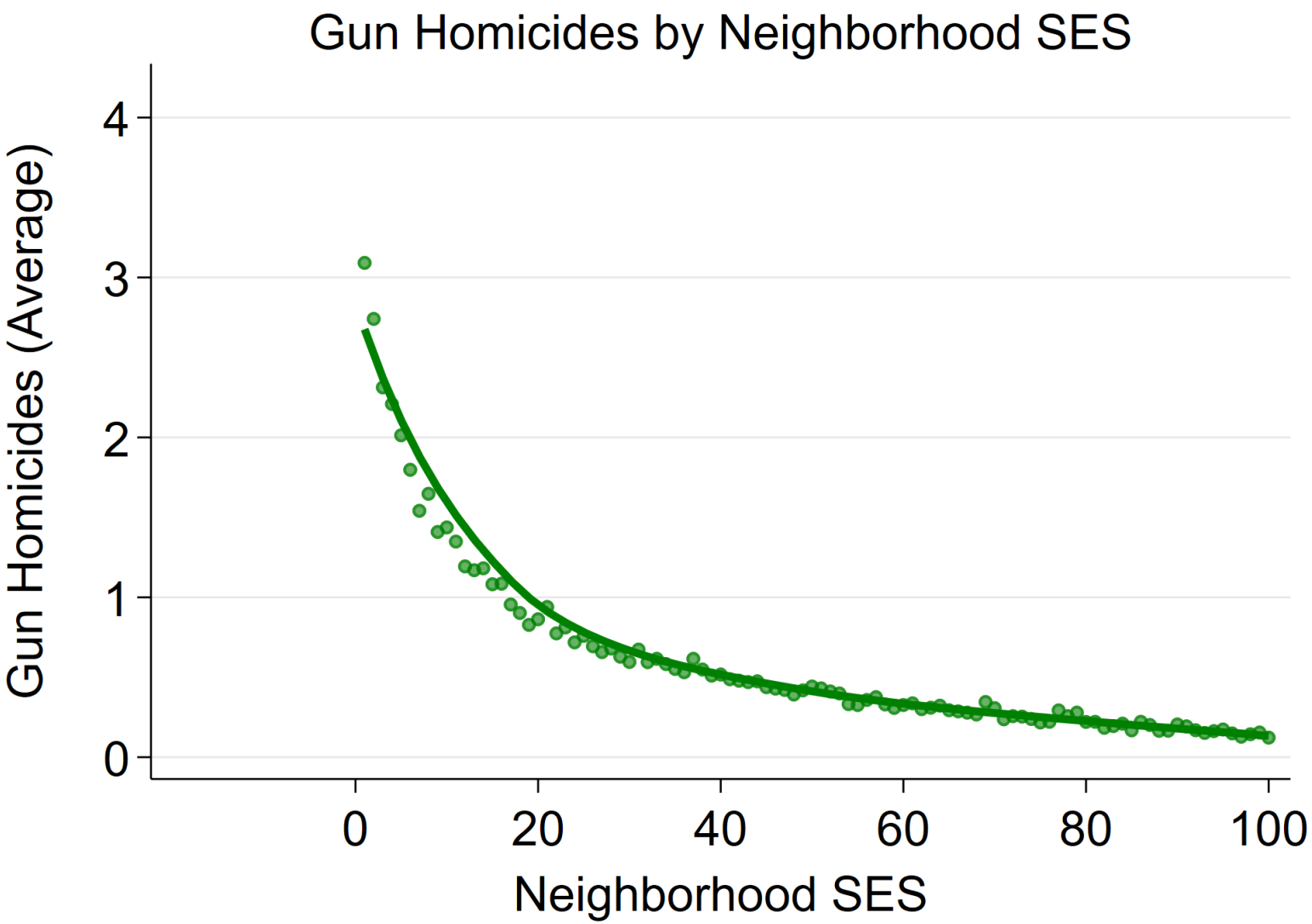
The views stated herein are those of the authors and are not necessarily those of the Federal Reserve Bank of Cleveland or the Board of Governors of the Federal Reserve System.

Residential Segregation in the US



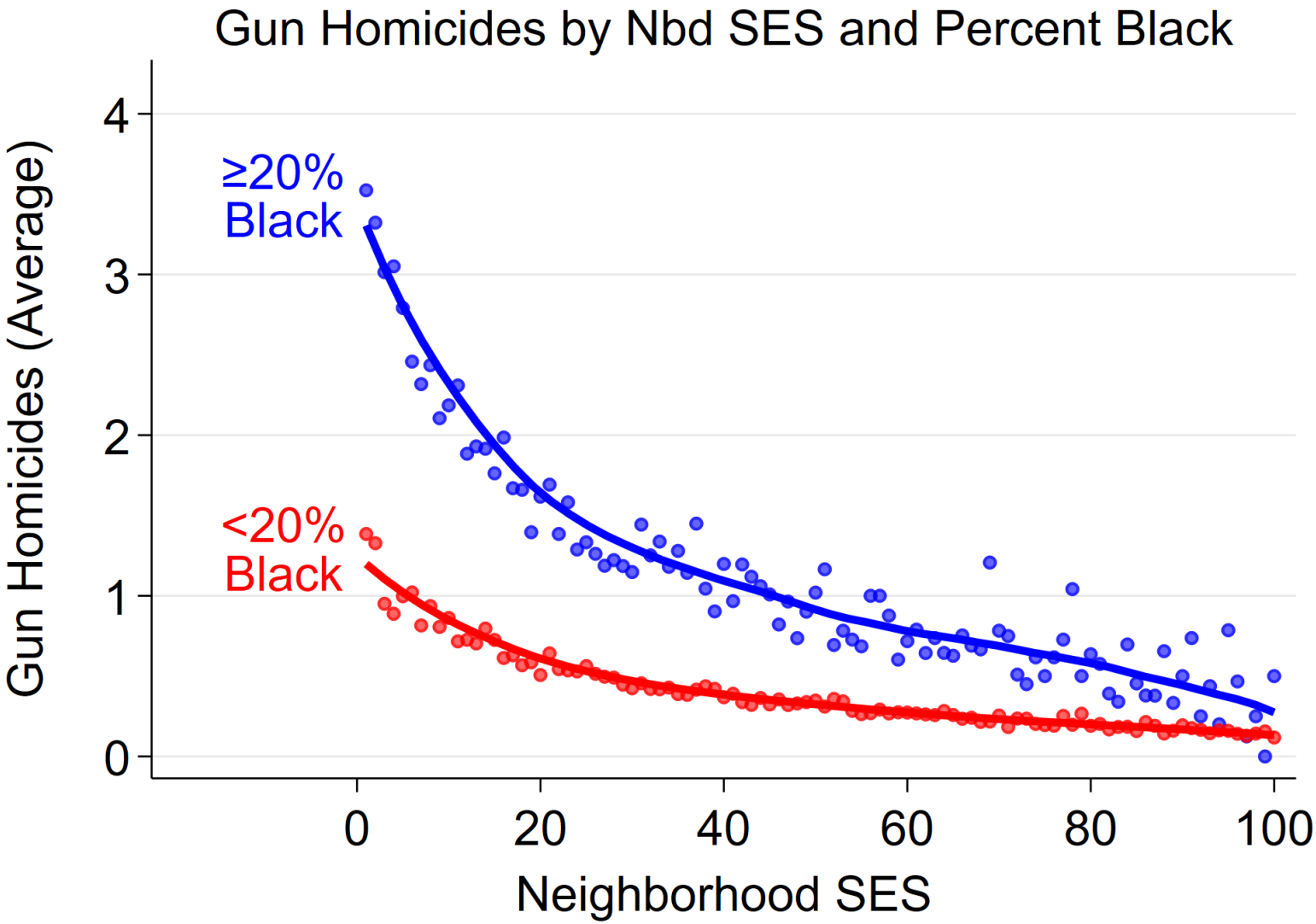
2014-2018 ACS

Safety in the US



2013-2018 Gun Violence Archive · 2014-2018 ACS

Safety in the US



Cheon et al. (2020) · 2013-2018 Gun Violence Archive · 2014-2018 ACS

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

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× homicides (15-24 · 25-34) NCHS 1977-2021
  - 4× 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× homicides (15-24 · 25-34) NCHS 1977-2021
  - 4× witnessing a shooting (0-11) NLSY97

- Short-run effects on Black males
  - Engaging in violent behavior Bingenheimer et al. (2005)
  - Academic attainment Aliprantis (2017)
  - Academic achievement Torrats-Espinosa (2020)

· Casey et al. (2018) · Sharkey et al. (2014)

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

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

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

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

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

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

Selection into Treatment

Random Selection $Y(0), Y(1) \perp\!\!\!\perp D$

Selection on Observables $Y(0), Y(1) \perp\!\!\!\perp D \,|\, W$

Propensity Score $\pi(W) = Pr(D = 1|W)$

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)
  - Biennial (2013-2019)
- We focus on subsample of non-Hispanic Black males
  - N=1,169
- Observed characteristics W Descriptive Stats
  - 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

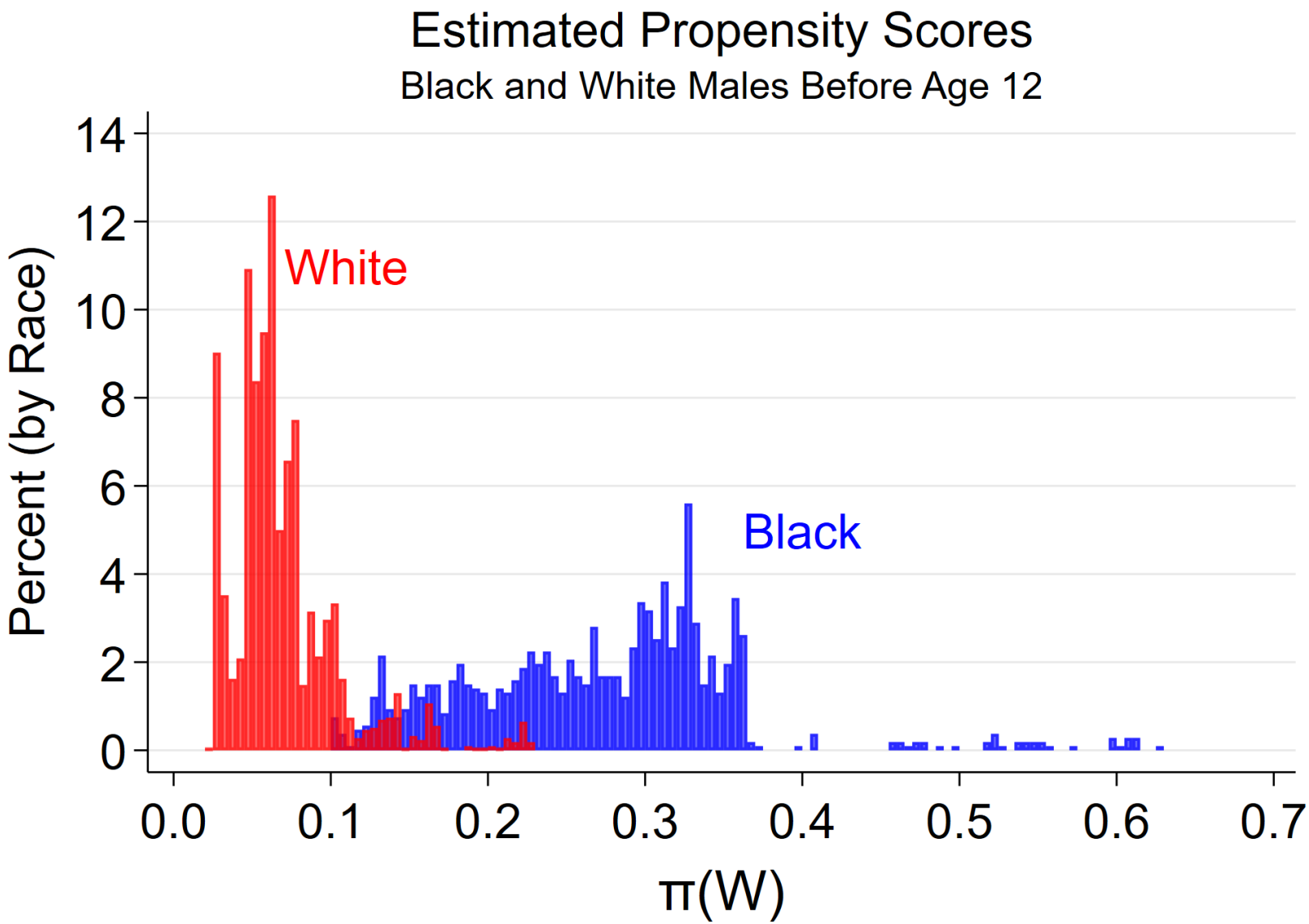
Data: NLSY97

Treatment *D*: Childhood or adolescent exposure to violence

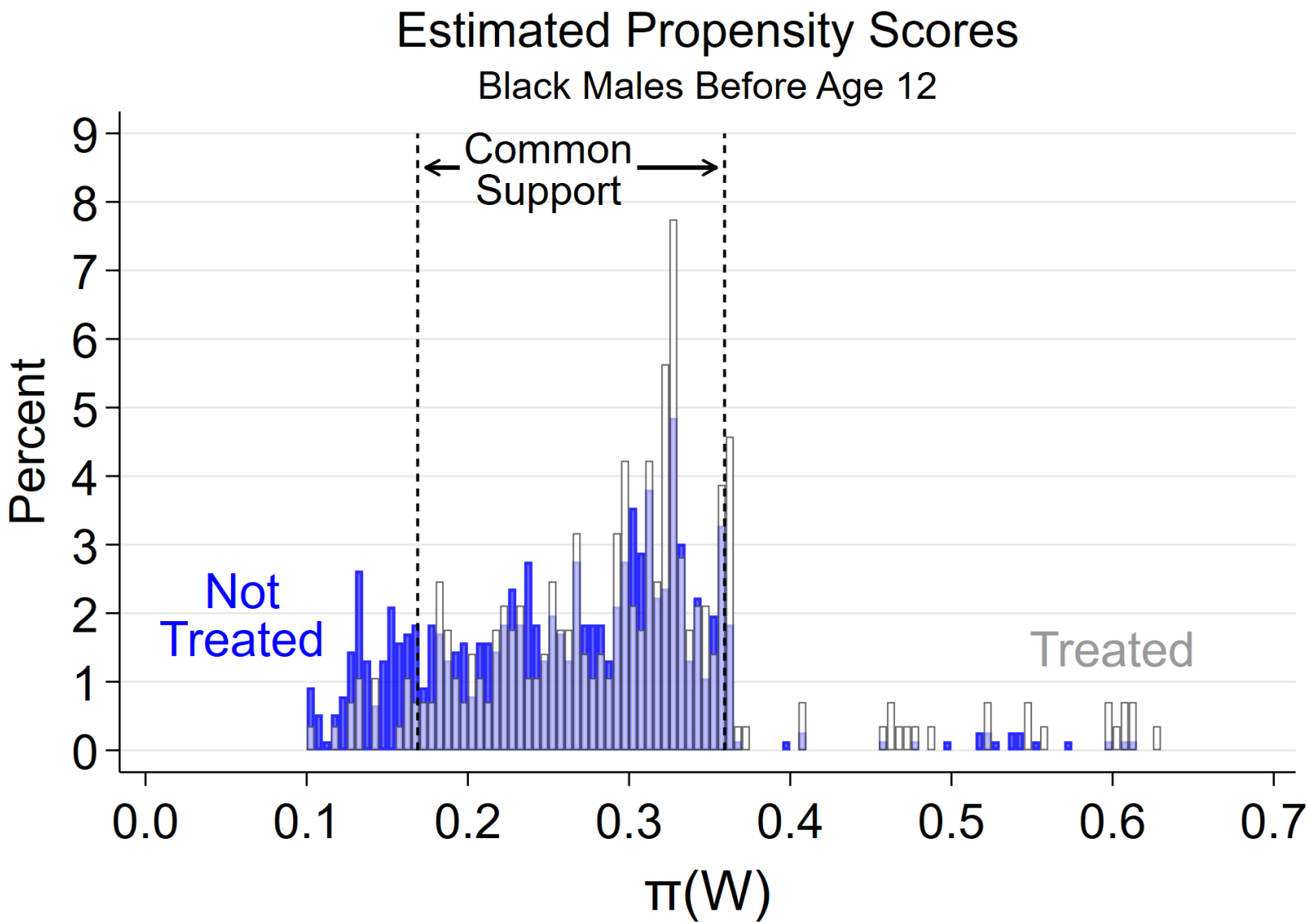
"did you ever see someone get shot or shot at with a gun?"

Age	% Treated
0-11	26
12-18	31
0-18	47

Common Support



Common Support



Treatment Effects of Exposure to Violence

	ATE by Selection Assumption					
	Childhood Exposure			Adolescent Exposure		
	Random		on Obs.	Random		on Obs.
Outcome	C. Mean	Effect	Entr. Bal.	C. Mean	Effect	Entr. Bal.
Violent Behavior (% at 15)	17	20 [0.00]	20 [0.00]			
Violent Behavior (% at 21)				9	15 [0.00]	14 [0.00]
HS Diploma (% by 26)	63	–16 [0.00]	–15 [0.00]	64	–13 [0.00]	–13 [0.00]
BA Diploma (% by 26)	7	–2 [0.25]	–2 [0.26]	8	–4 [0.06]	–4 [0.02]
ASVAB Pctl	25	–5 [0.00]	–5 [0.01]			

Treatment Effects of Exposure to Violence

	ATE by Selection Assumption					
	Childhood Exposure			Adolescent Exposure		
	Random		on Obs.	Random		on Obs.
Outcome in 2018	C. Mean	Effect	Entr. Bal.	C. Mean	Effect	Entr. Bal.
HH Earnings ($1,000s)	48	–13 [0.00]	–12 [0.00]	49	–12 [0.00]	–12 [0.00]
Ind. Earnings ($1,000s)	34	–7 [0.02]	–7 [0.02]	34	–7 [0.03]	–7 [0.01]
0 Earnings (%)	20	9 [0.02]	9 [0.03]	21	5 [0.17]	6 [0.10]
Hours Worked (Weekly Avg)	33	–5 [0.03]	–5 [0.04]	33	–4 [0.10]	–4 [0.10]
Ever Incarcerated (%)	26	8 [0.02]	8 [0.03]	21	21 [0.00]	22 [0.00]

Are Black People Inherently More Violent?

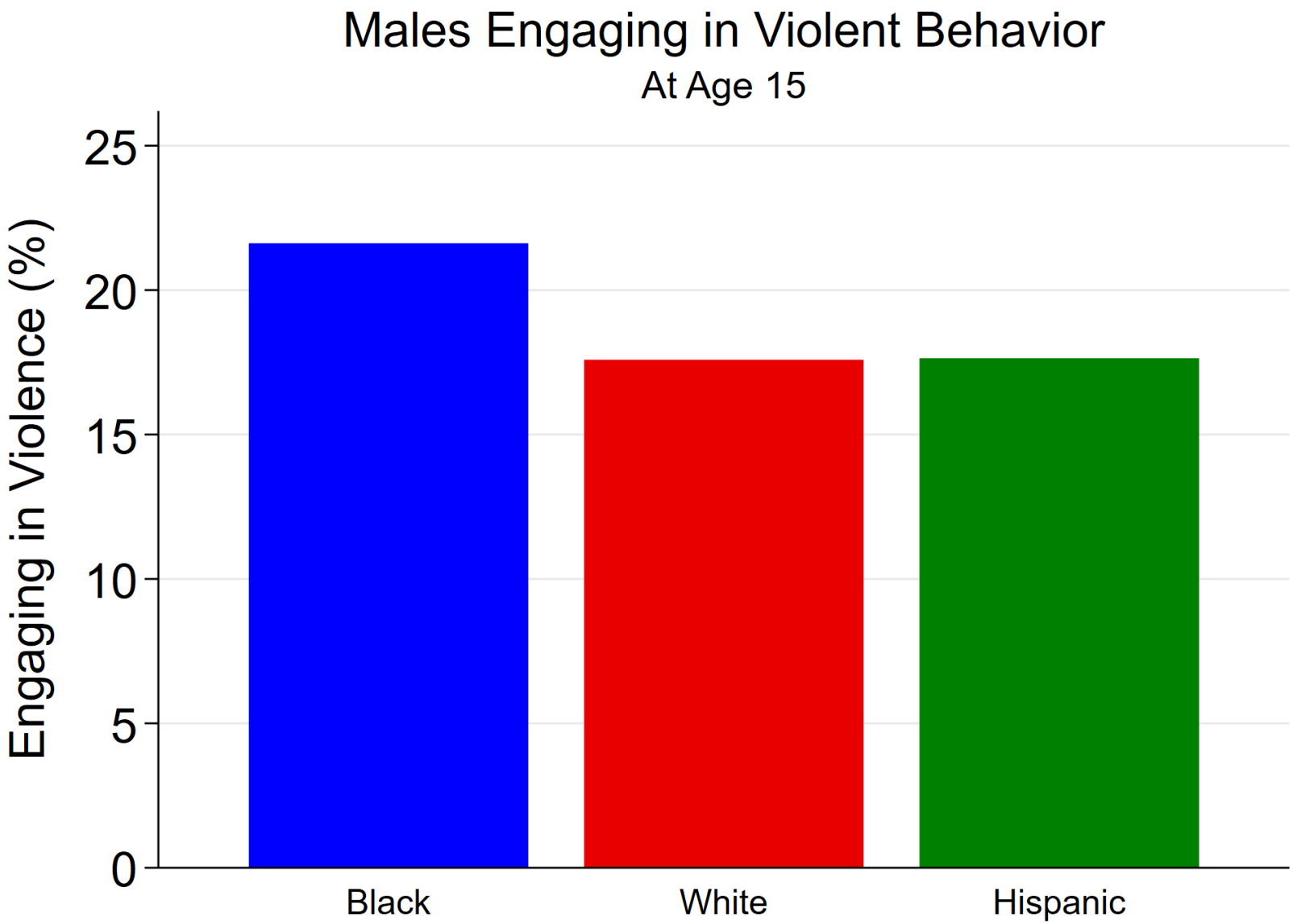
"The charges of white privilege and systemic racism that are tearing the country apart float free of reality. Two known facts, long since documented beyond reasonable doubt, need to be brought into the open and incorporated into the way we think about public policy: American whites, blacks, Hispanics, 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.

⋮

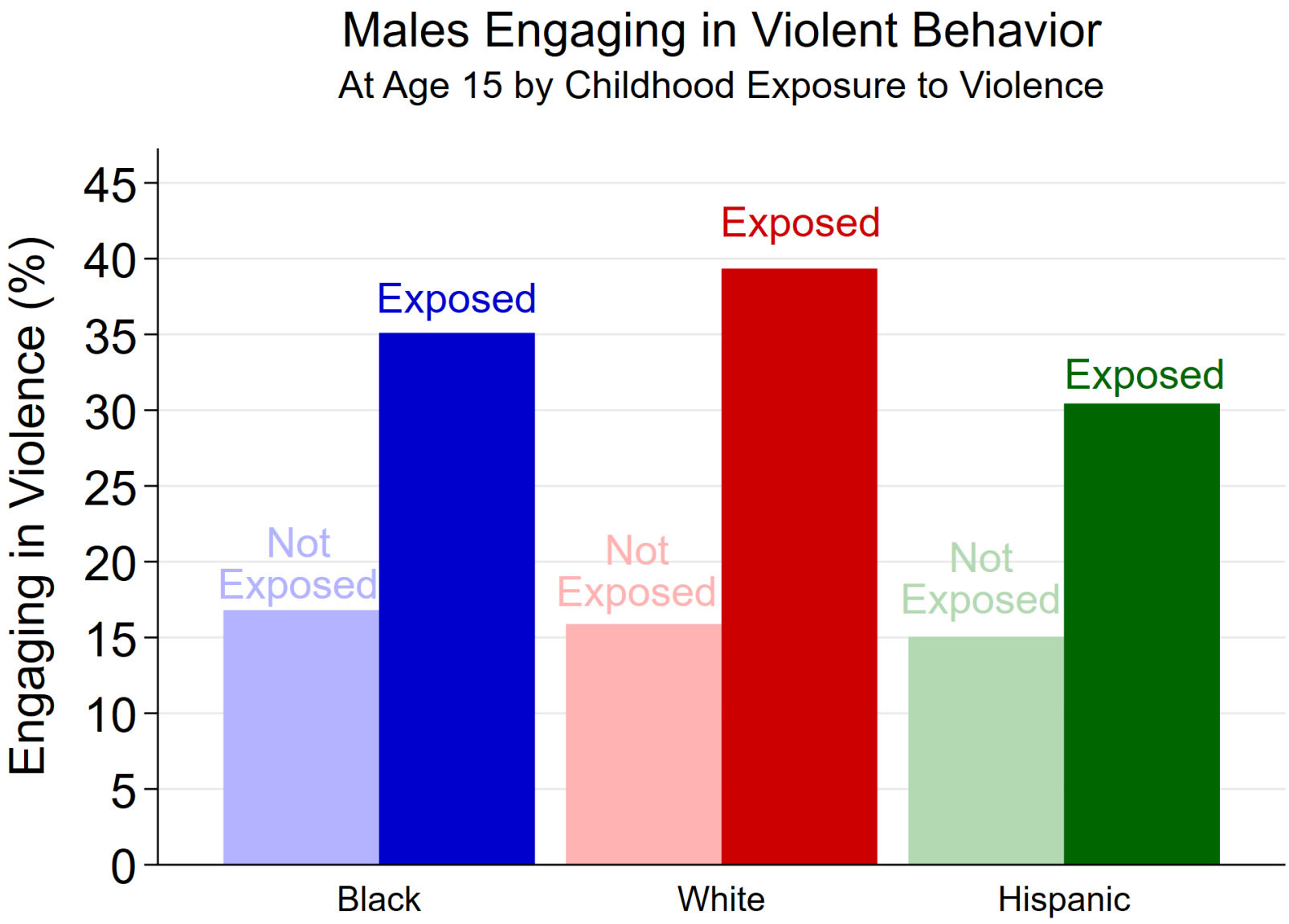
We have been unwilling to say openly that different groups have significant group differences. Since we have not been willing to say that, we have been left defenseless against the claims that racism is to blame. What else could it be? We have been afraid to answer. We must. Facing Reality is a step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

–*Facing Reality: Two Truths about Race in America* · Charles Murray

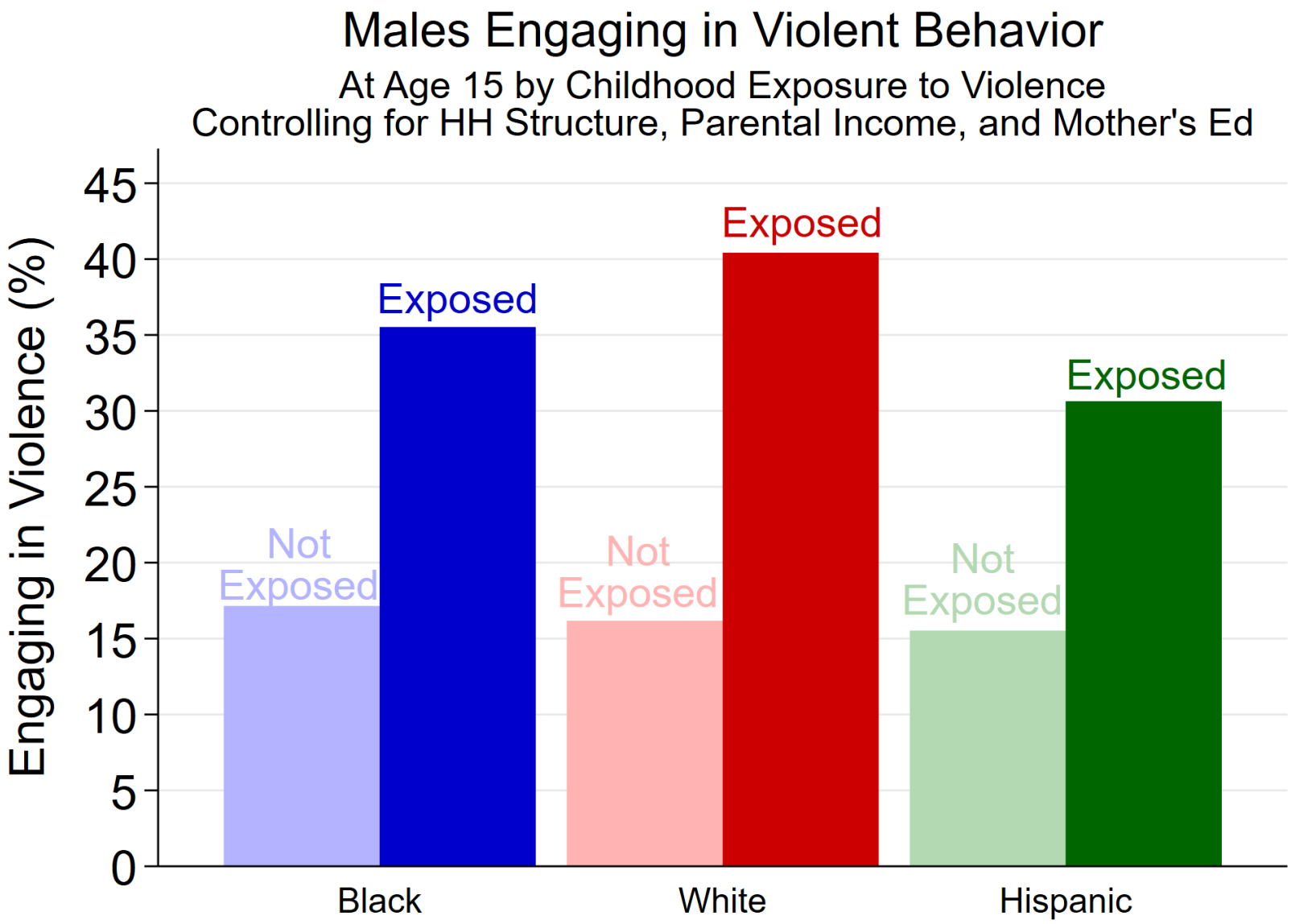
Are Black People Inherently More Violent?



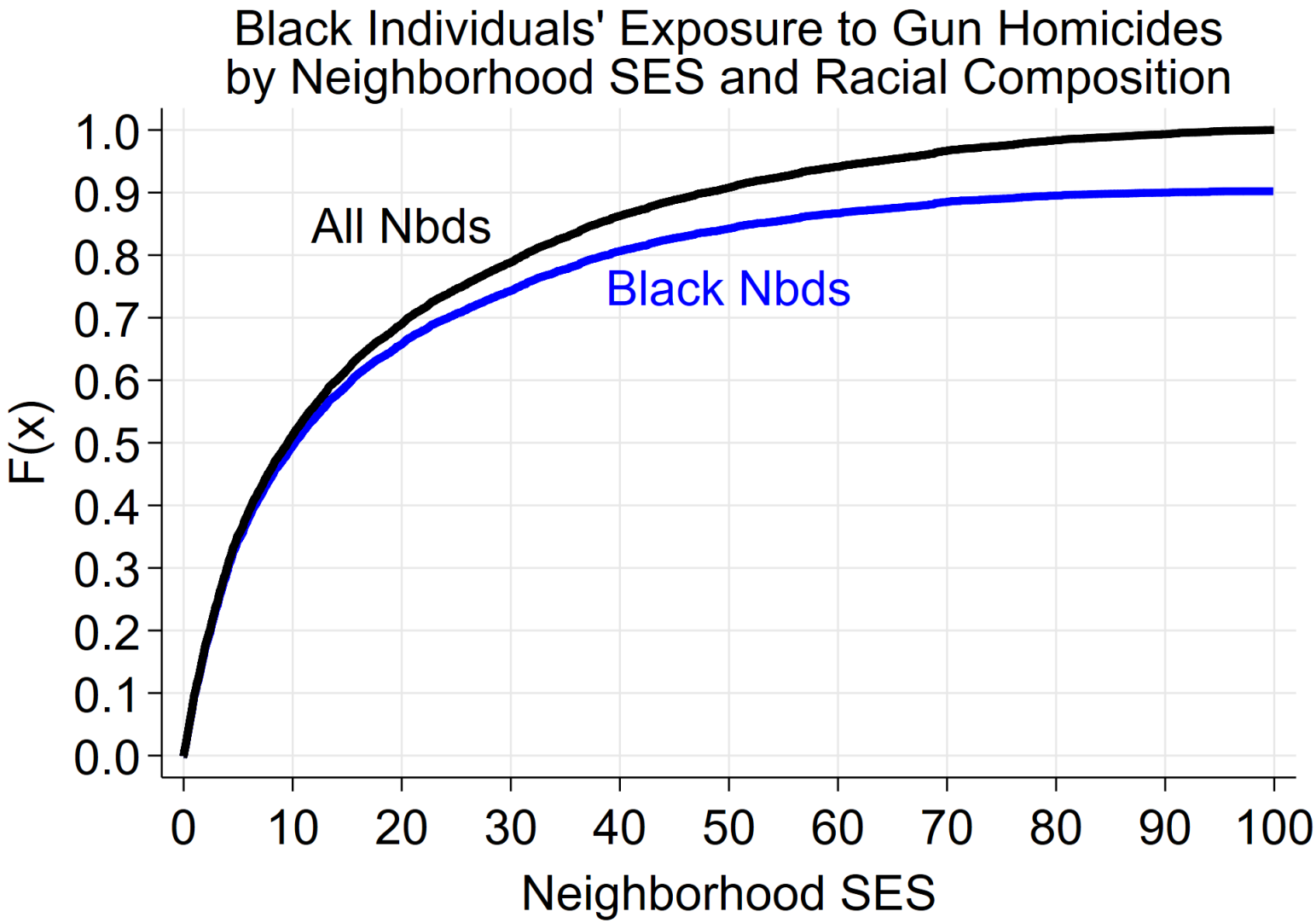
Are Black People Inherently More Violent?



Are Black People Inherently More Violent?



Effects of Violence or of Broader Nbd Context?



2013-2018 GVA · 2014-2018 ACS

Effects of Violence, Not of Broader Nbd Context

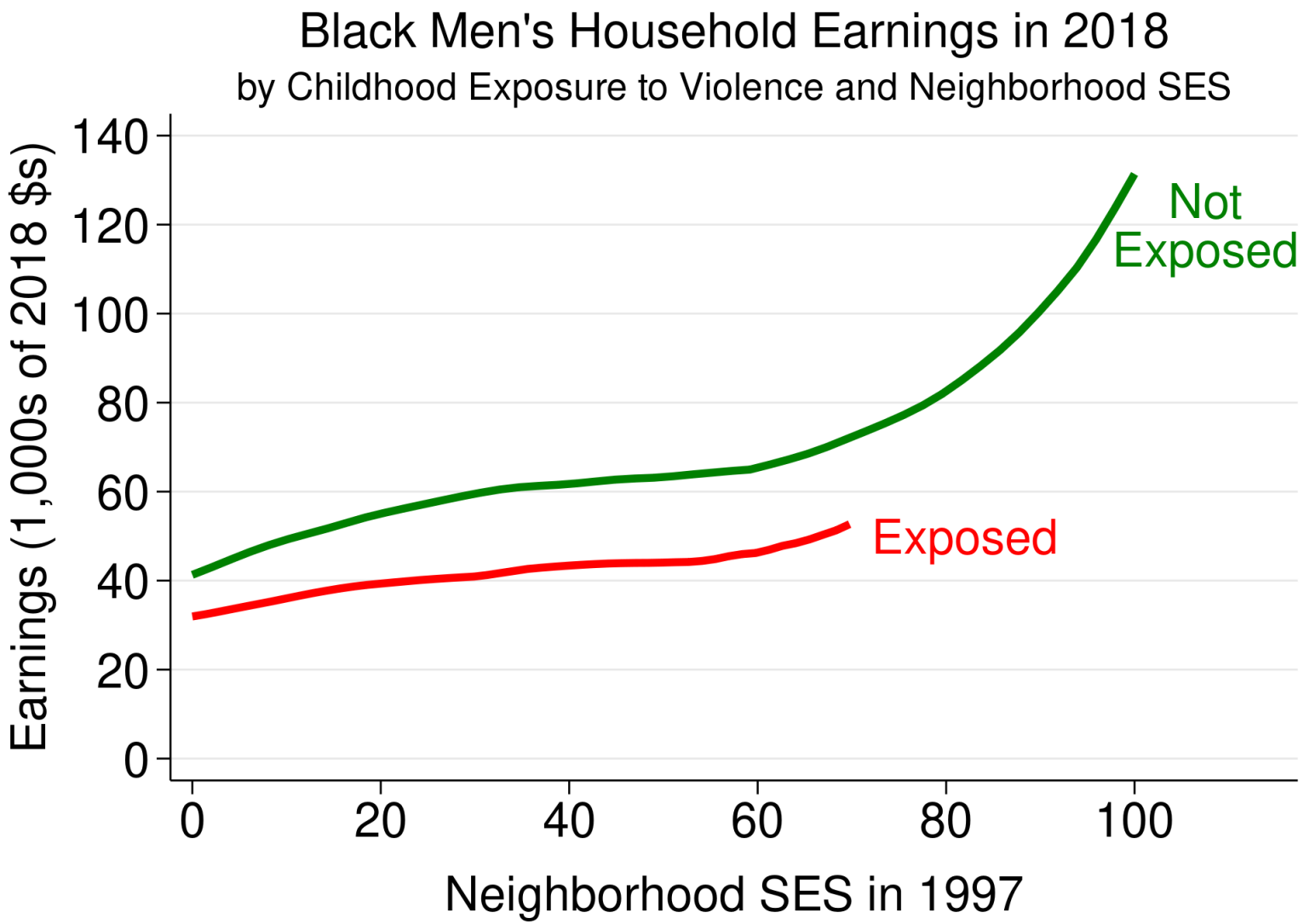


Table · Nbd SES in 1997

Effects of Exposure Mediated by Incarceration?

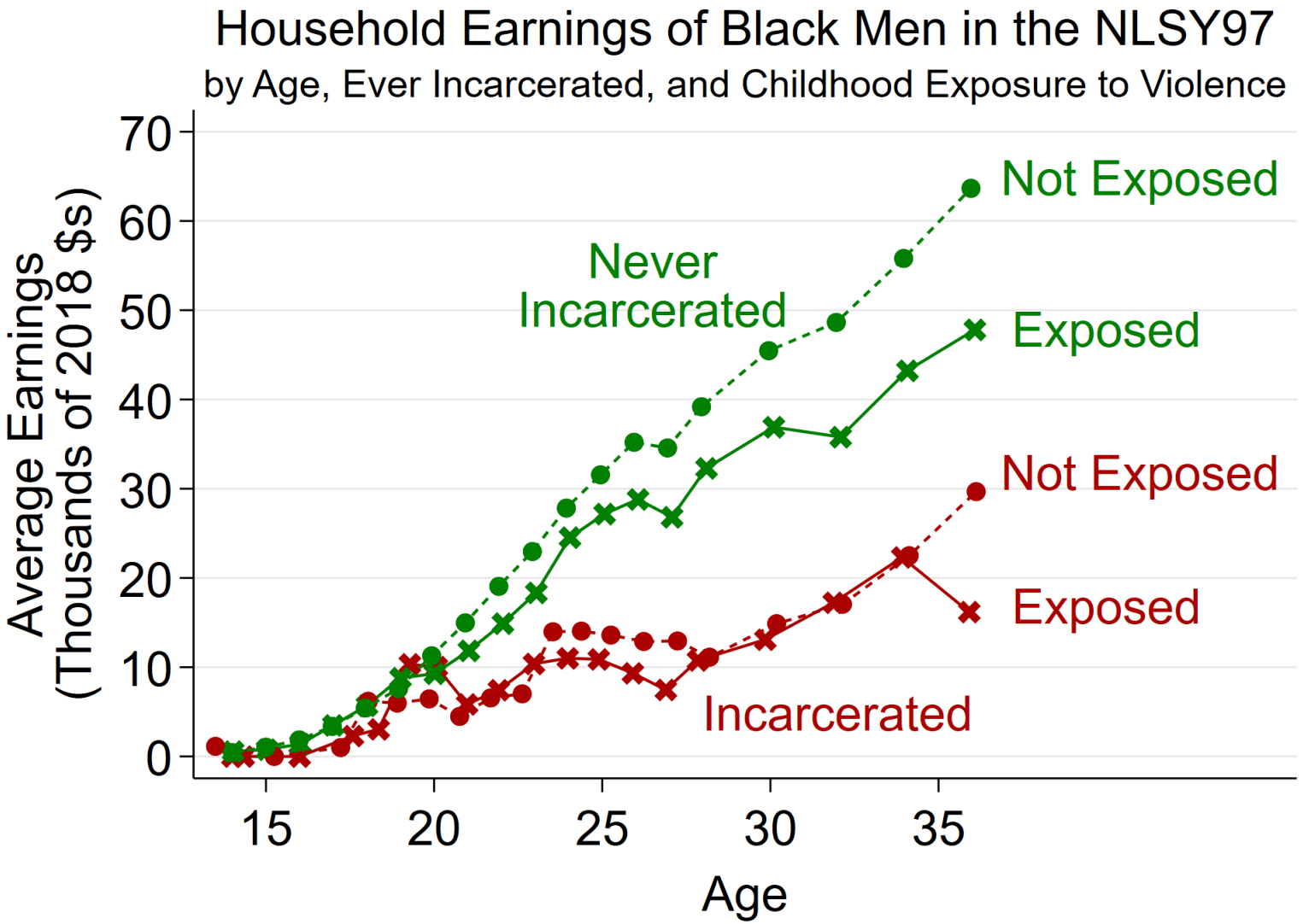
- Incar. critical for labor market outcomes in recent decades
  - Especially true for Black men

Bayer and Charles (2018) · Neal and Rick (2014)

- 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



Mechanisms?

Candidates

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

Mechanisms?

Candidates

- ~~Selection on observables~~
- ~~Selection on unobservables~~ · ~~Details~~
- ~~Broader neighborhood effects~~
- ~~Incarceration~~
- ~~Gangs~~ · ~~Details~~
- 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	+ Buffer	$\Longrightarrow$ Stress Response
Short, mild	w/ caring adult	Positive

National Scientific Council on the Developing Child (2011)
via Shonkoff and Garner (2012)

Toxic Stress

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

Stressful event	+ Buffer	$\Longrightarrow$ Stress Response
Short, mild	w/ caring adult	Positive
Longer, more severe	w/ caring adult	Tolerable

National Scientific Council on the Developing Child (2011)
via Shonkoff and Garner (2012)

Toxic Stress

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

Stressful event	+ Buffer	$\Longrightarrow$ Stress Response
Short, mild	w/ caring adult	Positive
Longer, more severe	w/ caring adult	Tolerable
Extended, severe	w/out caring adult	Toxic

National Scientific Council on the Developing Child (2011)
via Shonkoff and Garner (2012)

Toxic Stress and Nurturing Relationships

"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

Toxic Stress and Nurturing Relationships

"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

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

Variables in the NLSY97

NLSY97 is full of relevant variables during adolescence

Nurturing Relationships

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

Indexes of Exposure to Violence

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

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

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

1st Principal Component (PC) of J questions: θ_i^{PC}

Indexes of Exposure to Violence

$$\underline{\text{Sum}}: \quad \theta_i^{Sum} = \sum_{j=1}^{J} V_i^j$$

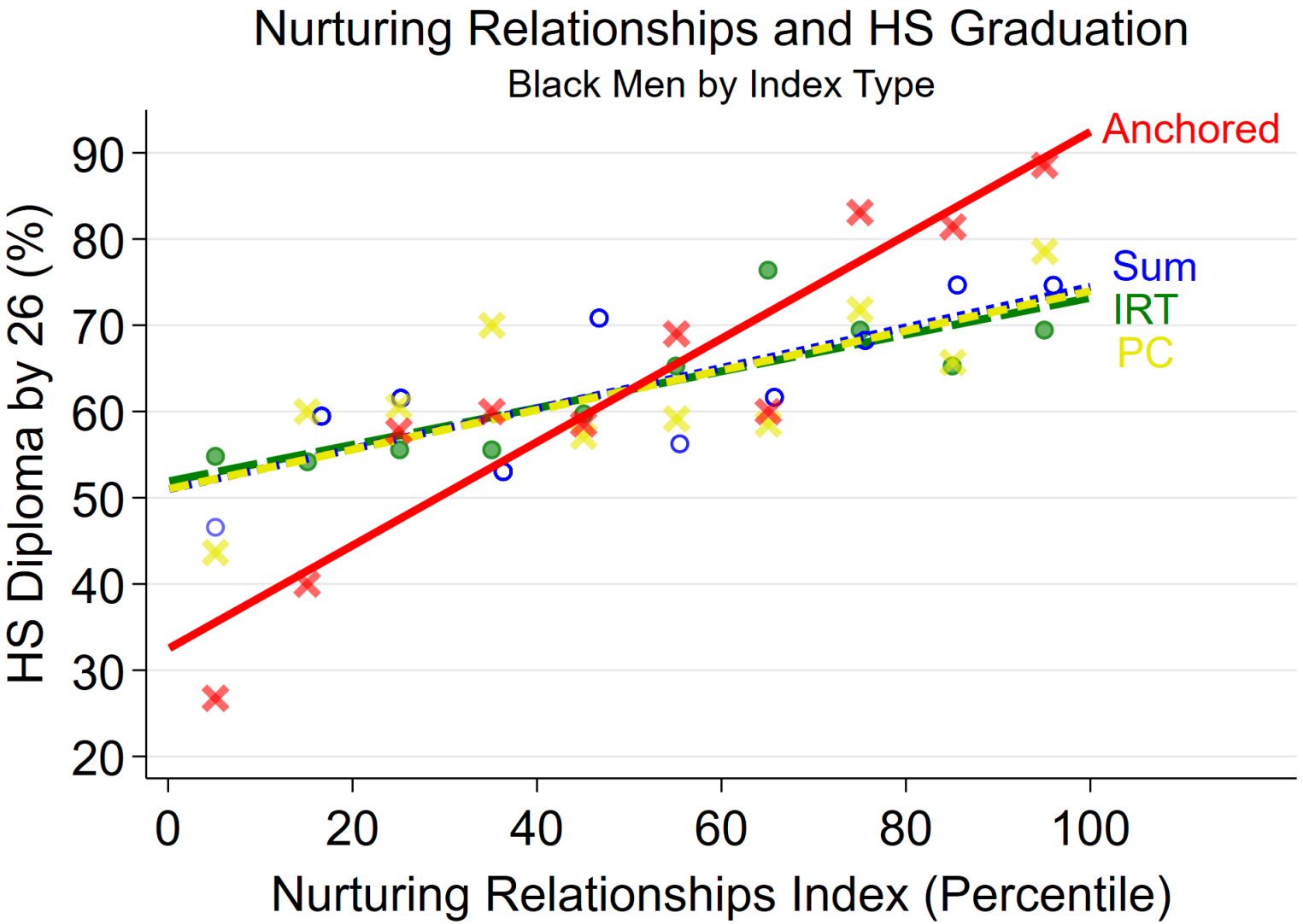
$$\underline{\text{Item Response Theory (IRT)}}: \quad V_i^j = \begin{cases} 1 & \text{if } \alpha_j(\theta_i^{IRT} - \beta_j) - \epsilon_i^j \geq 0 \\ 0 & \text{if } \alpha_j(\theta_i^{IRT} - \beta_j) - \epsilon_i^j < 0 \end{cases}$$

$\underline{\text{1st Principal Component (PC)}}$ of J questions: θ_i^{PC}

$$\underline{\text{Item-Anchored}}: \quad Y_i = \beta^1 V_i^1 + \cdots + \beta^J V_i^J + \epsilon_i \implies$$

$$\theta_i^{Anchored} = \mathbb{E}[Y | V_i^1, \ldots, V_i^J] = \beta^{1,OLS} V_i^1 + \cdots + \beta^{J,OLS} V_i^J$$

Indexes of Treatments



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 — Bond and Lang (2013)
    - B-W test score gap over time — Nielsen (2015)
    - M-F variation in test scores — Domicolo and Nielsen (2022)
    - Identification of skills — Agostinelli and Wiswall (2016)

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 — Bond and Lang (2013)
    - B-W test score gap over time — Nielsen (2015)
    - M-F variation in test scores — Domicolo and Nielsen (2022)
    - Identification of skills — Agostinelli and Wiswall (2016)
- Not Surprising
  - Similar results for health frailty index
    - 1st PC $\sim$ sum of adverse indicators — Hosseini et al. (2022)

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 — Bond and Lang (2013)
    - B-W test score gap over time — Nielsen (2015)
    - M-F variation in test scores — Domicolo and Nielsen (2022)
    - Identification of skills — Agostinelli and Wiswall (2016)
- Not Surprising
  - Similar results for health frailty index
    - 1st PC $\sim$ sum of adverse indicators — Hosseini et al. (2022)
- 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 $D_i^V = \mathbf{1}\{\theta_i^{Anchored} \geq \pi_{50}(\theta^{Anchored})\}$

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

$\widehat{\beta}_{L,L}^{OLS}$ on the $D^V = L,\ D^{NR} = L$ subsample

$\widehat{\beta}_{L,H}^{OLS}$ on the $D^V = L,\ D^{NR} = H$ subsample

$\widehat{\beta}_{H,L}^{OLS}$ on the $D^V = H,\ D^{NR} = L$ subsample

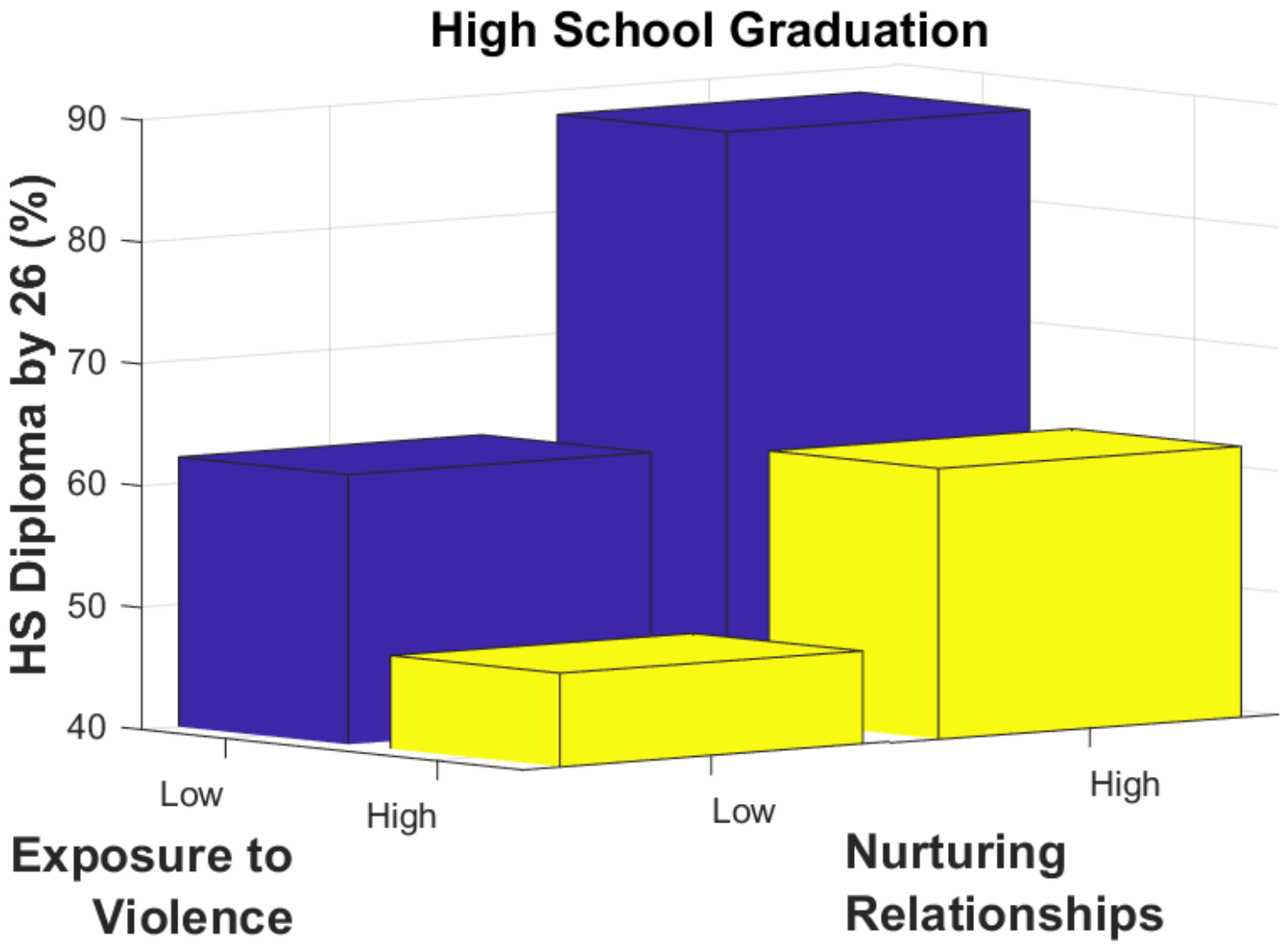
$\widehat{\beta}_{H,H}^{OLS}$ on the $D^V = H,\ D^{NR} = H$ subsample

to obtain

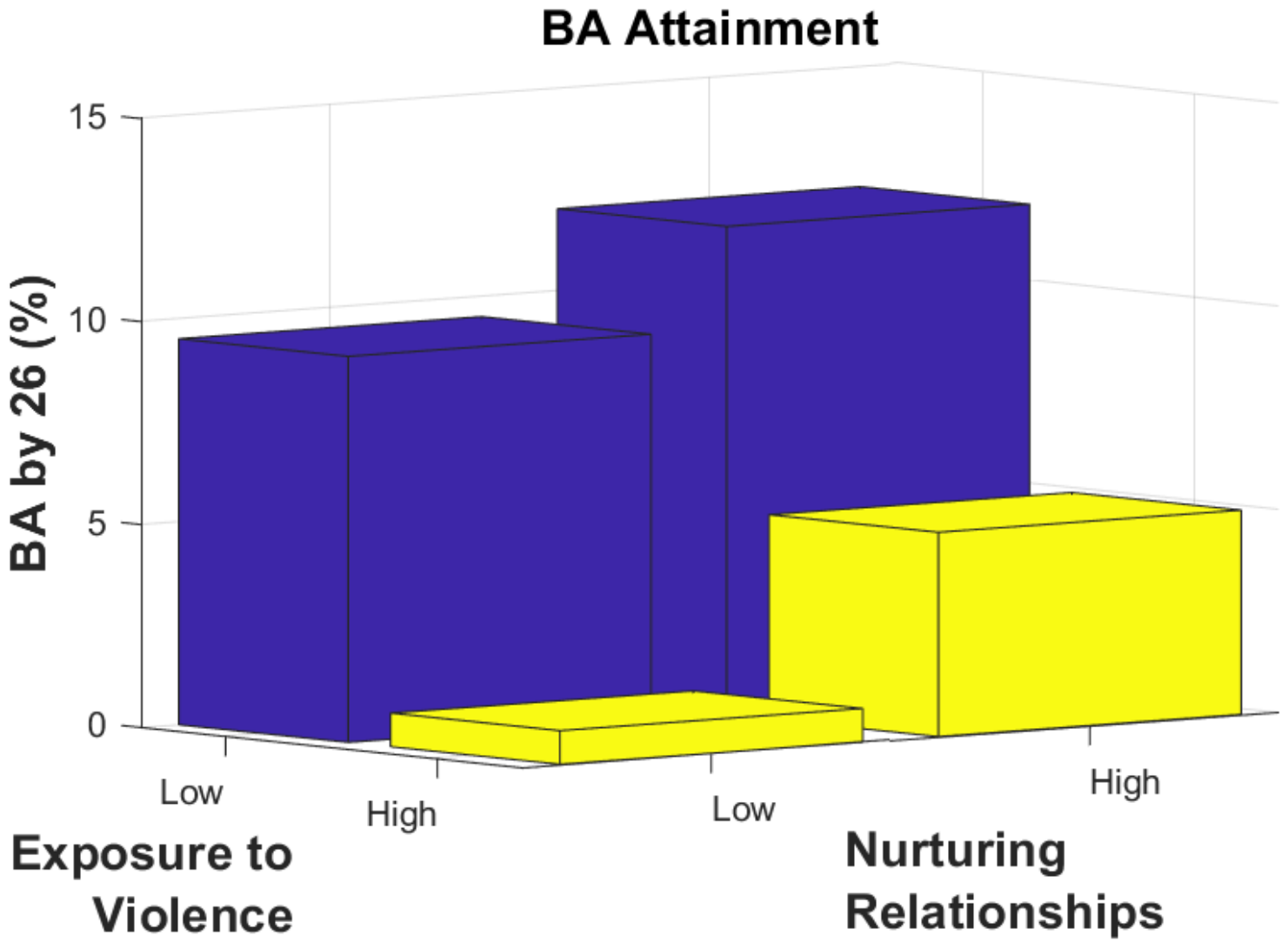
$$\mathbb{E}[Y(D^V, D^{NR})] = \mathbb{E}[\widehat{\beta}_{V,NR}^{OLS} W] \quad \text{for full sample}$$

Imbens (2015)

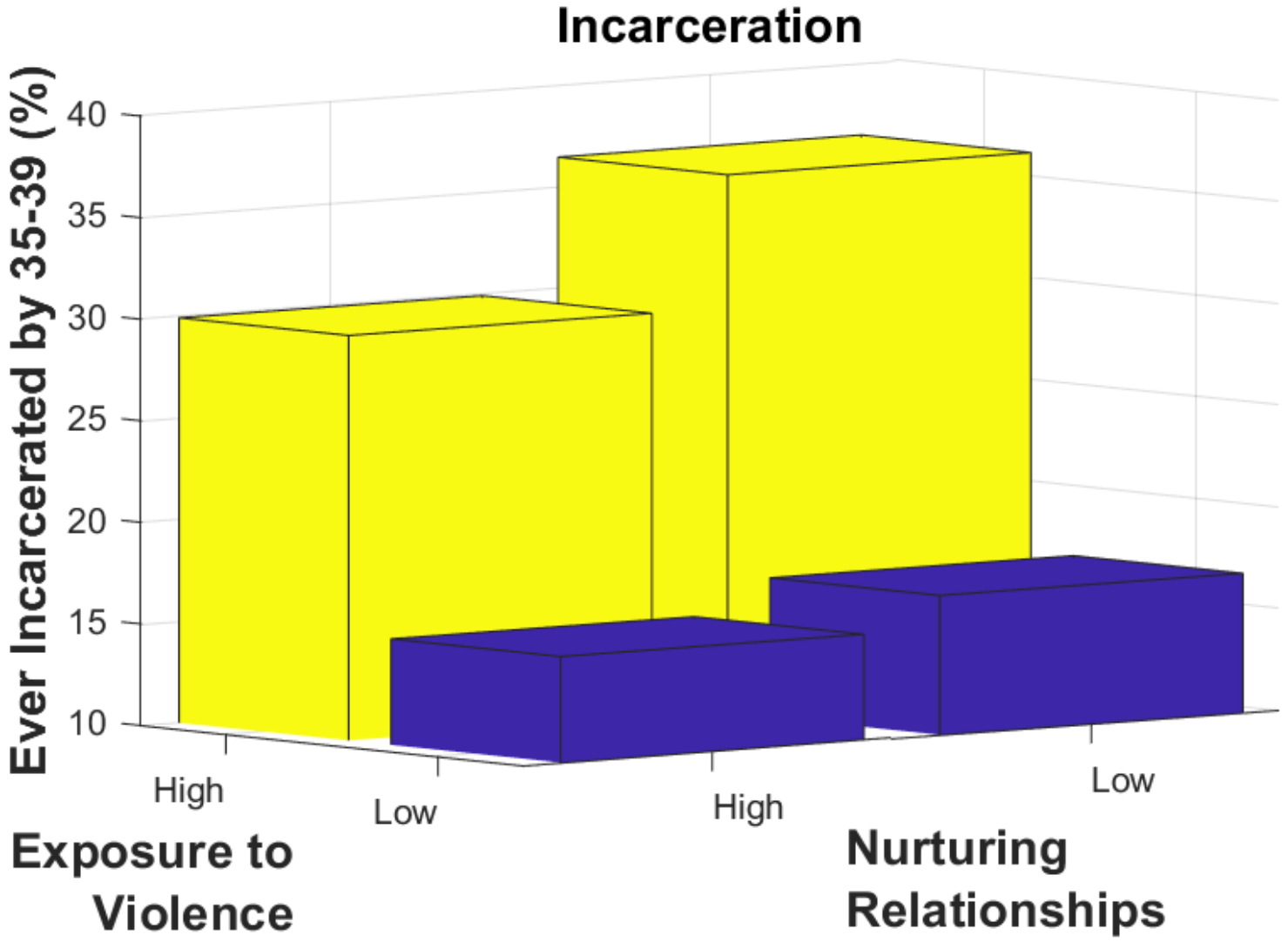
Potential Outcomes



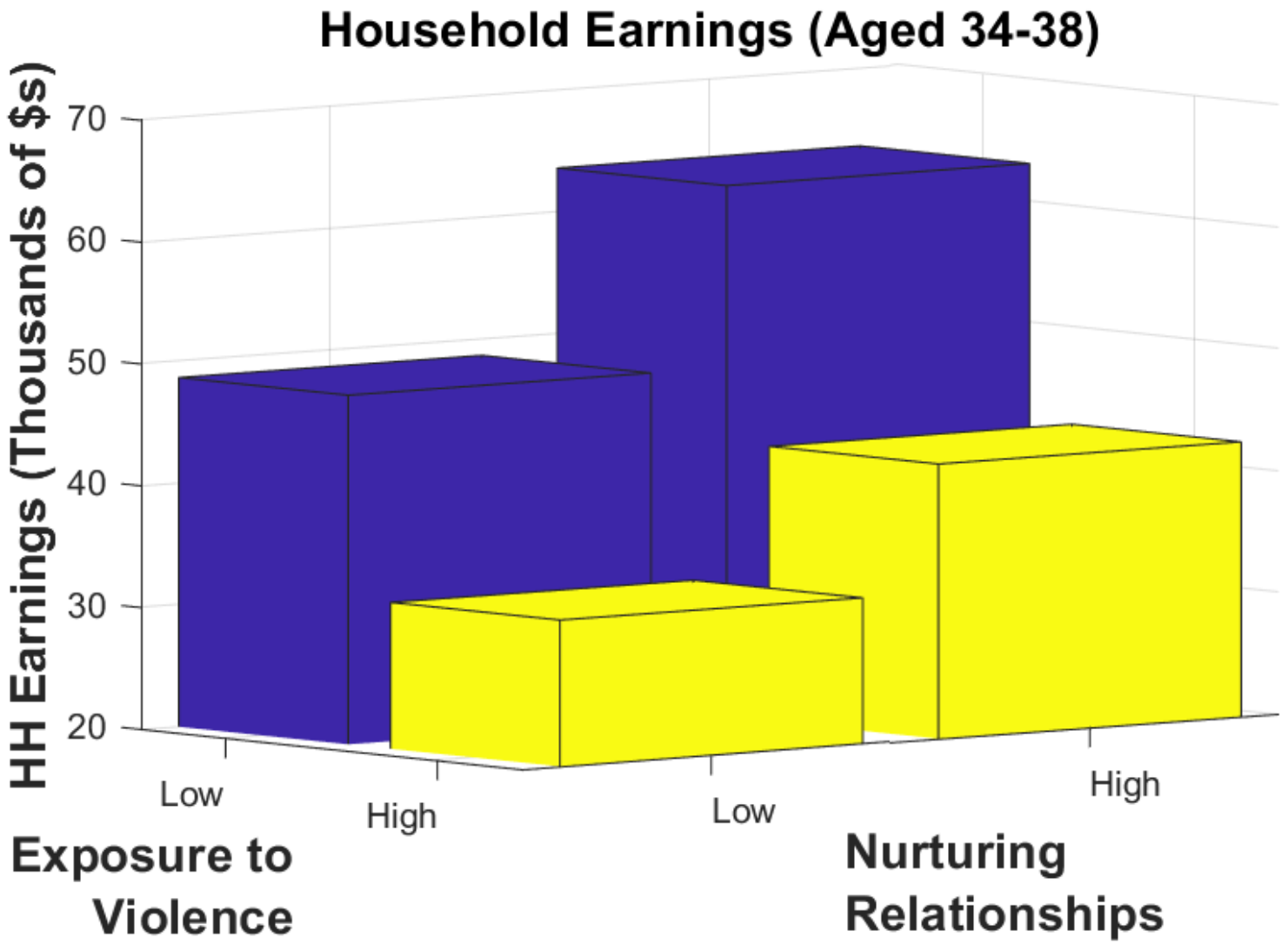
Potential Outcomes



Potential Outcomes



Potential Outcomes



Treatment Effects

	Given High Exposure to Violence and Low Nurturing Relationships		
	$\downarrow D^V$	$\uparrow D^{NR}$	Both
HS Diploma (% by 26)	14.5 [0.00]	14.5 [0.00]	40.3 [0.00]
BA Attainment (% by 26)	8.7 [0.03]	4.2 [0.12]	11.2 [0.00]
Ever Incarcerated (% by 2019)	–19.6 [0.00]	–6.5 [0.00]	–21.3 [0.00]
Household Earnings (1,000s of 2018 $s)	16.6 [0.01]	10.5 [0.04]	31.6 [0.00]

Inputs into Policy Maker's Decision Problem

		Benefit / Avoided Cost of Providing:		
	Compliers	NRs	Safety	Both
Ind. Earnings	10%	\$3.7B	\$5.2B	\$12.0B
(B. Males 25-54)	25%	\$9.1B	\$13.1B	\$29.9B
Incarceration	10%	\$1.4B	\$5.4B	\$9.4B
(B. Males $\leq$ 40)	25%	\$3.4B	\$13.6B	\$23.5B

	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)

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)
- $\Longrightarrow$ 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)

Data: NLSY97

Observed characteristics *W*

Variable	Means for Males Black	White
Mother's Ed		
Not Determined	9	11
Dropout	20	8
GED	6	4
HS Grad	48	48
AA	8	11
BA	9	17
Parent(s)' Income in 1996		
Mean (Thousands of 2018 $s)	39	71
HH Structure		
Two Parent (Both Bio)	26	60
Two Parent (One Bio)	14	17
Single Parent	50	21
Grandparent(s)	6	1
Other	4	1

Back

Data: NLSY97

Outcomes Y

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

Western and Wildeman (2009)

Admin + Survey + Census Data via Pettit and Western (2004)

Back

Codebook for *D*

National Longitudinal Survey of Youth, 1997 (NLSY97)

Treatment (*D*): Childhood exposure to violence

```
R04441.00    [YSAQ-519]                                    Survey Year: 1997
  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)

```
R03600.00    [YSAQ-380]                                    Survey Year: 1997
  PRIMARY VARIABLE

             R CARRIED GUN IN LAST 12 MONTHS?

Have you carried a hand gun in the past 12 months?

UNIVERSE: R has carried a hand gun

     480       1 Yes   (Go To R03601.00)
     381       0 No
  -------
     861

Refusal(-1)            0
Don't Know(-2)         0
TOTAL =========>     861   VALID SKIP(-4)    8123     NON-INTERVIEW(-5)       0

Min:              0        Max:              1        Mean:                 .56

Lead In: R03599.00[Default]
Default Next Question: R03603.00
```

Back

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]                                    Survey Year: 1997
  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

     232       1 Yes   (Go To R03609.00)
     239       0 No
  -------
     471

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
```

Back

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]                                  Survey Year: 1997
  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

     108       1 Yes
     265       0 No
  -------
     373

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
```

Back

Codebook for Components of s_v

$s_v(a) = 1$ if attacked someone in the past year (4/4)

R21991.00 [YSAQ-427] Survey Year: 1998
PRIMARY VARIABLE

TIMES ATTACK OR ASSAULT SINCE DLI?

You indicated earlier that you attacked someone with the idea of seriously hurting them or have had a situation end up in a serious fight or assault of some kind. How many times have you attacked someone or have had a situation end up in a serious fight or assault of some kind since the last interview on [date of last interview]?

UNIVERSE: R has physically attacked someone

75	0
439	1
201	2
109	3
47	4
58	5
12	6
7	7
6	8
3	9
22	10
2	11
5	12
8	13
0	14
14	15

Assessing Robustness via Age Profiles

What if correlation in outcomes were due to selection?

Assessing Robustness via Age Profiles

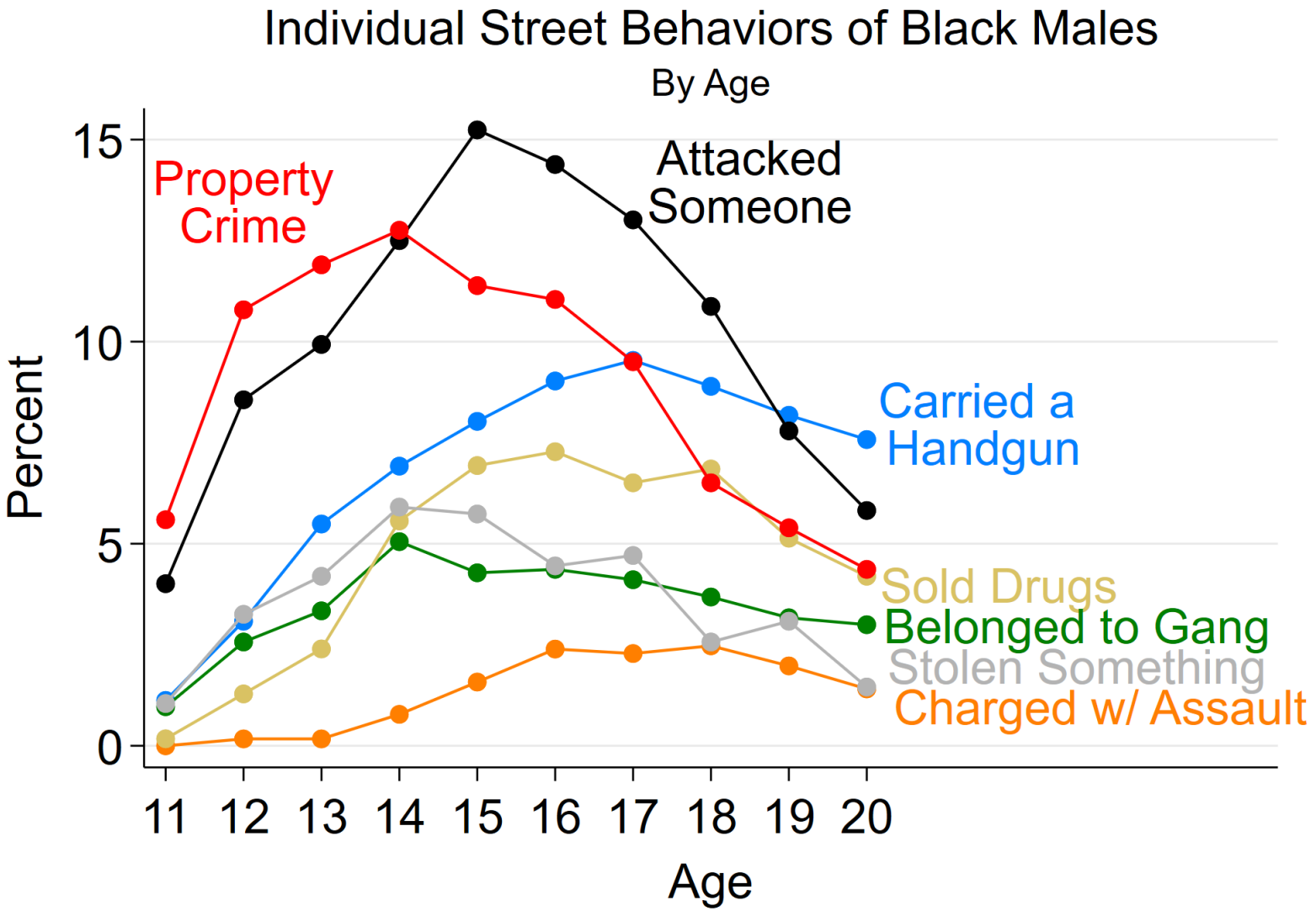
What if correlation in outcomes were due to selection?

Personality traits=common cause of exposure+poor outcomes

1. Personality traits $\Longrightarrow$ behaviors $\Longrightarrow$ 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

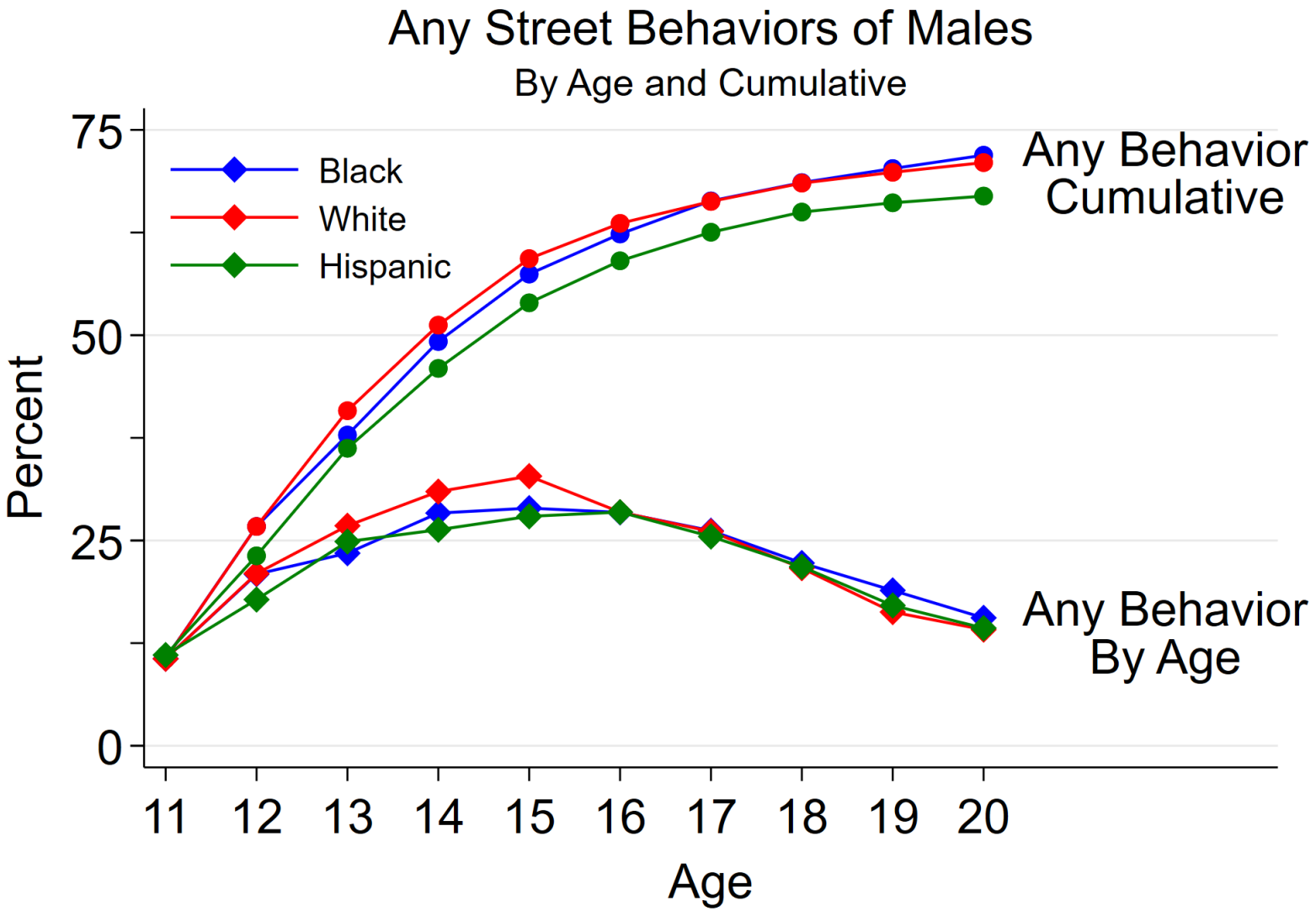
Age	% Treated
0-11	26
12-18	31
0-18	47

Assessing Robustness via Age Profiles



Back

Assessing Robustness via Age Profiles



Back

Selection Assumptions

Selection on c-Dependent Unobservables

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

Selection Assumptions

Selection on c-Dependent Unobservables

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

$\Longrightarrow$ bounds on treatment effects given c

Masten and Poirier (2018) · Manski (1990)

Selection Assumptions

Selection on c-Dependent Unobservables

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

$\Longrightarrow$ bounds on treatment effects given c

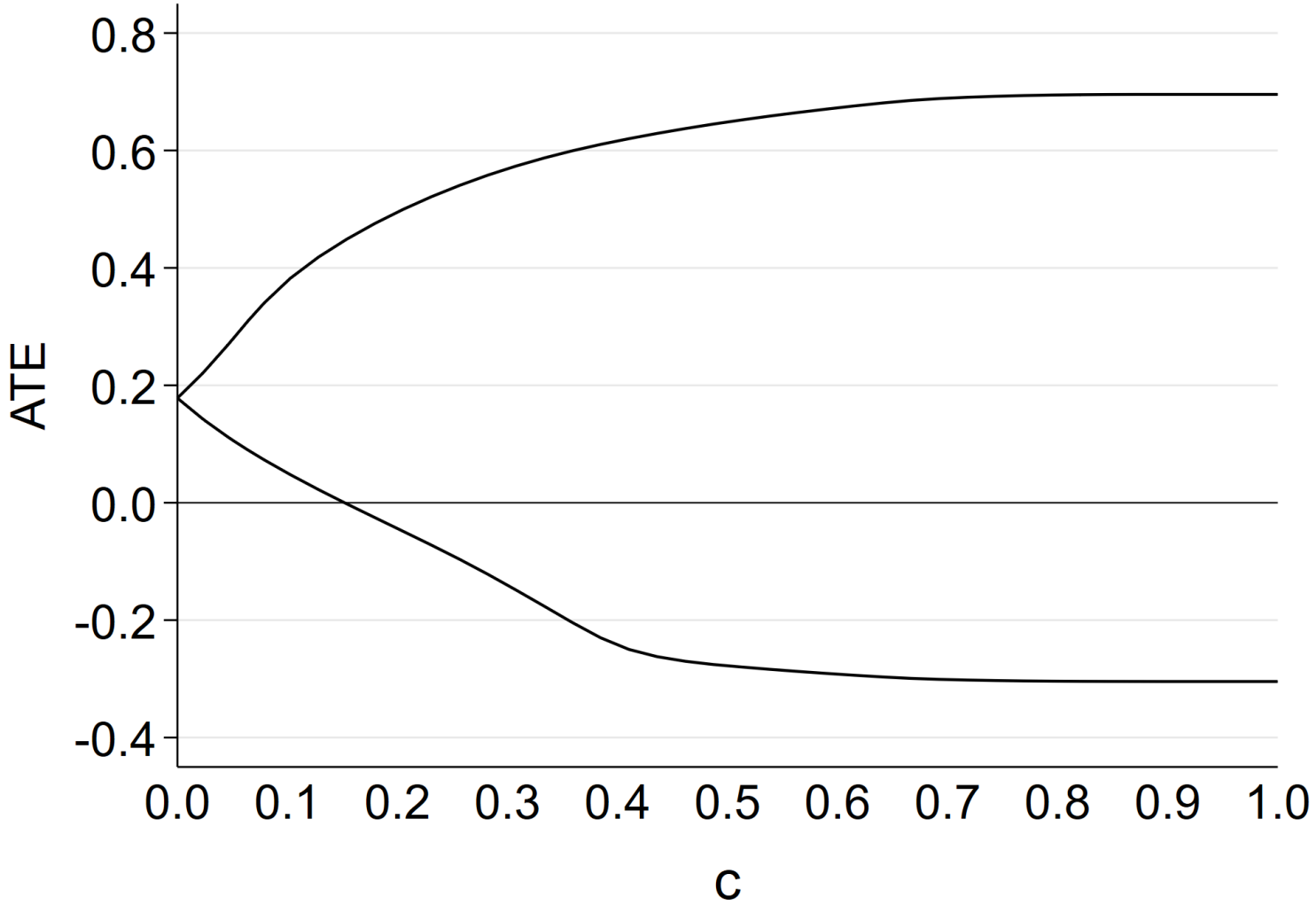
Masten and Poirier (2018) · Manski (1990)

$\Longrightarrow$ inference of +/– effect often breaks down at some c^*

Masten and Poirier (2020) · Horowitz and Manski (1995)

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)

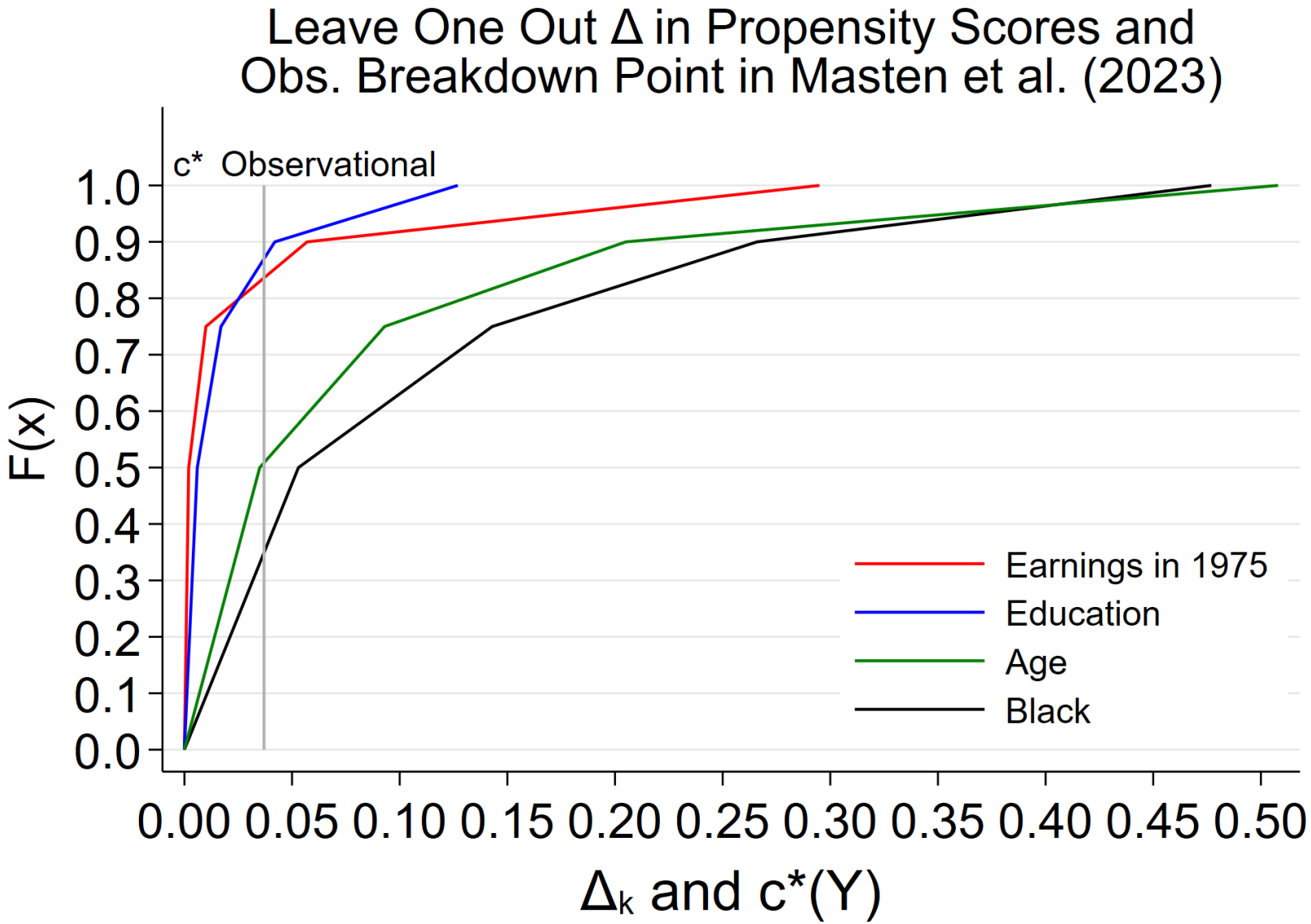
Where does c^* lie in the distribution of leave-one-out changes?

Masten, Poirier, and Zhang (2020)

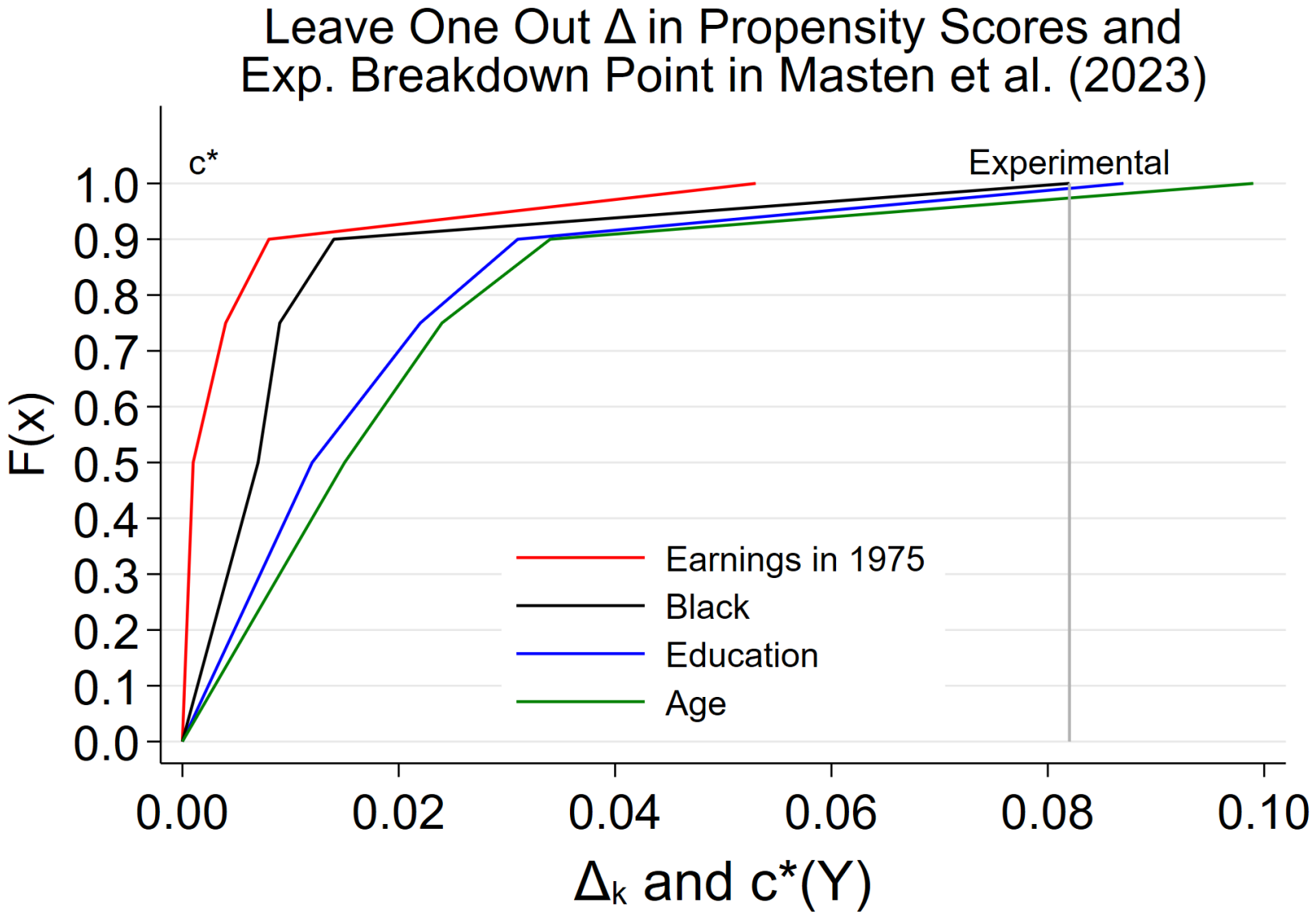
$$\triangle_k \equiv \left| \pi(w) - \pi(w_{-k}) \right|$$

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

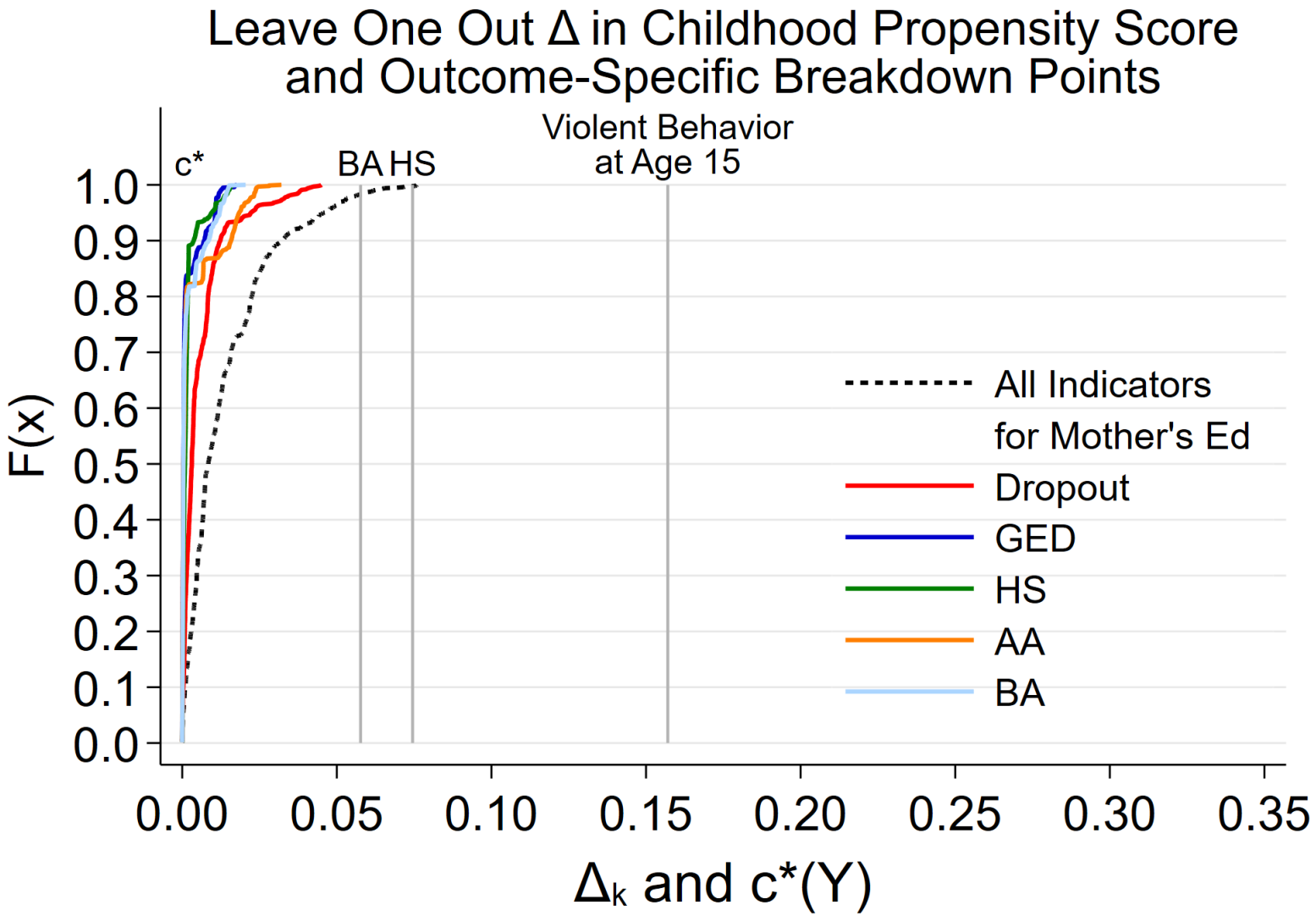
Assessing Robustness w *c*-Dependence



Assessing Robustness w *c*-Dependence

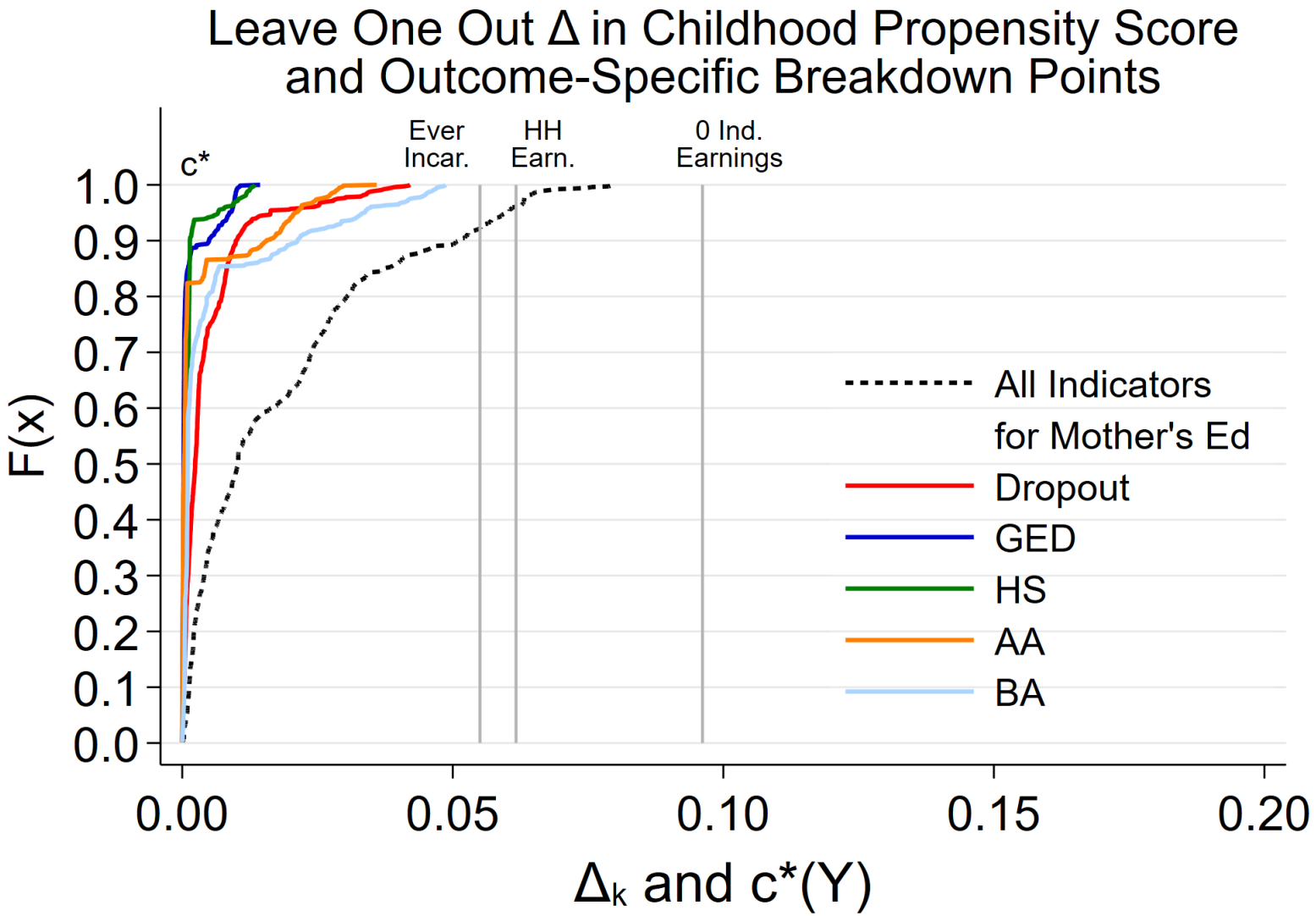


Assessing Robustness w *c*-Dependence



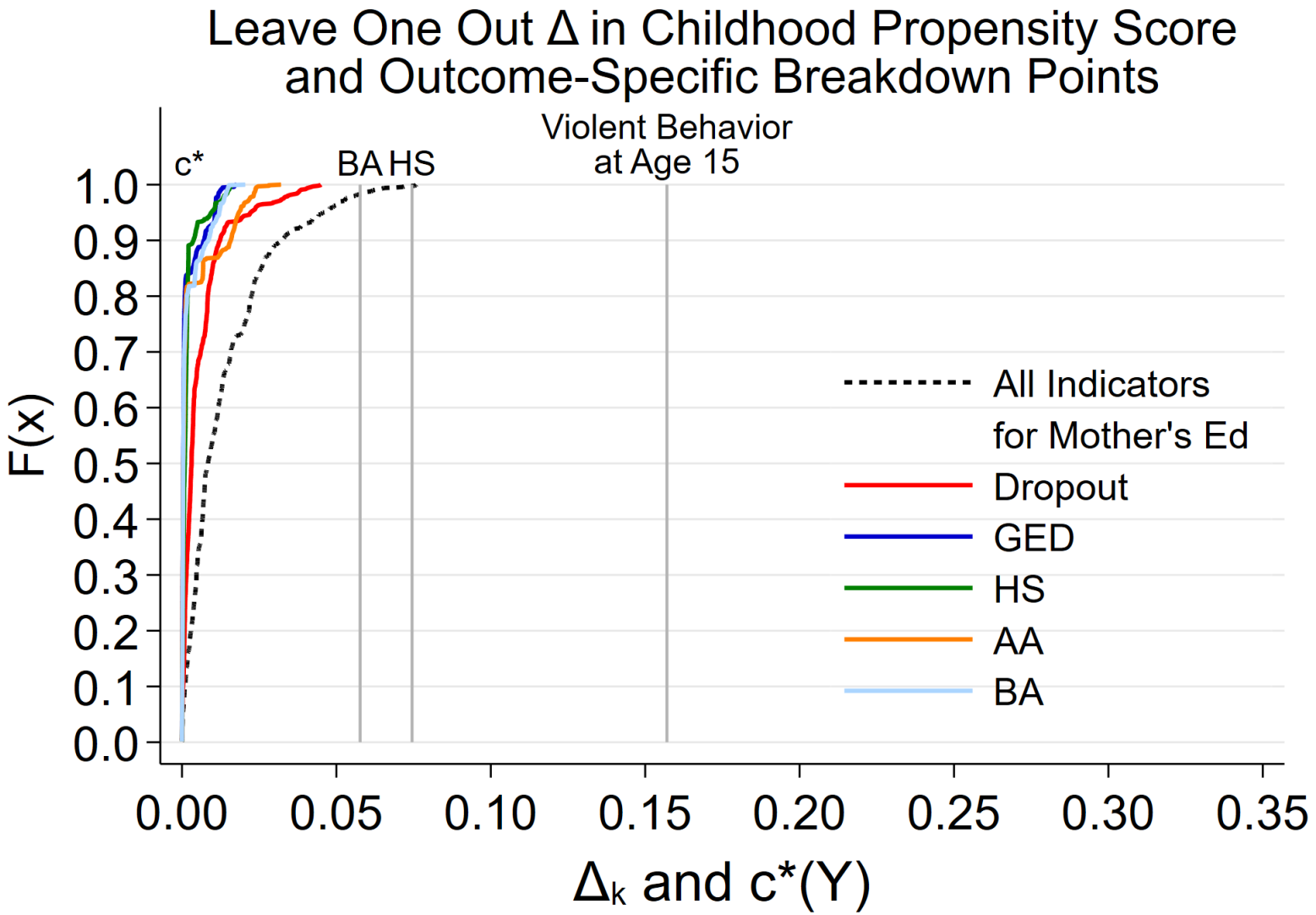
Back

Assessing Robustness w *c*-Dependence



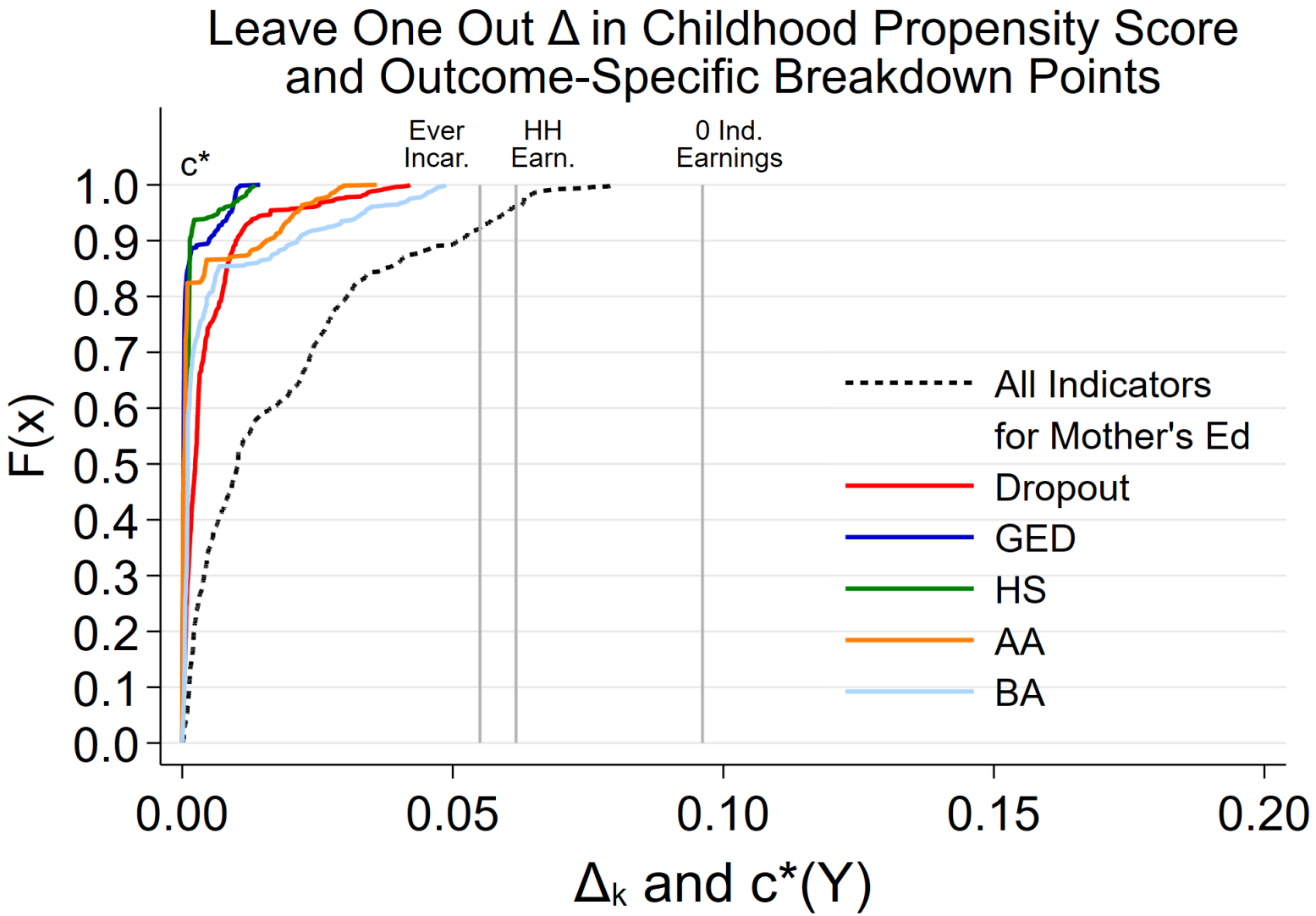
Back

Assessing Robustness w *c*-Dependence



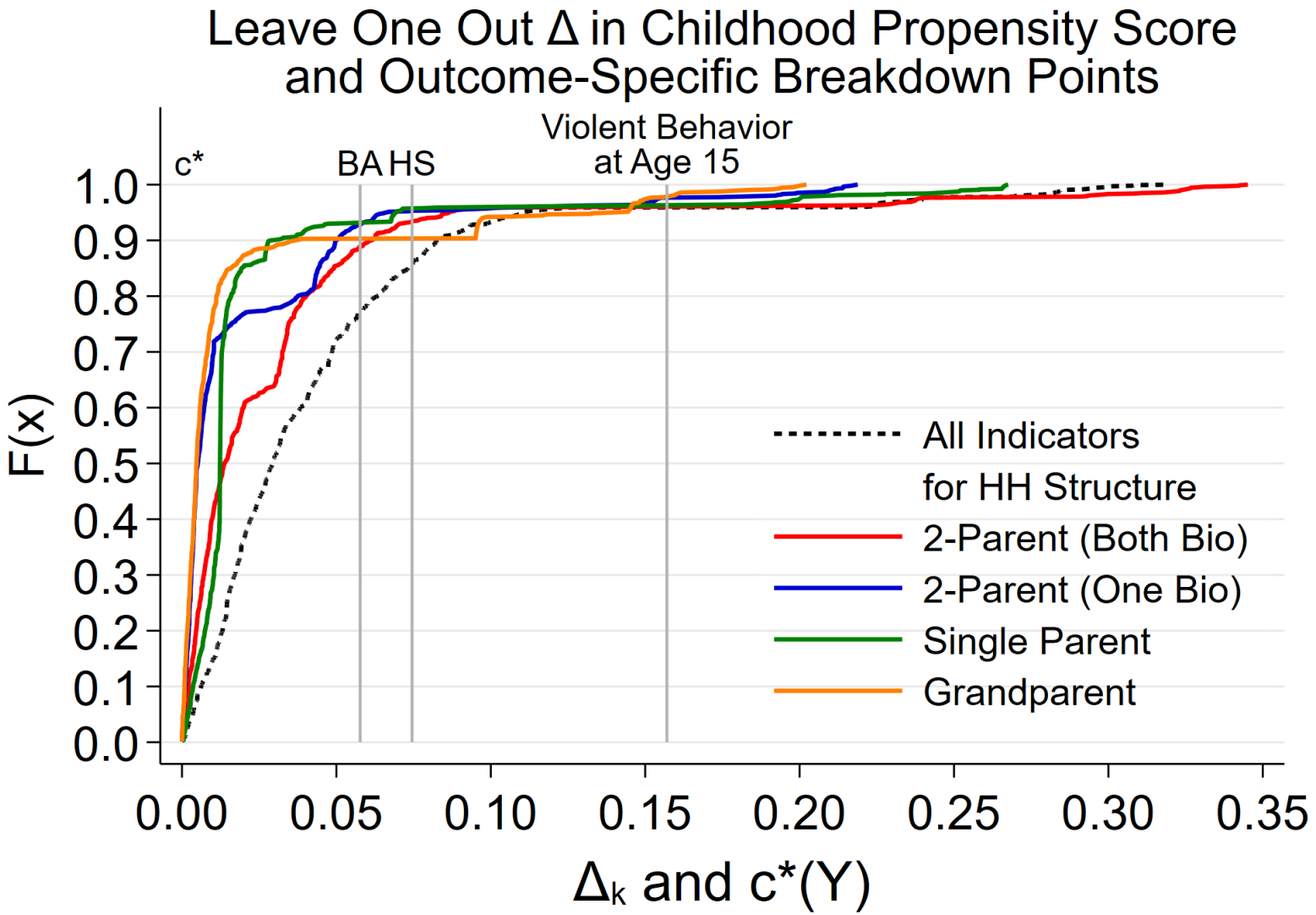
Back

Assessing Robustness w *c*-Dependence



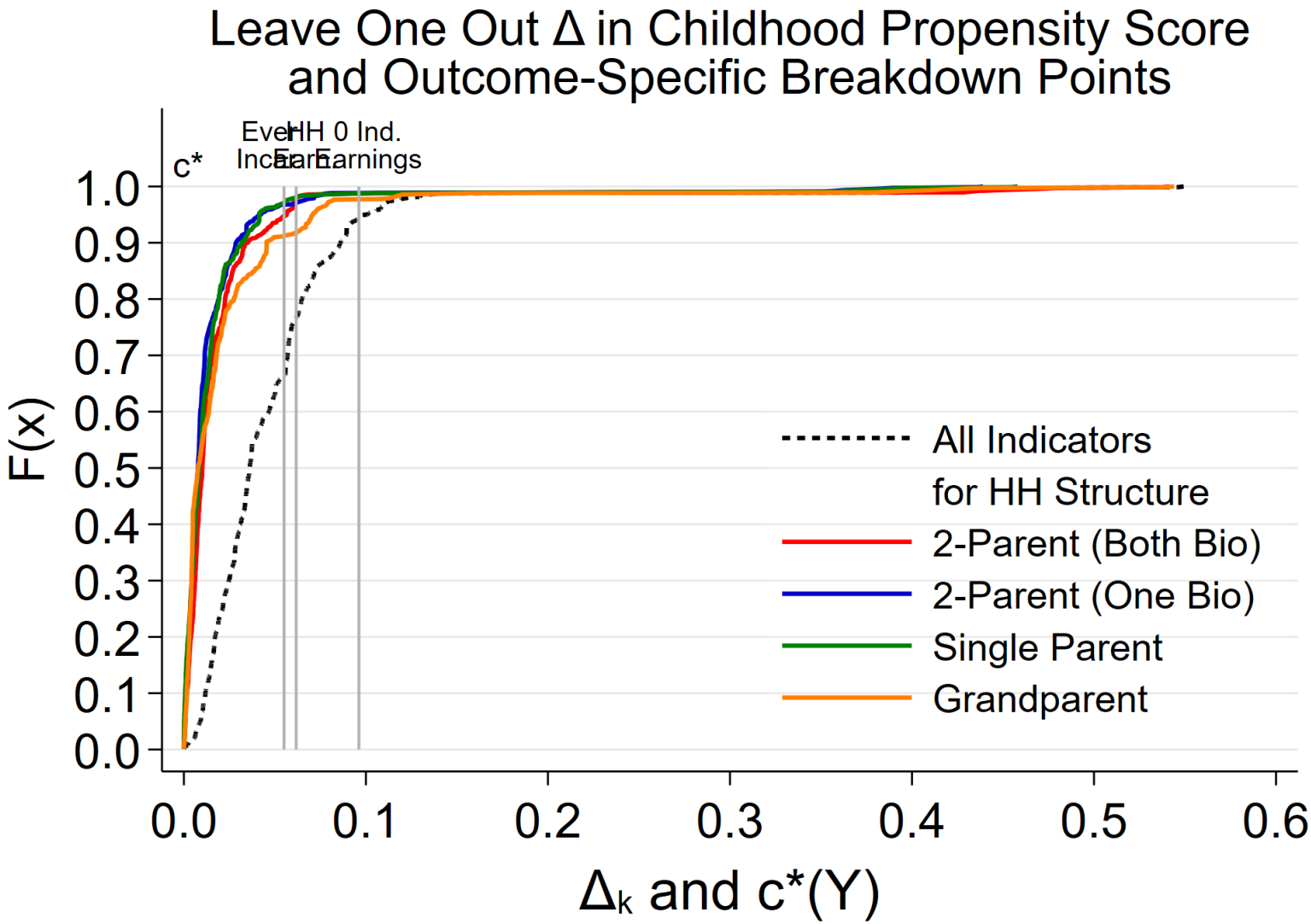
Back

Assessing Robustness w *c*-Dependence



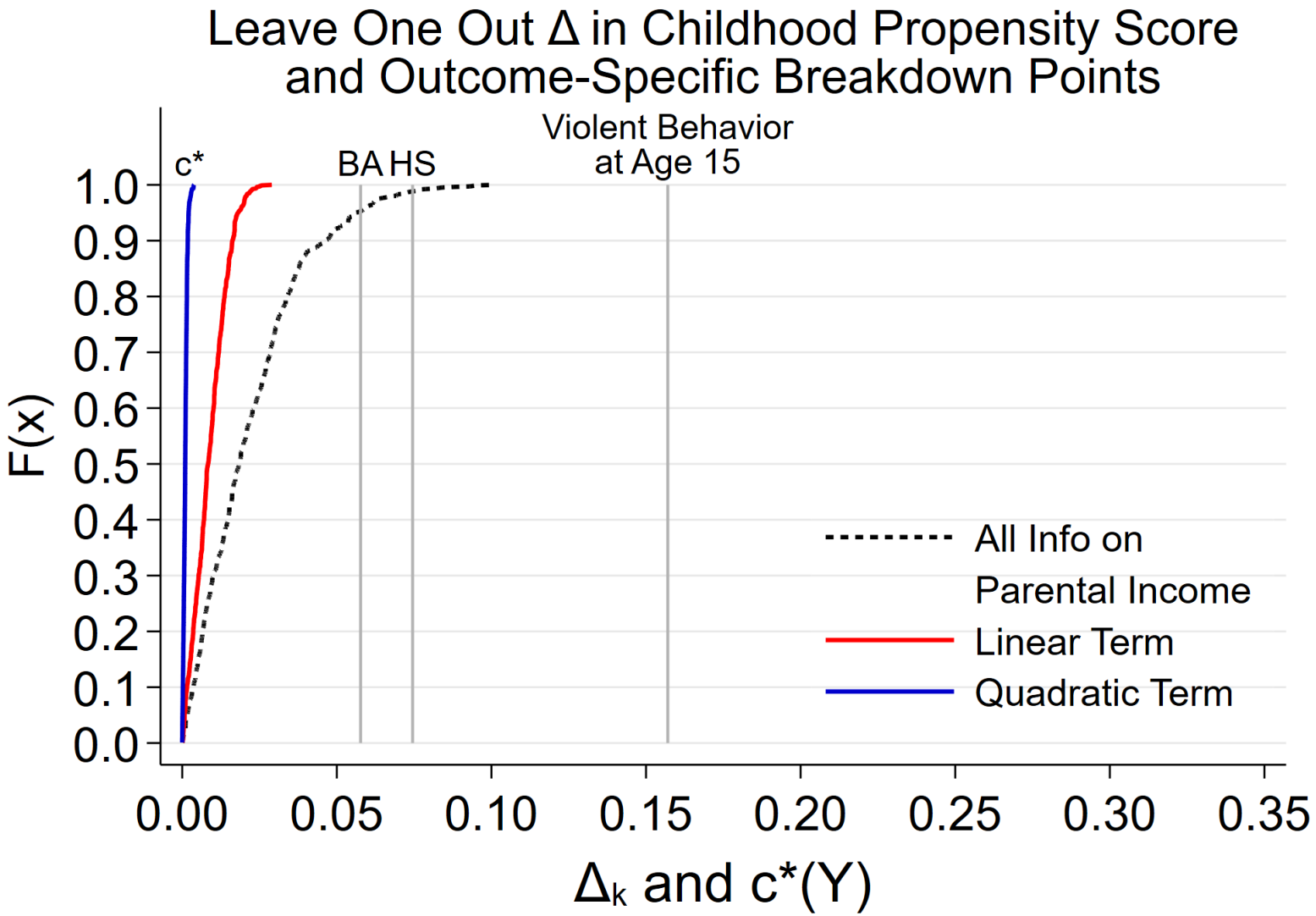
Back

Assessing Robustness w *c*-Dependence



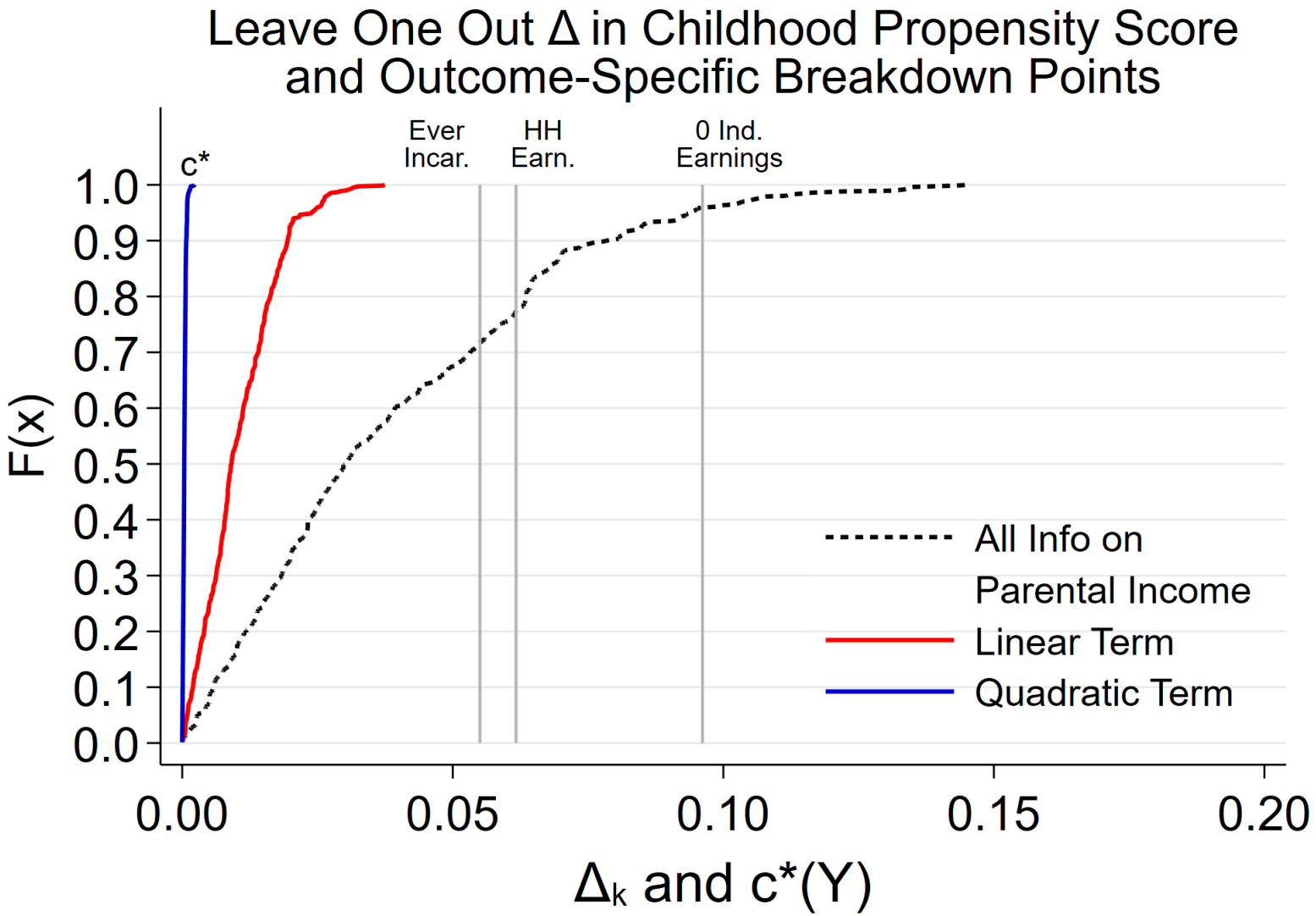
Back

Assessing Robustness w *c*-Dependence



Back

Assessing Robustness w *c*-Dependence



Back

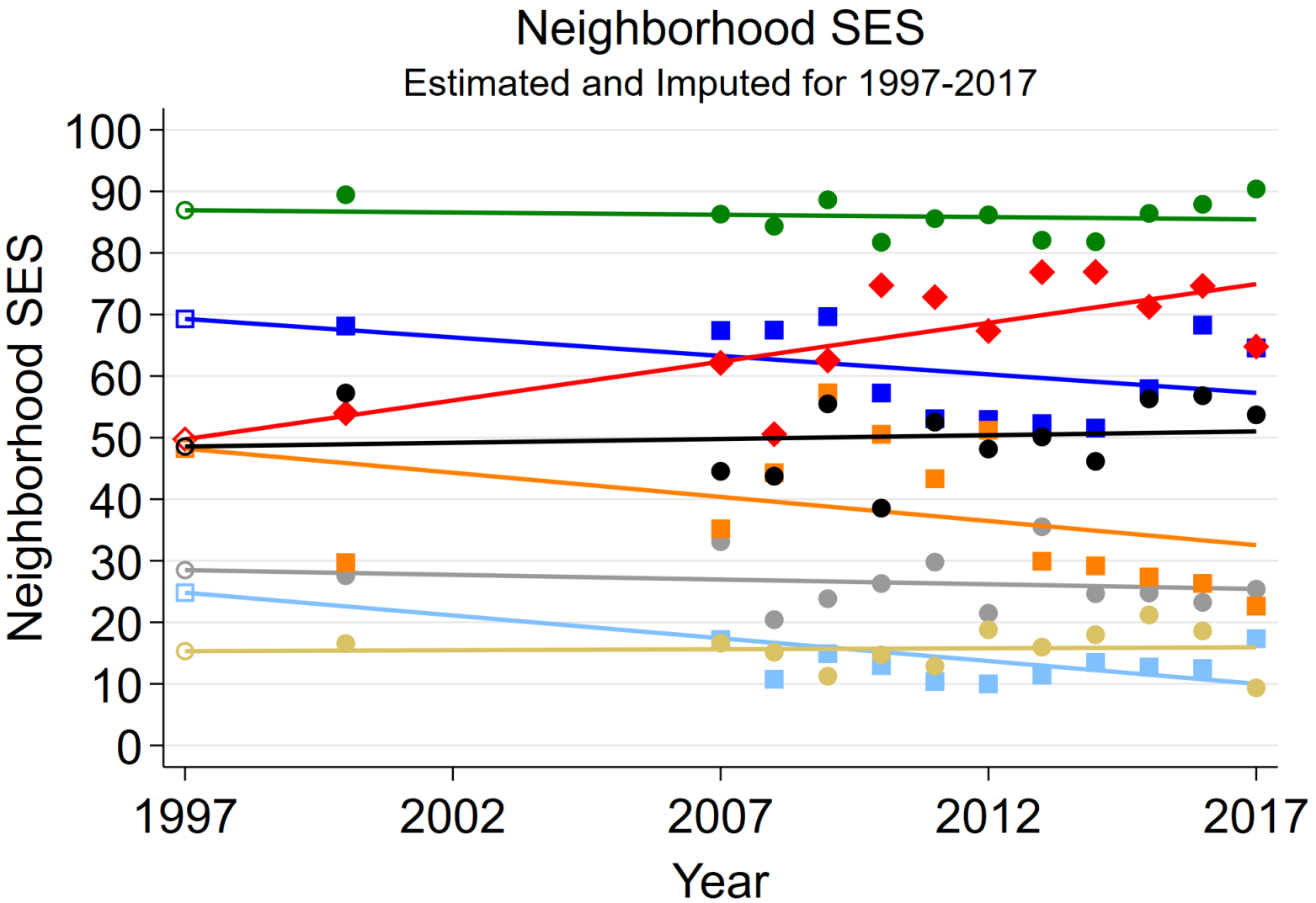
Effects of Violence, Not of Broader Nbd Context

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

Dependent Variable	Without	With
HH Earnings in 2018 ($1,000s)	–17.4 (4.6)	–16.8 (4.5)
HS by 26	–17.6 (3.2)	–16.5 (3.2)
BA by 26	–5.6 (1.9)	–4.9 (1.9)
Ever Incarcerated (% by 2019)	10.5 (2.9)	10.3 (2.9)

Back

Measuring Neighborhood SES in 1997



Back

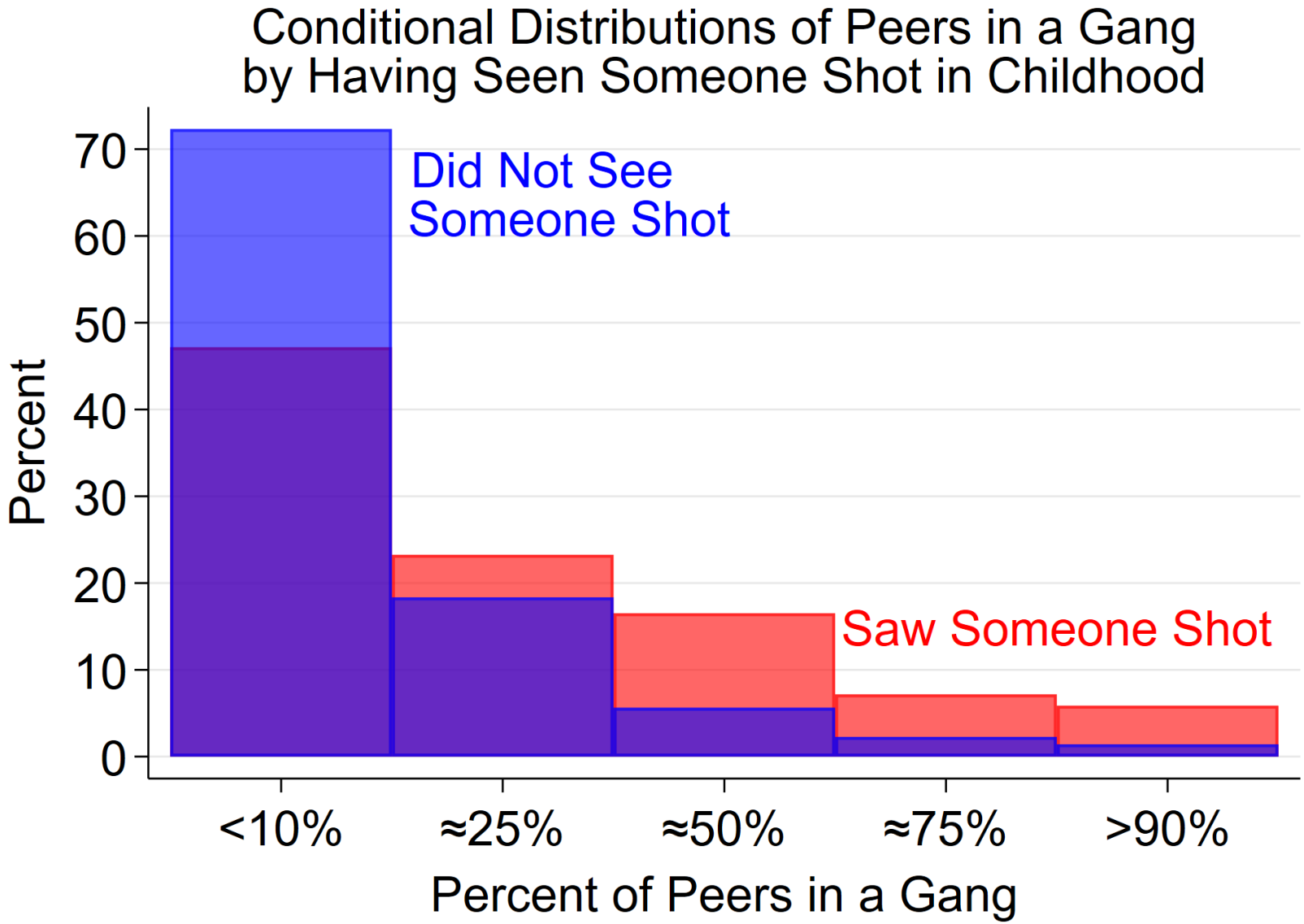
Effects of Exposure Not Mediated by Incarceration

Household Earnings in 2018

Independent Variable	Coefficient in Earnings Regression		
Childhood Exposure	–17.4 [0.00]		–15.2 [0.00]
Ever Incarcerated		–33.8 [0.00]	–33.3 [0.00]
R^2	0.02	0.06	0.07

Back

Effects of Violence or of Gang Activity?



Effects of Violence or of Gang Activity?

Outcome	Ref. Mean	Seen Shot	Peers in Gangs ≈ 25%	≈ 50%	≈ 75%	> 90%
Violent at 15 (%)	16	17 [0.00]	–1 [0.99]	–0 [0.99]	4 [0.42]	21 [0.00]
HS Diploma (%)	67	–16 [0.00]	6 [0.54]	–3 [0.54]	–11 [0.06]	–19 [0.00]
BA (%)	12	–5 [0.02]	0 [0.08]	–5 [0.08]	–6 [0.09]	–10 [0.01]
Incarcerated (%)	21	9 [0.00]	1 [0.20]	5 [0.20]	5 [0.32]	16 [0.01]
Earnings ($1,000s)	43	–10 [0.01]	–2 [0.01]	–12 [0.01]	–11 [0.11]	–20 [0.01]
HH Earnings ($1,000s)	61	–15 [0.00]	–4 [0.01]	–18 [0.01]	–18 [0.05]	–29 [0.00]

Back

Exposure and Acute Effects

Seen Someone Shot or Shot at (% of Males)

Age	Black	White
0-11	26	8
12-18	29	10
0-18	43	16

Back · NLSY97 · Aliprantis (2017) · Graham (2018)

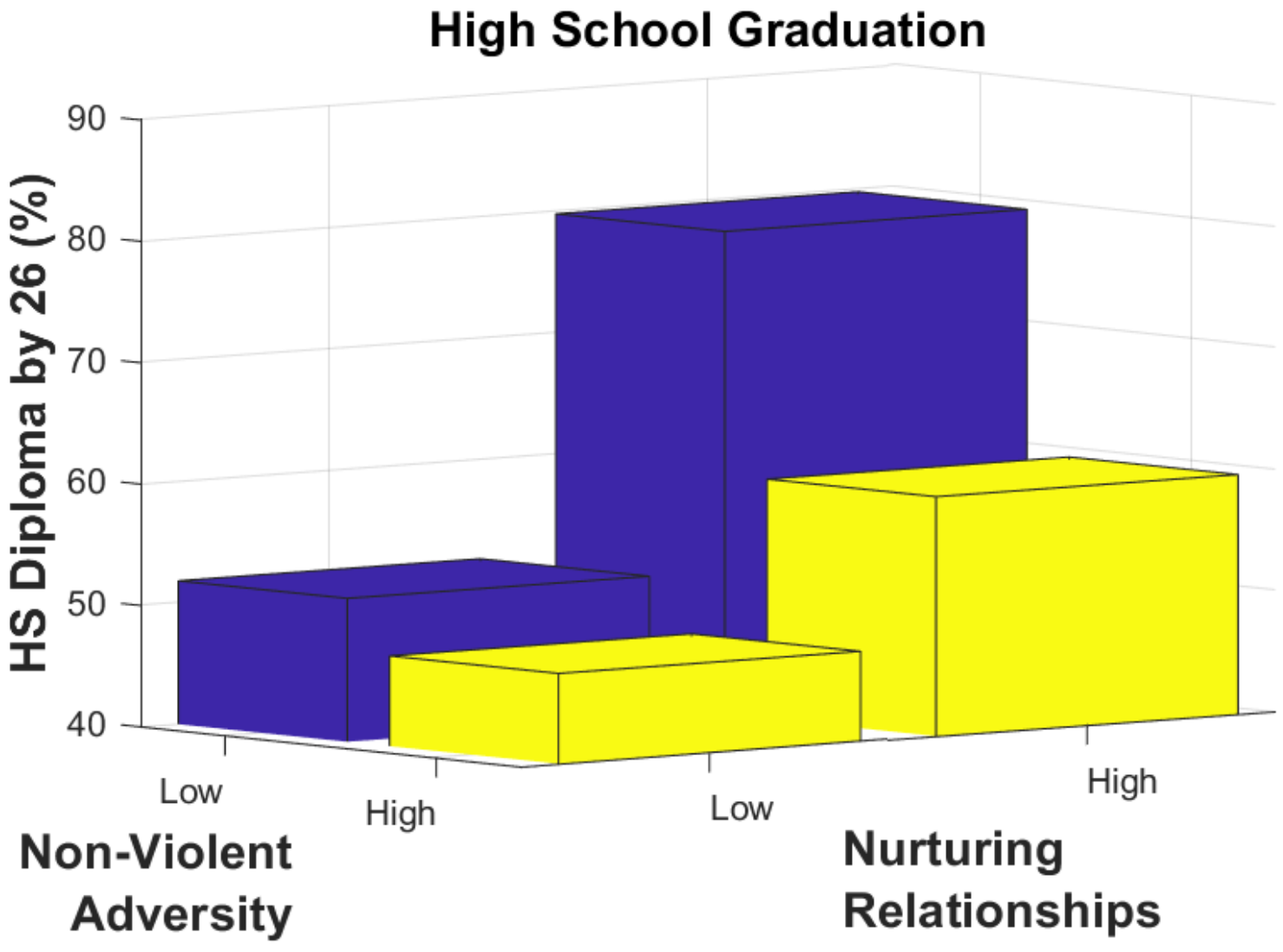
Non-Violent Adversity

Black Male Adolescents (12-18)

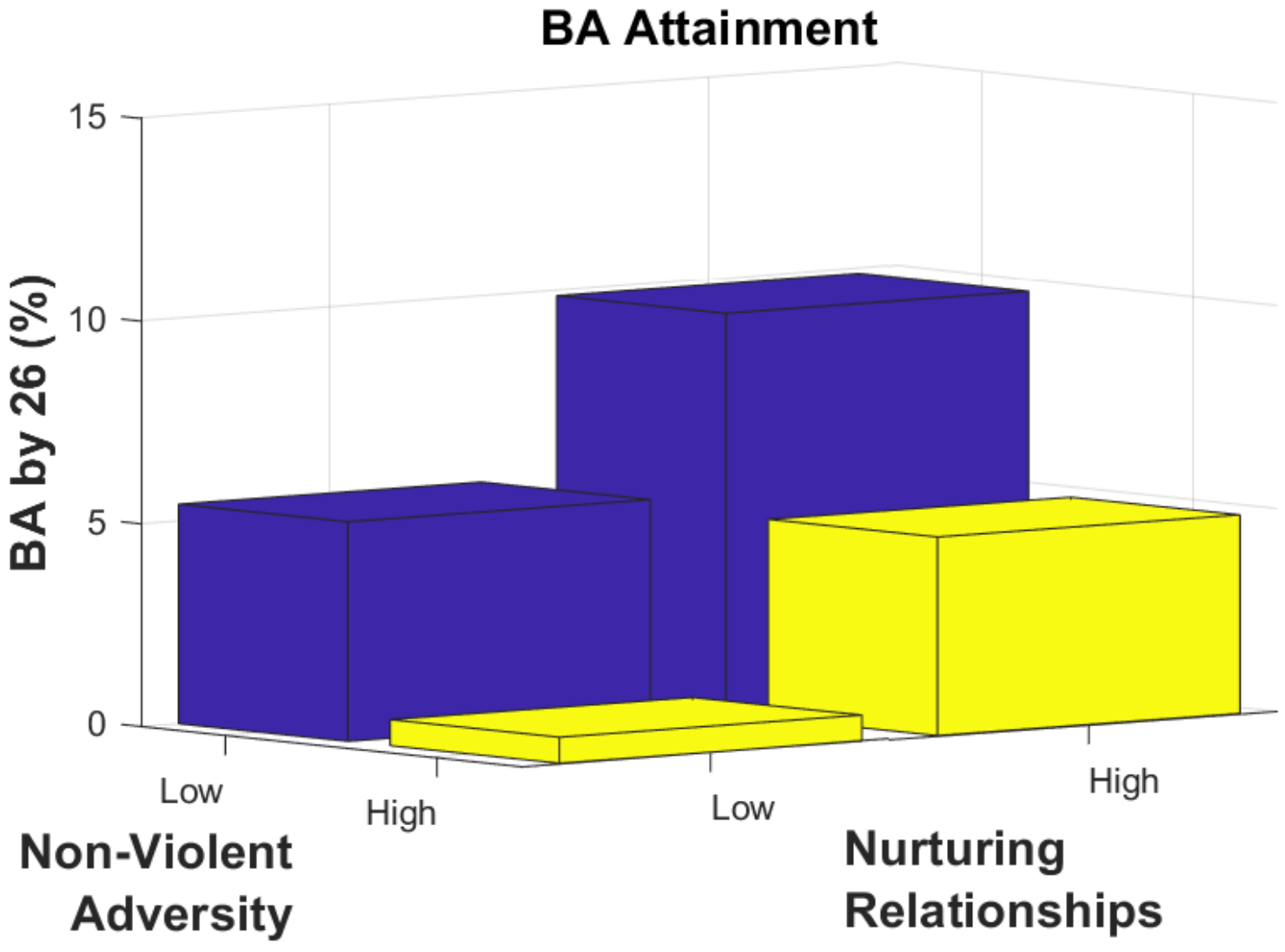
Non-Violent Adversity	Percent	Cumul.
Incarcerated Parent	1.2	1.2
Homeless	1.6	2.8
Unemployed Parent	6.4	9.0
Death of parent or sibling	15.0	23.6
Any Non-Violent Adversity	23.6	23.6

Back

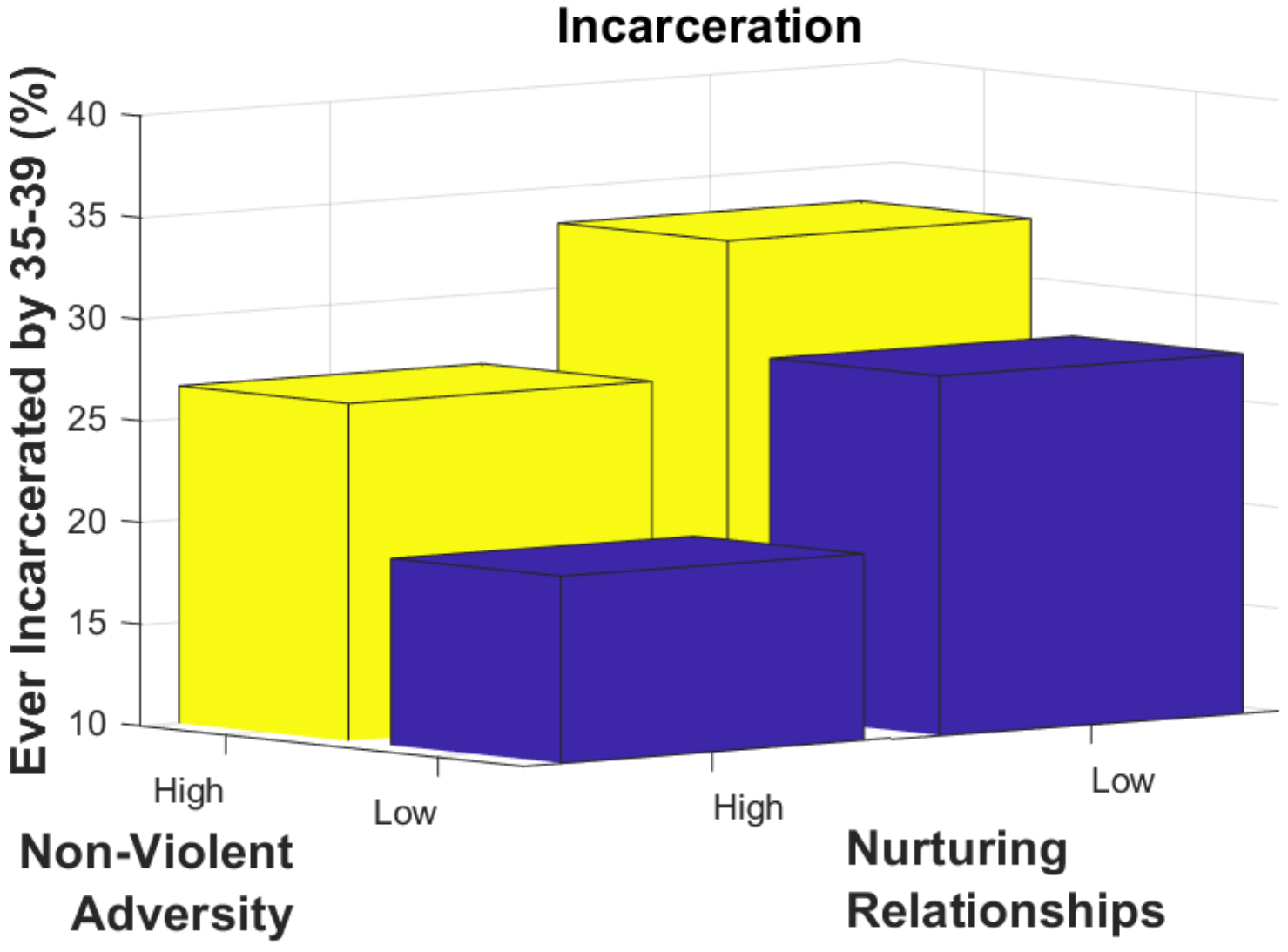
Potential Outcomes



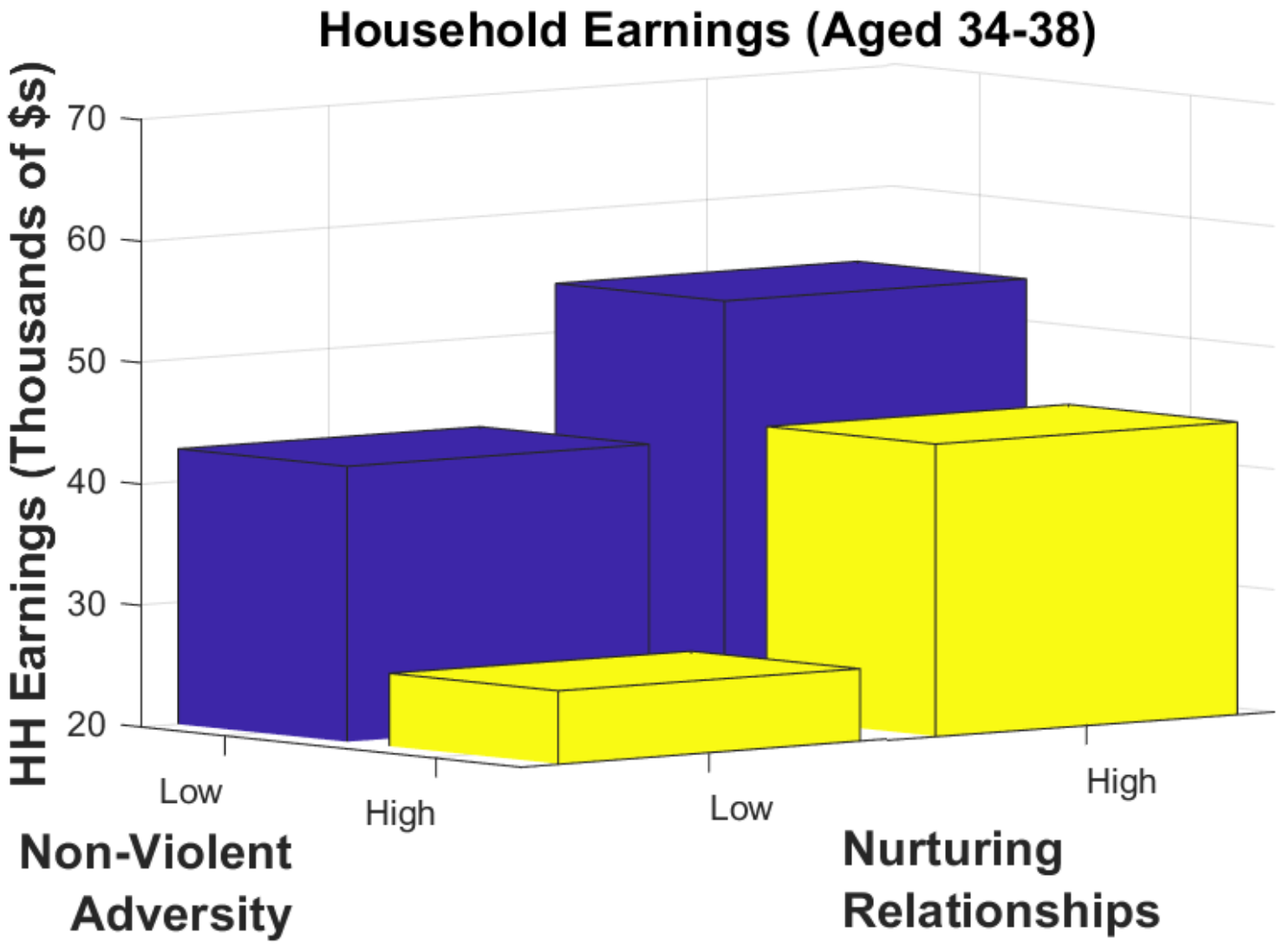
Potential Outcomes



Potential Outcomes



Potential Outcomes



Treatment Effects

	Given High Non-Violent Adversity and Low Nurturing Relationships		
	$\downarrow D^{NV}$	$\uparrow D^{NR}$	Both
HS by 26	4.4	12.3	32.3
(%)	[0.06]	[0.00]	[0.00]
BA by 26	4.8	4.3	9.2
(%)	[0.03]	[0.20]	[0.00]
Ever Incarcerated	–5.6	–6.6	–14.0
(% by 2019)	[0.07]	[0.11]	[0.00]
HH Earnings in 2018	16.7	18.1	28.0
($1,000s)	[0.03]	[0.11]	[0.00]

Back

Item Response Theory

Binary response item j depends on latent index θ_i^V

$$ACE_i^{V,j} = \begin{cases} 1 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j \geq 0 \\ 0 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j < 0. \end{cases}$$

Item Response Theory

Binary response item j depends on latent index θ_i^V

$$ACE_i^{V,j} = \begin{cases} 1 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j \geq 0 \\ 0 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j < 0. \end{cases}$$

Assuming ϵ_i follows a type-1 extreme value distribution:

$$Pr(ACE_i^{V,j} = 1 | \alpha, \beta, C, \theta_i^V) = \text{logit}[\alpha_j(\theta_i^V - \beta_j)]$$

Item Response Theory

Binary response item j depends on latent index θ_i^V

$$ACE_i^{V,j} = \begin{cases} 1 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j \geq 0 \\ 0 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j < 0. \end{cases}$$

Assuming ϵ_i follows a type-1 extreme value distribution:

$$Pr(ACE_i^{V,j} = 1 | \alpha, \beta, C, \theta_i^V) = \text{logit}[\alpha_j(\theta_i^V - \beta_j)]$$

Maximize the marginal LL

$$\mathcal{L}_i(\alpha, \beta) = \int_{-\infty}^{\infty} Pr(ACE_i^V | \alpha, \beta, \theta_i) d\Phi(\theta_i^V)$$

Item Response Theory

Binary response item j depends on latent index θ_i^V

$$ACE_i^{V,j} = \begin{cases} 1 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j \geq 0 \\ 0 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j < 0. \end{cases}$$

Assuming ϵ_i follows a type-1 extreme value distribution:

$$Pr(ACE_i^{V,j} = 1 | \alpha, \beta, C, \theta_i^V) = \text{logit}[\alpha_j(\theta_i^V - \beta_j)]$$

Maximize the marginal LL

$$\mathcal{L}_i(\alpha, \beta) = \int_{-\infty}^{\infty} Pr(ACE_i^V | \alpha, \beta, \theta_i) d\Phi(\theta_i^V)$$

Numerical quadrature assuming $\theta_i^V \sim \mathcal{N}(0, 1)$:

$$\mathcal{L}_i(\alpha, \beta) = \sum_{q=1}^{Q} Pr(PCE_i | \alpha, \beta, \theta_q) \widehat{\varphi}(\theta_q)$$

Item Response Theory

Binary response item j depends on latent index θ_i^V

$$ACE_i^{V,j} = \begin{cases} 1 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j \geq 0 \\ 0 & \text{if } \alpha_j(\theta_i^V - \beta_j) - \epsilon_i^j < 0. \end{cases}$$

Assuming ϵ_i follows a type-1 extreme value distribution:

$$Pr(ACE_i^{V,j} = 1 | \alpha, \beta, C, \theta_i^V) = \text{logit}[\alpha_j(\theta_i^V - \beta_j)]$$

Maximize the marginal LL

$$\mathcal{L}_i(\alpha, \beta) = \int_{-\infty}^{\infty} Pr(ACE_i^V | \alpha, \beta, \theta_i) d\Phi(\theta_i^V)$$

Numerical quadrature assuming $\theta_i^V \sim \mathcal{N}(0, 1)$:

$$\mathcal{L}_i(\alpha, \beta) = \sum_{q=1}^{Q} Pr(PCE_i | \alpha, \beta, \theta_q) \widehat{\varphi}(\theta_q)$$

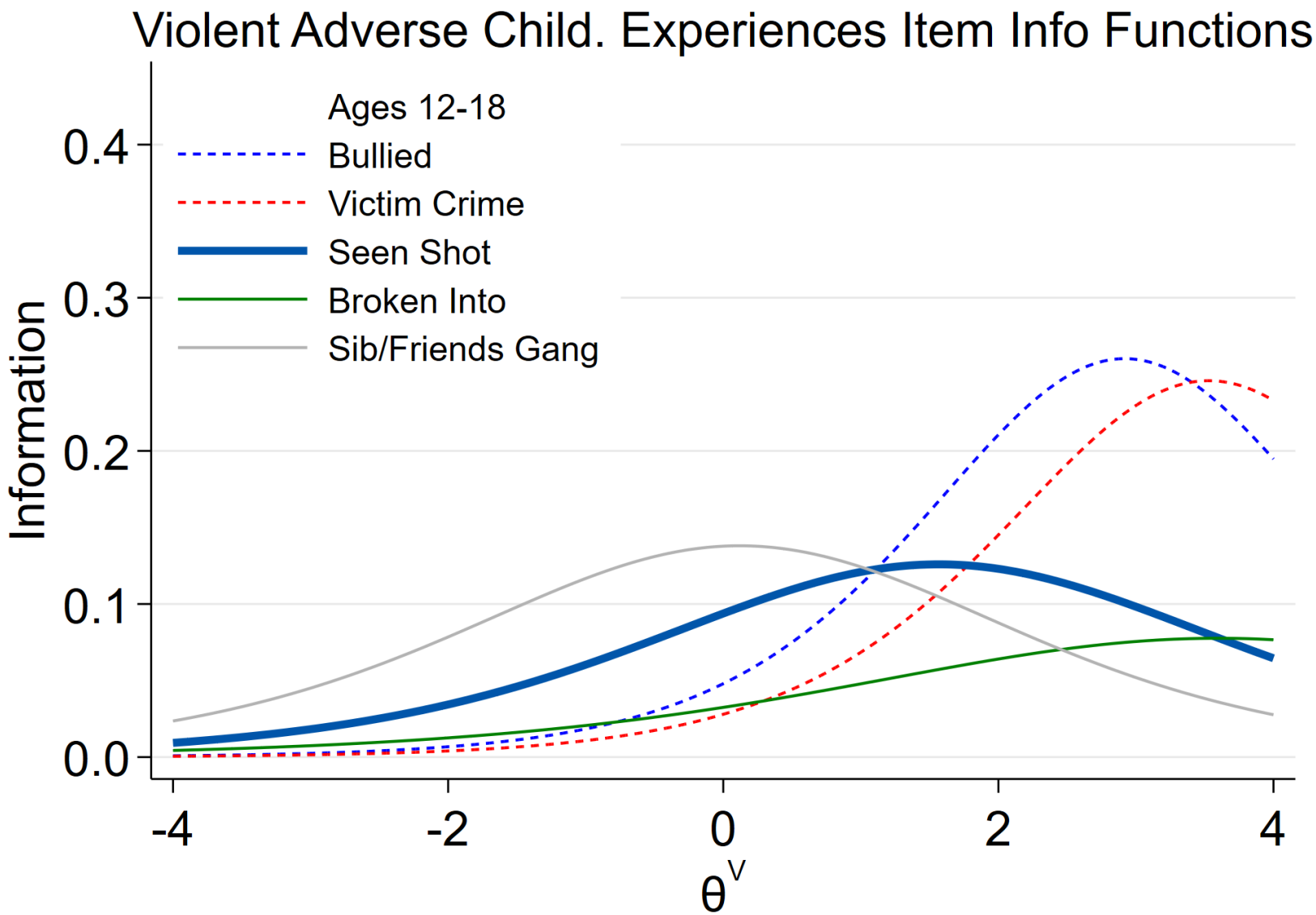
Note: Can be generalized to ordered responses

Item Response Theory

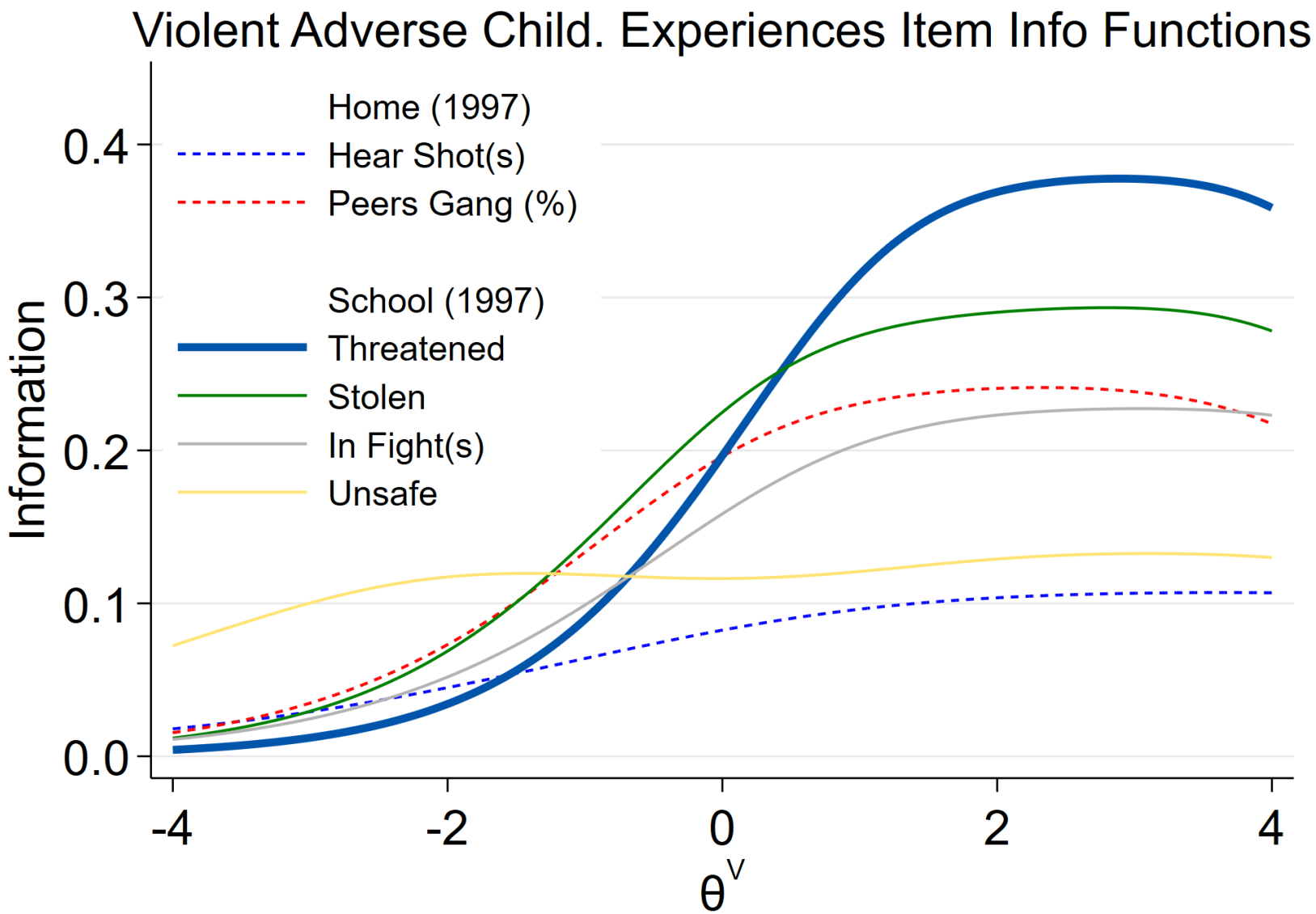
Empirical Bayes estimates of each *i*'s latent index:

$$\overline{\theta}_i = \int \frac{\theta Pr(ACE_i^V|\widehat{\alpha},\widehat{\beta},\theta)\varphi(\theta)}{Pr(ACE_i^V|\widehat{\alpha},\widehat{\beta},\theta)\varphi(\theta)} d\theta$$

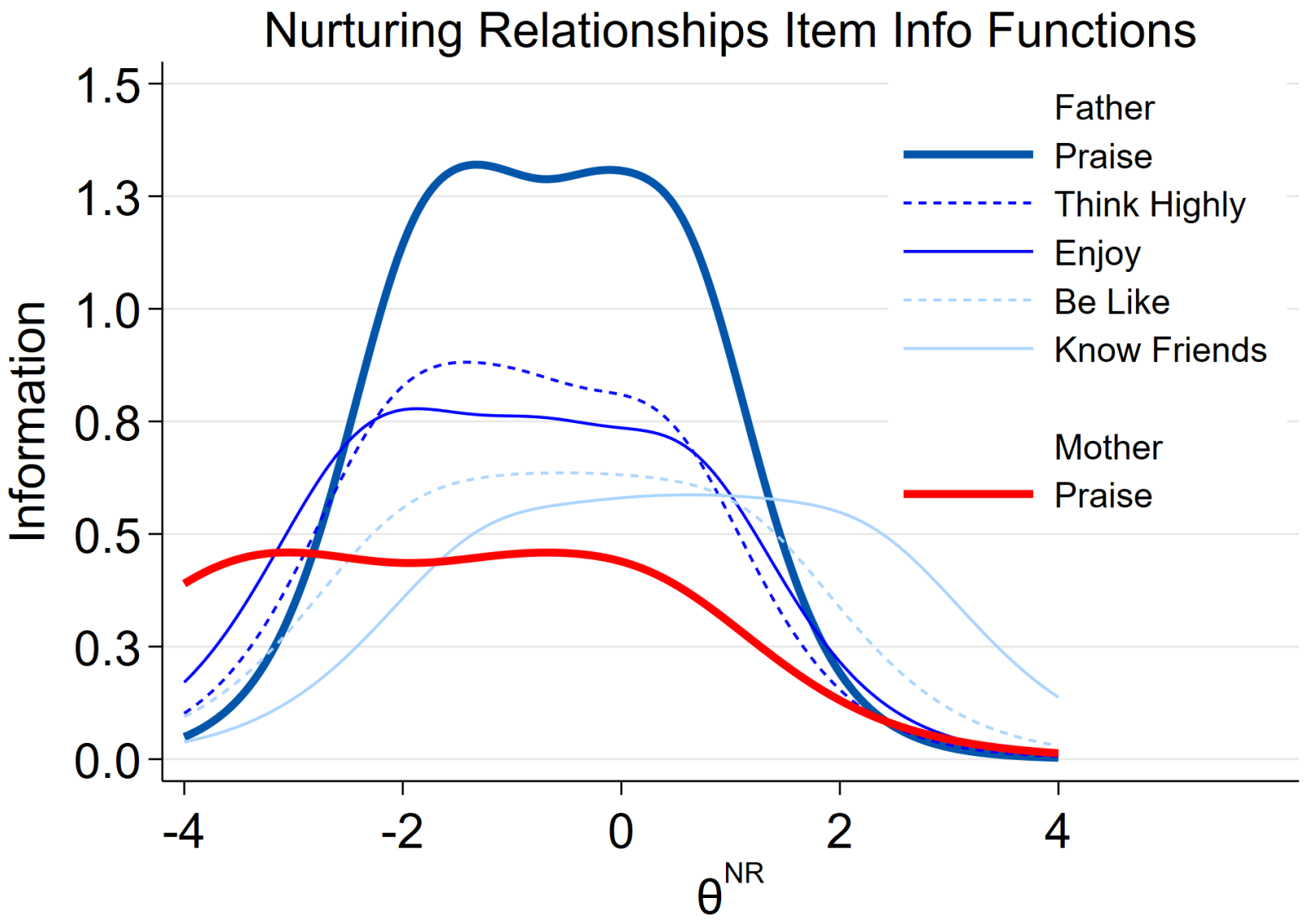
Item Response Theory



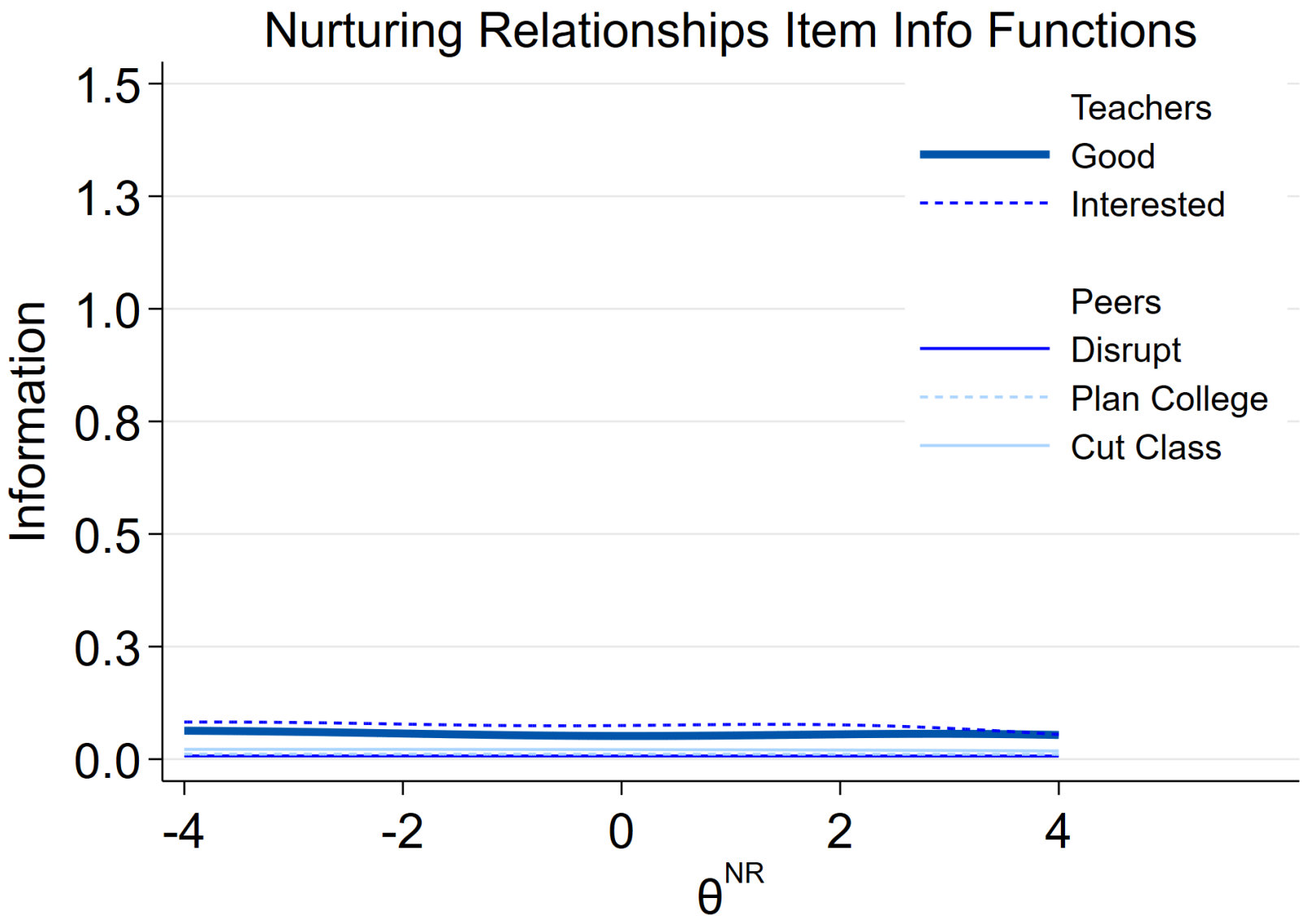
Item Response Theory



Item Response Theory



Item Response Theory



IRT-Based Treatment

Empirical Bayes estimates of each *i*'s latent index:

$$\overline{\theta}_i = \int \frac{\theta Pr(ACE_i^V|\widehat{\alpha},\widehat{\beta},\theta)\varphi(\theta)}{Pr(ACE_i^V|\widehat{\alpha},\widehat{\beta},\theta)\varphi(\theta)} d\theta$$

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) · Del Bono et al. (2022) · Bond and Lang (2013) · Nielsen (2015)

IRT-Based Treatment

Empirical Bayes estimates of each *i*'s latent index:

$$\overline{\theta}_i = \int \frac{\theta Pr(ACE_i^V|\widehat{\alpha},\widehat{\beta},\theta)\varphi(\theta)}{Pr(ACE_i^V|\widehat{\alpha},\widehat{\beta},\theta)\varphi(\theta)} d\theta$$

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) · Del Bono et al. (2022) · Bond and Lang (2013) · Nielsen (2015)

- Let's use the $\widehat{\theta}_i$ to create a discrete treatment

Binary Treatment: Non-Violent Adversity

Black Male Adolescents (12-18)

Non-Violent Adversity	Percent	Cumul.
Incarcerated Parent	1.2	1.2
Homeless	1.6	2.8
Unemployed Parent	6.4	9.0
Death of parent or sibling	15.0	23.6
Any Non-Violent Adversity	23.6	23.6

IRT Ordering Is Robust to Dist. Assumptions

Discrete IRT-Based Treatment D^V based on θ^V

- Ordering of individuals that synthesizes many variables

IRT Ordering Is Robust to Dist. Assumptions

Discrete IRT-Based Treatment D^V based on θ^V

- Ordering of individuals that synthesizes many variables

But... estimated under the assumption $\theta_i \sim \mathcal{N}(0, 1)$
Seemingly innocuous normalizations $\Longrightarrow$ biased estimates

Agostinelli and Wiswall (2016) · Del Bono et al. (2022)

IRT Ordering Is Robust to Dist. Assumptions

Discrete IRT-Based Treatment D^V based on θ^V

- Ordering of individuals that synthesizes many variables

But... estimated under the assumption $\theta_i \sim \mathcal{N}(0, 1)$
Seemingly innocuous normalizations $\Longrightarrow$ biased estimates

Agostinelli and Wiswall (2016) · Del Bono et al. (2022)

We just need ordering to be same under alt. assumptions
This will yield identical treatments

Nielsen (2015) · Bond and Lang (2013)

IRT Ordering Is Robust to Dist. Assumptions

Discrete IRT-Based Treatment D^V based on θ^V

- Ordering of individuals that synthesizes many variables

But... estimated under the assumption $\theta_i \sim \mathcal{N}(0, 1)$
Seemingly innocuous normalizations $\Longrightarrow$ biased estimates

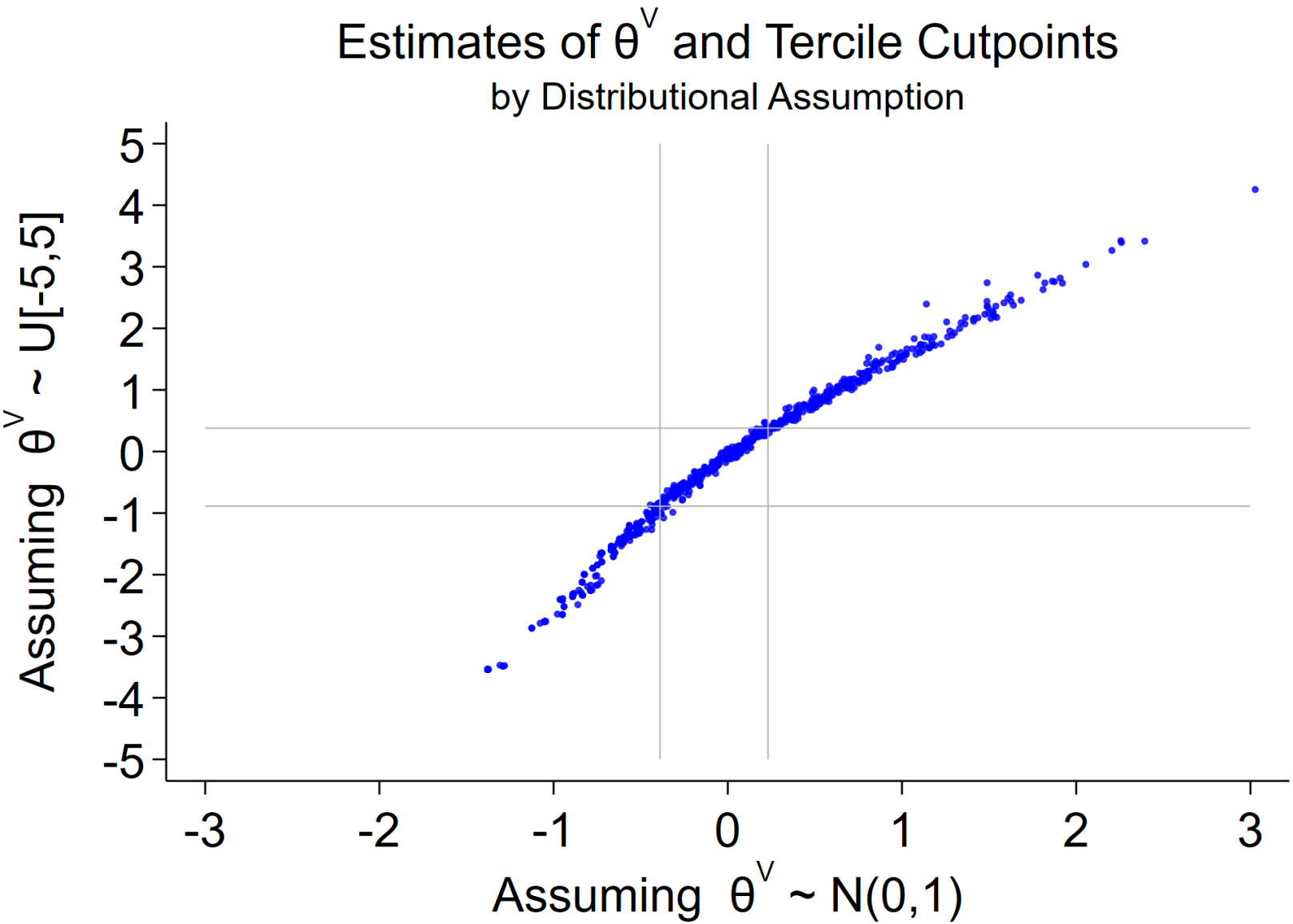
Agostinelli and Wiswall (2016) · Del Bono et al. (2022)

We just need ordering to be same under alt. assumptions
This will yield identical treatments

Nielsen (2015) · Bond and Lang (2013)

So let's estimate IRT model under different distributional assumptions and compare orderings

IRT Ordering Is Robust to Dist. Assumptions



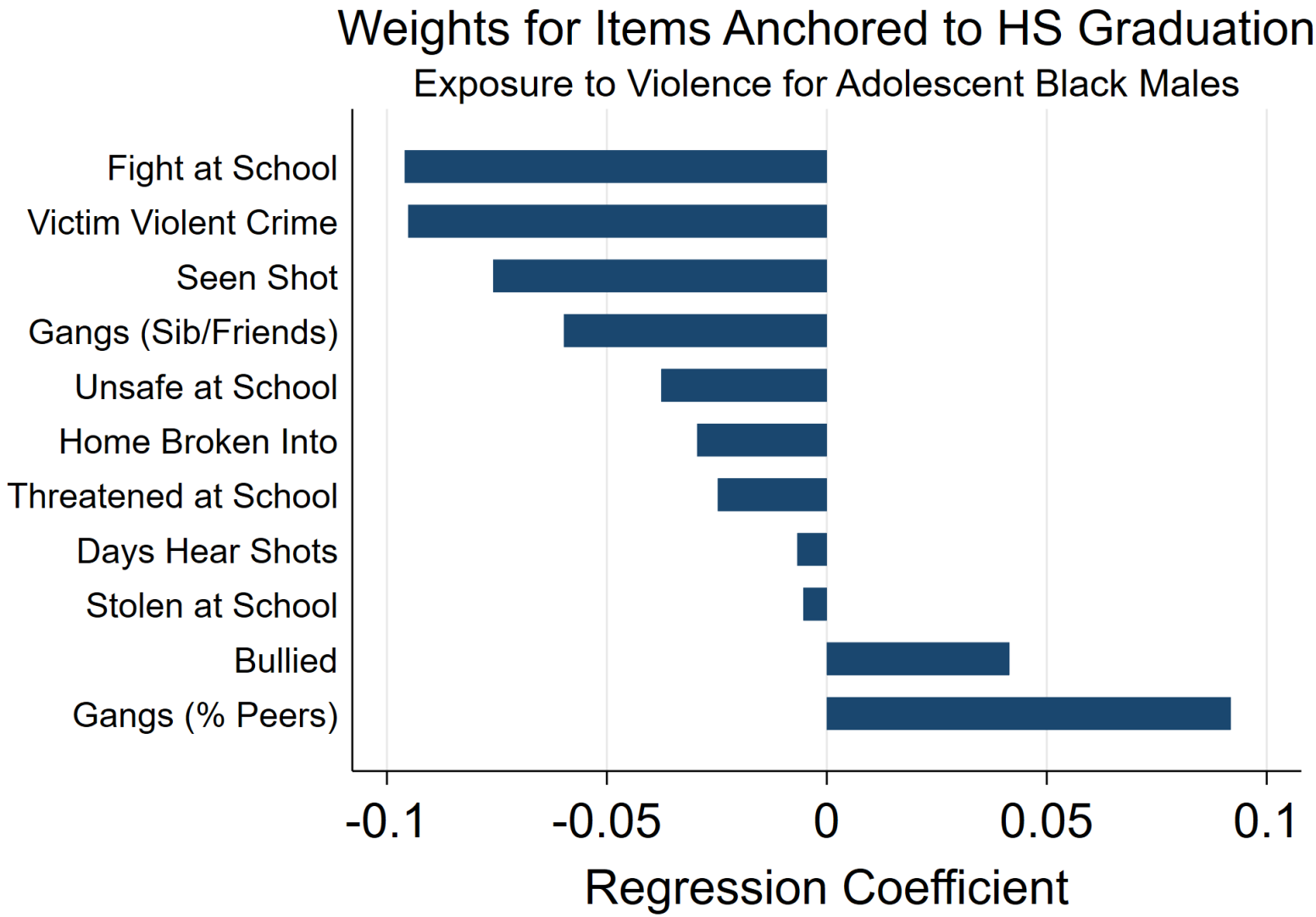
IRT Ordering Is Robust to Dist. Assumptions

Ordering does not depend on distributional assumption on θ^V

Difference in Discrete Treatments

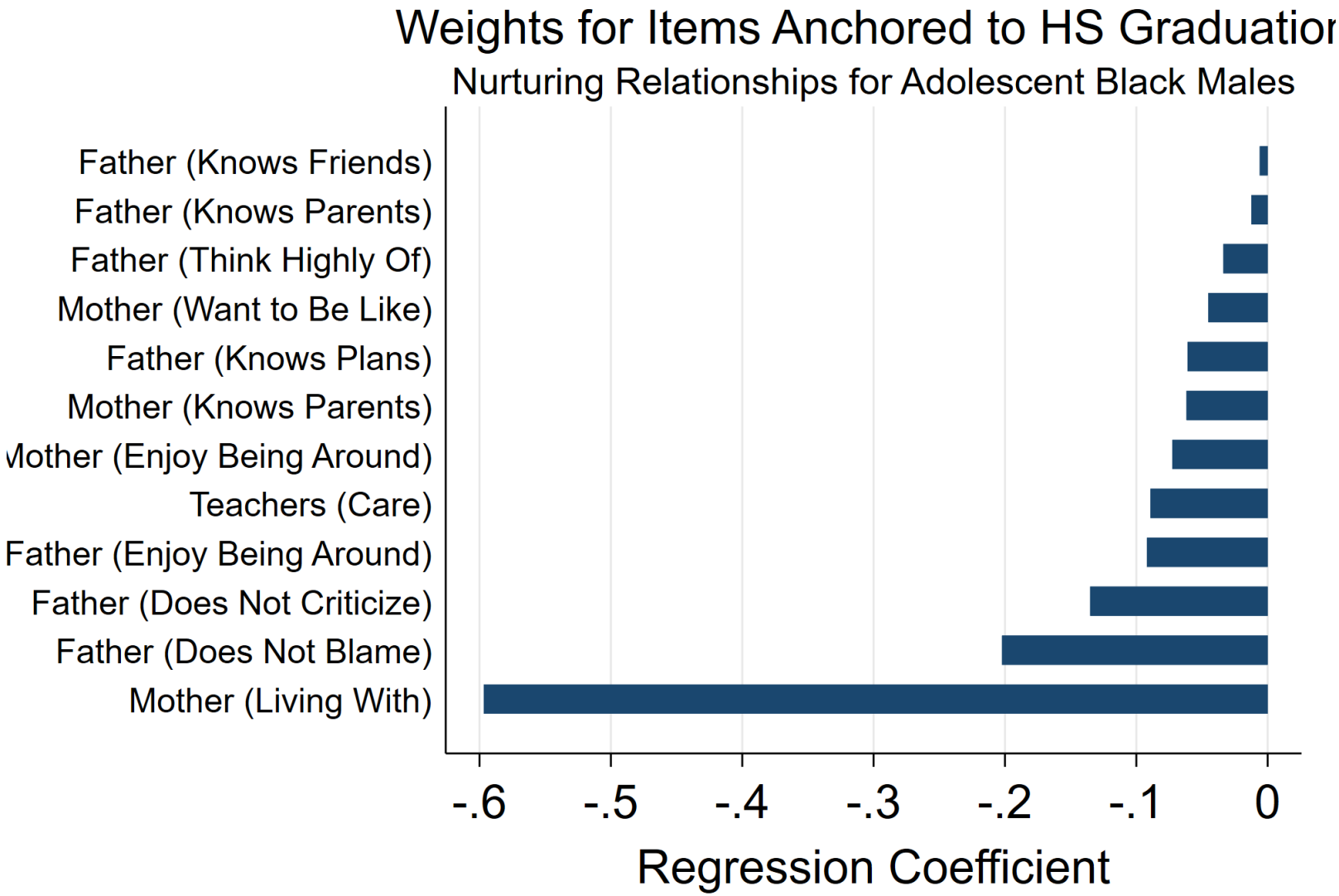
	$D_U^V - D_N^V$		
	–1	0	1
Frequency	10	700	11
Percent	1.4	97.1	1.5

Anchoring Coefficients



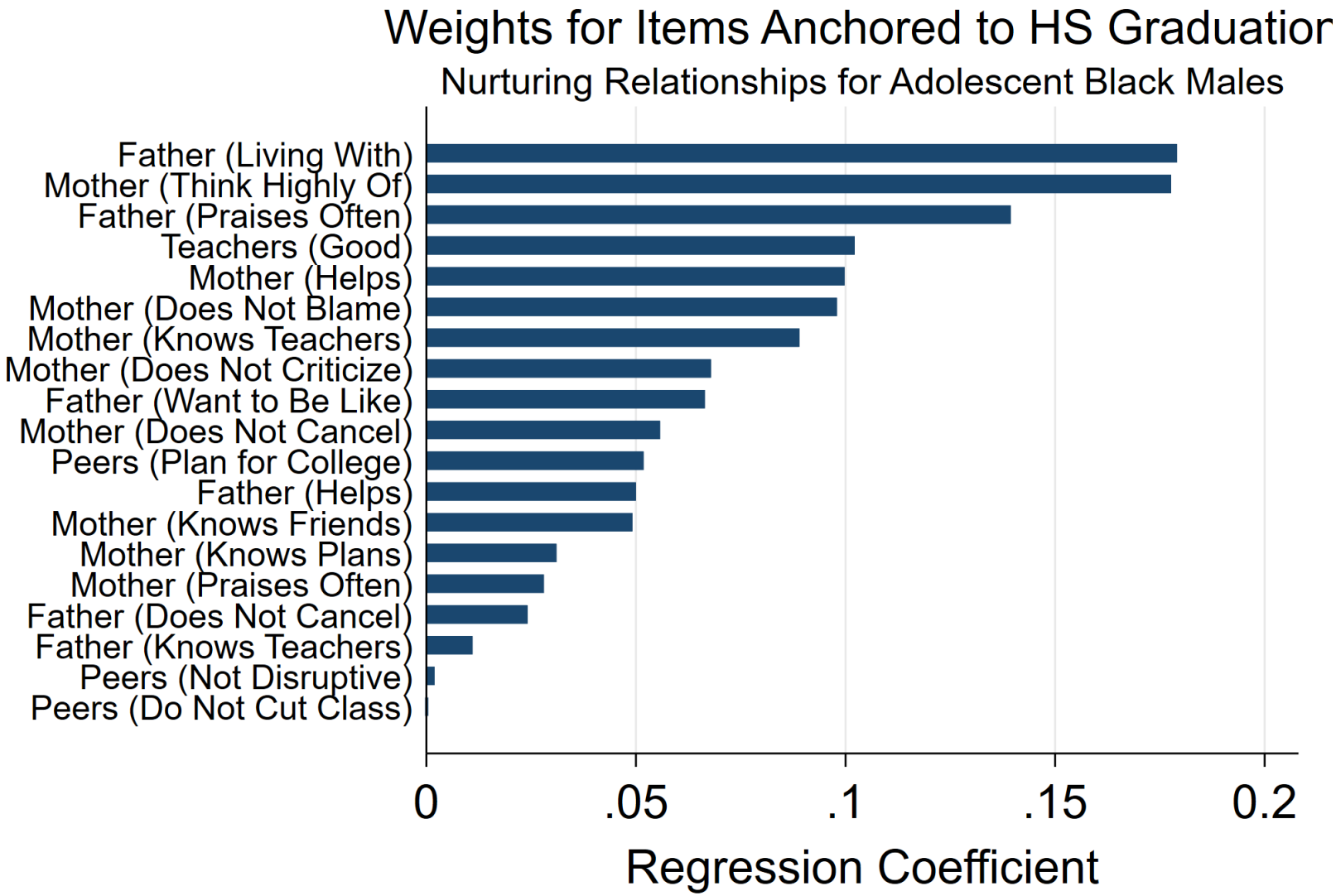
Back

Anchoring Coefficients



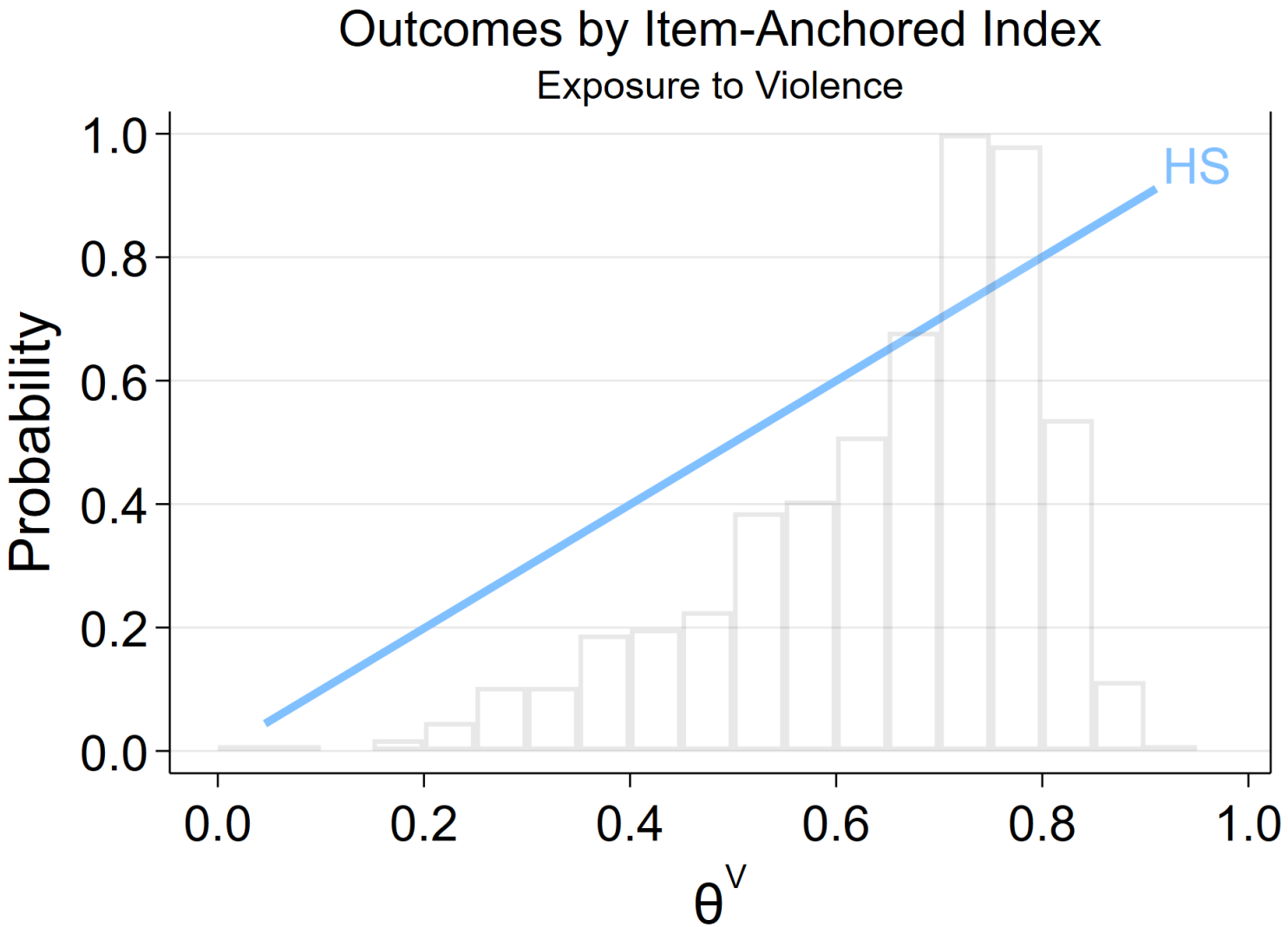
Back

Anchoring Coefficients



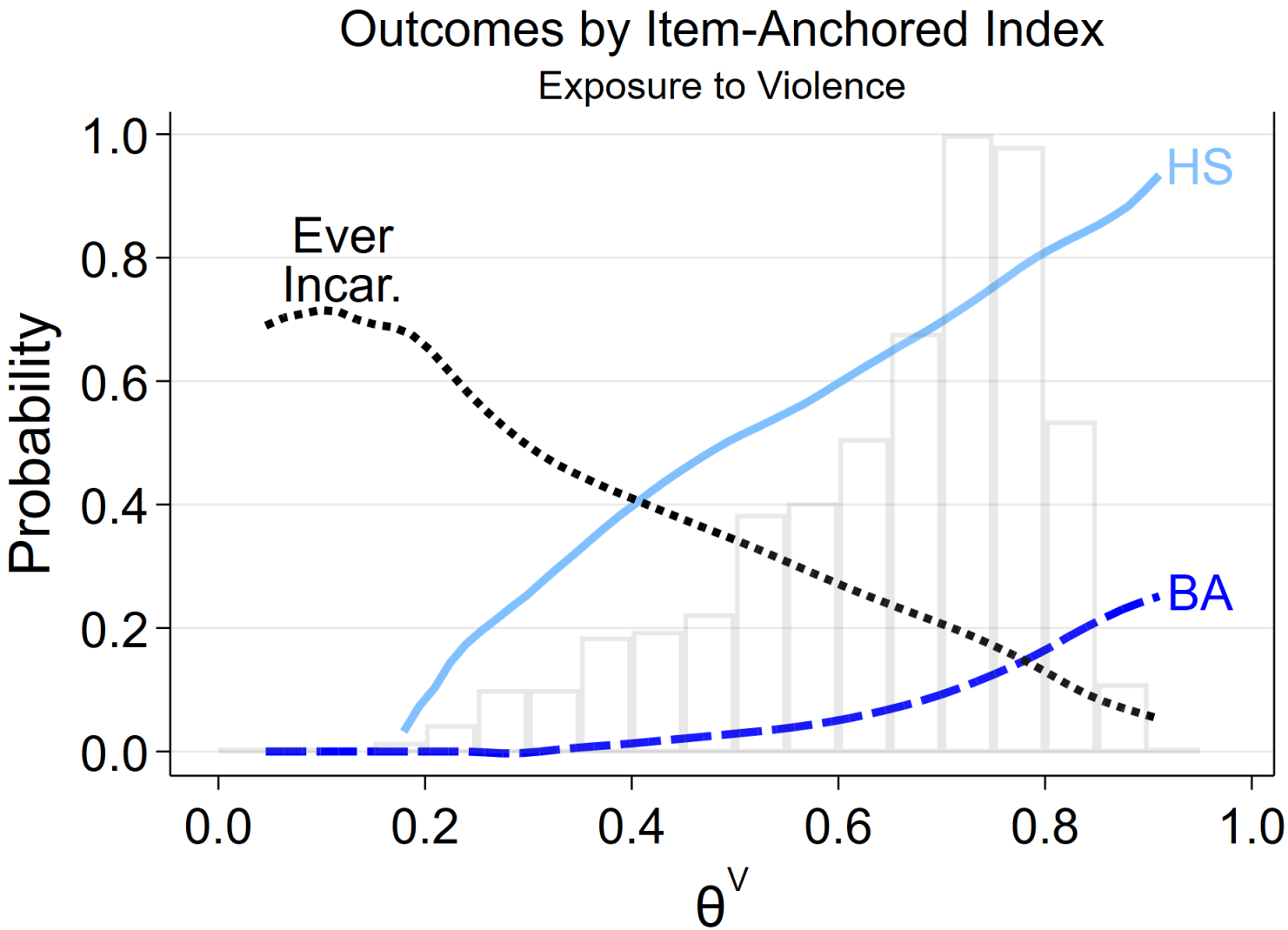
Back

Descriptive Analysis



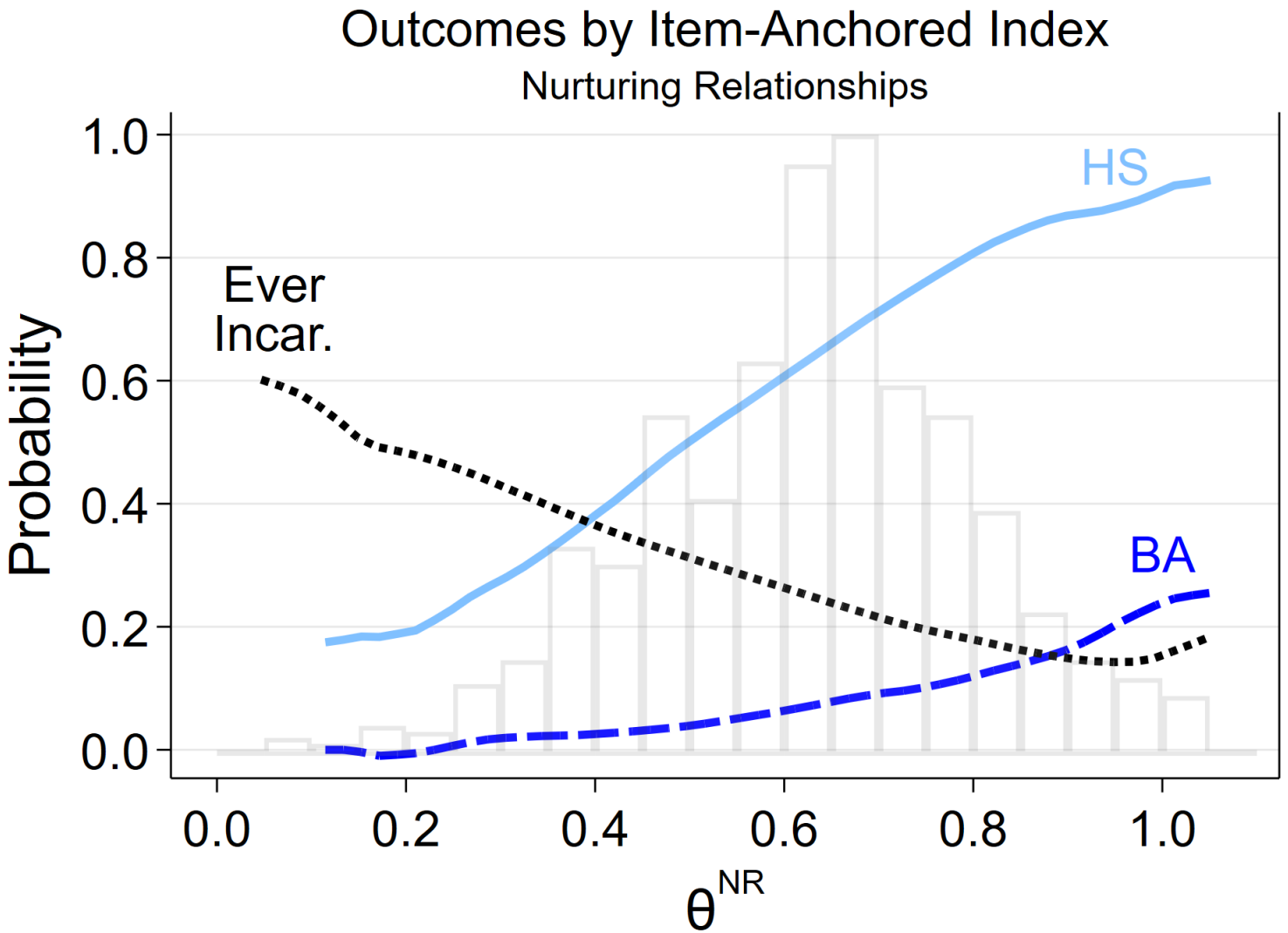
Back

Descriptive Analysis



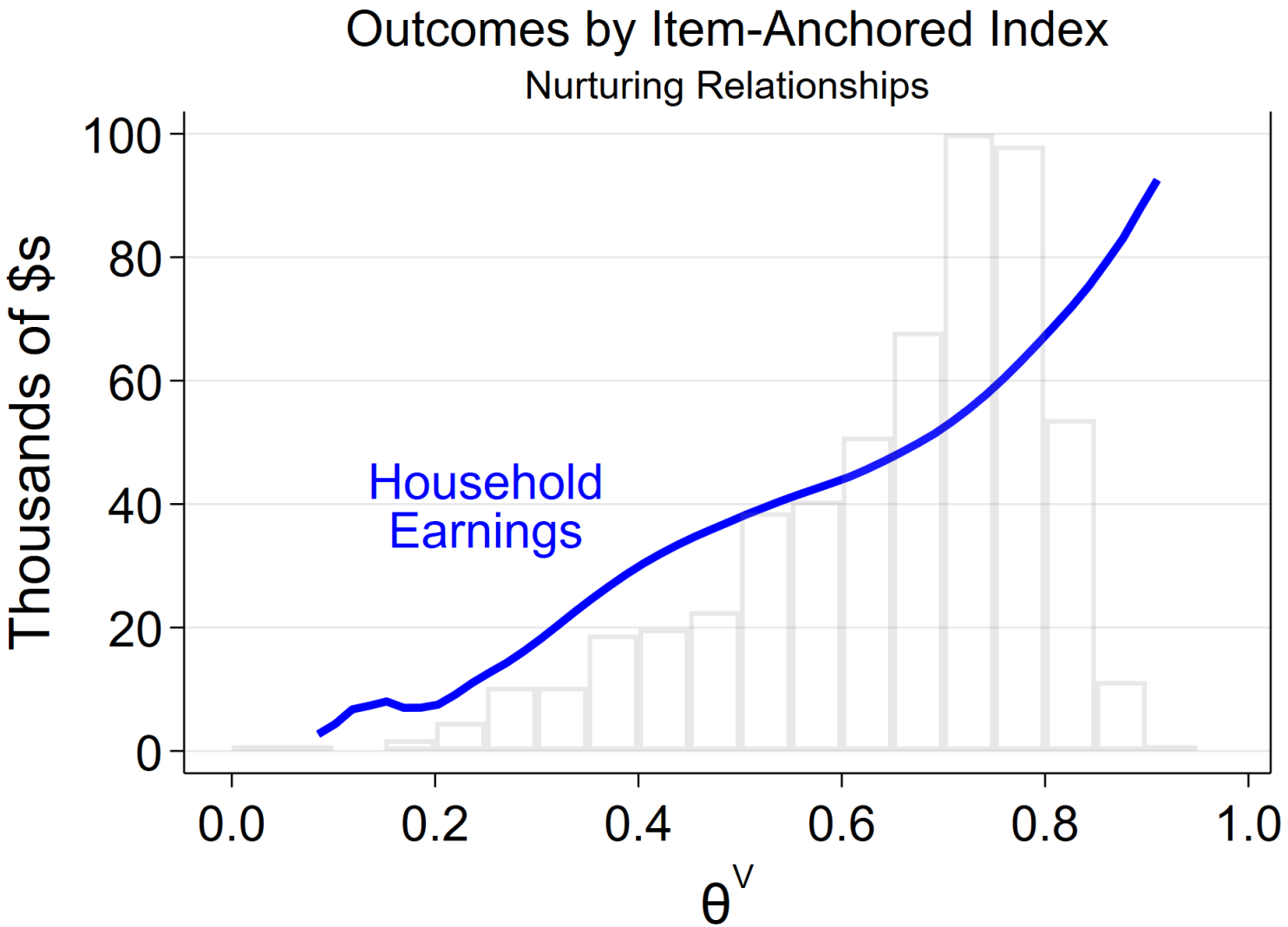
Back

Descriptive Analysis



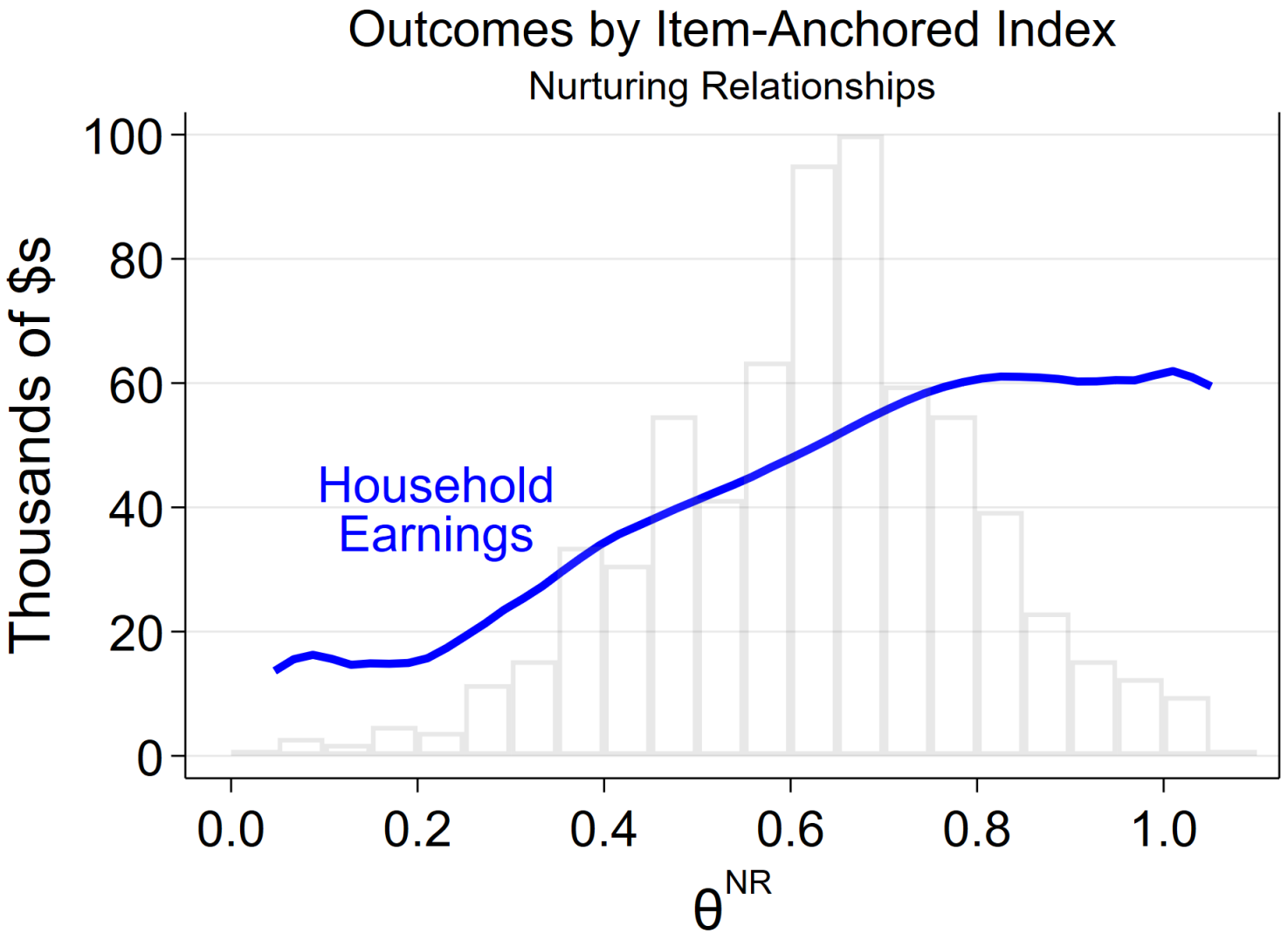
Back

Descriptive Analysis



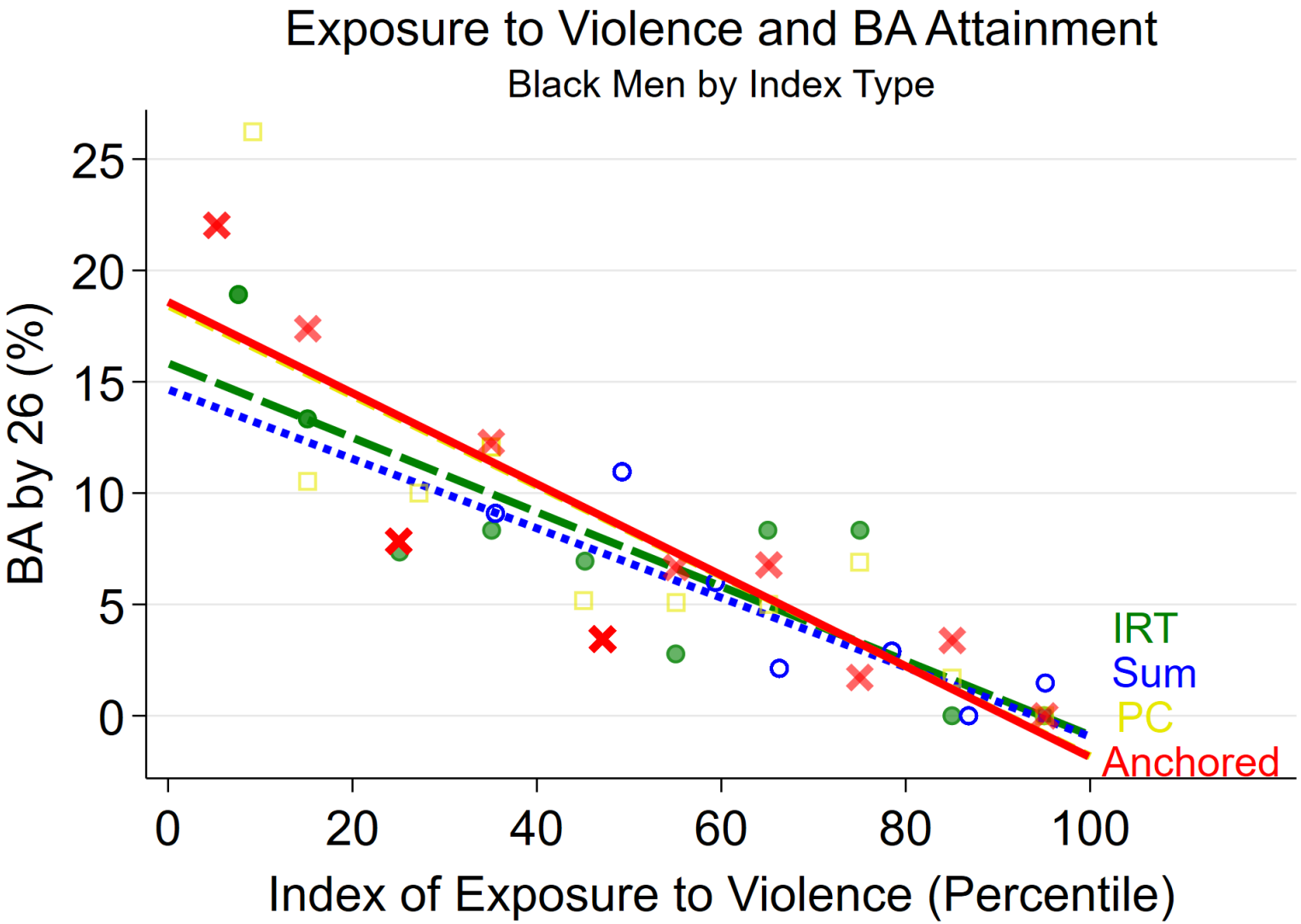
Back

Descriptive Analysis



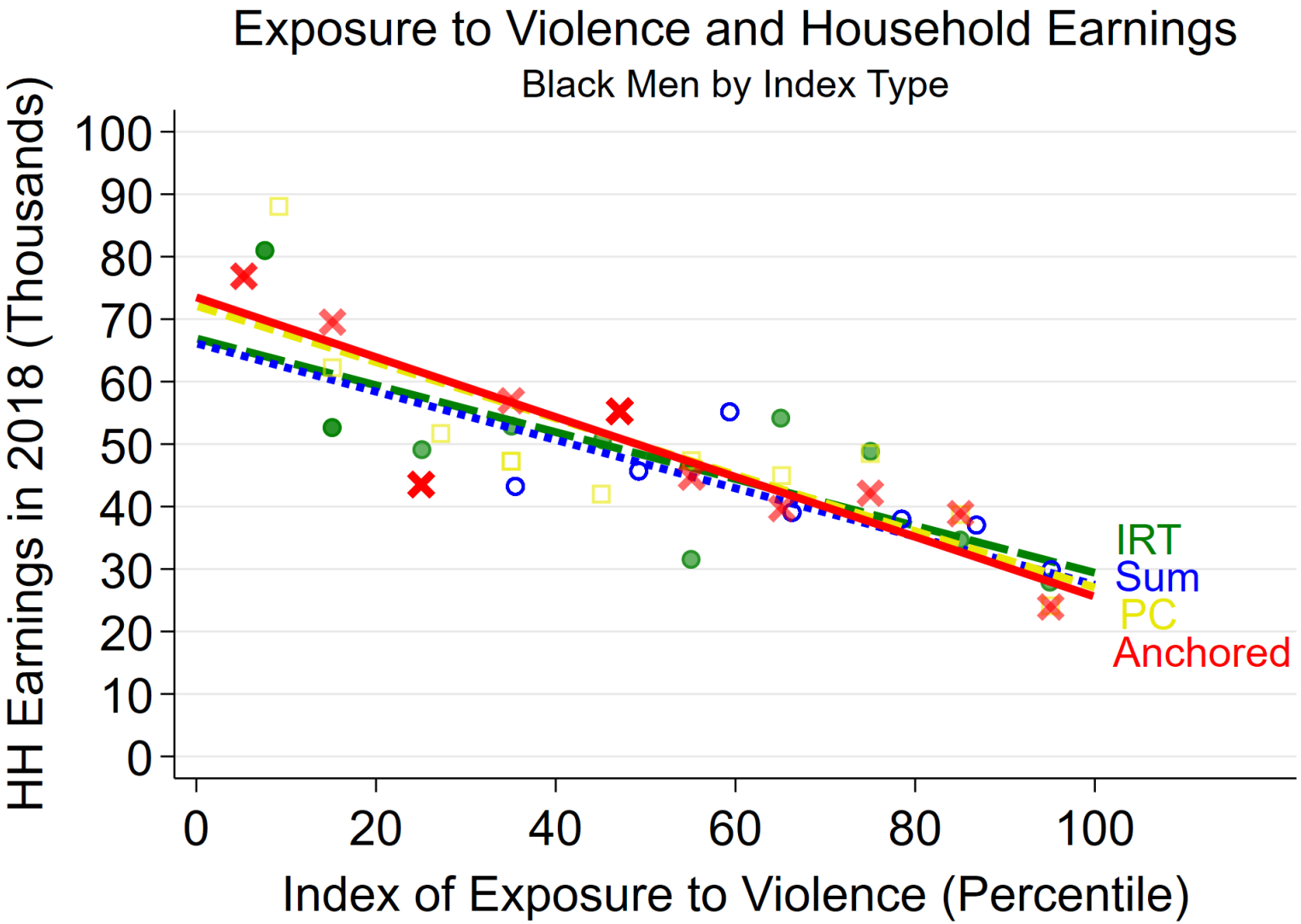
Back

Indexes of Exposure to Violence



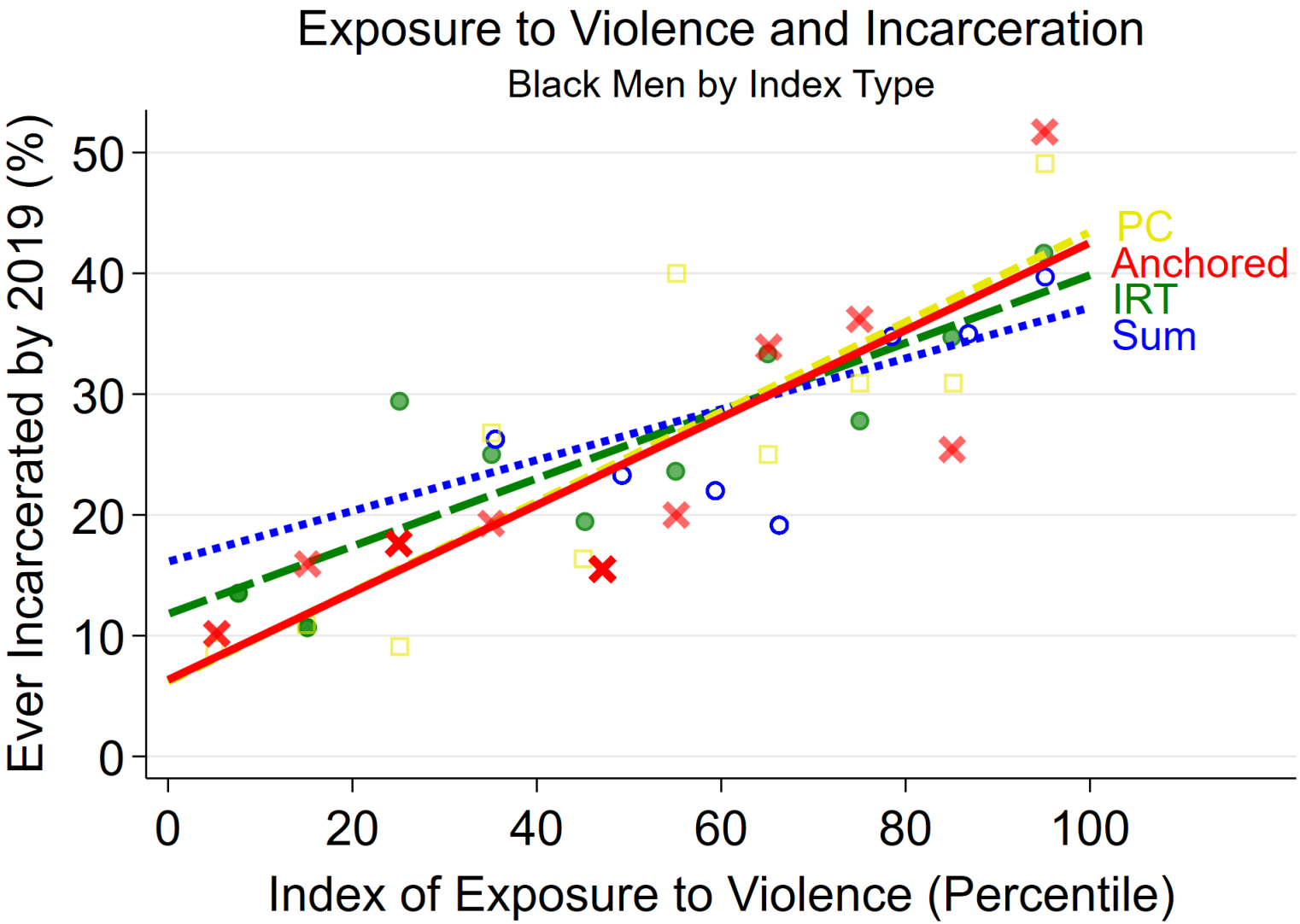
Back

Indexes of Exposure to Violence



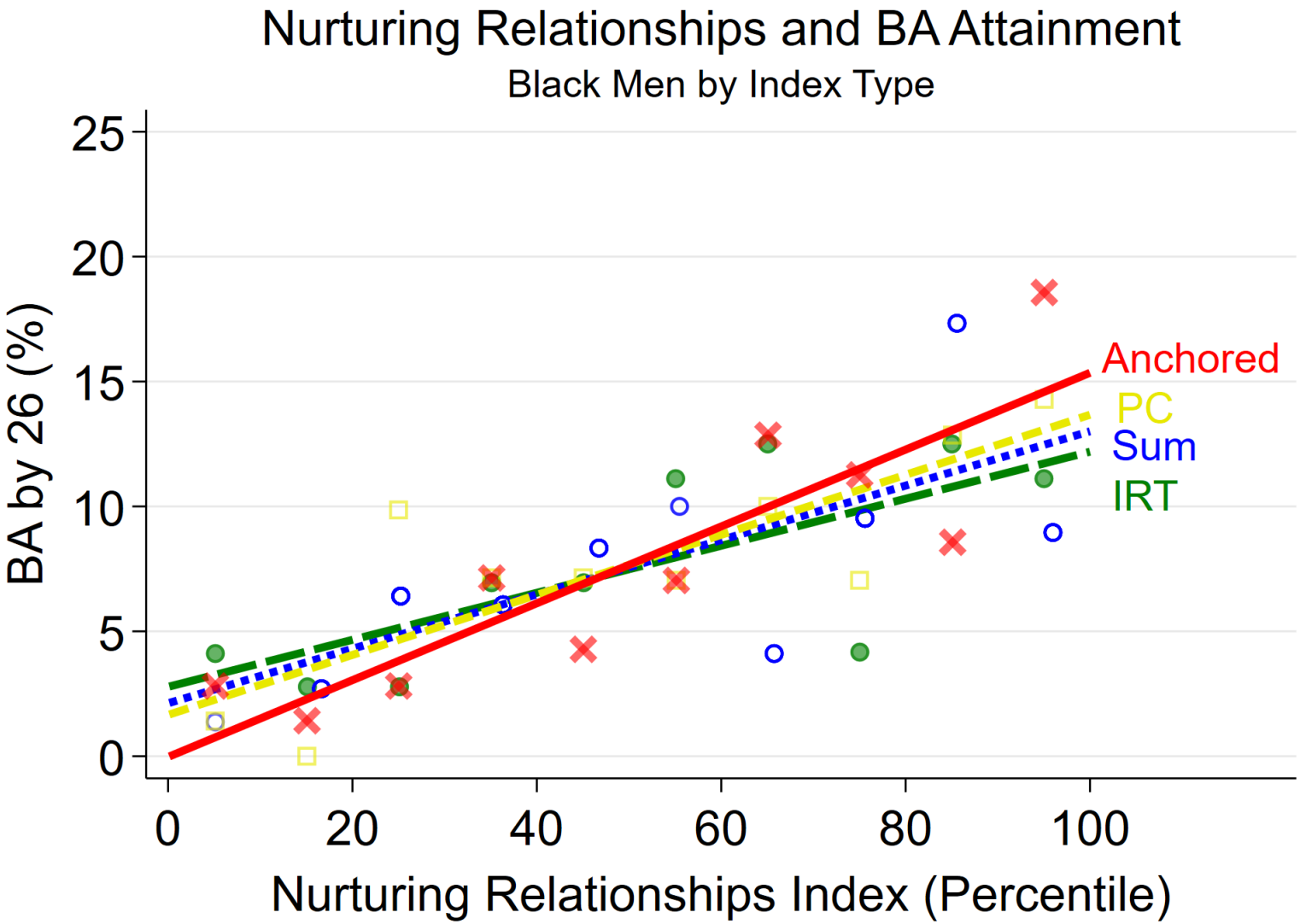
Back

Indexes of Exposure to Violence



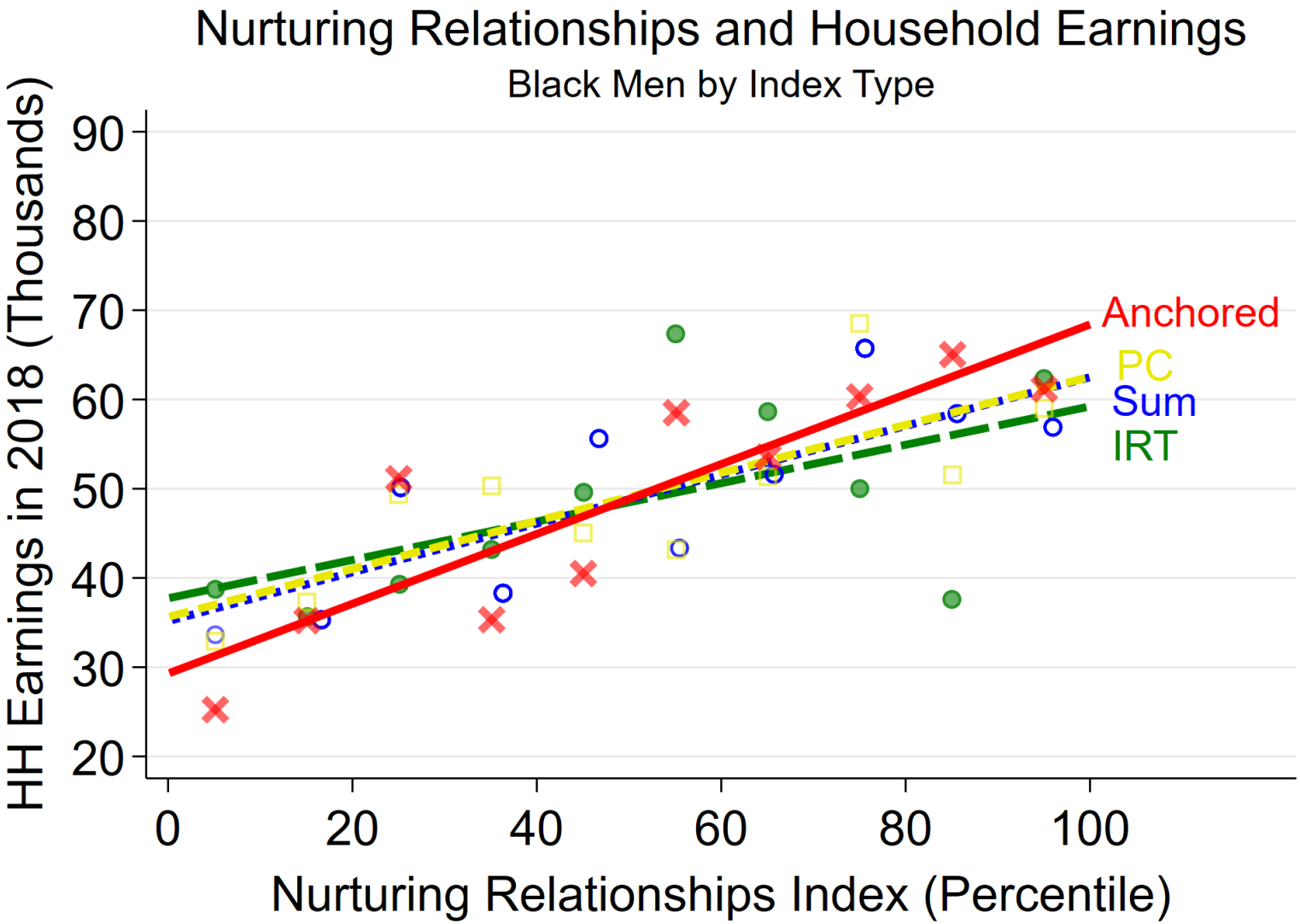
Back

Indexes of Nurturing Relationships



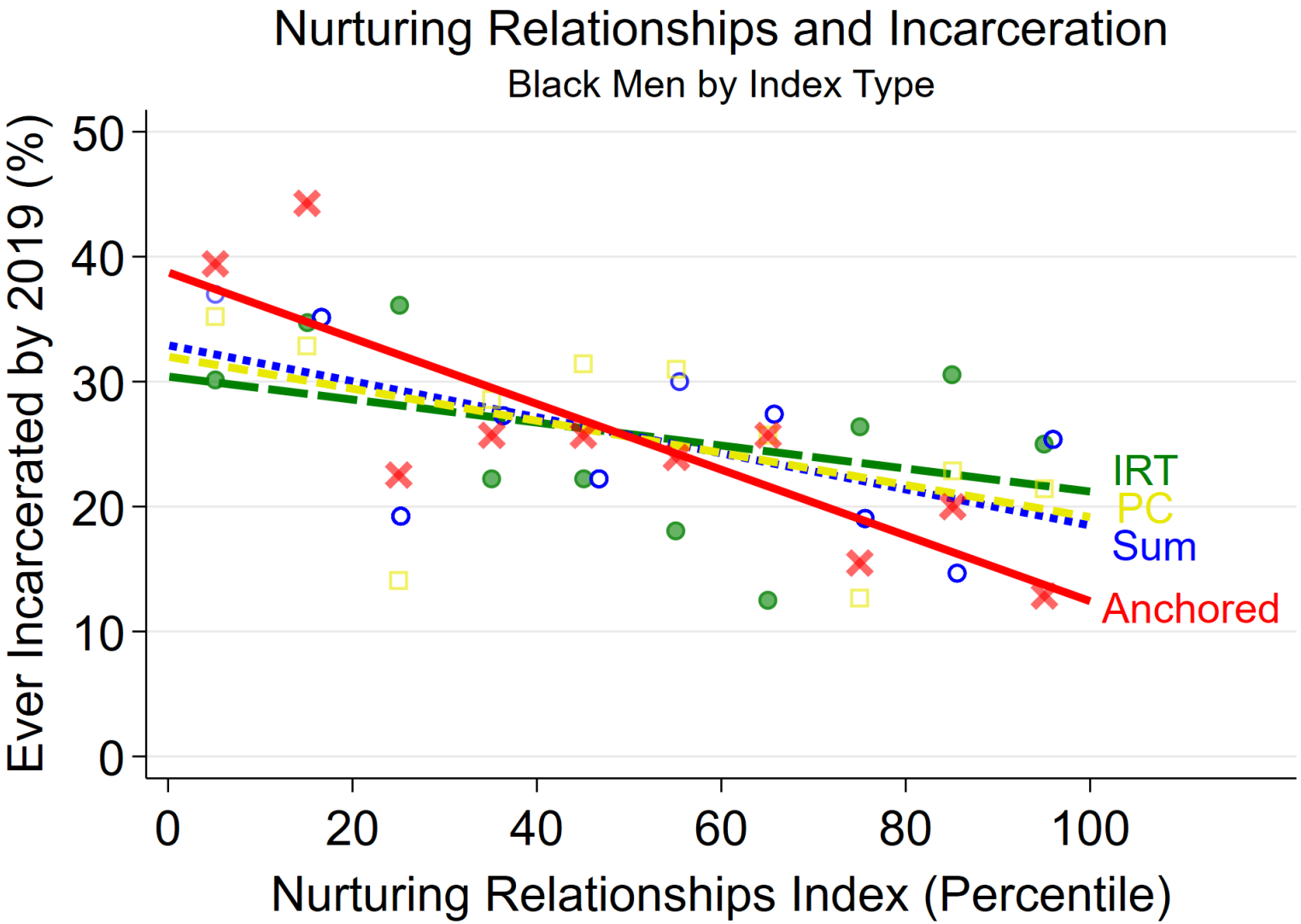
Back

Indexes of Nurturing Relationships



Back

Indexes of Nurturing Relationships



Back