

# The Geography of Opportunity: Developmental Trajectories of Children in Baltimore

Elia De la Cruz Toledo  
Irwin Garfinkel  
Christopher Wimer

Chapin Hall at the University of Chicago  
Columbia University

FEDERAL RESERVE SYSTEM COMMUNITY DEVELOPMENT RESEARCH  
CONFERENCE

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**Building a Brighter Future for Children,  
Families and Communities**

# Research Questions

## Goal

Study the *developmental trajectories* of Baltimore's youth through age 15.

## Questions

- 1 Do these trajectories differ from those of youth in other cities?
- 2 Are there differences by gender and race?
- 3 What drives the differences in these trajectories?
- 4 What is the role of :
  - Residential segregation
  - Income inequality
  - Family structure
  - School quality

# Neighborhood Theories

Pathways through which neighborhoods affect child and adolescent outcomes (Wilson, 1987; Jencks & Mayer, 1990).

- 1 **Neighborhood advantage:** role models and institutional resources influence children and adolescents.
  - *neighborhood institutional resource theory:* access to resources provide stimulating learning and social environments.
  - *collective socialization:* presence of adult role models, potential "enforcers".
- 2 **Relative deprivation:** evaluation of their own situation relative to neighbors or peers.
  - Perception of disadvantage creates negative effect.
- 3 **Epidemic:** when critical levels of social problems arise, influence of negative behavior of peers is stronger.
  - Loss of beneficial social networks and jobs.

Other potential mechanisms through which neighborhoods affect development ([Leventhal & Brooks-Gunn, 2000](#)).

## 1 Institutional resources

- Availability, accessibility, affordability and quality of resources.
- Schools, child care centers, medical facilities.
- Employment opportunities.

## 2 Relationships:

- Parental characteristics
- Support networks available to parents.
- Parental behavior.
- Quality of home environment.

## 3 Norms/ collective efficacy:

- Community supervision of residents' behavior.
- Focus on anti-social group behavior.

# Neighborhood Effects and Child Development

From [Leventhal & Brooks-Gunn, \(2000\)](#) review:

- High-SES neighborhoods had a consistent positive effect on *school readiness* and *achievement* outcomes.
- Low-SES neighborhoods had an adverse effect on children's and adolescents' *externalizing behavior*.
- Among children and adolescents, residing in a low-SES neighborhood had an adverse effect on behavioral and emotional wellbeing.
  - Externalizing behavior problems among young children.
  - Delinquency and externalizing behavior problems among adolescents.

# Neighborhood Effects and Long-term Outcomes

- Neighborhood characteristics are key determinants of long-term economic outcomes (Chetty et al., 2014; Chetty & Hendren, 2015; Chetty, Hendren & Katz, 2016)
- Crowder & South (2011) found that the fraction of childhood spent in high-poverty areas is negatively associated to high-school completion.
- Chetty et al., (2014) found that in high-mobility areas, children from low-income families are more likely to attend college and less likely to have a teen pregnancy.
- Chetty & Hendren (2015) found that moving to an area with high-upward mobility at a young age ( $<3$ ) increases earnings in adulthood.

## Fragile Families Child Well-being Study

- $N_{t0} = 4,998$  based on the same number of live births.
  - 3,711 non-marital.
  - 1,187 marital.
- First wave of data (1998 to 2000) collected at the time of birth.
- Consecutive waves were collected when the child was 1, 3, 5, 9, and 15 years of age.
- Sixth wave (2014 to 2016) collected 15 years after child's birth.
- Analytic sample
  - $N = 4,897$  mothers with complete baseline information.
  - 338 Baltimore residents at the time of the interview (7%)
  - 4,559 Residents in other cities (93%)



## Behavior problems

- Internalizing behavior: measure of negative behaviors directed at the self (e.g., social withdrawal, fearfulness) - ages: 3, 5, 9, 15
- Externalizing behavior: measure of negative behaviors directed at others (e.g., aggression, fighting) - ages: 3, 5, 9, 15
- Delinquent behavior:
  - *Mothers' report* - ages: 5, 9, 15
  - *Self report* - ages: 9, 15

## Cognitive skills

- PPVT scores: a measure of language skills - ages: 3, 5, 9

## Health

- Health status (*mothers' report*) - ages: 1, 3, 5, 9, 15
- Asthma (*mothers' report*) - ages: 1, 3, 5, 9, 15
- Child's self-report on overall health - ages: 9, 15

more

## Controls (at baseline)

- *Education*: < HS, HS, Some College/Assoc.s degree, College & +.
- *Race*: White, Black, Hispanic and Other.
- *Marital status*: Married, Cohabiting, Involved in a romantic relationship but living apart, Being friends, and No relationship.
- *Household poverty status*: 0-49%, 50-99%, 100-199%, 200-299%, and 300% +.
- *Mothers' age*: 14-20, 21-24, 25-29, and 30+.

# Neighborhood Characteristics (*from Chetty's Equality of Opportunity Project*)

## **Inequality and Crime**

- Income Inequality (Gini Index)
- Racial Segregation (Theil Index)
- Crime Rate per capita

## **School Quality**

- School Expenditure per capita (in public schools)
- Student-Teacher Ratio
- Test Score Percentile

## **Family Structure**

- Fraction of Single Mothers

## **Others**

- Social Capital Index
  - Includes: voter turnout rates, fraction of people who return their census forms, and participation in community organizations
- Population Density and Median Rent

# Empirical Strategy (reference model)

## Goal

Estimate the trajectory of children's behavior, health and cognitive skills.

$$ChildOutcome_{it} = \alpha + \beta_1 wave_t + \beta_2 wave * BALTIMORE_{it} + \theta X_{it} + \epsilon_{it} \quad (1)$$

## Child Outcomes

- 1 Externalizing and Internalizing behavior (CBCL) [ $t=3,4,5,6$ ]
- 2 Delinquent behavior -Mother's report [ $t=4,5,6$ ]
- 3 Delinquent behavior -Self-report [ $t=5,6$ ]
- 4 Cognitive score (PPVT) [ $t=3,4,5$ ]
- 5 Health status (mother- and self-report) & Asthma [ $t=2,3,4,5,6$ ]

## Empirical Strategy (full model)

$$\begin{aligned} ChildOutcome_{it} = & \alpha + \beta_1 wave_t + \beta_2 wave * BALTIMORE_{it} + \\ & \beta_3 Incomelnequality_j + \beta_4 SchoolQuality_j + \\ & \beta_5 SocialCapital_j + \beta_6 CrimeRate_j + \\ & \beta_7 RacialSegregation_j + \theta X_{it} + \epsilon_{it} \end{aligned} \quad (2)$$

### Marginal Changes in Child Outcomes

$$MarginalChange(Y_i) = \delta(ChildOutcome(Y_i)|X, Baltimore = 0, 1) / \delta wave_t$$

# Descriptive Results: Unadjusted Scores

	First score reported			Last score reported		
	Non-Baltimore (1)	Baltimore (2)	Difference (3)	Non-Baltimore (4)	Baltimore (5)	Difference (6)
<i><b>Behavior and cognitive outcomes</b></i>						
<b>Internalizing behavior</b>	0.052 (0.020)	-0.158 (0.051)	<b>0.210**</b>	0.131 (0.020)	0.165 (0.076)	<b>-0.034</b>
<b>Externalizing behavior</b>	0.141 (0.020)	-0.016 (0.061)	<b>0.157*</b>	0.116 (0.020)	0.250 (0.082)	<b>-0.134+</b>
Cognitive Score	-0.099 (0.022)	-0.021 (0.071)	-0.078	-0.144 (0.016)	-0.225 (0.057)	0.082
<b>Delinquent Behavior</b>	0.052 (0.052)	0.079 (0.079)	<b>-0.027</b>	0.113 (0.021)	0.262 (0.083)	<b>-0.149+</b>
<b>Self-rep. Delinquency</b>	0.046 (0.015)	0.237 (0.062)	<b>-0.191***</b>	0.141 (0.022)	0.409 (0.092)	<b>-0.268***</b>
<i><b>Health outcomes</b></i>						
Good Health	-0.025 (0.016)	0.135 (0.055)	-0.160**	-0.116 (0.019)	-0.112 (0.068)	-0.004
Asthma	0.101 (0.019)	0.175 (0.070)	-0.075	0.120 (0.017)	0.095 (0.060)	0.025
Self-reported Good health	-0.043 (0.019)	0.081 (0.061)	-0.124+	-0.104 (0.020)	-0.056 (0.069)	-0.049
Observations	2,766	247		2,870	228	

Standard errors in parentheses. Statistical significance: \*\*\*p<0.001, \*\*p<0.01, \*p<0.05, +p<0.10

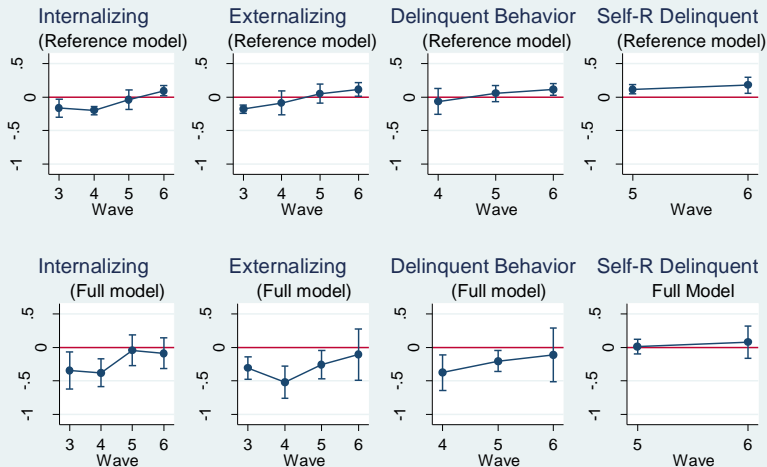
# Neighborhood Differences across cities

	Non-Baltimore	S.D.	Baltimore	S.D.	Difference
<b>Income Inequality (<i>Gini Index</i>)</b>	<b>0.536</b>	<b>(0.119)</b>	<b>0.576</b>	<b>(0.091)</b>	<b>-0.040***</b>
School Expenditure	6.835	(1.200)	6.712	(0.196)	0.123***
Student-Teacher Ratio	19.494	(2.789)	18.275	(0.758)	1.219***
<b>Test Score Percentile</b>	<b>-10.685</b>	<b>(9.246)</b>	<b>-17.898</b>	<b>(6.968)</b>	<b>7.213***</b>
<b>Fraction of Single Mothers</b>	<b>0.293</b>	<b>(0.099)</b>	<b>0.439</b>	<b>(0.135)</b>	<b>-0.146***</b>
Social Capital Index	-0.218	(0.959)	-0.204	(0.300)	-0.014
<b>Crime Rate</b>	<b>0.009</b>	<b>(0.004)</b>	<b>0.015</b>	<b>(0.002)</b>	<b>-0.006***</b>
<b>Racial Segregation (<i>Theil Index</i>)</b>	<b>0.291</b>	<b>(0.128)</b>	<b>0.347</b>	<b>(0.081)</b>	<b>-0.056***</b>
Population Density	7.780	(1.371)	8.423	(0.965)	-0.643***
Median Rent	\$783.96	(242.21)	\$613.44	(117.74)	170.516***

Notes: 1. All measures are taken from Chetty and Hendren (2015). 2. In our models, scores are standardized using national means and standard deviations from the 2000 census. 3. In this table we present unstandardized measures for simplicity of interpretation. 4. Both indices show that worse levels of inequality as the measure approaches one. 5. A two-sample t-test was used to determine differences in means from Baltimore – non-Baltimore cities. 6. Statistical significance: \*\*\*p<0.001, \*\*p<0.01, \*p<0.05, +p<0.10.

# ADJUSTED Developmental Trajectories

## Fig 1: Children's Behavior Trajectories

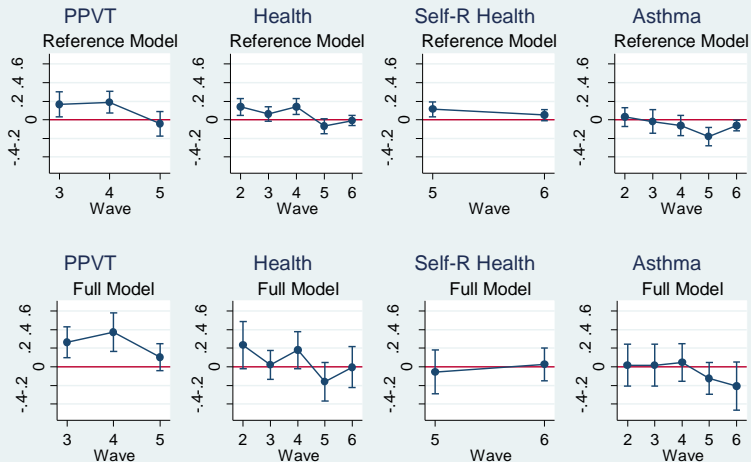


NOTES: Units are measured in standard deviations from the city mean. Data from FFCWS 1998-2015.



# ADJUSTED Developmental Trajectories

## Fig 2: Children's Cognitive and Health Trajectories

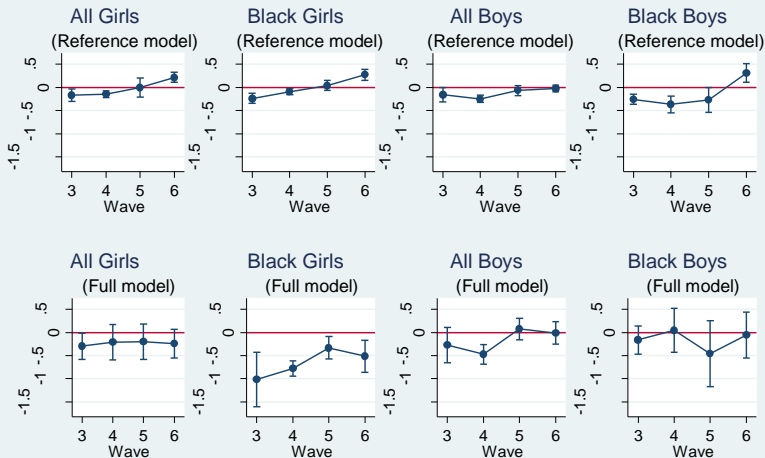


NOTES: Units are measured in standard deviations from the city mean. Data from FFCWS 1998-2015.

# Race and Gender Differences

# Internalizing Behavior

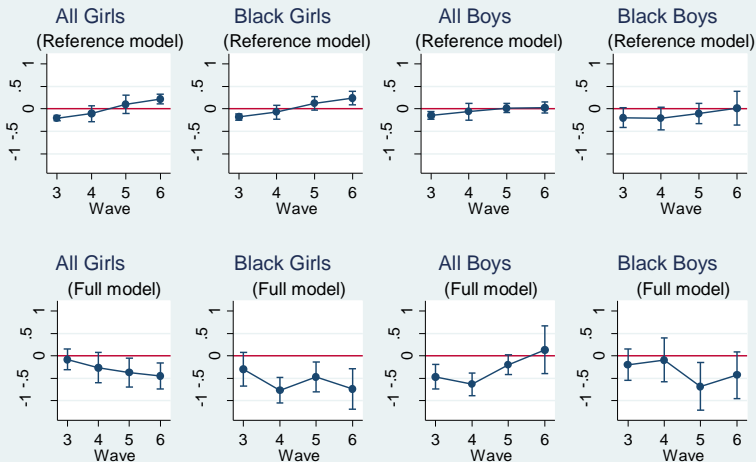
## Fig 3: Internalizing Behavior



NOTES: Units are measured in standard deviations from the city mean. Data came from FFCWS 1998-2015.

# Externalizing Behavior

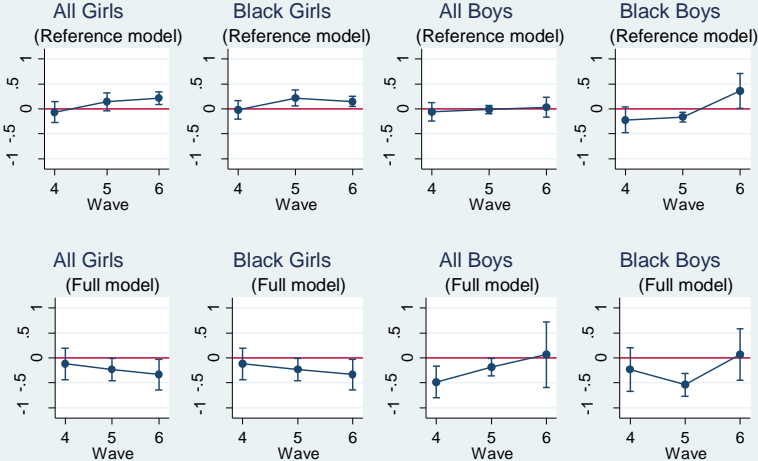
## Fig 4: Externalizing Behavior



NOTES: Units are measured in standard deviations from the city mean. Data came from FFCWS 1998-2015.

# Delinquent Behavior

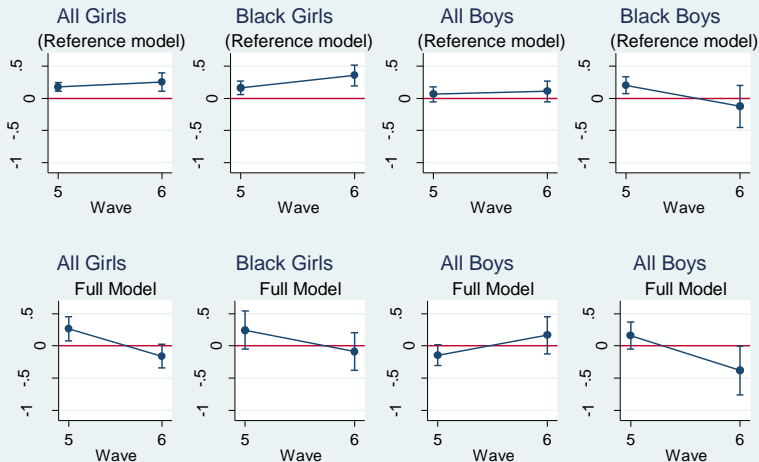
## Fig 5: Delinquent Behavior



NOTES: Units are measured in standard deviations from the city mean. Data came from FFCWS 1998-2015.

# Self-reported Delinquent Behavior

Fig 6: Self-Reported Delinquent Behavior



NOTES: Units are measured in standard deviations from the city mean. Data came from FFCWS 1998-2015.

# Summary

- A youth's neighborhood environments may affect their developmental trajectories.
- Over time, we observe worse developmental trajectories of children in Baltimore.
- Baltimore children would have likely been better off than children in other cities in several domains if residential context was characterized by lower inequalities.
- These inequalities are likely to explain the deterioration of social behavior of Baltimore children over time, particularly for black girls.
- Developmental trajectories of black boys in Baltimore did not seem to be affected by income, race or other forms of inequality in the residential context.

- Research has shown that neighborhoods tend to depress upward mobility in adulthood.
- In this study we found that neighborhoods can also have negative consequences for children at a young age.
- Neighborhood inequalities can even change the trajectories of children in a way that might be difficult to reverse.
- Community-level factors such as income and racial inequality are also important predictors of economic mobility for individuals living in predominantly low-income neighborhoods.



- One hypothesis is that children and youth in low-income and segregated communities may lack informal control and, consequently, the ability to regulate the behavior of children and youth.
- In these neighborhoods, institutions may not be present to supervise and protect children and adolescents.
- Recent studies have shown that exposure to socioeconomic inequality in an everyday setting negatively affects willingness to publicly support a redistributive economic policy ([Sands, 2017](#)).

Thank You!

# Appendix

# Standardization

- Scores ( $Y_{it}$ ) are standardized and can be interpreted relevant to the larger population (and not only to the sample).
- $Z\text{-score}_{it} = Y_{it} - \mu_w / \delta_w$   
 $\mu_w$  = weighted mean,  $\delta_w$  = standard deviation,  $w$  = **city weights**.

## Interpretation

- Z-score of 0 = Average score of children born to the 20 cities in the FF sample between 98-00.
- Z-score of 1 indicates a one standard deviation above the average score of children in this cohort.
- Z-score of -1 indicates a one standard deviation below the average score of children in this cohort.

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# Household and Mothers' Characteristics

	Proportion – All Cities	Non-Baltimore	Baltimore	Difference
<b><i>Race</i></b>				
White	0.211	0.214	0.172	0.042***
Black	0.476	0.454	0.775	<b>-0.321***</b>
Hispanic	0.273	0.291	0.030	<b>0.261***</b>
Other	0.039	0.041	0.024	0.017***
<b><i>Education</i></b>				
Less than high school	0.348	0.351	0.299	<b>0.052***</b>
High School	0.302	0.298	0.361	-0.062***
Some College / Assoc.	0.243	0.245	0.216	0.029*
College or more	0.107	0.106	0.124	<b>-0.018**</b>
<b><i>Household poverty level</i></b>				
0 – 49%	0.189	0.190	0.183	0.006
50 – 99%	0.171	0.174	0.136	<b>0.038***</b>
100 – 199%	0.258	0.258	0.251	0.006
200 – 299%	0.155	0.152	0.195	<b>0.008***</b>
300% +	0.226	0.226	0.234	-0.008
<b><i>Relationship status</i></b>				
Married	0.243	0.243	0.246	-0.003
Cohabiting	0.364	0.367	0.320	0.047***
Visiting	0.260	0.260	0.272	-0.012
Friends	0.060	0.058	0.095	-0.036***
No relationship	0.073	0.073	0.068	0.005
<b><i>Age categories</i></b>				
14-20	0.265	0.264	0.275	-0.011
21-24	0.267	0.267	0.260	0.006
25-29	0.234	0.234	0.228	0.006
30+	0.235	0.235	0.237	-0.001
Observations	4,877	4,539	338	