

# Estimating Social Interactions: Selection Within & Across Groups

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# Background

- Social interactions: An individual's behaviors or outcomes depend on that of "neighbors"
- Contexts
  - School children
  - Neighborhood employment
  - Human capital spillovers
  - Strategic games
- Naive strategies suggest strong interactions

# Mechanisms

- Strategic / Utility complementarities
- Information transmission
- Knowledge spillovers

# Wilson [1987], *The Truly Disadvantaged*

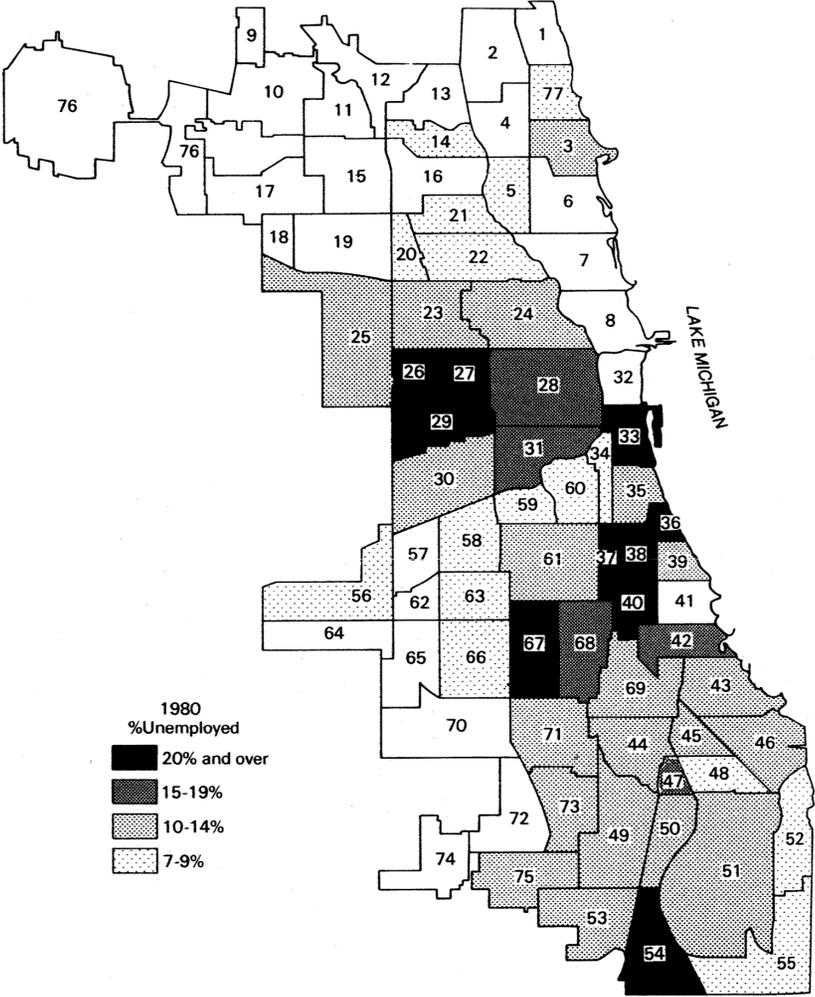


Figure 2.6. Unemployment rates in Chicago Community Areas, 1980.  
Source: see fig. 2.3.

# Selection, Selection, Selection

- Concern about people selecting into groups
- Focus of existing literature
- Focus on selection into groups, not selection within groups

# Instrumental Variables

- Instrument for group variables
- Very popular strategy
- Two versions:
  1. Randomized experiments
    - Moving to Opportunity (MTO)
  2. Quasi-experiments
    - Gautreaux, Housing Projects; Roommates, Cross-Class variations
- Sizeable effects on neighborhoods
- Generally small social effects

# Moving to Opportunity (MTO)

- Highly visible study - Katz, Kling, *et. al.*
- Modeled on medical trial
- Participants randomized into 1 of 3 groups:
  1. Control - No program, but move around
  2. Section 8 - Voucher to move
  3. Treatment - Voucher to move to low poverty neighborhood

## MTO: Effect on Employment

	<i>Employed (self)</i>		<i>Share 2001 Quarters (admin.)</i>		<i>Share Year 1-5 Quarters (admin.)</i>		<i>Share Year 5 Quarters (admin.)</i>	
	<i>Est. (SE)</i>	<i>Low High</i>	<i>Est. (SE)</i>	<i>Low High</i>	<i>Est. (SE)</i>	<i>Low High</i>	<i>Est. (SE)</i>	<i>Low High</i>
ITT Exp-Control: Effect of .074 change in neighborhood emp.	.015 (.021)	-.026 .056	-.017 (.017)	-.050 .016	-.006 (.013)	-.031 .019	.002 (.018)	-.033 .037
ITT Sec 8-Control: Effect of .056 change in neighborhood emp.	.024 (.023)	-.021 .069	.014 (.017)	-.019 .047	.001 (.014)	-.026 .028	.008 (.020)	-.031 .047
TOT Exp-Control: effect of .159 change in neighborhood emp.	.033 (.044)	-.053 .119	-.036 (.035)	-.105 .033	-.012 (.028)	-.067 .043	.005 (.039)	-.071 .081
TOT Sec 8-Control: effect of .093 change in neighborhood emp.	.040 (.038)	-.034 .114	.022 (.028)	-.033 .077	.001 (.023)	-.044 .046	.013 (.032)	-.050 .076

Source: Kling *et. al.* [2004]

## Comparing MTO to Weinberg, Reagan, and Yankow.

	MTO				WRY		
	<i>Self Rep.</i>	<i>Share 2001 Qtrs.</i>	<i>Share Year 1-5 Qtrs.</i>	<i>Share Year 5 Qtrs.</i>	OLS	FE	FE & Ind. Trends
	<i>Low High</i>	<i>Low High</i>	<i>Low High</i>	<i>Low High</i>	Est.	Est.	Est.
ITT Exp-Control: Effect of .074 Chng. in N. Emp.	-.026 .056	-.050 .016	-.031 .019	-.033 .037	0.062	0.018	0.011
ITT Sec 8-Control: Effect of .056 change in neighborhood emp.	-.021 .069	-.019 .047	-.026 .028	-.031 .047	0.047	0.014	0.008
TOT Exp-Control: effect of .159 change in neighborhood emp.	-.053 .119	-.105 .033	-.067 .043	-.071 .081	0.133	0.039	0.024
TOT Sec 8-Control: effect of .093 change in neighborhood emp.	-.034 .114	-.033 .077	-.044 .046	-.050 .076	0.078	0.023	0.014
Share of WRY above MTO Upper-Bound					12/16	2/16	0/16

## Endogenous Effects for Employment Implied by MTO.

	<i>Estimate</i>			
	<i>Emp. (self)</i>	<i>Share 2001 Quarters (admin.)</i>	<i>Share Year 1-5 Quarters (admin.)</i>	<i>Share Year 5 Quarters (admin.)</i>
ITT experimental-control	0.203	-0.230	-0.081	0.027
ITT Section 8-control	0.429	0.250	0.018	0.143
TOT experimental-control	0.208	-0.226	-0.075	0.031
TOT Section 8-control	0.430	0.237	0.011	0.140
	<i>Upper Bound</i>			
ITT experimental-control	0.757	0.221	0.263	0.504
ITT Section 8-control	1.232	0.845	0.508	0.843
TOT experimental-control	0.748	0.205	0.270	0.512
TOT Section 8-control	1.226	0.827	0.495	0.814

Calculated from Kling *et. al.* [2004]

# Why Are Estimates Small?

- 1<sup>st</sup>: Are they small or just noisy?
- Focuses on upward bias from selection into groups; selection *within* groups is ignored
- Policies move at-risk individuals from very troubled to moderately troubled groups
- Guys who are moved sort to be with people like themselves within new groups
- Effect of even large moves on associations may be small

# My Approach

- Generates non-linearities and interactions naturally
  - Breaks zero-sum implication
  - Reflection problem
- Group size effects
- Peer pressure

# Empirical Analysis

- Add Health - National Longitudinal Study of Adolescent Health
- Data on background, behaviors, and friendship networks among high school students
- Determinants of associations and behaviors

Table 3. Mean Associate Characteristics Related to Own Characteristics.

	Full Sample	Neighborhood Sample	
White	0.235 (0.004)	0.217 (0.009)	0.210 (0.009)
Black	0.572 (0.003)	0.577 (0.008)	0.522 (0.008)
Asian	0.316 (0.003)	0.397 (0.008)	0.390 (0.008)
Indian	0.033 (0.003)	0.044 (0.006)	0.043 (0.006)
Hispanic	0.231 (0.004)	0.237 (0.009)	0.228 (0.009)
Mother has some College	0.094 (0.003)	0.086 (0.008)	0.080 (0.008)
Mother Homemaker With Dad	0.018 (0.003)	0.013 (0.007)	0.013 (0.007)
	0.026 (0.003)	0.028 (0.007)	0.025 (0.007)
N (Race Variables)	46,990	8,080	8,080
N (Hispanic)	42,822	7,371	7,371
N (Family Background)	36,942	6,350	6,350
Full Sample	Yes		
Neighborhood Sample		Yes	Yes
With Own*Neighborhood Interactions			Yes

Fig. 5 - Own, Group, and Associates' Chars.

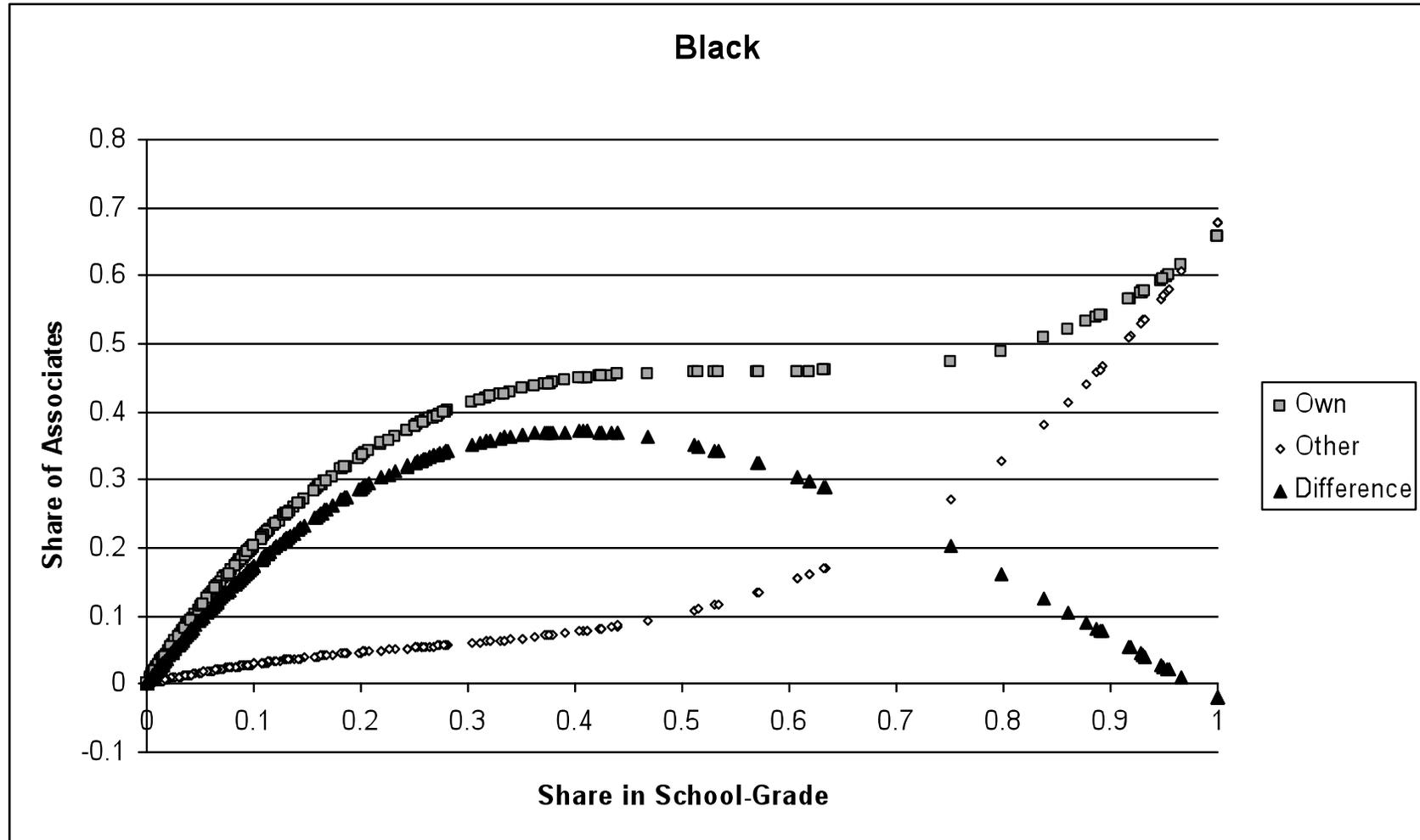
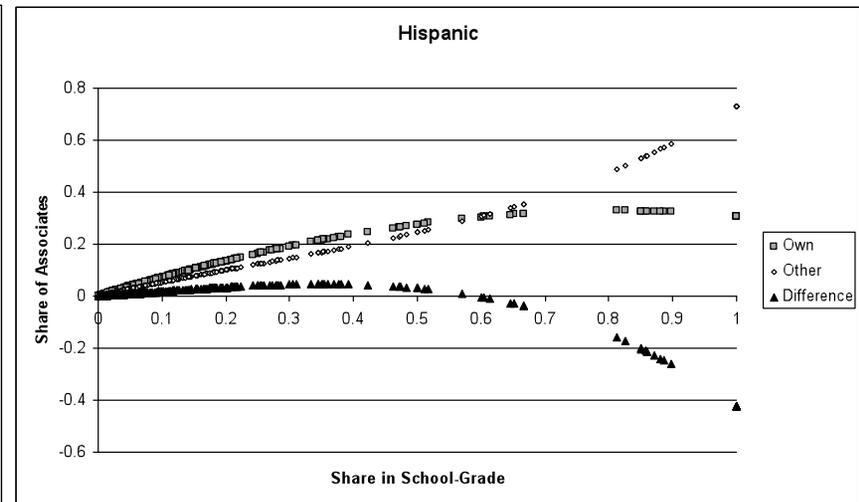
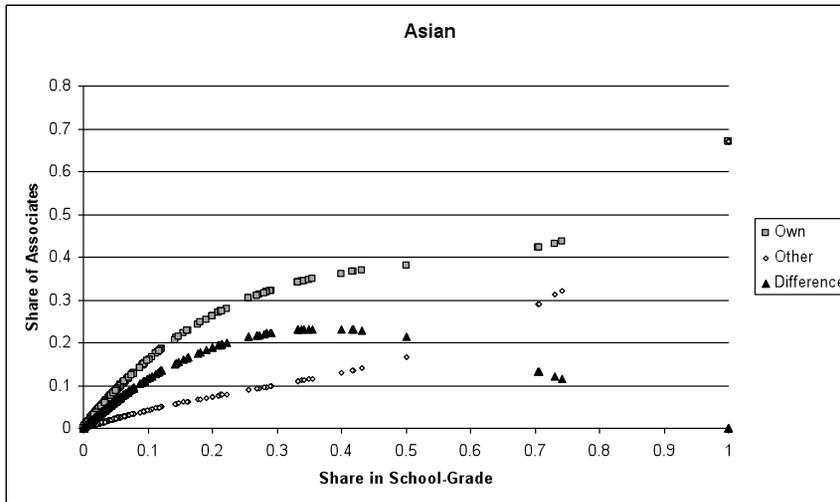
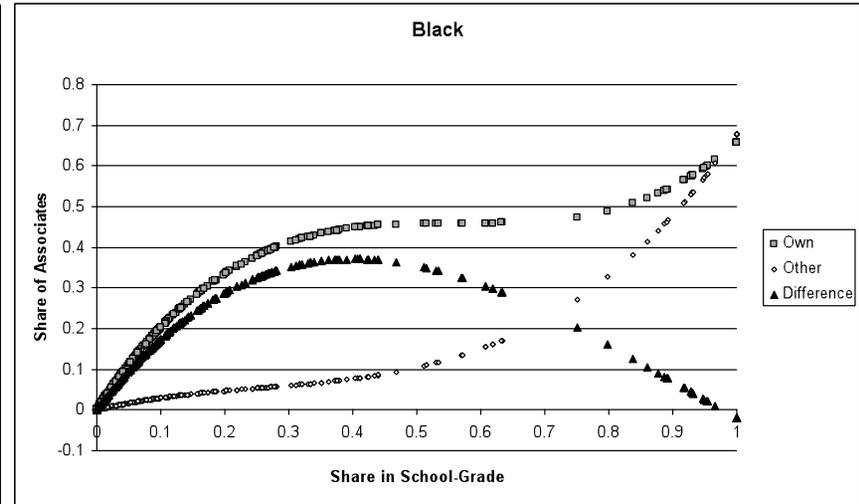
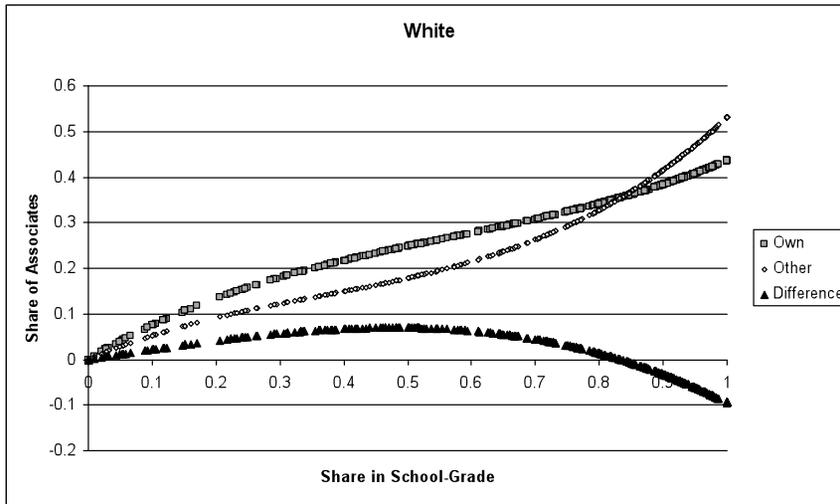


Fig. 5 - Own, Group, and Associates' Chars.



# Grade Size

- Large groups facilitate sorting

Table 5. The Effect of Macro-Group Size on Sorting.

	Own Characteristic *
	Log(School-Grade Size)
White	0.0040 (0.0046)
Black	0.0672 (0.0042)
Asian	0.1382 (0.0049)
Indian	0.0093 (0.0041)
Hispanic	0.1089 (0.0054)
Mother has some College	0.0056 (0.0022)
Mother Homemaker	0.0230 (0.0045)
With Dad	-0.0021 (0.0042)
N (Race Variables)	46,990
N (Hispanic)	42,822
N (Family Background)	36,942
School-Grade Effects	Yes

# Conclusions

- Solutions to selection across groups may exacerbate selection within groups
- Want to think about how people sort within groups
- Valuable to manipulate group size as well as group composition