Changes in the Nature of Neighborhood Socioeconomic Status

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Why Produce a NSES Measure?

- Neighborhood effects have been studied for decades
- NSES is predictor of outcomes above individual factors
- No study has tested a measure with stable measurement properties over time
  - Longitudinal invariance
- Motivated by 20 year longitudinal study
  - Neighborhoods effects on cognitive aging
- Applicable to applied public health research
  - Monitor conditions of neighborhoods

Approaches to NSES Measurement

- Measures of broad neighborhood characteristics need to be refined to focus on NSES
  - Measures of disadvantage
  - Measures which split affluence and disadvantage
  - Measures of neighborhood socioeconomic resources

- Prior NSES measures not designed for longitudinal research
  - Necessity for measurement equivalence over time

Goal of Project

- Develop single factor
- Ensure time-invariant measurement properties
- Focus solely on SES variables

Tract-Level Data Come from Census and American Community Survey

- **Time points:**
  - 1990, 2000 (Census)
  - 2005-2009 (ACS)
- **Geography level:**
  - Census tract, harmonized to year 2000 boundaries
  - 65,456 tracts nation-wide in 2000

We Selected 10 SES Indicators

- Median household income
- % of households with income <100% of Federal Poverty Line
- % of population 25+ without a high school diploma or equivalent (GED)
- % of population 25+ who hold a bachelor's degree
- % of workers age 16+ who are unemployed
- % of workers age 16+ in management, professional, and related occupations
- % of households that receive any public assistance income
- % of female-headed households (no male present) with children under age 18
- % of households with more than 1.00 occupants per room (crowded housing)
- Median home value of owner-occupied housing units

Analytic Approach

Data Preparation:

- Log transformed skewed variables:
  - –Median household income
  - –% Female headed households
  - –% Unemployment
  - –% Poverty

- Created a single scaled education variable:
  <HS = 0; HS = 1; BA = 2

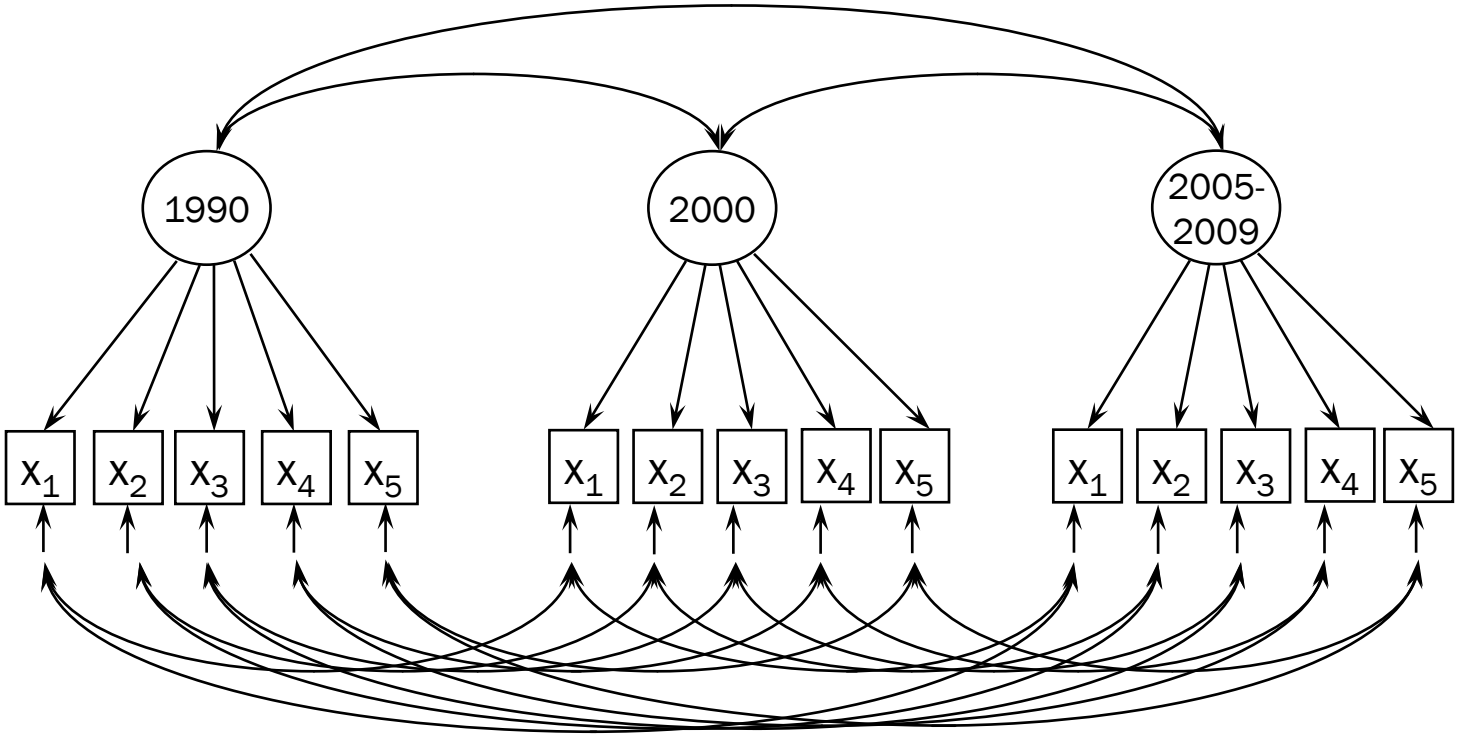
Data Analysis:

- Confirmatory factor analysis (CFA) - a rigorous test of a single-factor model
- Test equivalence of loadings over time in combined dataset in factor analytic model

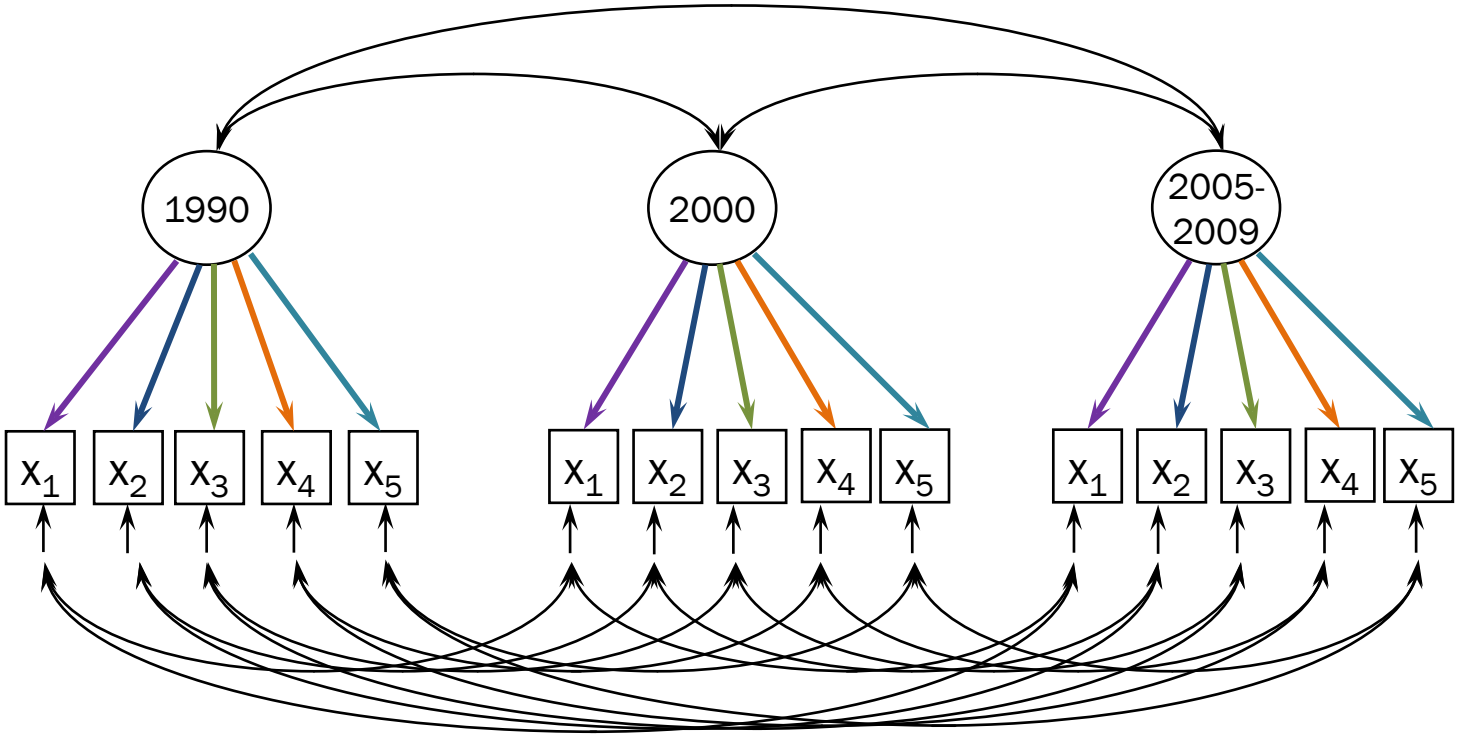
Analytic Approach

- Stage 1:
  - Develop single-factor model fitted to three time points
- Stage 2:
  - Test for longitudinal invariance by comparing fit of unconstrained vs. constrained models
  - Dropped indicators if they failed equivalence testing:
    - Public Assistance Income
    - Median Home Value
    - Crowded Housing
    - Professional Occupations

Single Factor Model: Unconstrained



Single Factor Model: Constrained



Model Loadings

	1990		2000		2005-2009	
	Est	SE	Est	SE	Est	SE
F1 BY						
Median Household Income	1.00		1.00		1.00	
Female-Headed Households	-1.30	0.01	-1.00	0.01	-1.15	0.01
Unemployment	-1.18	0.01	-1.11	0.01	-0.83	0.01
Poverty	-2.46	0.01	-1.70	0.02	-1.78	0.01
Education	0.47	0.00	0.42	0.01	0.42	0.01

Model Loadings

	1990		2000		2005-2009		Constrained	
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Median Household Income	1.00		1.00		1.00		1.00	
Female-Headed Households	-1.30	0.01	-1.00	0.01	-1.15	0.01	-1.13	0.01
Unemployment	-1.18	0.01	-1.11	0.01	-0.83	0.01	-1.10	0.01
Poverty	-2.46	0.01	-1.70	0.02	-1.78	0.01	-1.97	0.01
Education	0.47	0.00	0.42	0.01	0.42	0.01	0.45	0.00

Constrained Model is a Slightly Worse Fit But Still Acceptable

	Unconstrained	Constrained	Acceptable
CFI	.95	.93	> .90
RMSEA	.039	.043	< .06
SRMR	.058	.070	< .08
χ^2	6941	9296	p < .05
DF	69	77	-

We Assessed Quantitative Differences in Fit

- χ^2 test is significant
  - Given sample size, overpowered
- CFI difference larger than we would like
  - Recommendation Δ CFI < 0.01
- Correlations between factor scores at each of 3 time points was high (~0.998)
- Implication for measure:
  - Doesn't matter which model we use

The Stable NSES Measure

[1 × (ln(Median Household Income))] + [-1.129 × (ln(% Female-Headed Households))] + [-1.104 × (ln(% Workers 16+ who are unemployed))] + [-1.974 × (ln(% of households in poverty))] + 0.451 × [1 ×(% high school grads but not BA holders) + 2 × (% BA holders)]

Note: Works when tracts are harmonized to 2000 boundaries!

We Now Have a Time-Invariant Measure of NSES

- Ensure accurate comparisons
- Study health disparities over time
- Examine if there has been real change in NSES (gentrification or deterioration) in a given neighborhood

Applications of Our NSES Measure

- Public health researchers
  - Use the measure in longitudinal models and in other public health surveillance
- Applied demographers & regional planners
  - Use it to classify neighborhoods

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Appendices

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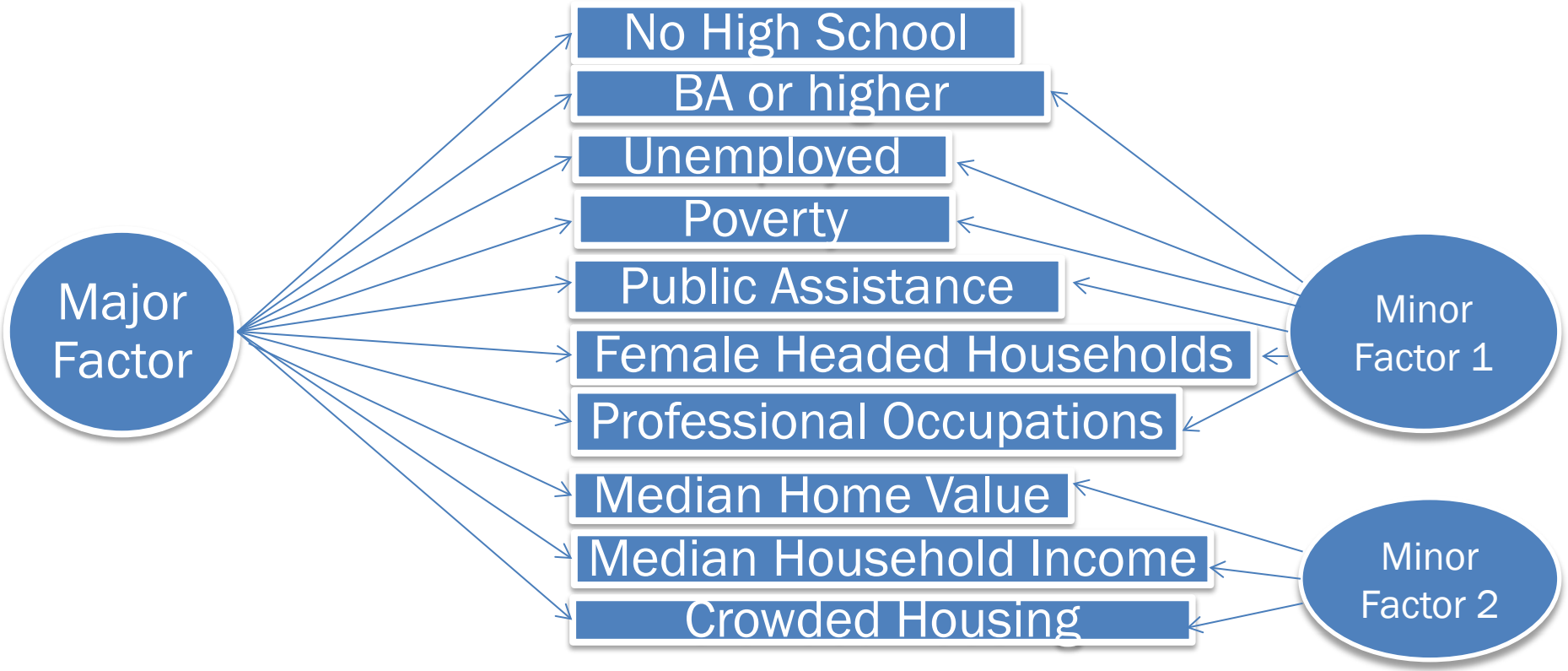
Our First Model: The Bi-Factor Model



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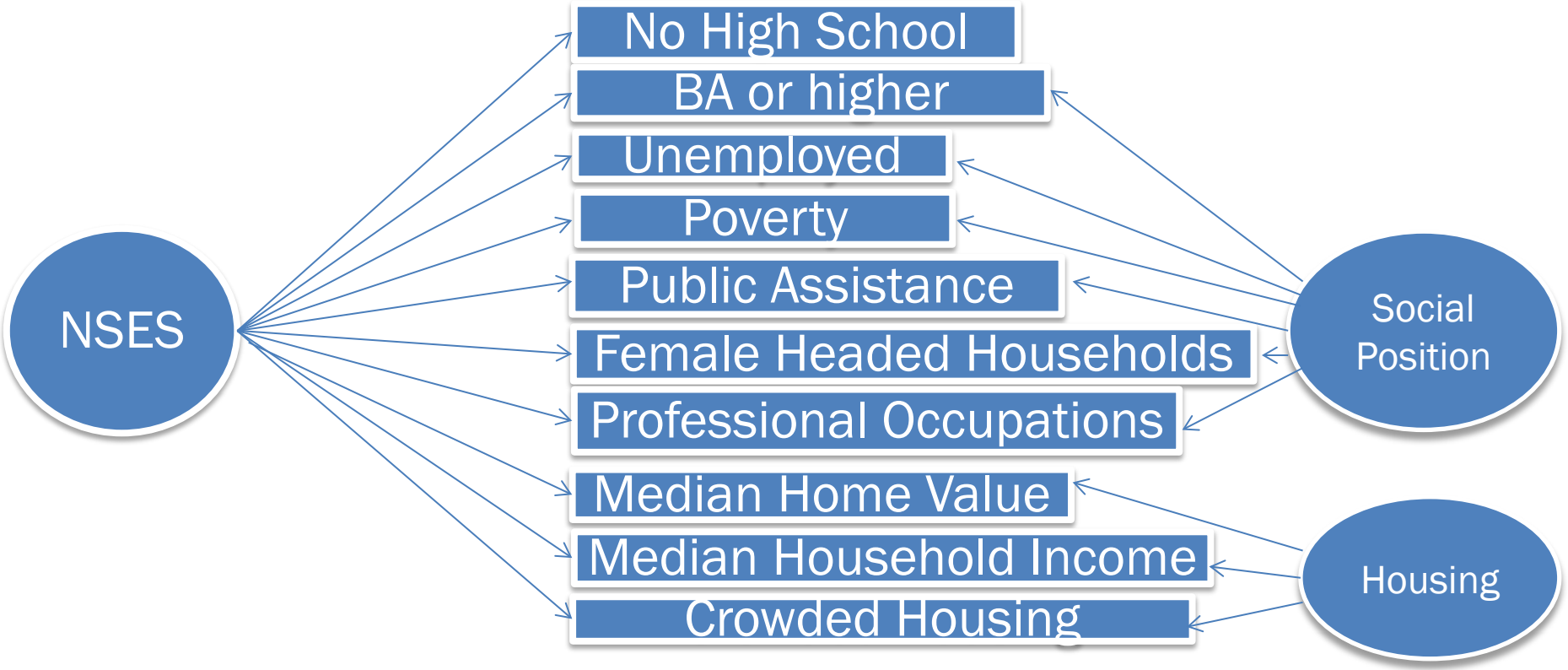

Bi-Factor Loadings

	1990		2000		2005-2009	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
BIGF BY						
Median Household Income	1	N/A	1	N/A	1	N/A
Educ. Less Than High School	-0.915	0.003	-0.757	0.003	-0.632	0.003
Median Home Value	0.362	0.002	0.360	0.002	0.412	0.003
Educ. BA or Higher	0.818	0.003	0.870	0.003	0.926	0.003
Unemployment	-0.293	0.001	-0.254	0.001	-0.232	0.001
Poverty	-0.701	0.003	-0.585	0.002	-0.613	0.003
Income from Public Assistance	-0.692	0.003	-0.228	0.001	-0.141	0.001
Female–Headed Households	-0.441	0.002	-0.286	0.001	-0.428	0.002
Professional Occupations	0.691	0.003	0.742	0.003	0.806	0.003
Crowded Housing	-0.282	0.002	-0.289	0.002	-0.157	0.001
F1 BY						
Median Household Income	1	N/A	1	N/A	1	N/A
Median Home Value	1.564	0.018	1.314	0.016	2.166	0.026
Crowded Housing	0.438	0.005	0.515	0.006	0.264	0.003
F2 BY						
Educ. BA or Higher	1	N/A	1	N/A	1	N/A
Unemployment	0.277	0.003	0.285	0.003	0.173	0.003
Poverty	0.688	0.006	0.583	0.005	0.538	0.006
Income from Public Assistance	0.761	0.007	0.227	0.002	0.119	0.002
Female -Headed Households	0.569	0.005	0.264	0.003	0.395	0.005
Professional Occupations	0.77	0.004	0.716	0.003	0.737	0.005

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The loadings on these items change considerably over the time period.

The signs of the loadings of Items on F1 & F2 are different from those on BigF. Difficult to interpret.


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