

# **Social Inequality and Disparities in Health: Their Connections Over the Life Course**

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**Presentation at the Conference, Health and Attainment Over the Life Course:  
Reciprocal Patterns from Before Birth to Old Age**

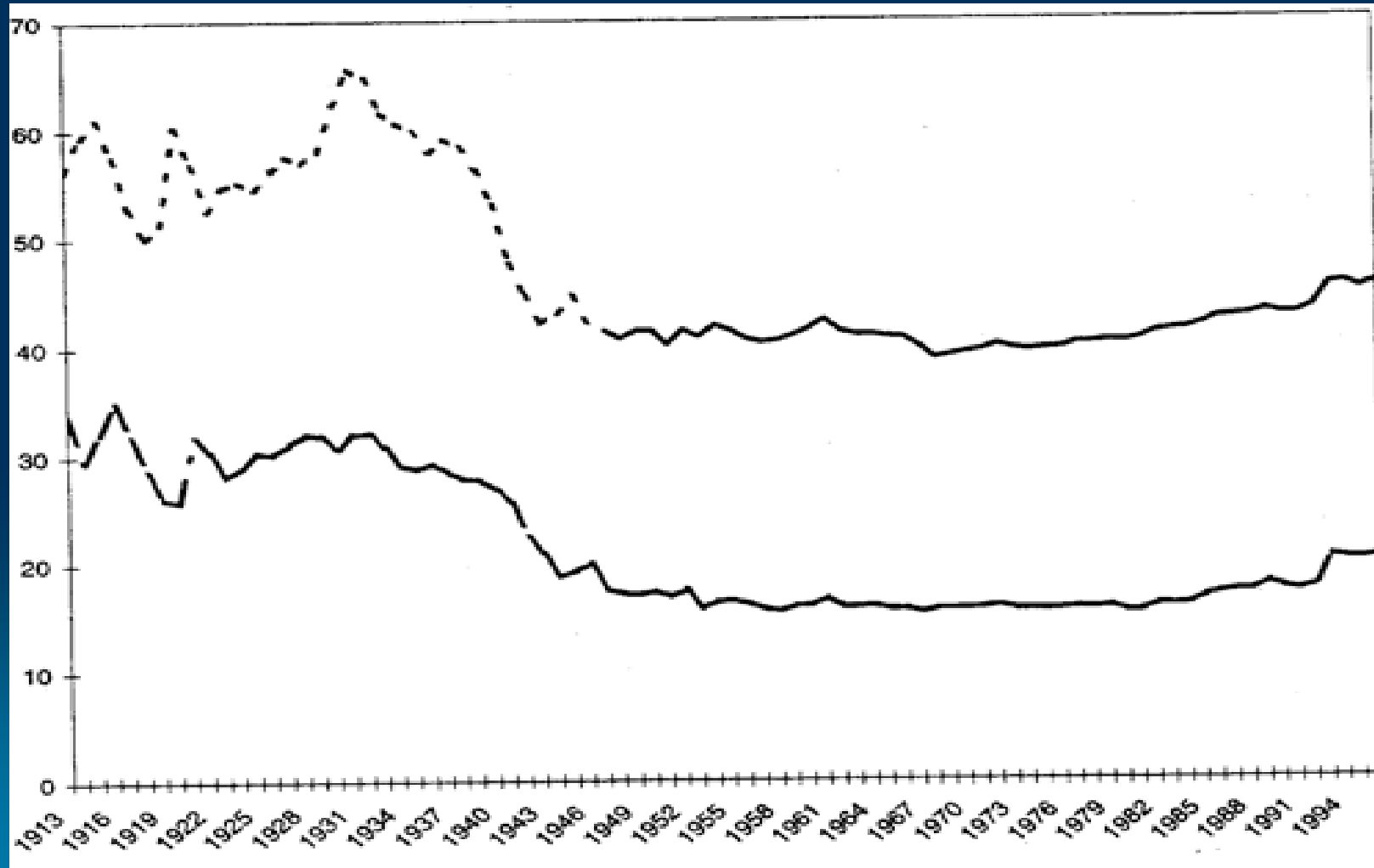
**Co-Sponsored by Cells to Society (C2S): The Center on Social Disparities and Health,  
Institute for Policy Research; Center for Human Potential and Public Policy; Chapin  
Hall Center for Children; Center for Health and the Social Sciences,  
University of Chicago**

# Overview of Presentation

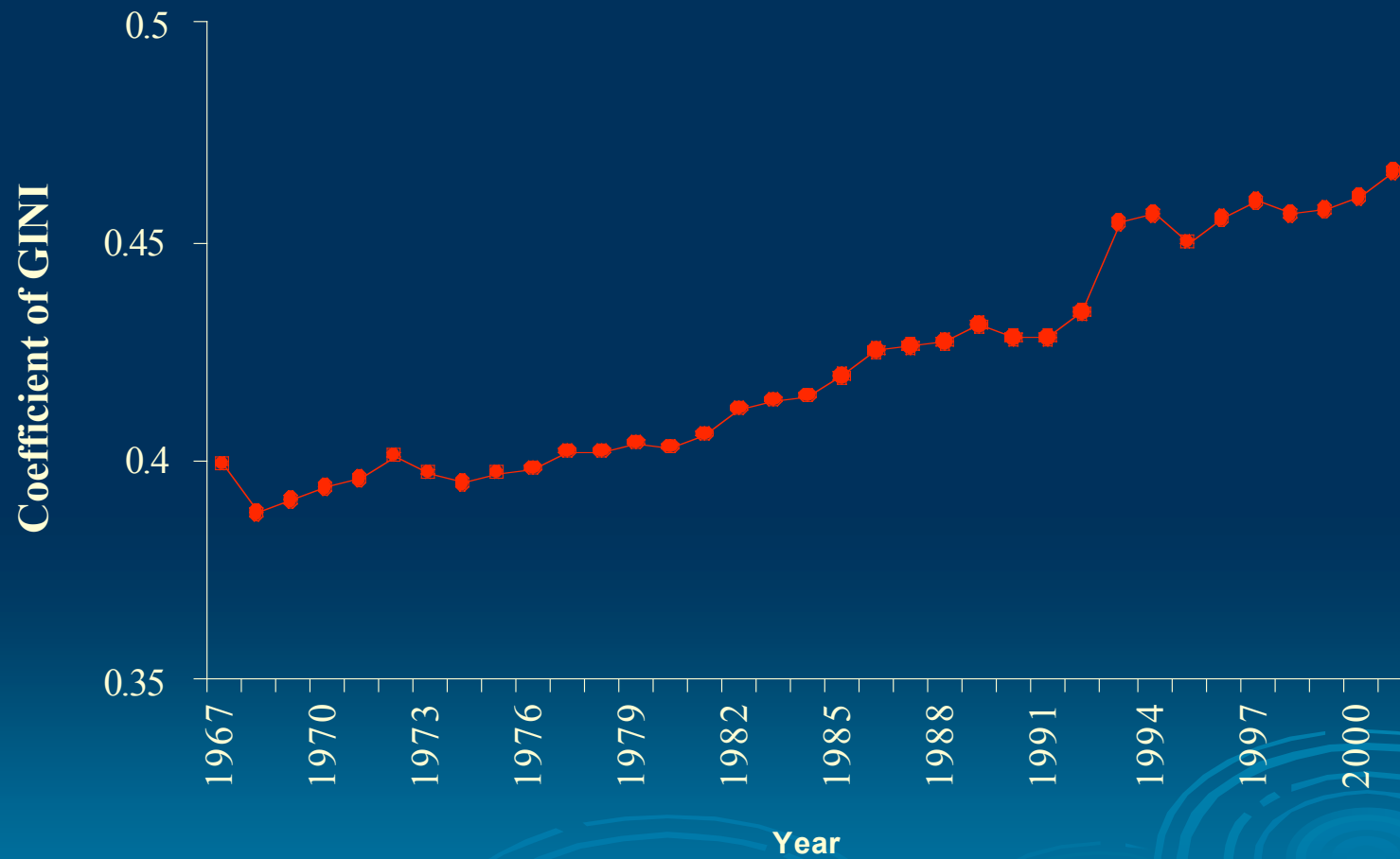
- Evidence for Social Inequality
- Evidence for Socioeconomic (SES) Disparities in Physical Health
- Challenges in Understanding How SES and Health are Linked Over the Life Course
- Psychological and Psychobiological Processes
- New Life Course Evidence

# Gini Index 1913-1994

(From Plotnik, 1999)

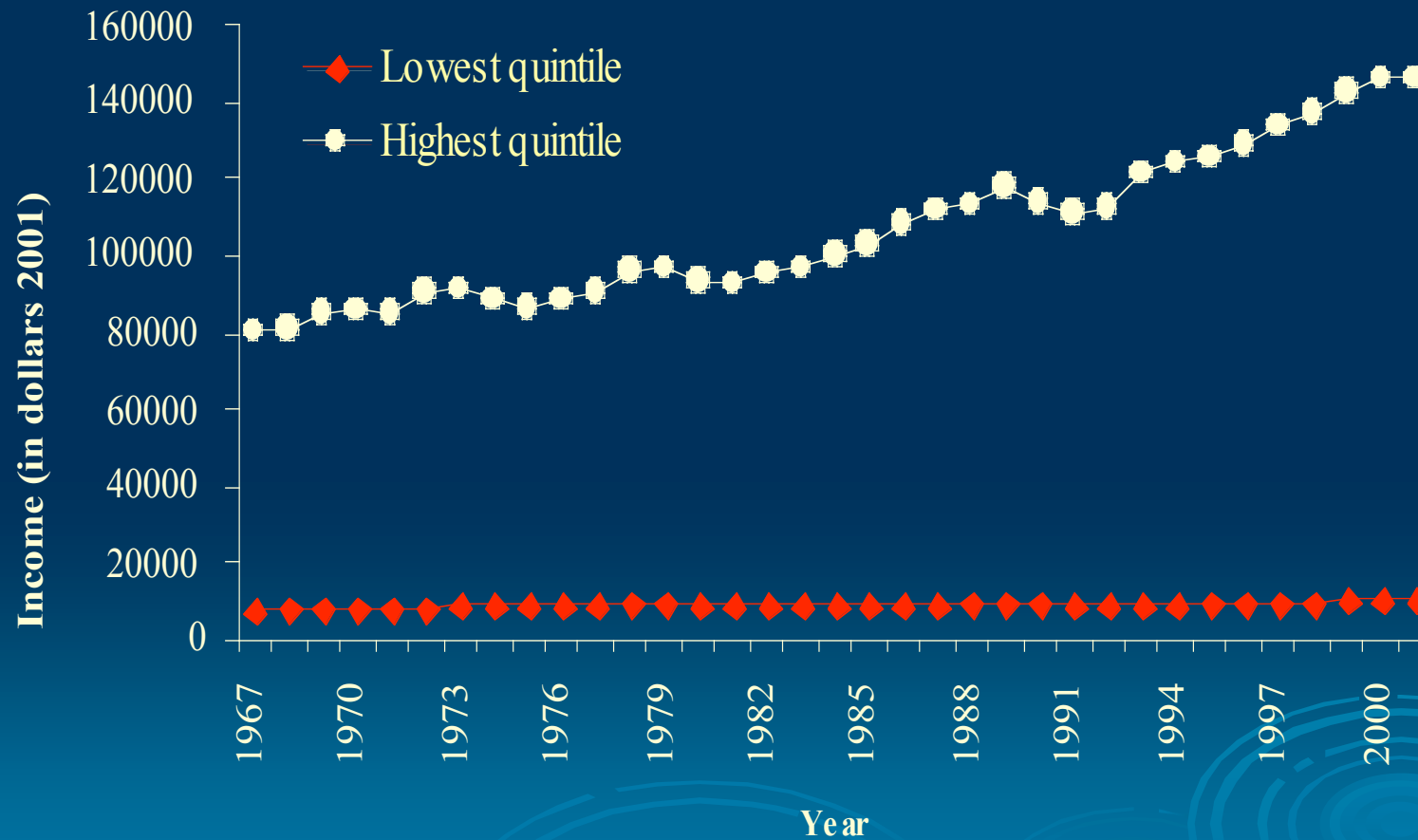


# U.S. Income Inequality 1967-2001



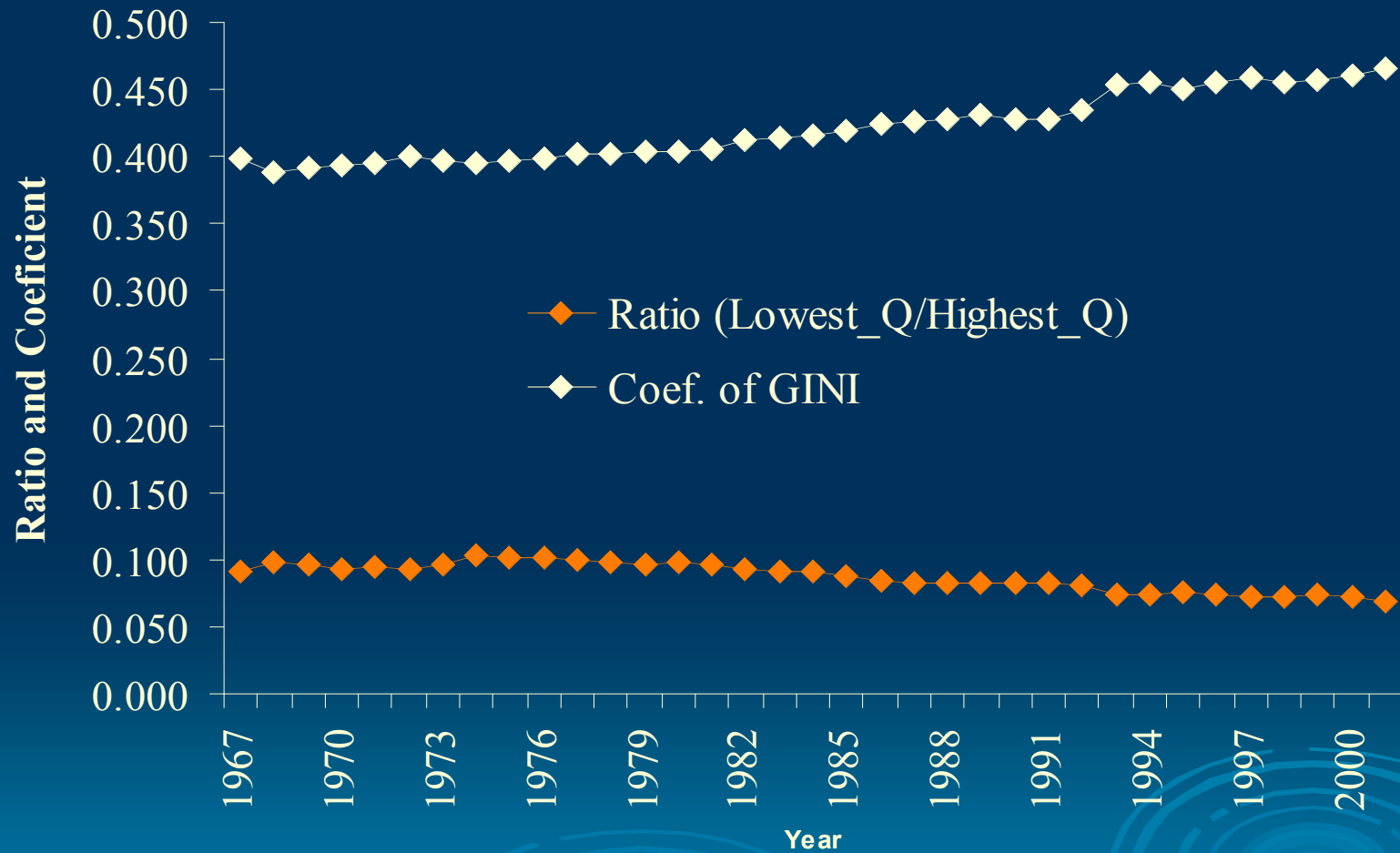
Source: U.S. Census Bureau.

# U.S. Income Lowest and Highest 1967-2001



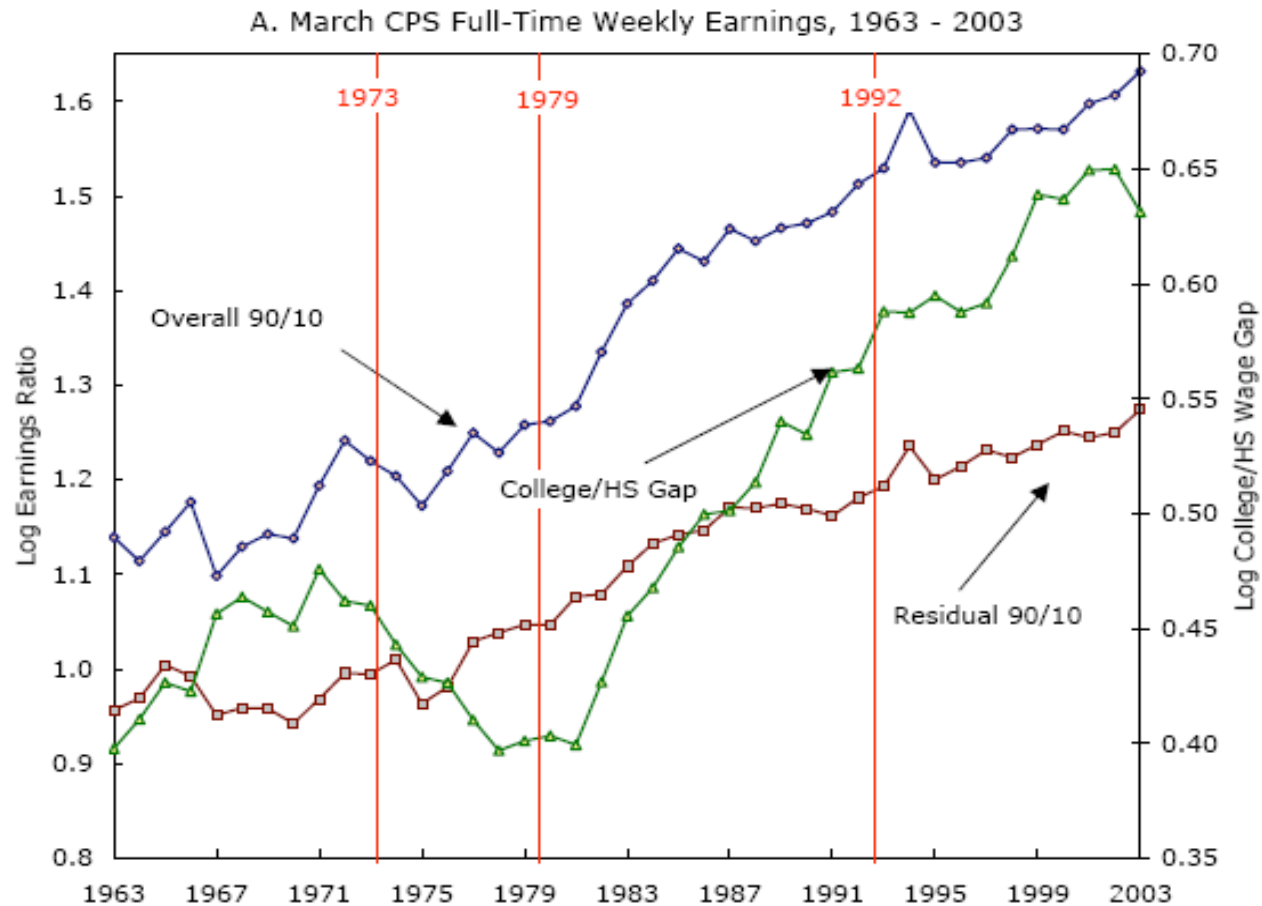
Source: U.S. Census Bureau.

# U.S. Income Inequality 1967-2001



Source: U.S. Census Bureau.

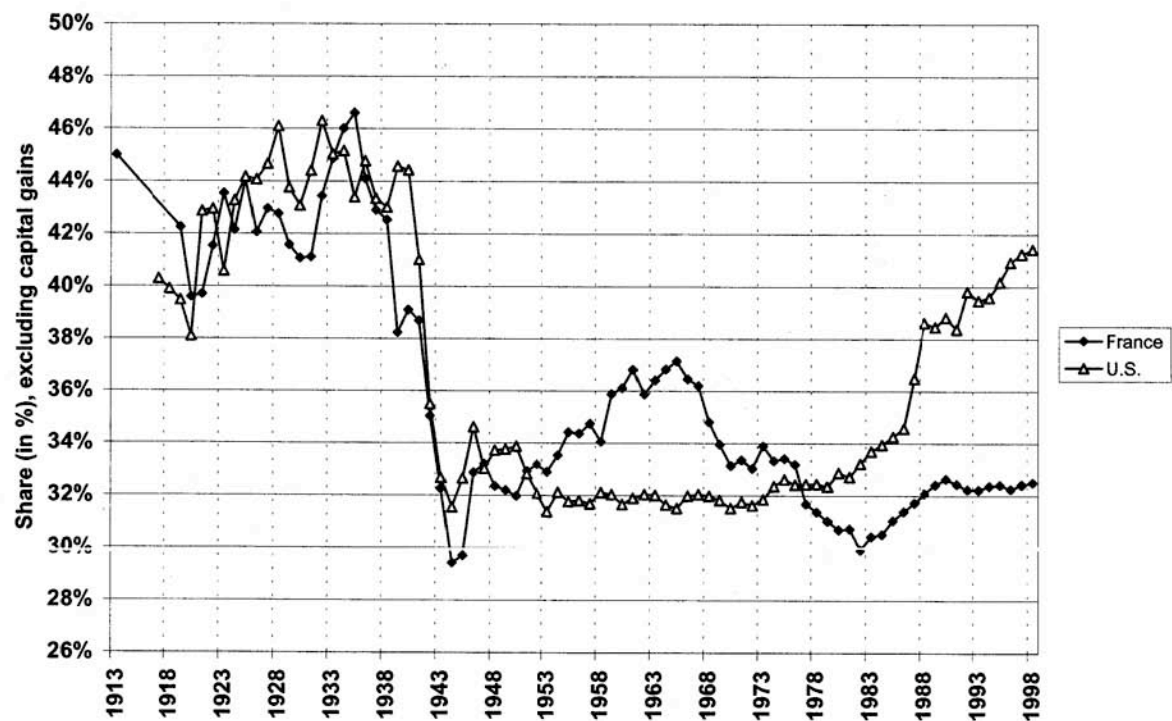
# U.S. Income Inequality by Education 1963-2003



Source: Katz and Kearney. Trends in U.S. Inequality: Re-Assessing the Revisionists. NBER Working Paper Series no. 11627.

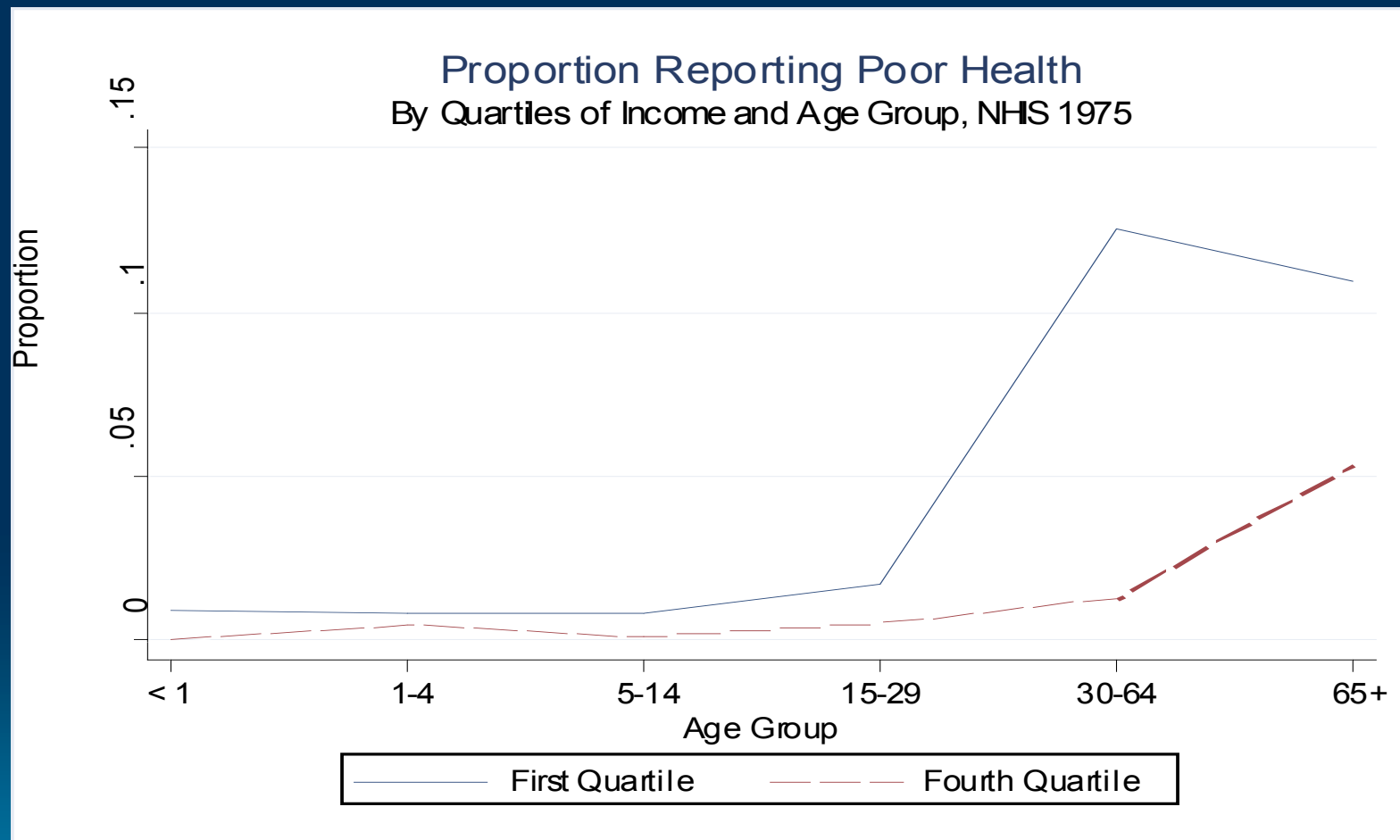
Fig 15

Figure 19: The top decile income share in France and In the U.S., 1913-1998



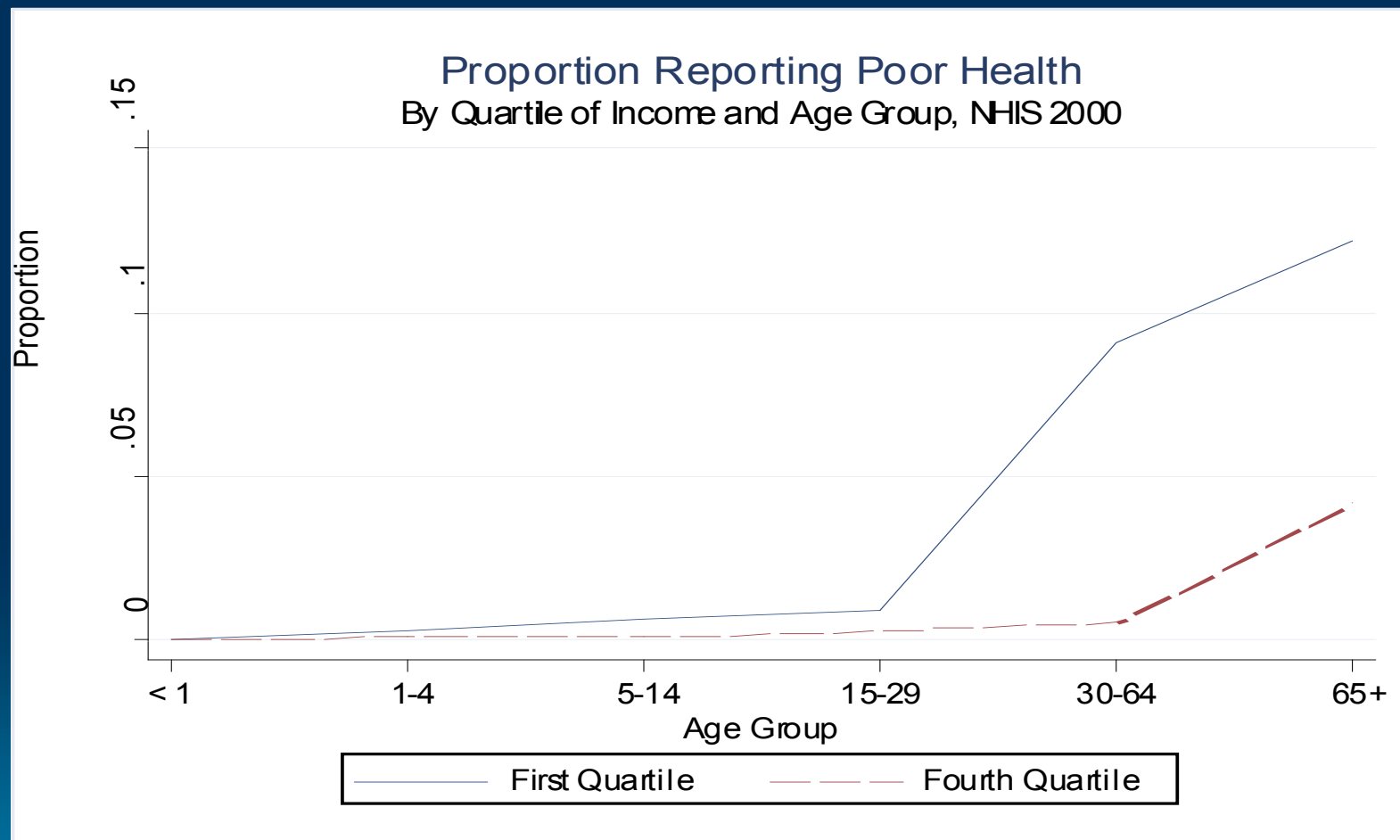
Source: Authors' computations based on income tax returns (France: see Piketty (2001b, table A1, col. P90-100); U.S.: see this paper, table A1, col. P90-100)

# Poor self-reported health by income 1975



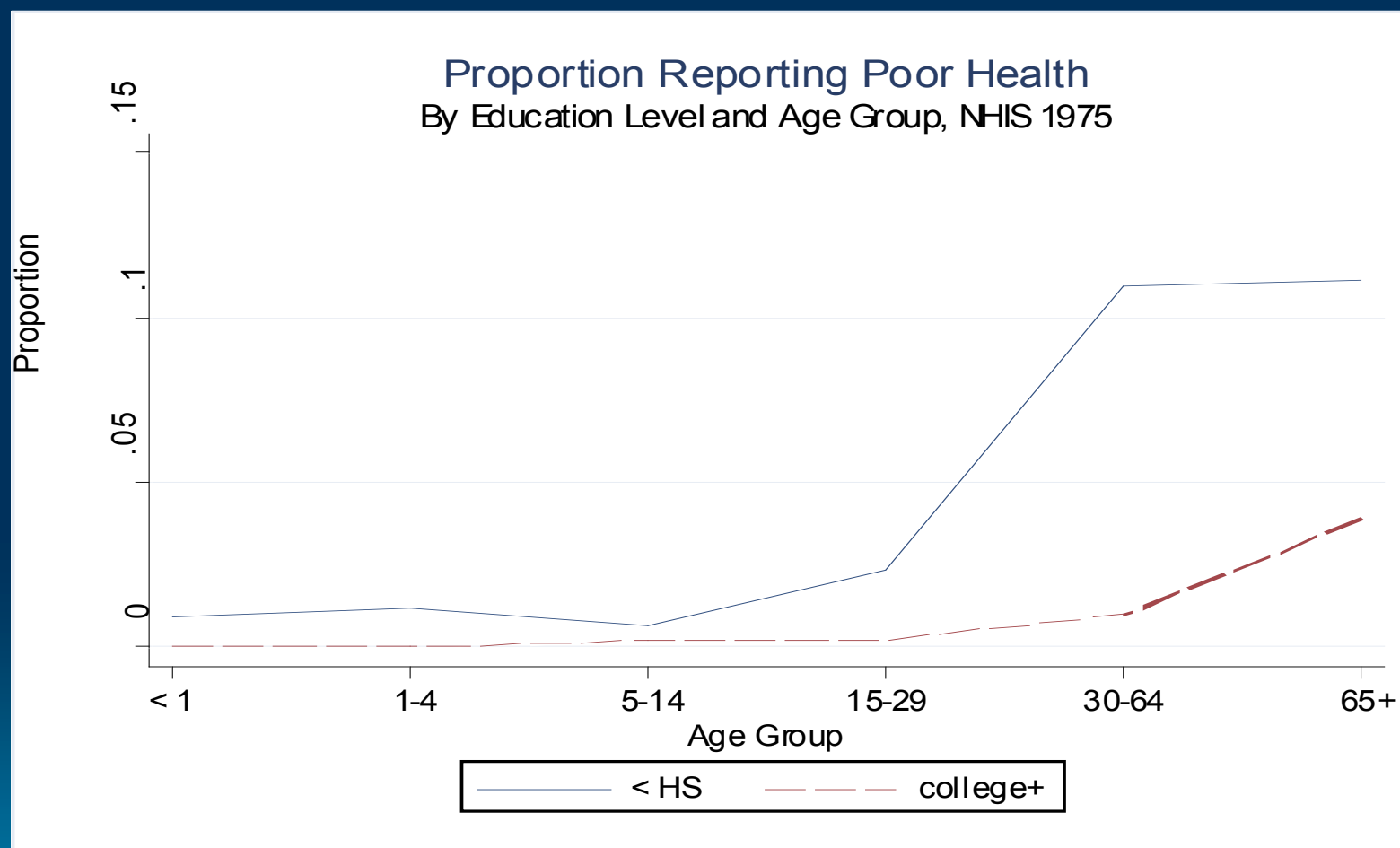
Source: NHIS, 1975.

# Poor self-reported health by income 2000



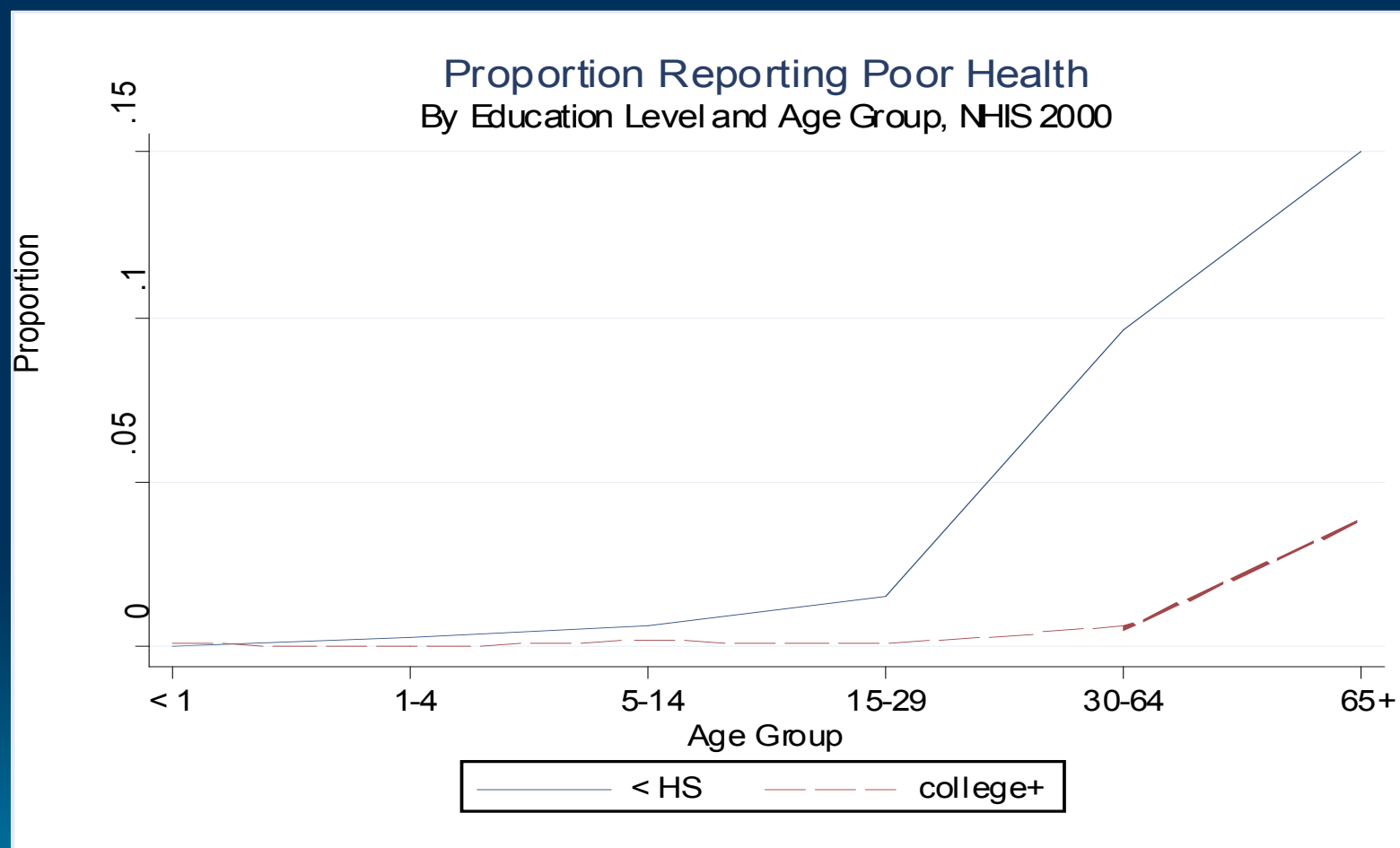
Source: NHIS, 2000.

# Poor self-reported health by education 1975



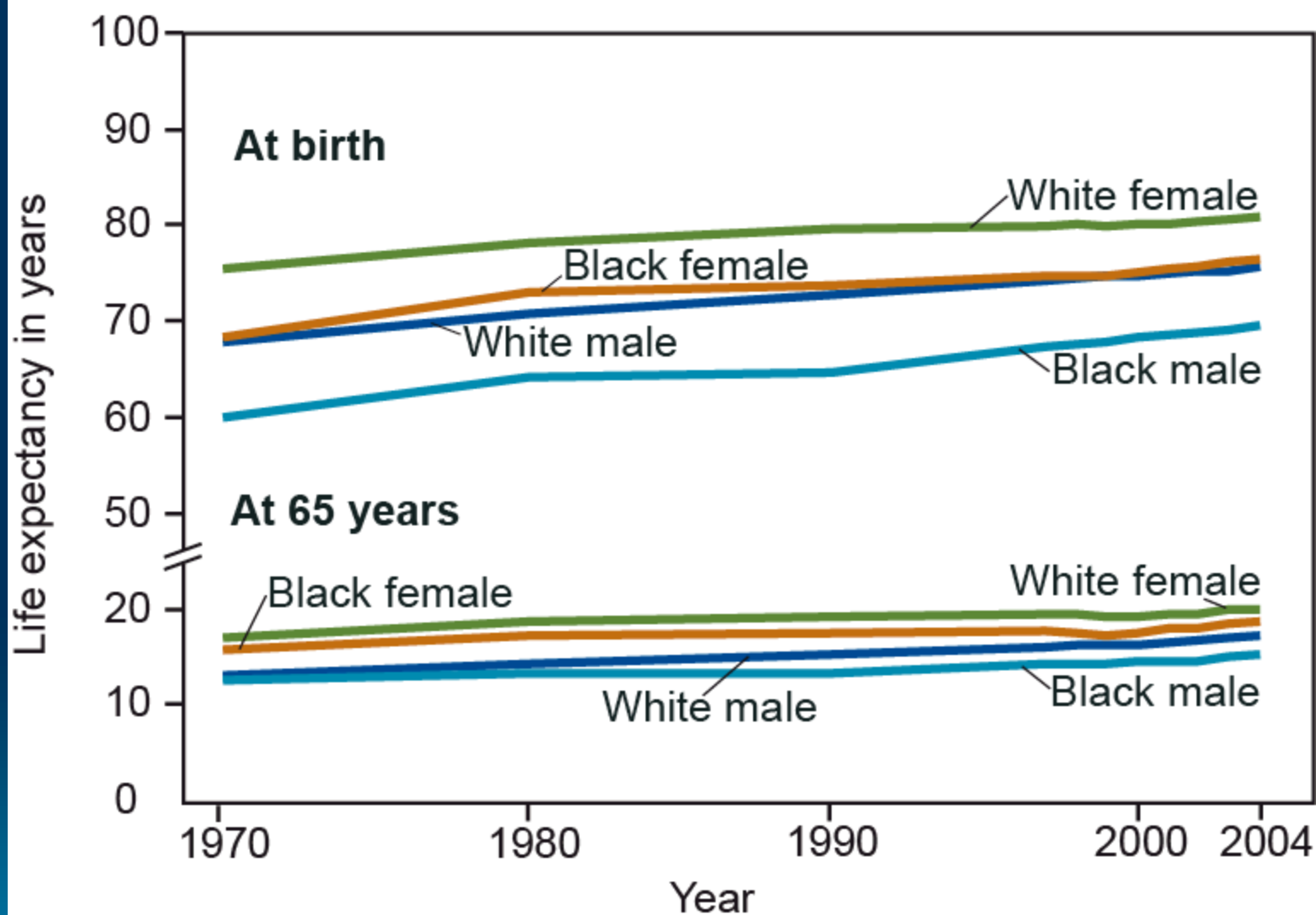
Source: NHIS, 1975.

# Poor self-reported health by education 2000



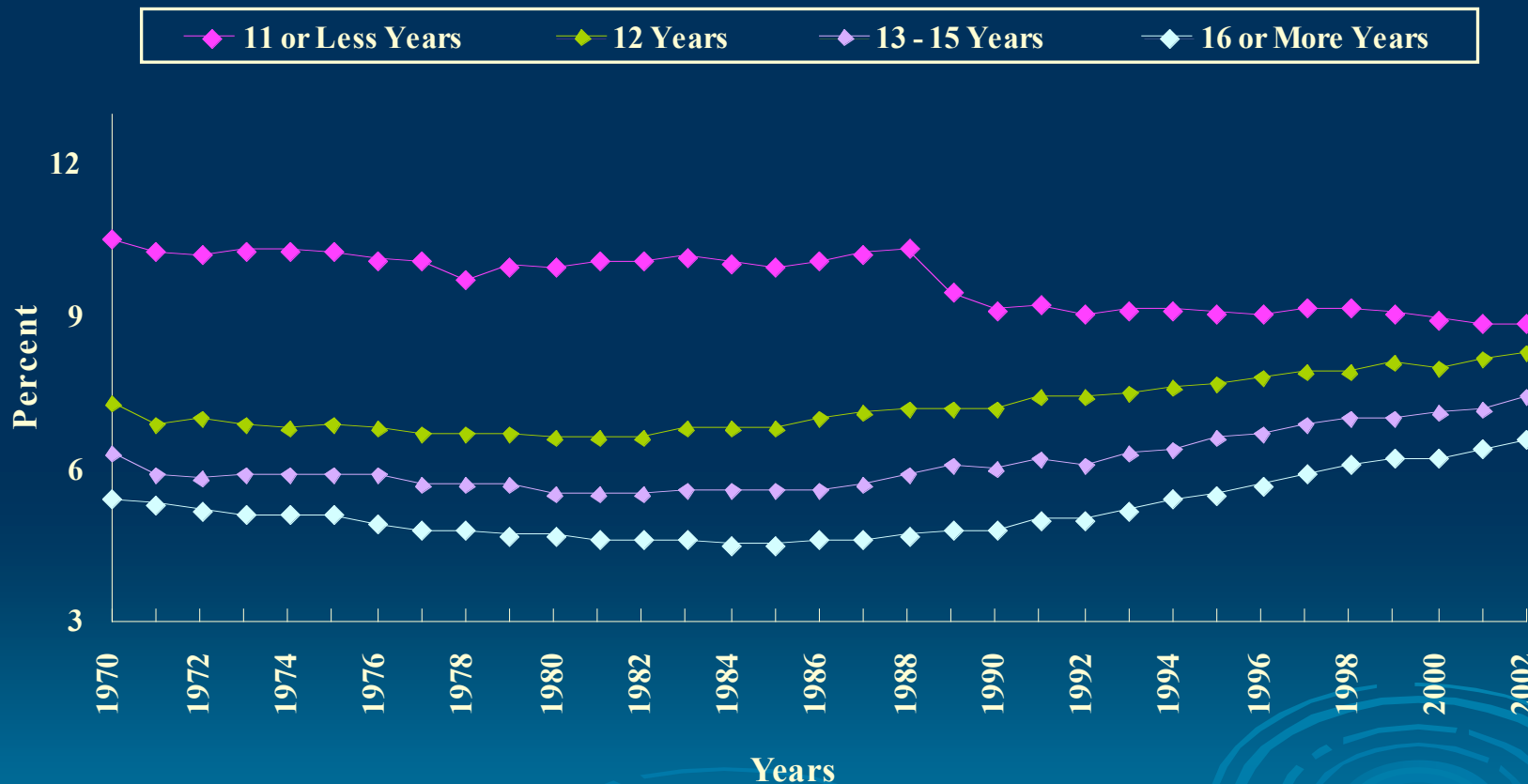
Source: NHIS, 2000.

# Life expectancy



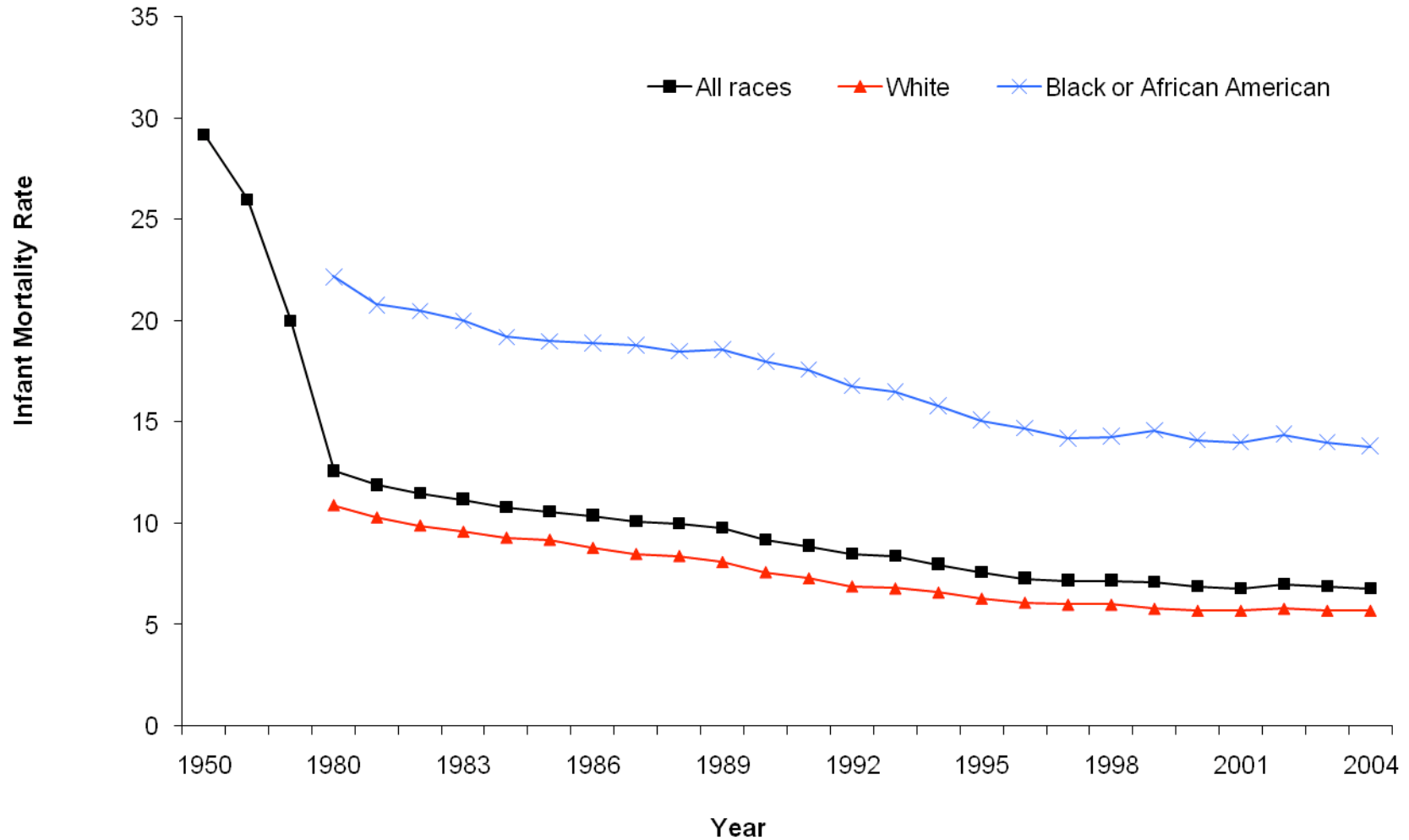
SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, *Health, United States, 2007*, Figure 18. Data from the National Vital Statistics System.

# Percent of live births weight less 2,500 grams By mother's education

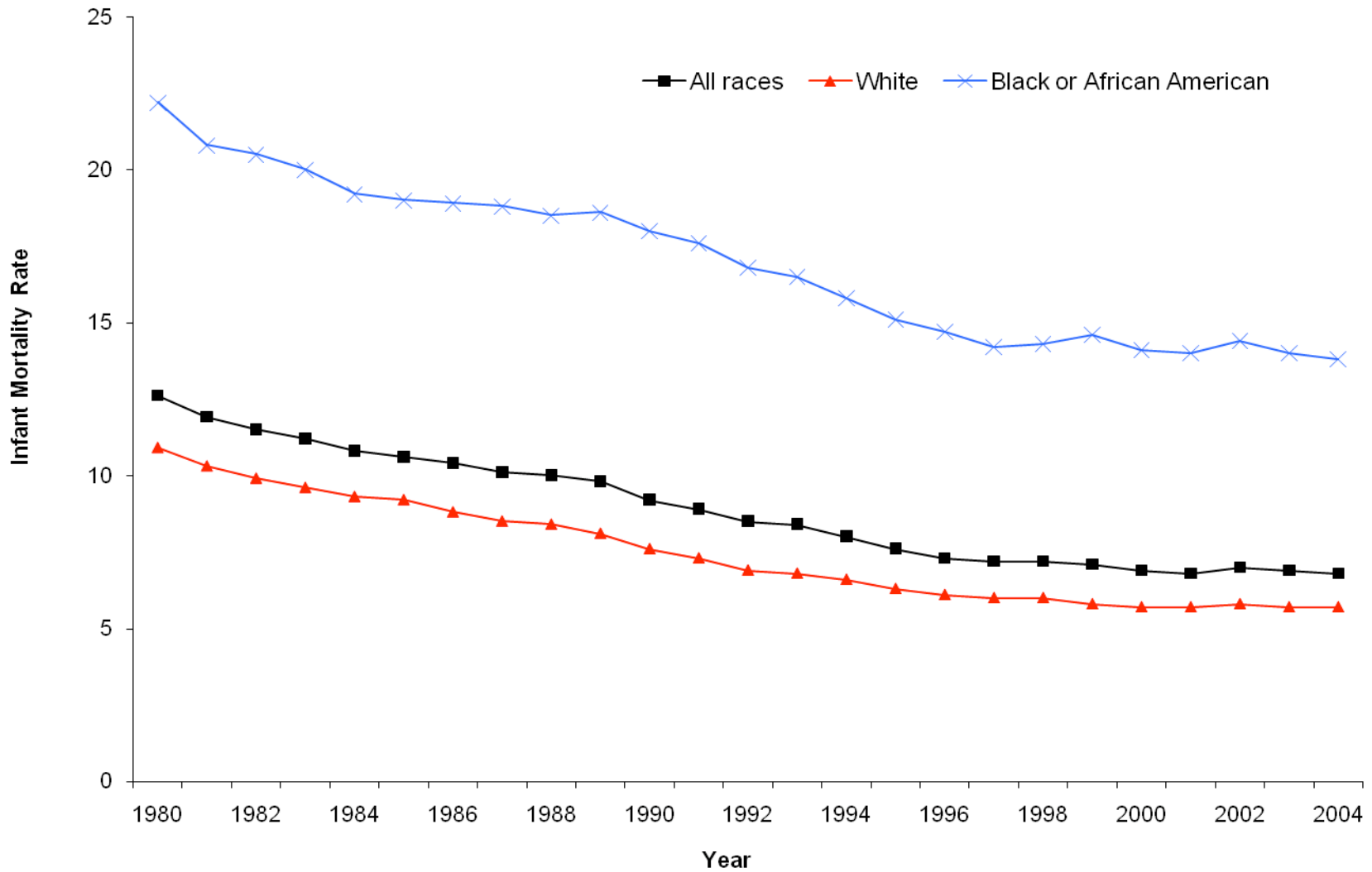


Source: CDC-NCHS-Division of Vital Statistics

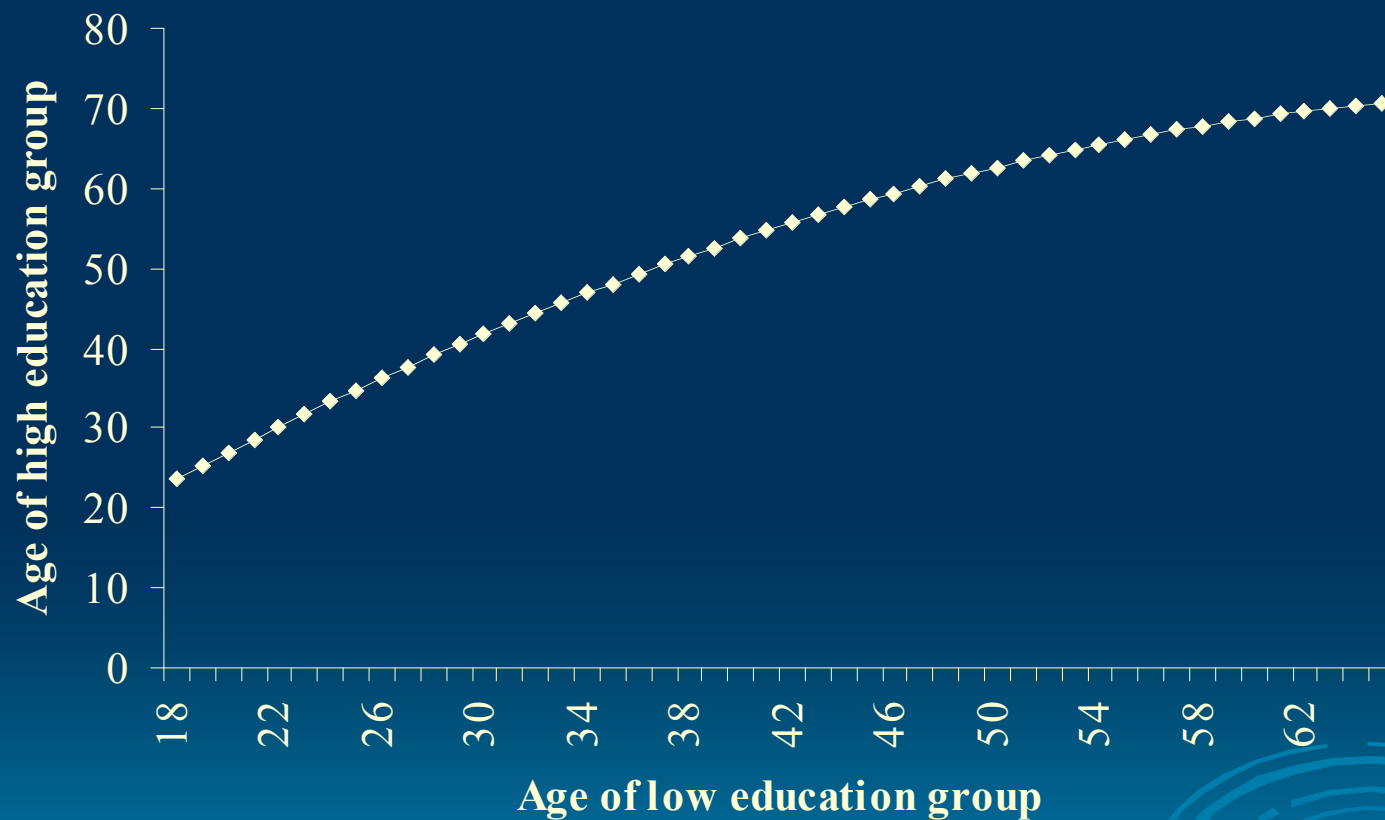
# Infant Mortality by Race (1950-2004)



# Infant Mortality by Race (1980-2004)

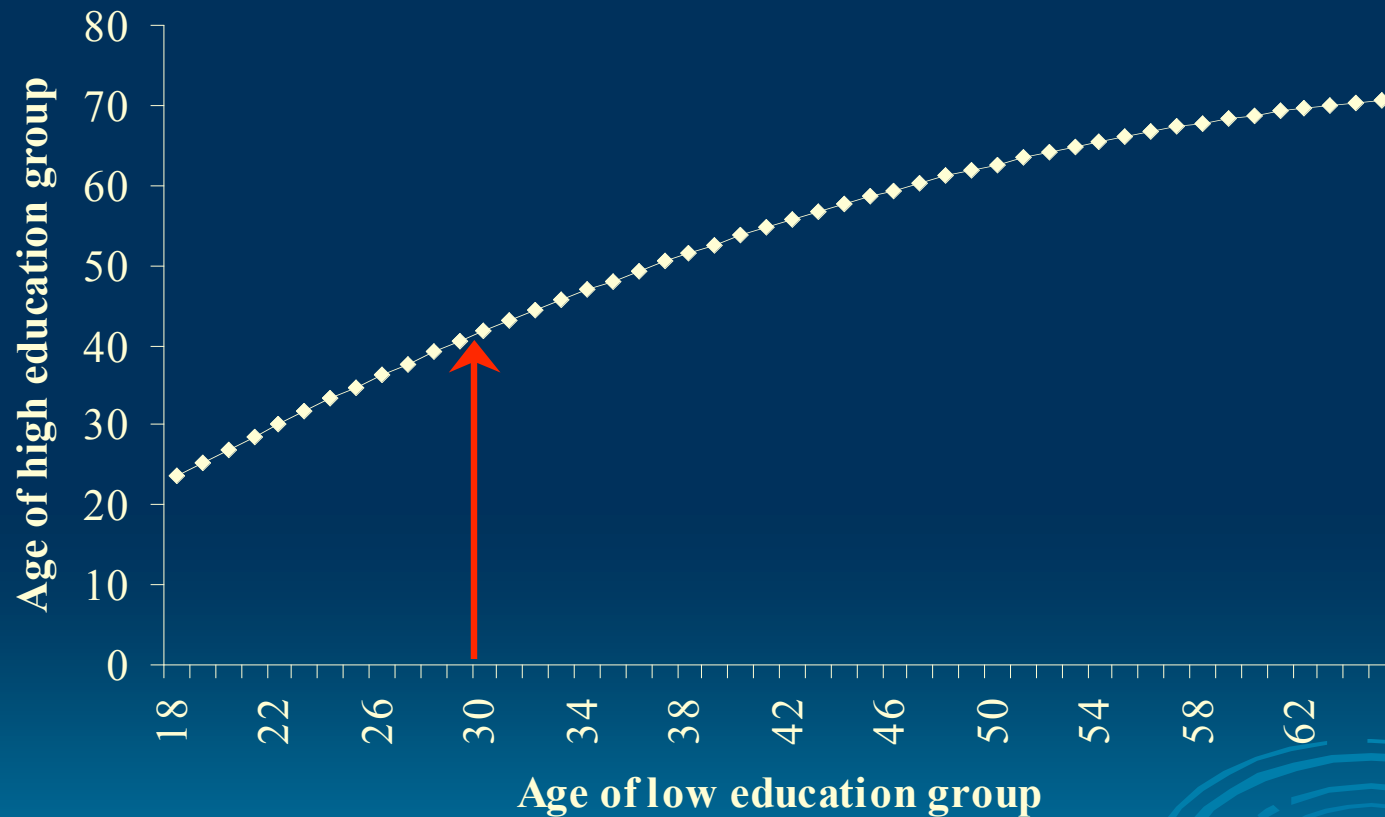


# Age mortality equivalence for high and low education



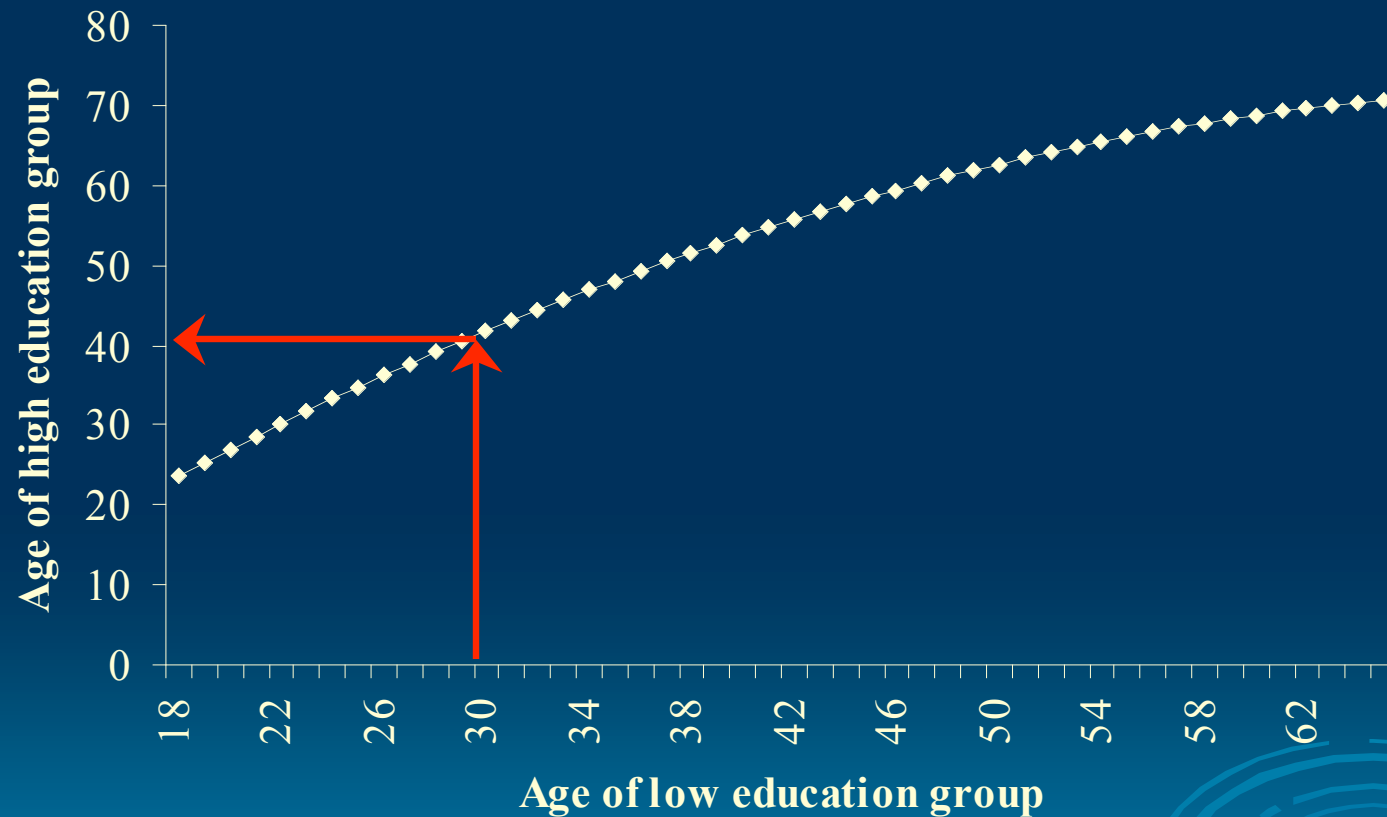
Source: NHIS-NDI (Projected to 2005)

# Age mortality equivalence for high and low education



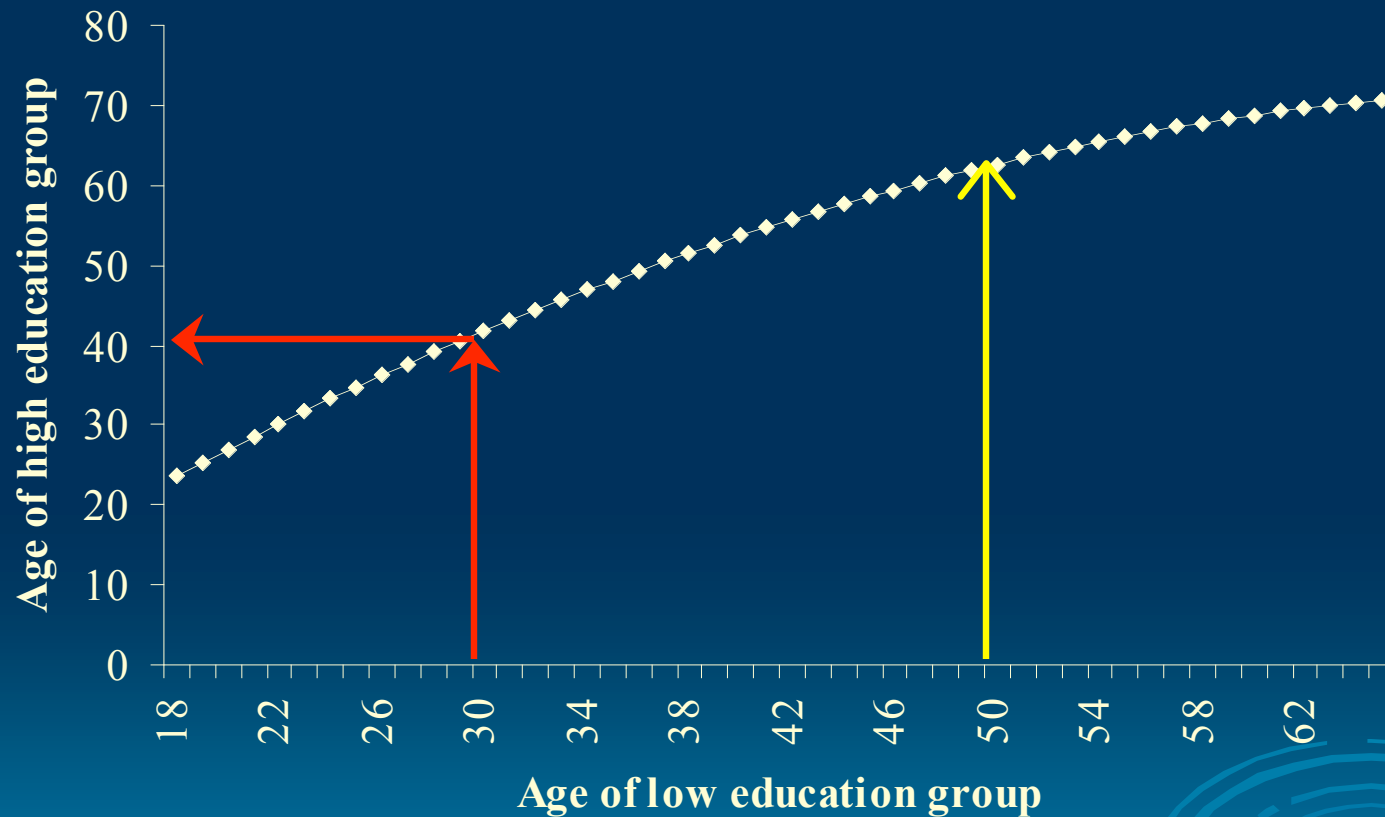
Source: NHIS-NDI (Projected to 2005)

# Age mortality equivalence for high and low education



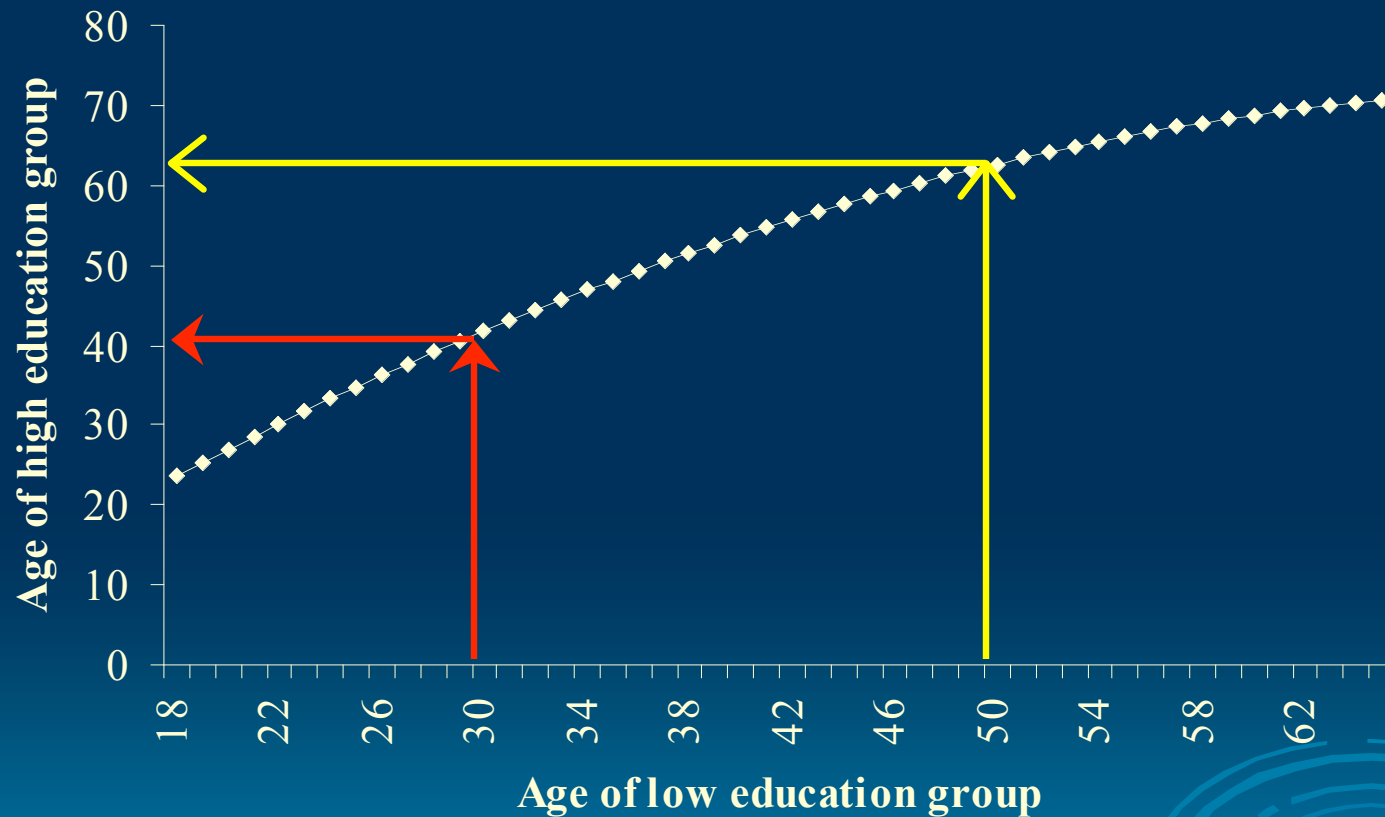
Source: NHIS-NDI (Projected to 2005)

# Age mortality equivalence for high and low education



Source: NHIS-NDI (Projected to 2005)

# Age mortality equivalence for high and low education



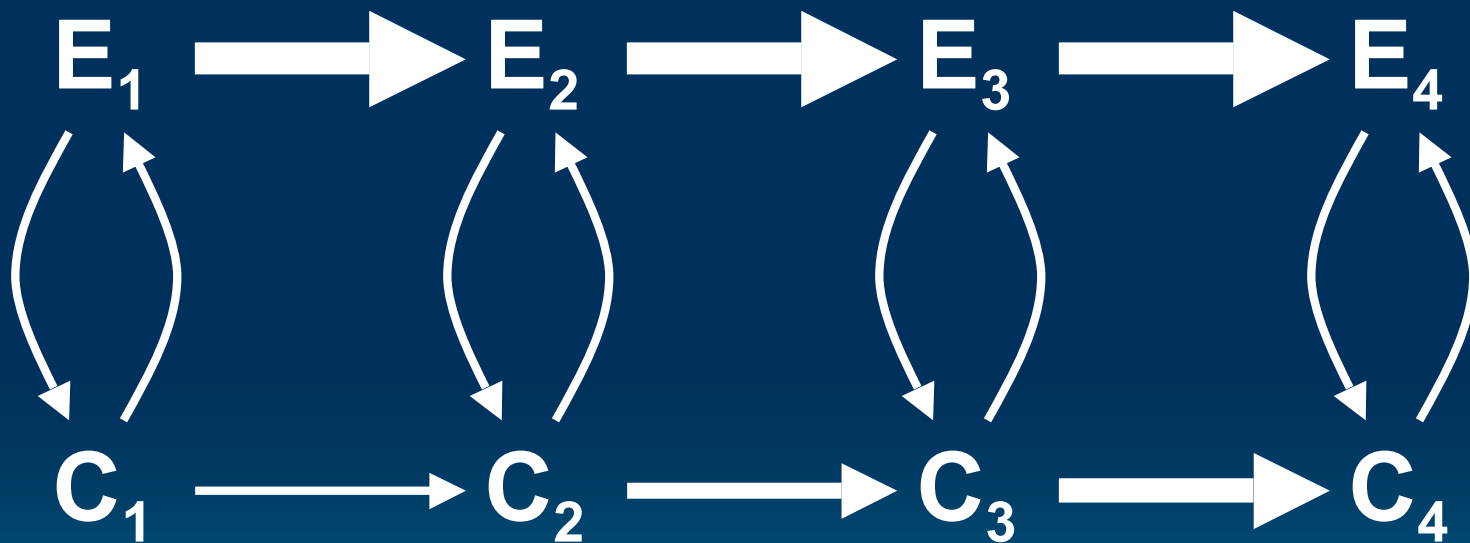
Source: NHIS-NDI (Projected to 2005)

# Role of Developmental Science

- Largely absent from most studies of etiology of adult morbidity and morality
- Central focus on psychological trajectories and family functioning over time



# Transactional Theory of Development



Source: Sameroff, A. (1994). Developmental systems and family functioning. In R.D. Parke & S.G. Kellam (Eds.), *Exploring family relationships with other social contexts* (pp. 199-214). Hillsdale, NJ: Lawrence Erlbaum.

# Genetics and Epigenetics

- Largely missing from literatures on social disparities and health over the lifecourse
- Naive views of the role of genes
- Genes are probabilistic, not deterministic

# Genetics and Epigenetics

- Explosion in research opportunities
  - Twin registries
  - Embedded twin samples in population studies and large community studies
  - DNA in national samples and smaller studies



# Genetics and Epigenetics

- Epigenetics is poised to move from animal to human models
  - Processes that modify gene expression
  - Environments cannot change DNA sequence but can influence DNA expression



# Role of Psychological Factors in Health

- Most health outcomes in large-scale demographic studies are:
  - Morbidity
  - Mortality
  - Health Status (poor, fair, good)

# Role of Psychological Factors in Health

- Psychiatric disorders have been largely ignored until recently
  - Dunedin Study is major exception
- Psychiatric disorders are linked to physical health problems
- 50% of U.S. adults experience a psychiatric disorder at some point

# Role of Psychological Factors

What do we know about continuity in early childhood to adulthood?

- Intelligence
  - Personality
  - Social relations
- 

# Continuity in Intelligence

- Understand complex ideas
- Adapt effectively to the environment
- Engage in various forms of reasoning
- Overcome obstacles by taking thought

# Continuity in Intelligence

- Widely measured by IQ tests
- Stability of IQ in childhood: .45
- Stability of IQ: Middle childhood to adulthood: .65 to .75
- High heritability (.65-.75) but also can be changed

# Continuity in Personality

- Rough outline of human individuality
- Recognizable signature that a person tends to express across situations (but not all)
- Also over time (but not forever)

# Continuity in Personality

- Begins in childhood with temperament
  - Easy-going
  - Undercontrolled
  - Shy/Inhibited
- These patterns map similar personality traits in adolescence and adulthood
- Correlation is moderate



# Continuity in Social Relations

- Early family life is very influential
- Proximal environment
- Healthiest patterns involve:
  - Warmth
  - Responsiveness
  - Sensitivity to infant and child cues
  - Appropriate limit setting

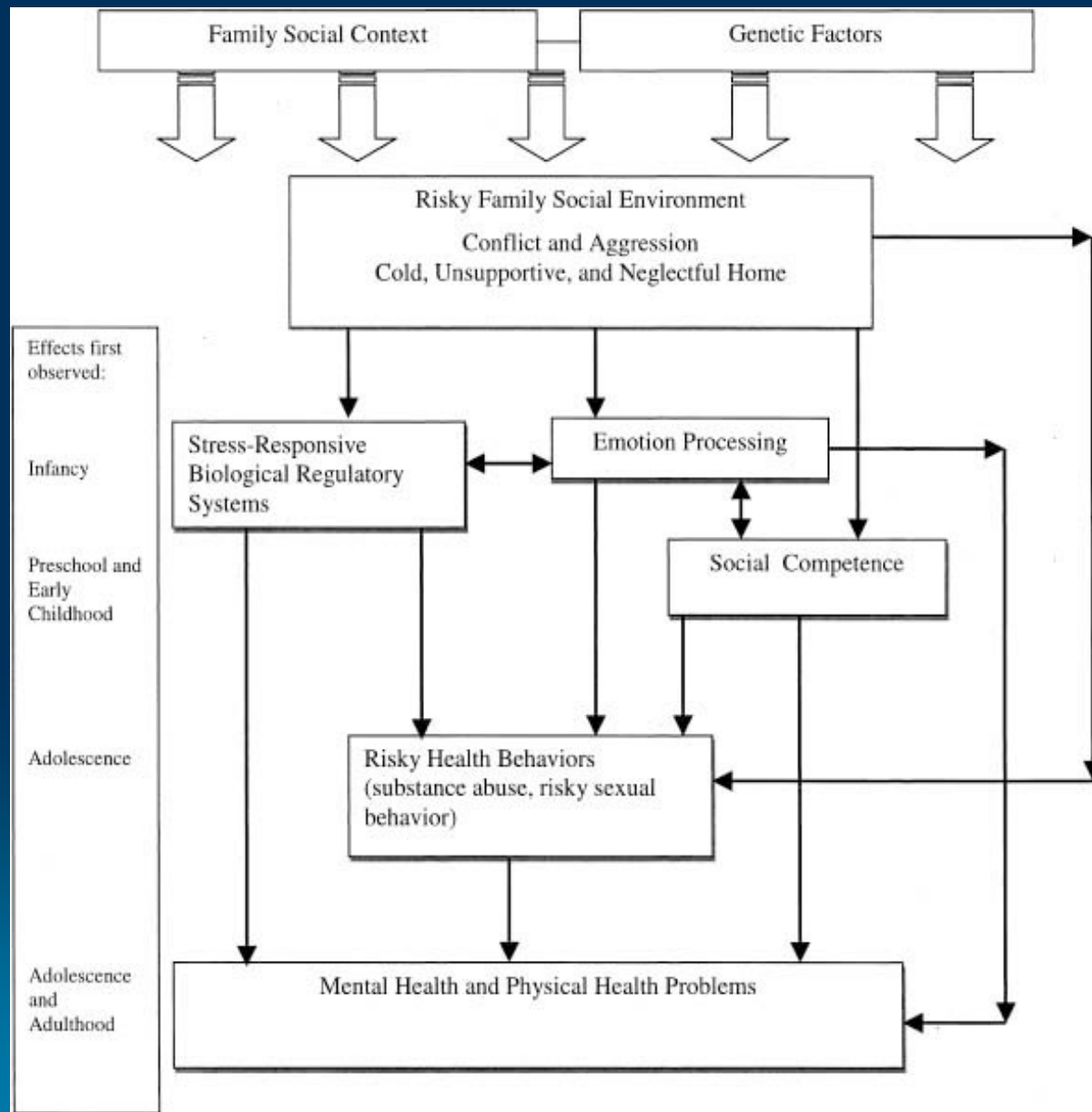


# Continuity in Social Relations

- Infants develop a sense of security, trust in others, efficacy, enthusiasm
- Social relationships within the family influence social relations outside the family

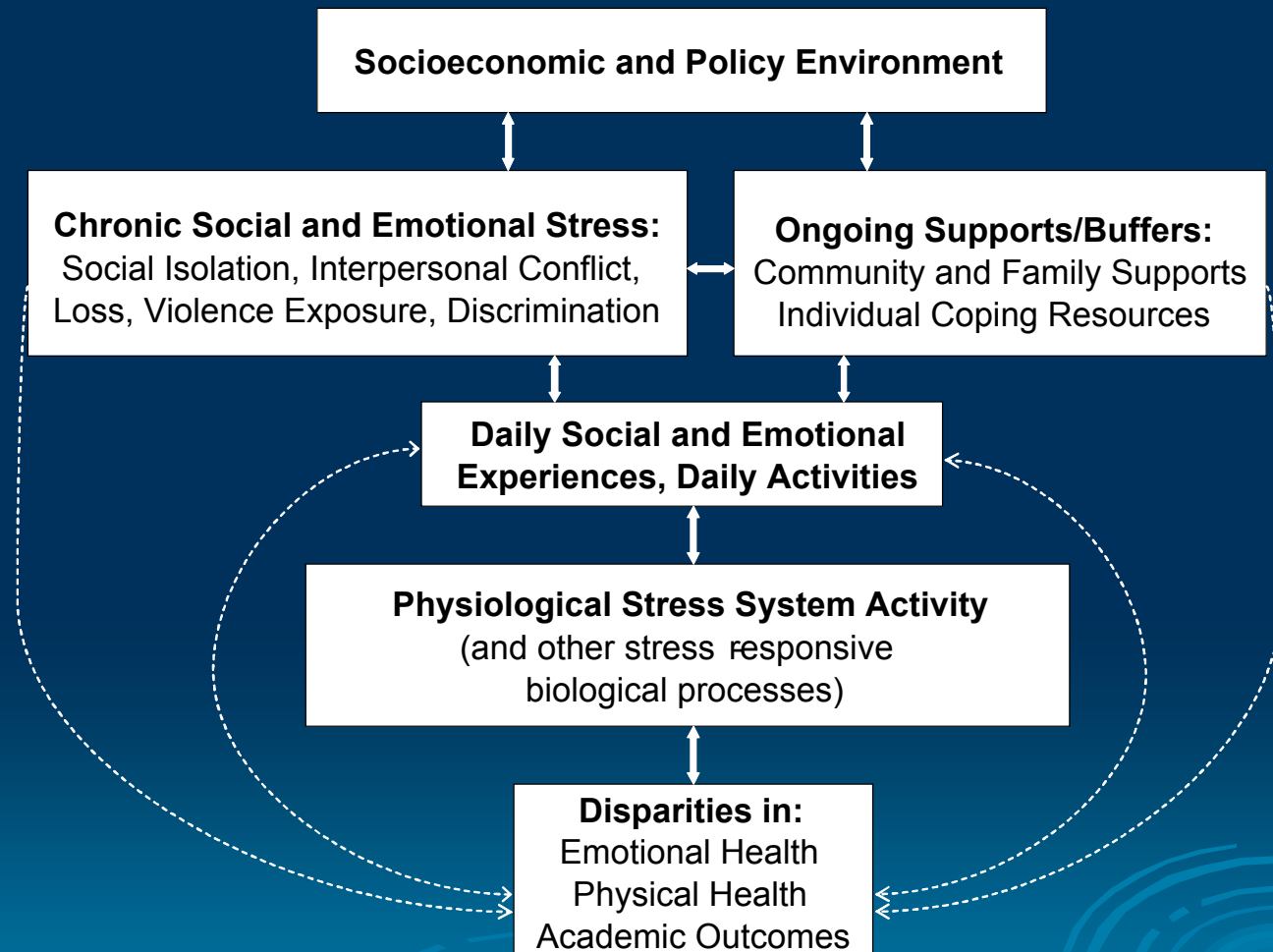


# Risky Families Model




Source: Repetti, R. L., Taylor, S. E., & Seeman, T. E. (2002). *Psychological Bulletin*, 128(2), 330-366.

# Stress-sensitive Physiological Responses



Adam, E. K., Doane, L. D., Mendelsohn, K. (In press). Spit, sweat, and tears: Measuring biological data in naturalistic settings. To appear in: Hargittai, Eszter (Ed.) Research methods from the trenches. University of Michigan Press.

# Malleability of Psychological Development in Early Childhood

- Developmental scientists have known for 30 years that the early years are a sensitive period
  - Responsive and stimulating environments in early childhood launch children on healthy psychological trajectories
  - New research buttresses and expands this knowledge
- 

# Malleability of Psychological Development in Early Childhood

- Evidence from neuroscience and "brain architecture"
- Evidence from psychobiology and early stress reactivity




# Malleability of Psychological Development in Early Childhood

- Adult outcomes of early childhood intervention programs
- Perry Preschool Project
- Abecedarian Study



# Long term Effects of Model Programs

## ➤ Reductions in:

- Placement in special education
  - High school drop-out
  - Teenage childbearing
  - Health problems
  - Criminal activity
- 

# Dunedin Study

- Population study of health and development
- Birth cohort, 1972-73
- 1,000 individuals interviewed and assessed at 3, 5, 7, 9, 11, 15, 18, 21, 26, and 32 years
- Hospital records obtained at birth

# Dunedin Study

- Brings together strong theory and measurement from:
  - Developmental science
  - Psychiatry
  - Demography
  - Epidemiology
  - Medicine
- Key findings presented today by Andrea Danese

# Three New Dunedin Lifecourse Studies

Illustrate the role of psychological factors in adult physical and psychiatric health

(1) Social isolation in childhood is linked to CVD risk at age 26

*Caspi, A., Harrington, H., Moffitt, T.E., Milne, B.J., & Poulton, R. (2006)*

(2) Conduct disorder beginning in childhood is linked at age 32 with:

- Mental health disorders
- Multiple morbidities

*Odgers, C.L., Caspi, A., Broadbent, J.M., Dickson, N., Hancox, R.J., Harrington, H., Poulton, R., Sears, M.R., Thomson, W.M., & Moffitt, T.E. (2008)*


# Three New Dunedin Lifecourse Studies

(3) Low SES in childhood is linked at age 32 to:

- Higher likelihood of
  - Tobacco dependence
  - Drug and alcohol abuse
  - CVD risk
- But not to major depressive disorder or anxiety disorders
- *Melchior, M., Moffitt, T.E., Milne, B.J., Poulton, R., & Caspi, A. (2007)*

# Three New Dunedin Lifecourse Studies

## (3) Explanatory factors are:

- Parental health history
  - Parents' current health problems and behaviors
  - Adolescent smoking, alcohol, and drug use
  - Childhood BMI and IQ
  - Childhood maltreatment
  - Adult SES
- 

# A simple model

$$S_x = S_x(s_0, H_{x-1}, S_{x-1}, E_{x-1})$$

$$H_x = H_x(h_0, S_{x-1}, H_{x-1}, I_{x-1})$$



# The model expanded

$$S_x = \alpha_x s_o + \beta_x h_o + \gamma_1 E_1 + \dots \gamma_{x-1} E_{x-1} + \phi S_o + \lambda_1 H_1 + \dots \lambda_{x-1} H_{x-1} + \sum_{i=1} \rho_i \varphi_{x-i} + \varepsilon_x$$

$$H_x = a_x s_o + b_x h_o + g_1 I_1 + \dots g_{x-1} I_{x-1} + \mu H_o + l_1 S_1 + \dots l_{x-1} S_{x-1} + \sum_{i=1} r_i \nu_{x-i} + e_x$$



# A simplified model

$$S_x = \alpha_x' s_o + \beta_x' h_o + \theta_1 S_{x-1} + \theta_2 H_{x-1} + \xi_1$$

$$H_x = a_x' s_o + b_x' h_o + \sigma_1 H_{x-1} + \sigma_2 S_{x-1} + \xi_2$$



Figure 1. Path diagram of health and SES over the life cycle (see equation 1)

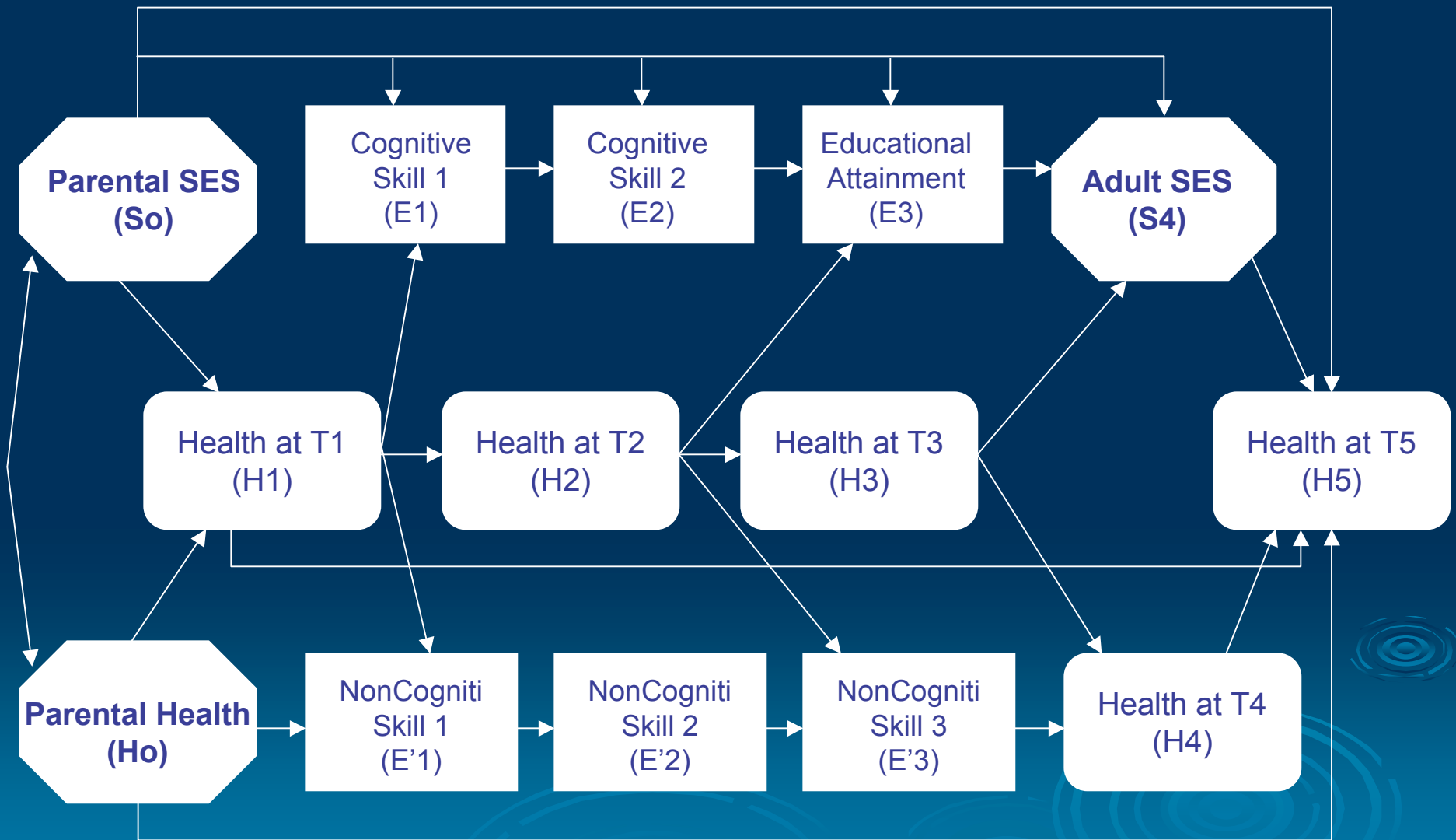


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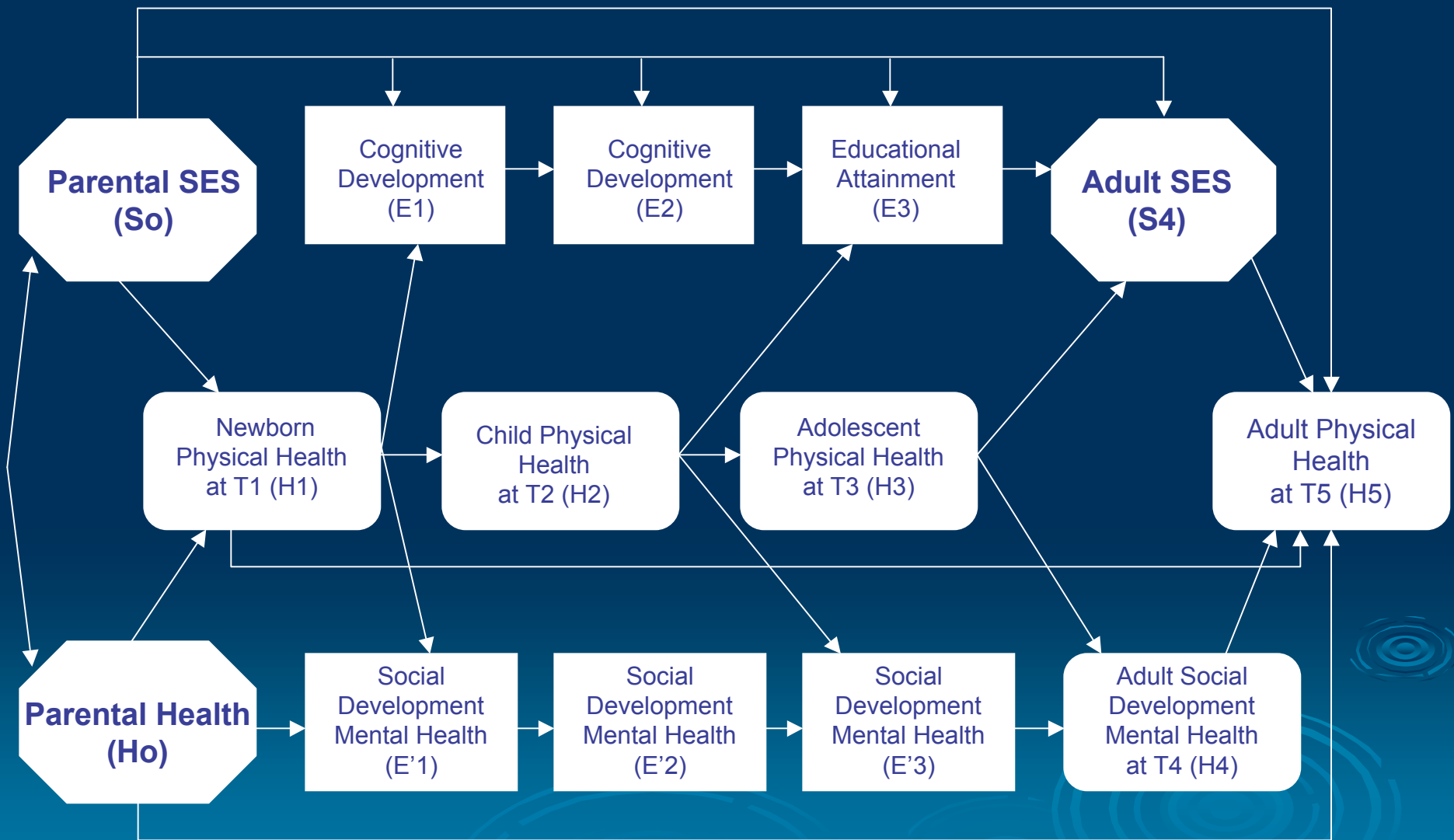
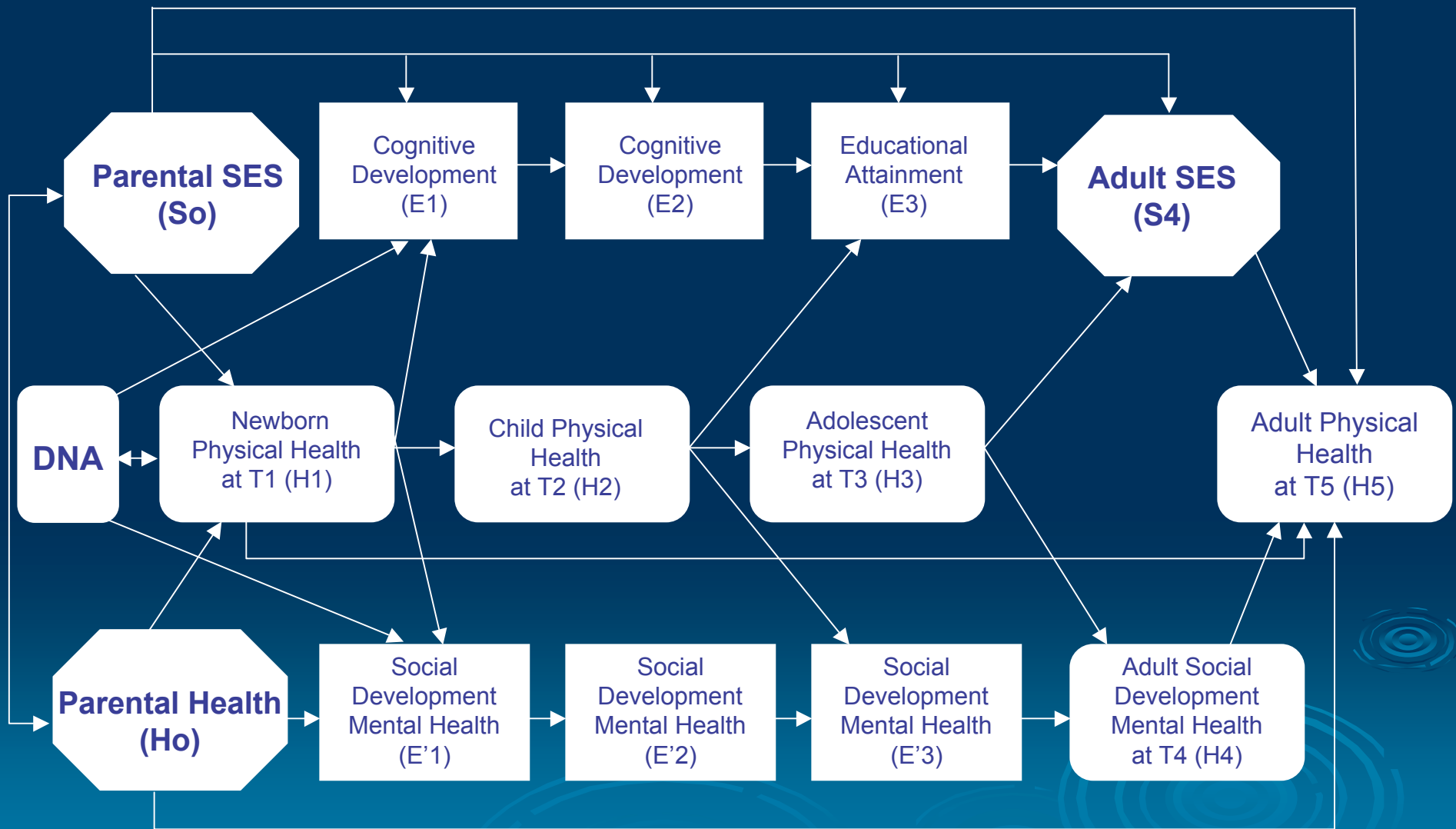


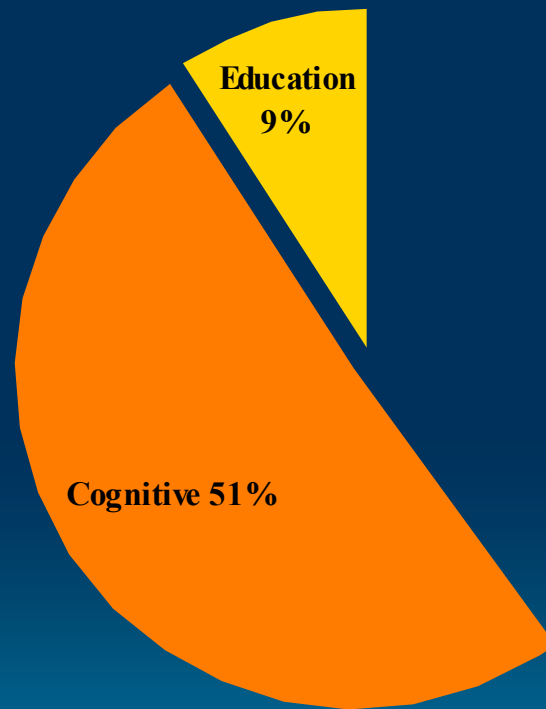
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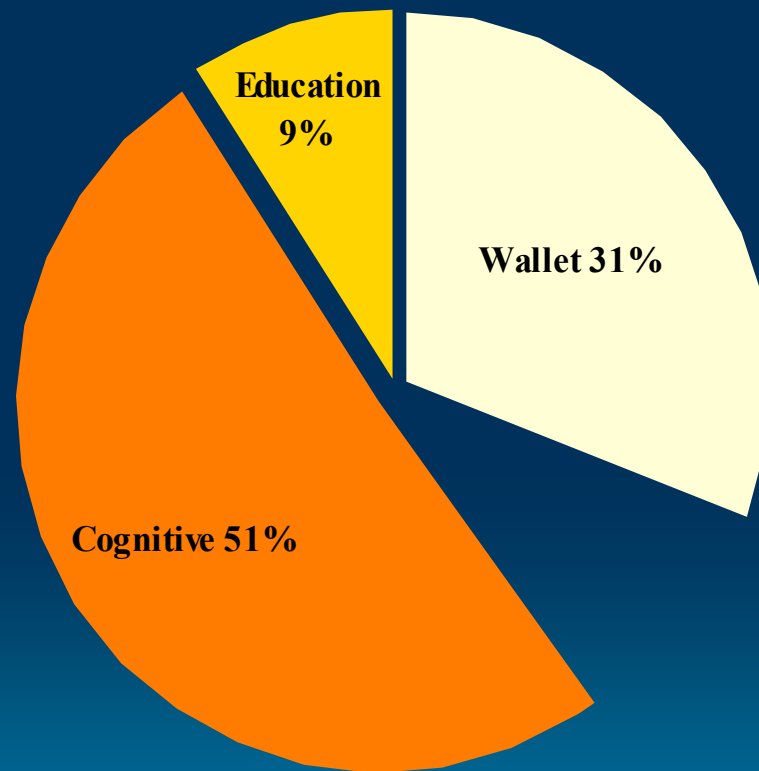
# Estimation and simulation

- Estimation of SEM
- Use estimated regression coefficients to simulate a life course
- Identify SES gradients:
  - Under observed conditions
  - When early health paths are eliminated

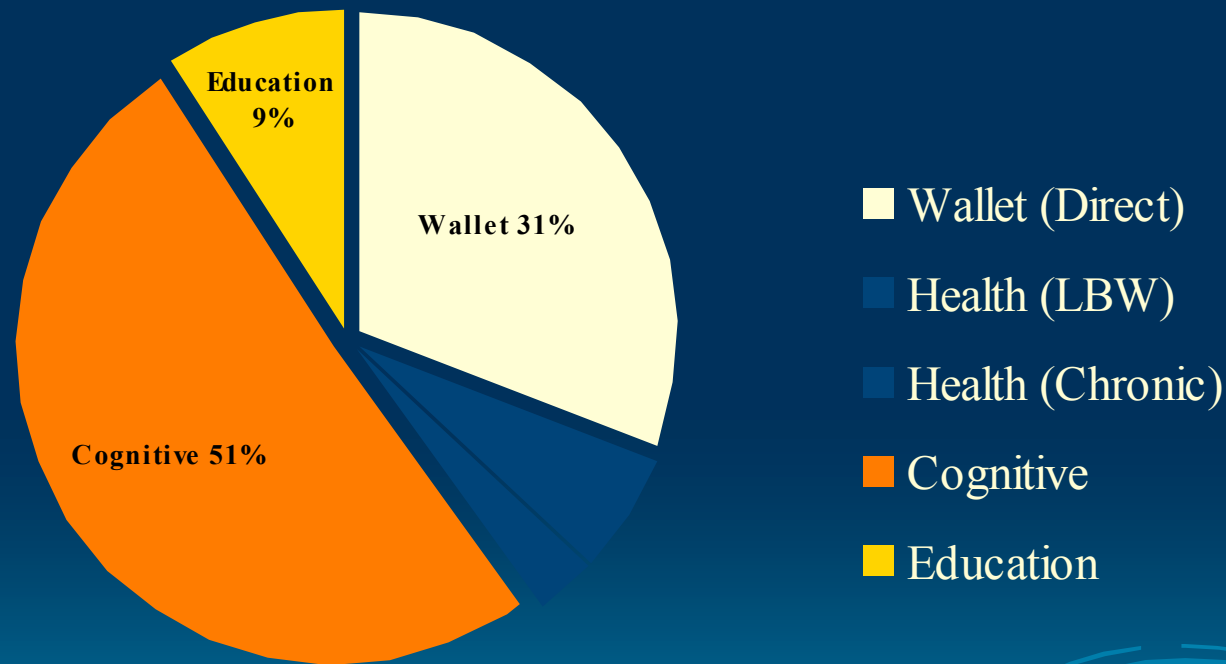
# Decomposition of effects of parental social class on sons' social class



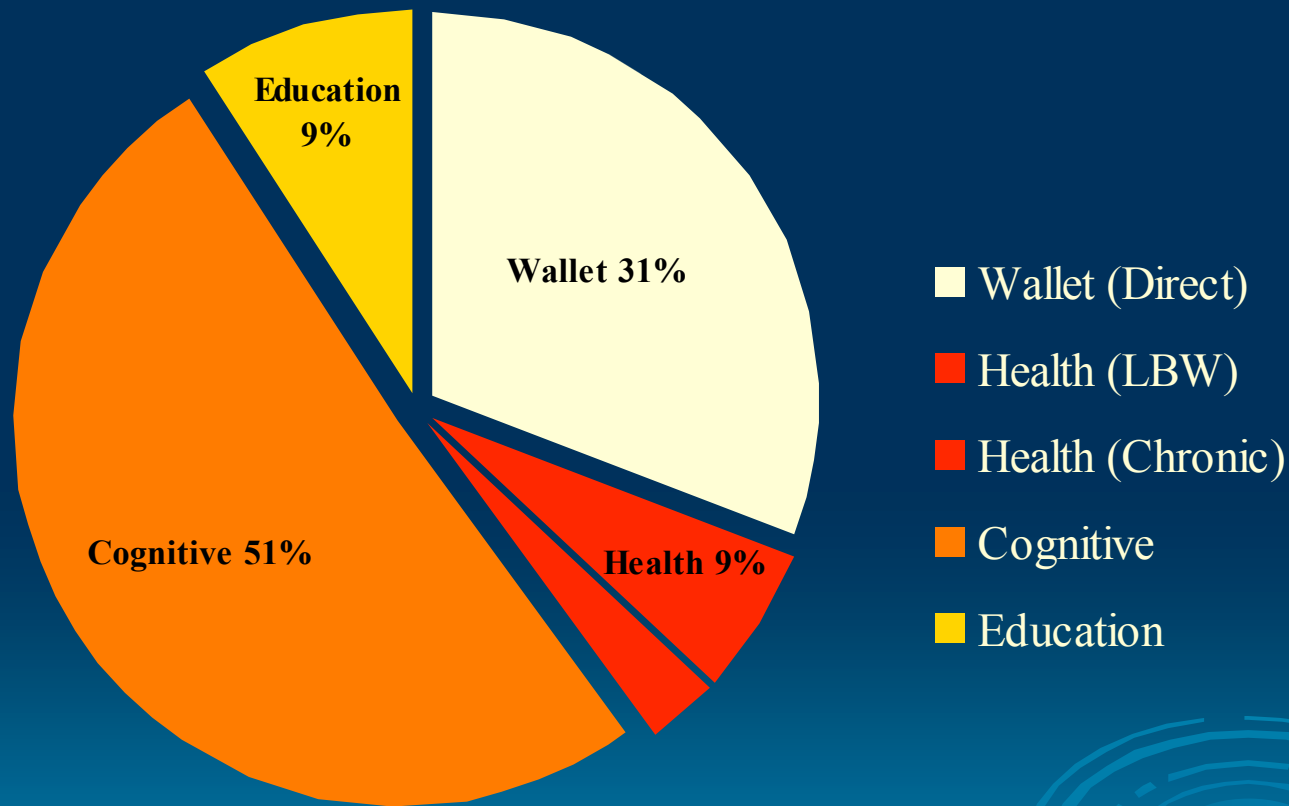
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# Decomposition of effects of parental social class on sons' social class



# Magnitude of selection effects

- Observed SES gradients is .30
- If early health effects are eliminated SES gradients descends to .24 or it accounts for about 1/5 of the total gradient
- We worry about things that contribute less, why shouldn't we pay attention to this?

# Relations between the three empirical regularities

