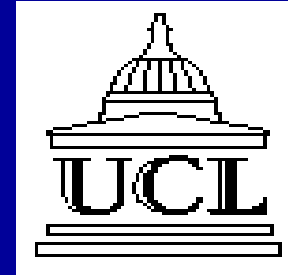


# "Socioeconomic context and cognition in early old age"

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National Heart, Lung, and Blood Institute

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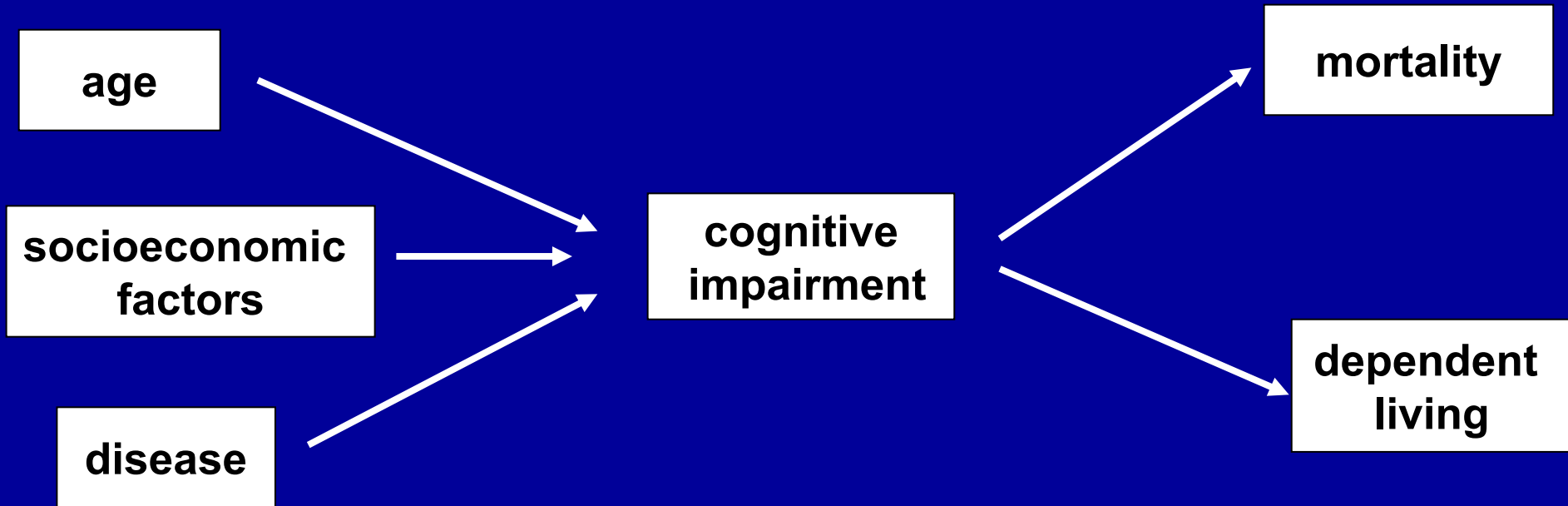
*British Medical Research Council*

*British Heart Foundation*

*British Health and Safety Executive*

*British Department of Health*

# Research on cognitive function in old age



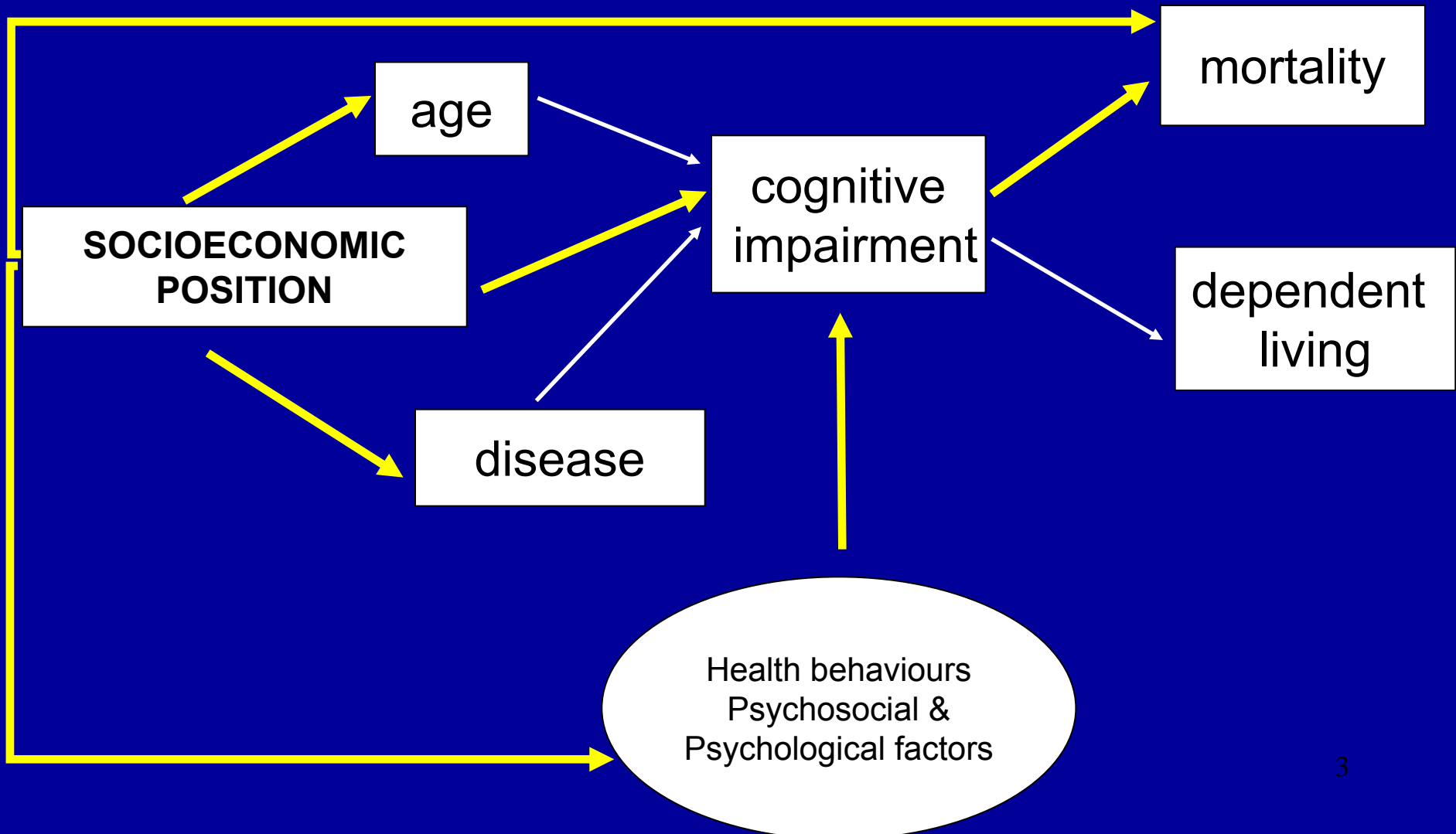
Holland & Rabbitt, 1991

***Ageing: cognition a health outcome + a risk factor***

**Whitehall II research: modify this framework to**

- add the “lifecourse” framework
- focus on socioeconomic factors
- extend it to early old age
  - co-morbidity & confounding
  - pre-clinical dementia itself modifies “risk factors”

# Determinants of cognitive decline in “early old age” : research agenda

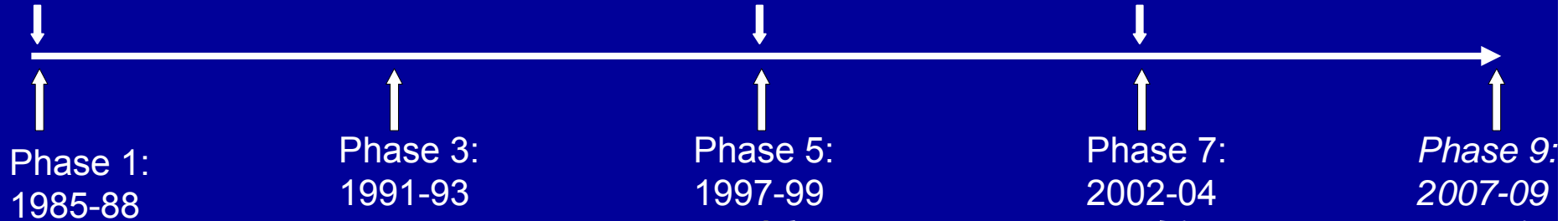


# Data: the Whitehall II study

N = 10308  
age=44 (34-56)

N = 6025  
age=56 (44-68)

N = 6327  
age=61 (50-74)



## Cognitive function

- Verbal memory
- Reasoning (AH4-I)
- Vocabulary (Mill Hill)
- Phonemic fluency (S words)
- Semantic fluency (animal words)
- MMSE

**exposures**

Mortality: N = 274

Mortality follow-up till July 2006 4  
N = 463; with cognitive data N = 190

# SES, cognitive function in early old age

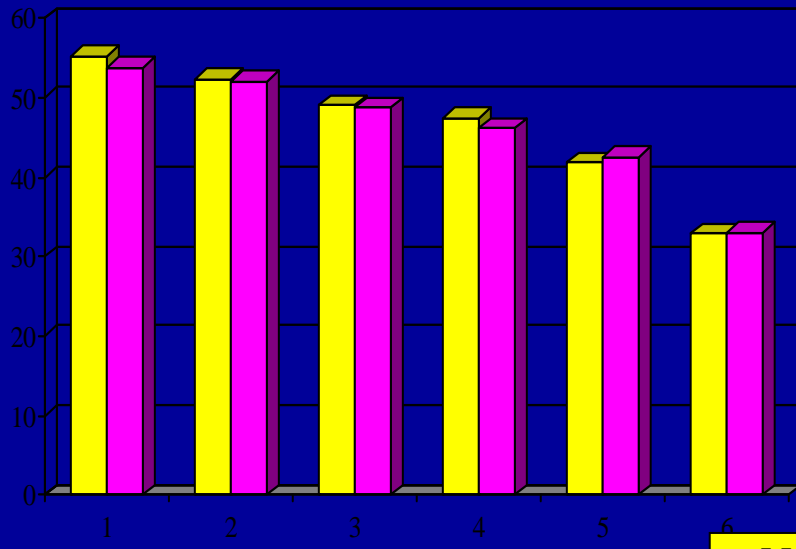
## SES and cognition: independent influences on health?

### Cognitive plasticity (potential cognitive modifiability)

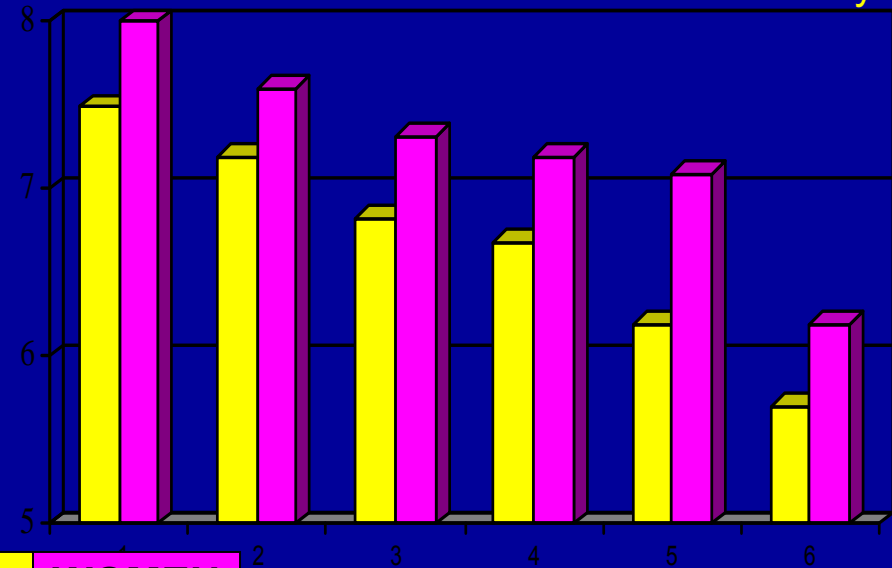
- SES across the lifecourse and cognition
- Vascular risk factors (IMT) and SES and cognition: SES as a moderator
- Health behaviours and cognition: SES a confounder

# "Social gradient" in cognitive function: Whitehall II data

## Reasoning (AH4-I)

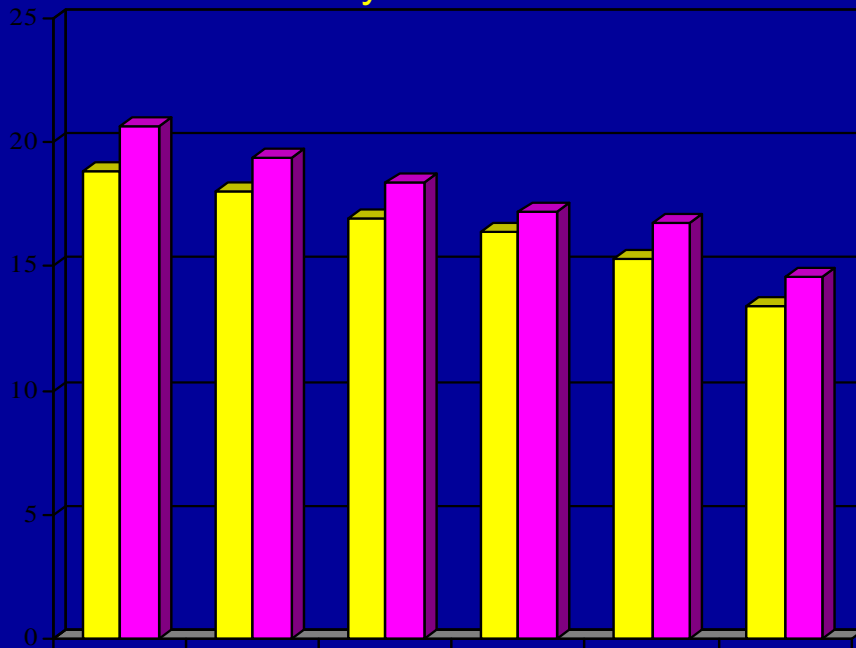


## Memory

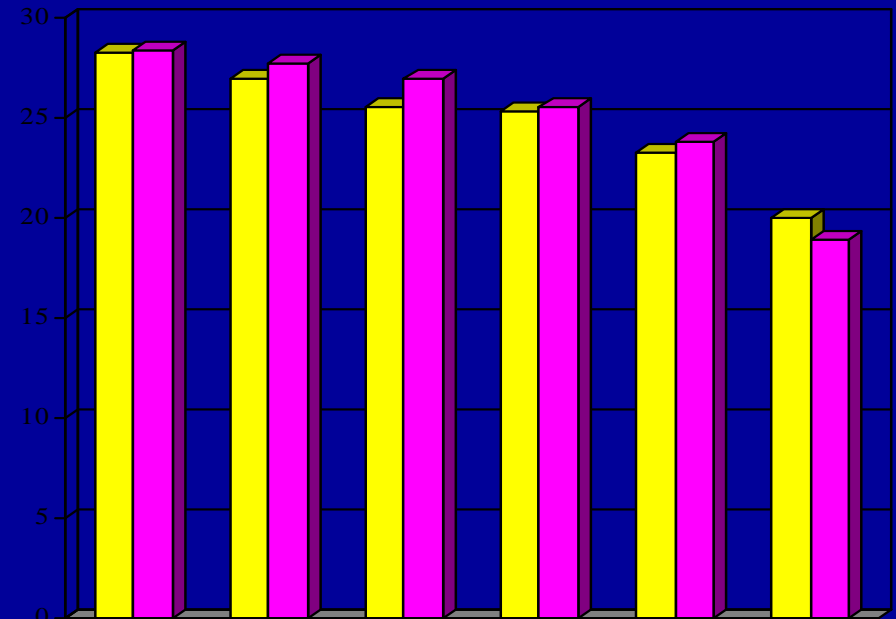


**MEN** **WOMEN**

## Phonemic fluency



## Vocabulary (Mill-Hill)



# Social epidemiology & cognition

## Two conceptual models

- **SOCIAL CAUSATION (SES → health)**
  - material conditions: deprivation, poor housing, access to care...
  - health behaviours: smoking, alcohol, diet, physical activity...
  - work conditions: physical, social and psychological...
  - psychosocial factors: social support & network, self-esteem...
  
- **SELECTION**
  - health → SES
  - Cognition (intelligence → SES and health): “**health self care**” hypothesis

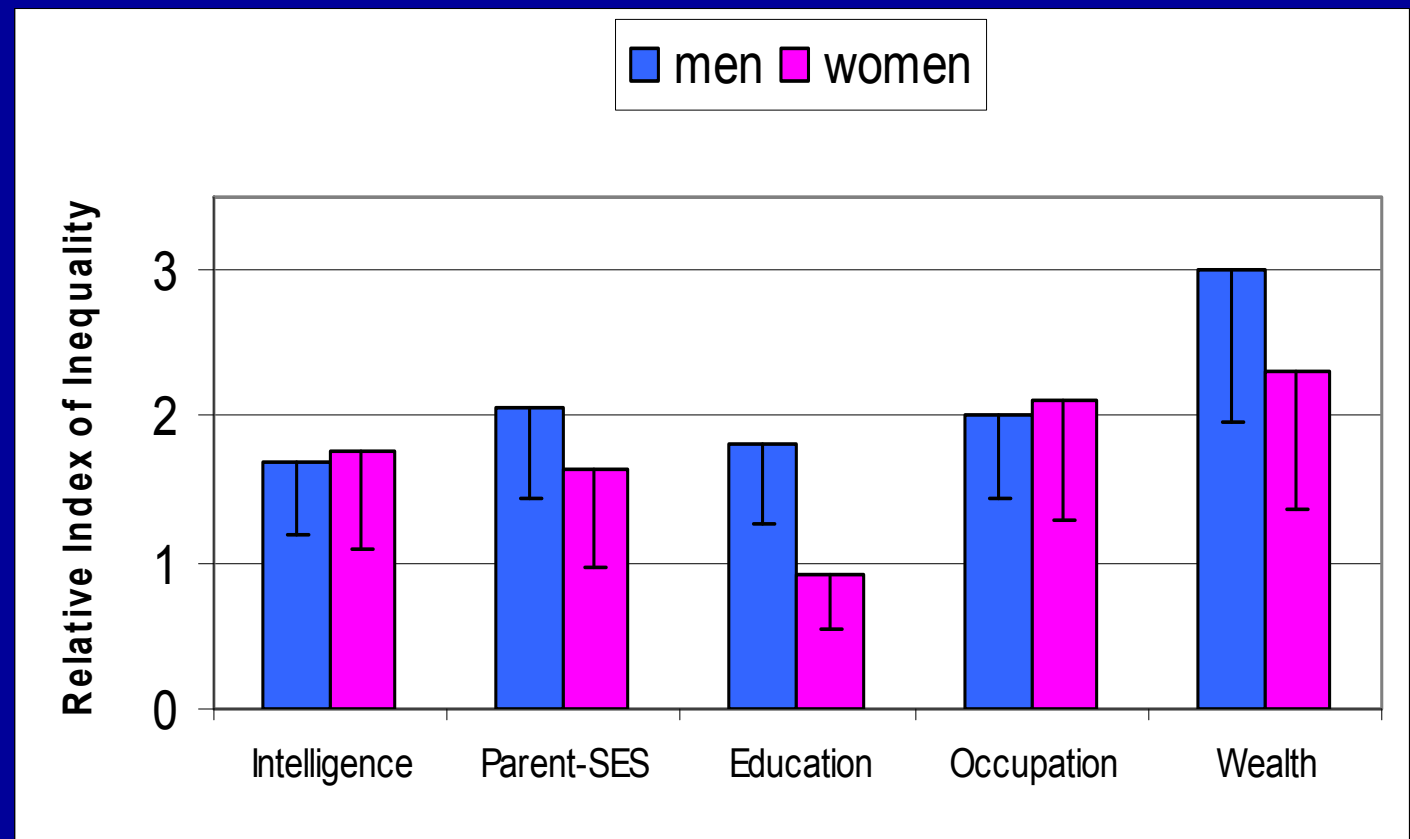
## SES, cognition and health (CHD)

- Is intelligence related to health outcomes?
- Does intelligence explain the association between socioeconomic position & health?

### Measures

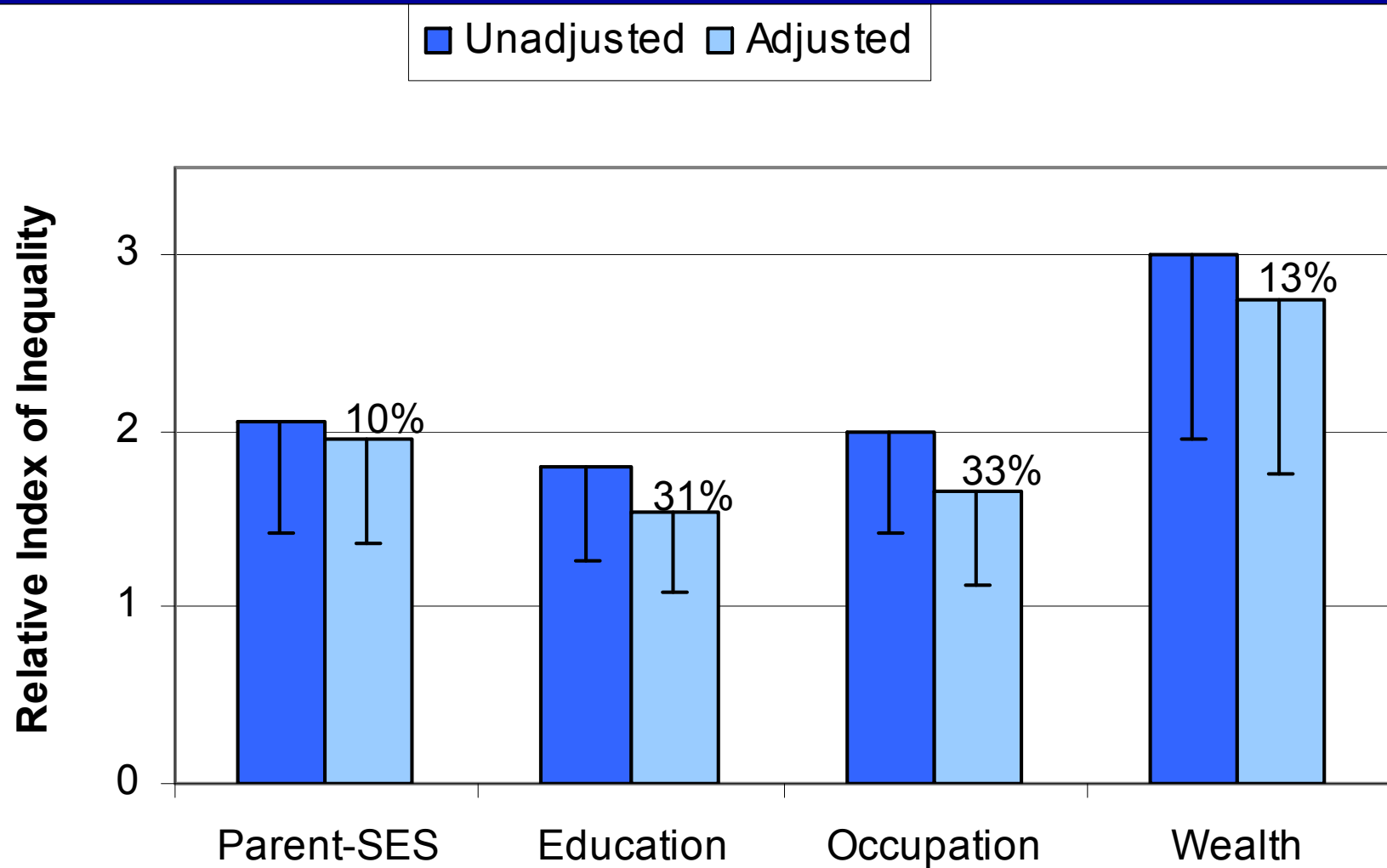
Intelligence: measure of reasoning/fluid intelligence (AH4-I)

Health: Coronary Heart Disease (CHD)

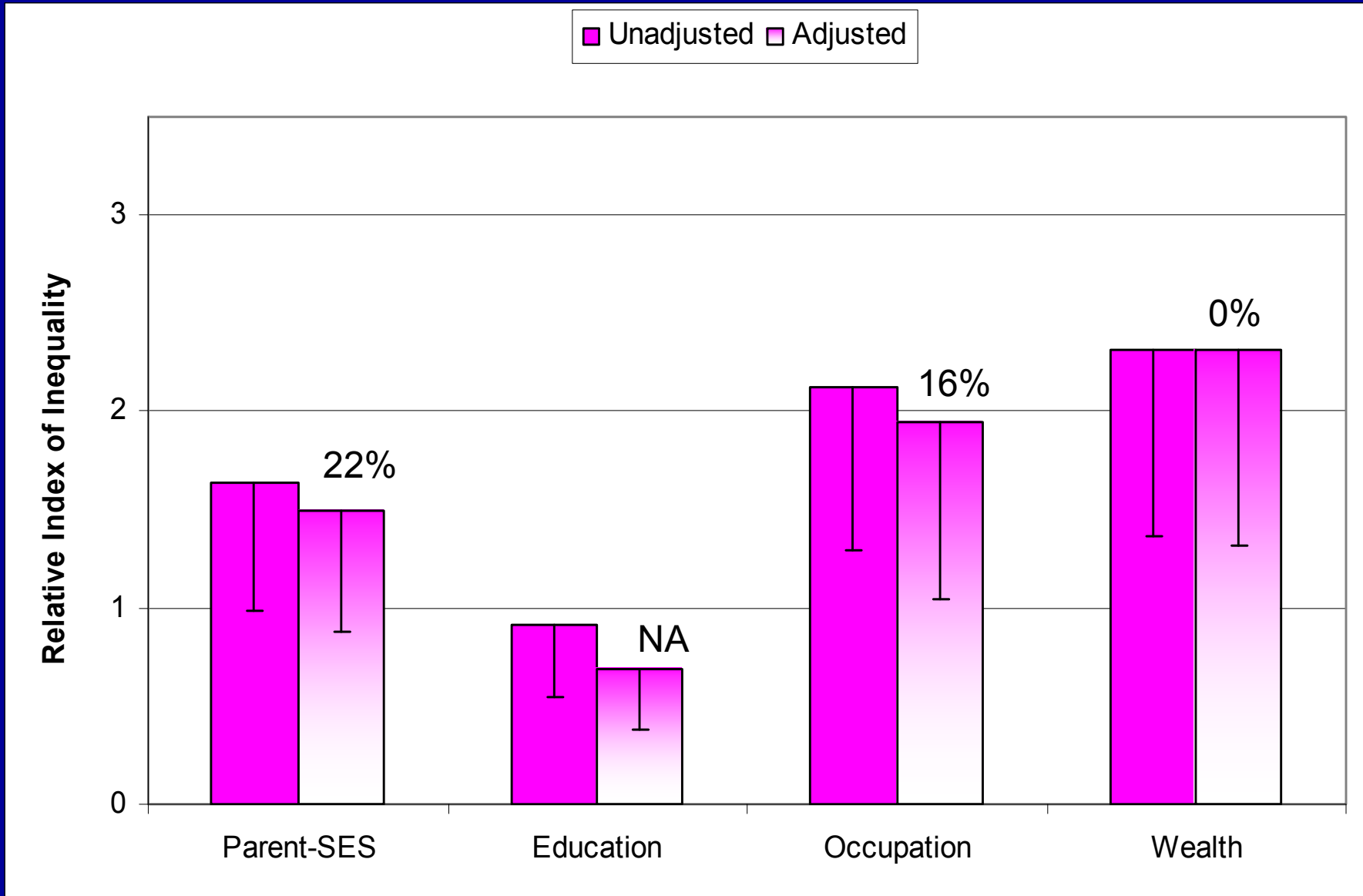


Singh-Manoux et al., Am. J. Epidemiol., 2005; 161: 831-839.

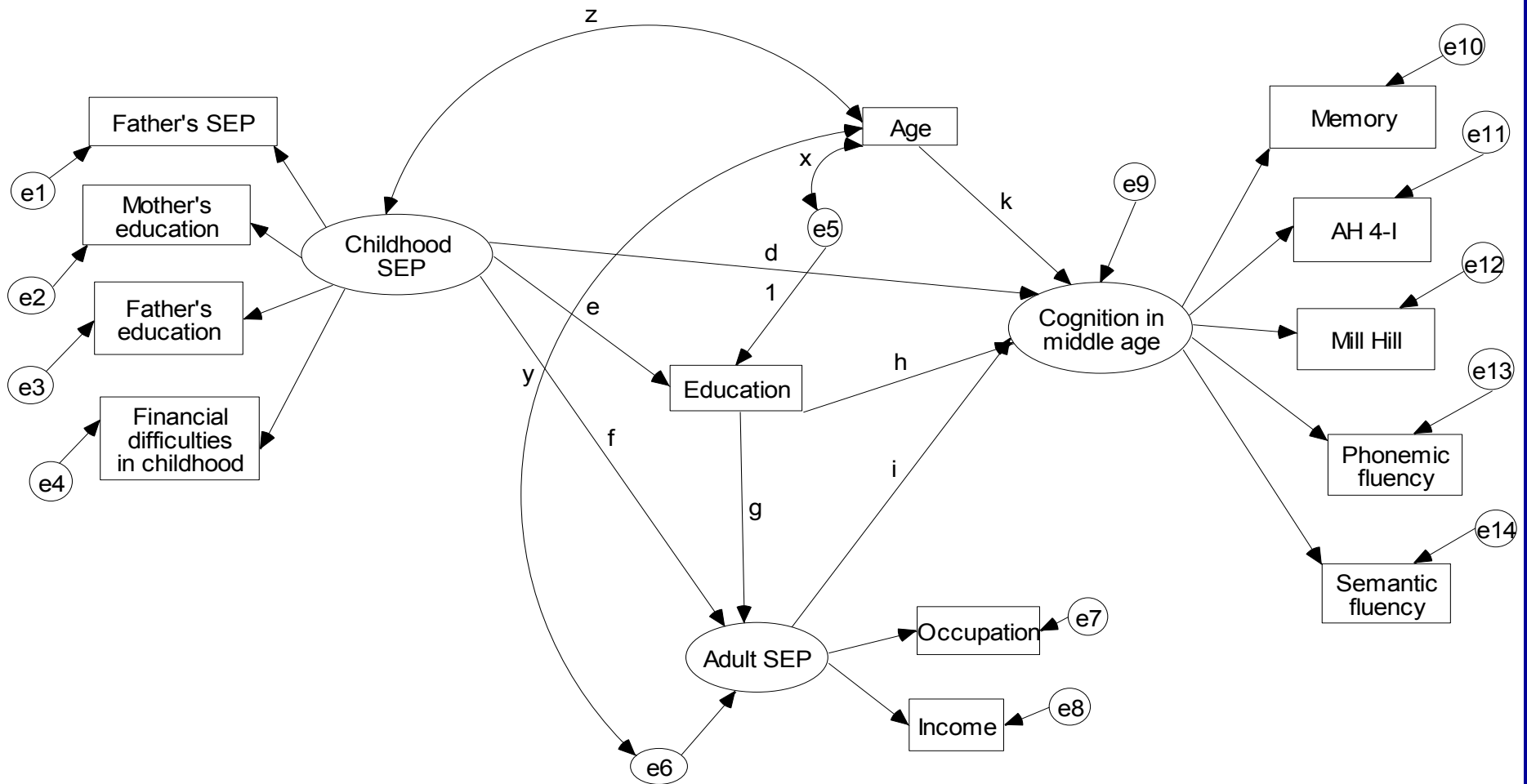
## SES & CHD, adjusted for Intelligence (men)



## SEP & CHD, adjusted for Intelligence (women)



# SES over the lifecourse and cognitive plasticity



Note

1. All observed variables are in boxes, unobserved variables and error terms (e1-e14) are in ellipses.
2. d, e, f, g, h and i represent standardized regression coefficients; x, y and z are correlation coefficients.

# Social epidemiology & cognitive function

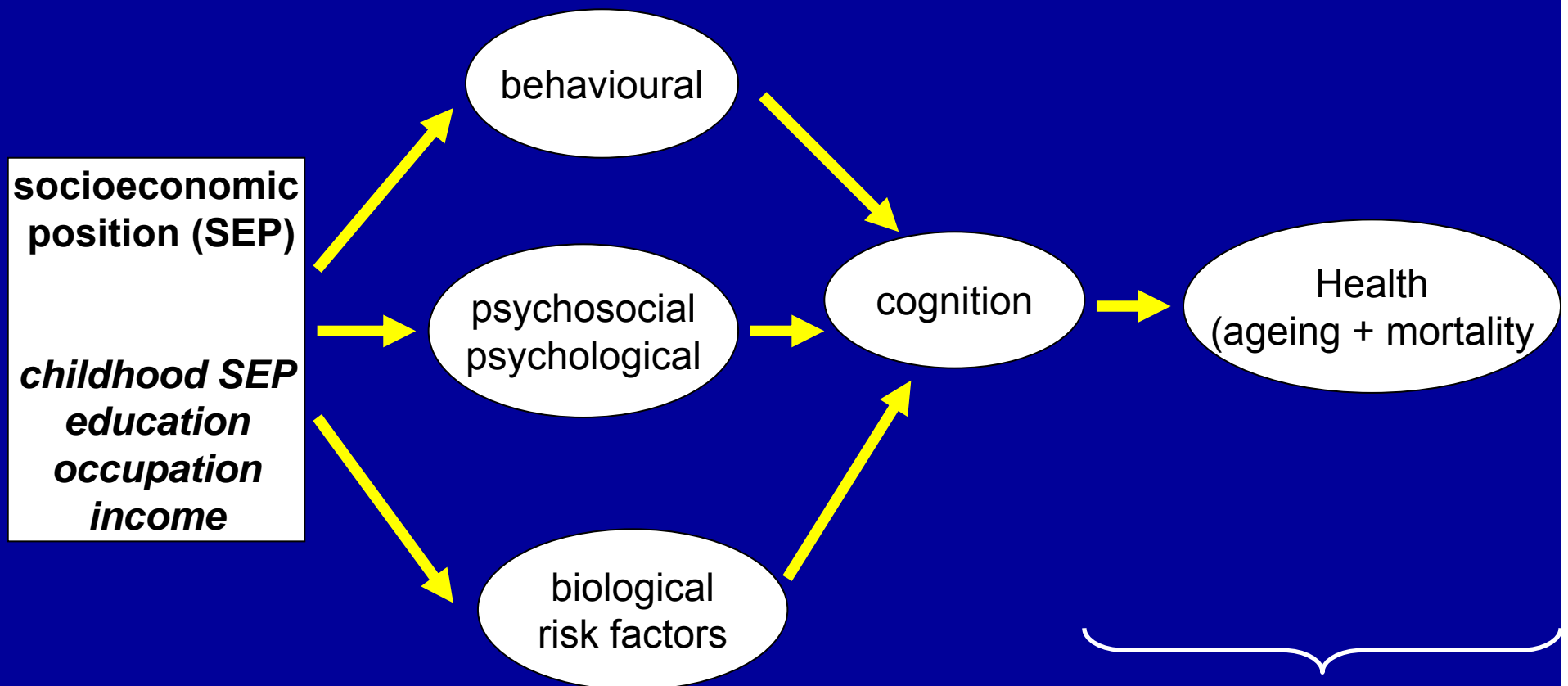
## SOCIAL CAUSATION (SES → health)

material conditions: deprivation, poor housing, access to care...

health behaviours: smoking, alcohol, diet, physical activity...

work conditions: physical, social and psychological...

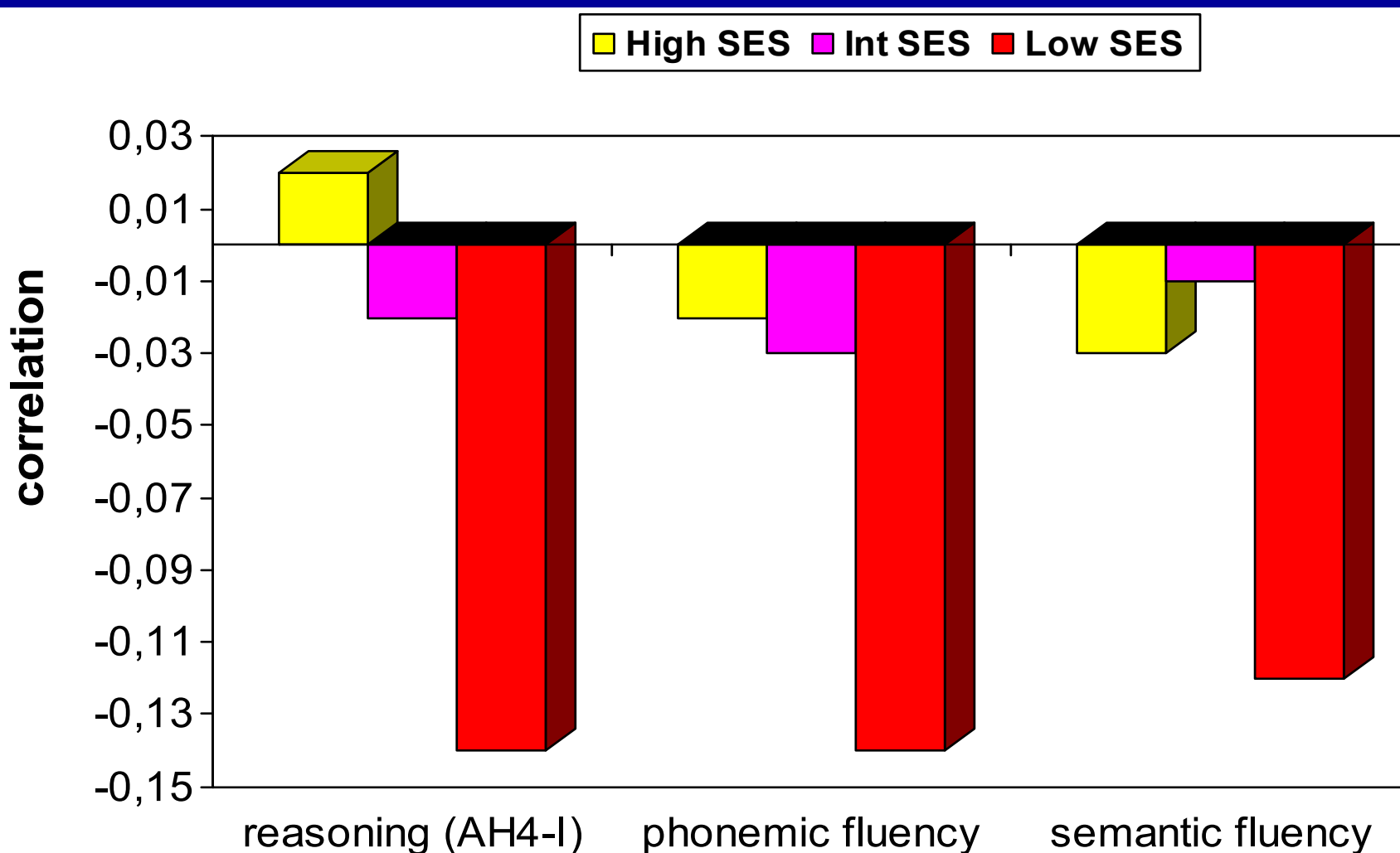
psychosocial factors: social support & network, self-esteem...



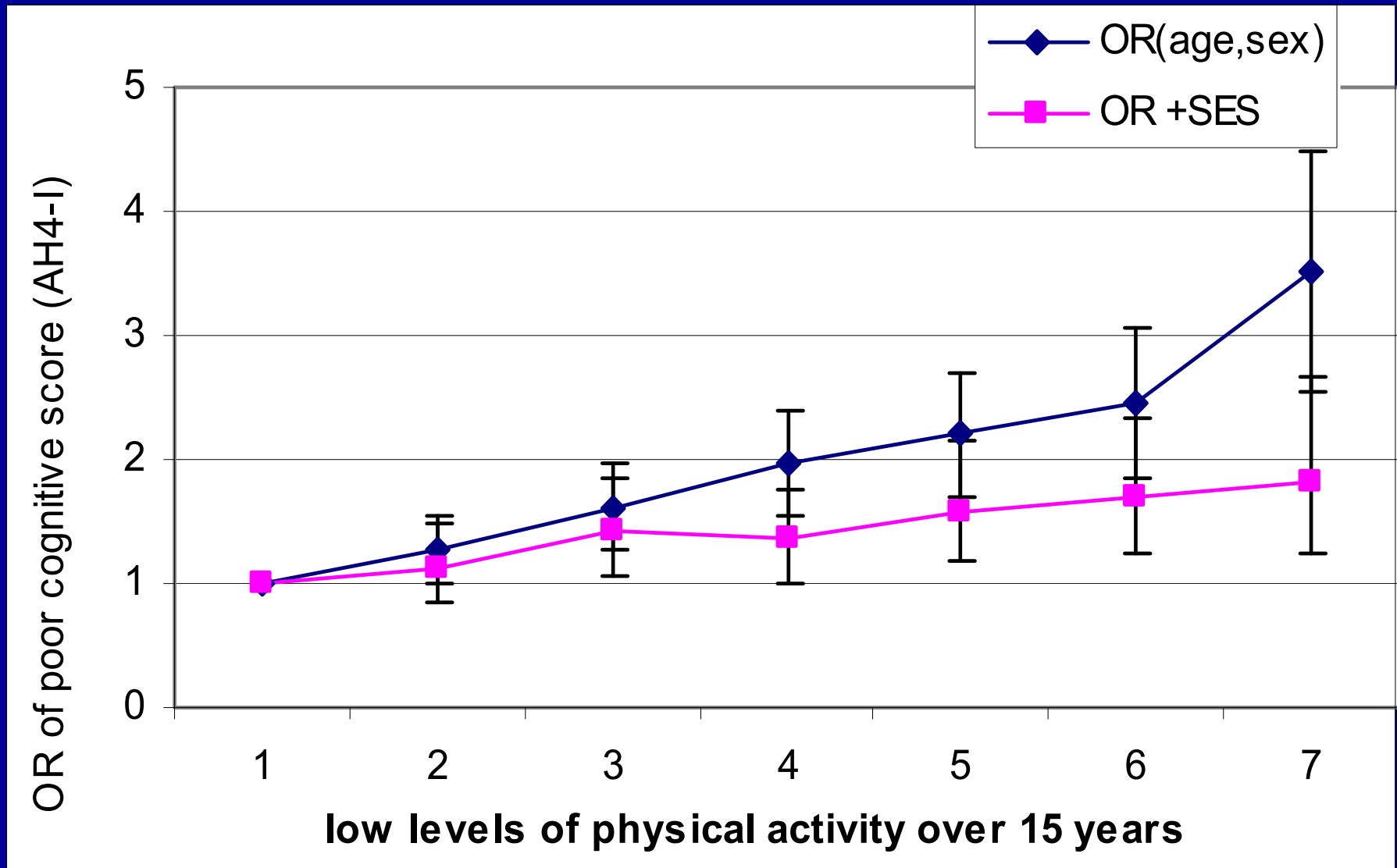
In preparation<sup>2</sup>

## Does SES moderate the association between risk factors and cognition?

Carotid IMT is a measure of generalized atherosclerosis



## Physical activity and cognition: SES effects



# Final thoughts: SES, cognition & health

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## The role of SES in shaping cognitive ageing

1. Independence of effect: SES not a proxy for cognitive ability
2. SES shapes levels of risk factors: SES an antecedent variable and / or a confounder
3. SES moderates the association between risk factors and cognition
  - cognitive reserve: what are the links to dementia?

## Publications (Whitehall II): cognitive function

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- Brunner EJ. Social and biological determinants of cognitive aging. *Neurobiol Aging*. 2005; Suppl 1:17-20.
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- Fuhrer R, Head J, Marmot MG. Social position, age, and memory performance in the Whitehall II Study. *Ann N Y Acad Sci*. 1999;896:359-62.
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- Singh-Manoux A, Marmot M. High blood pressure was associated with cognitive function in middle-age in the Whitehall II study. *J Clin Epidemiol* 2005; 58: 1308-1315.
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- Singh-Manoux et al., The role of cognitive ability (intelligence) in explaining the association between socioeconomic position and health: Evidence from Whitehall II prospective cohort study. *Am J Epidemiol* 2005; 161: 831-839.
- Singh-Manoux A, Britton A, Kivimaki M, Guéguen A, Halcox J, Marmot M. Socioeconomic status moderates the association between carotid intima-media thickness and cognition in midlife: evidence from the Whitehall II study. *Atherosclerosis*. **In press**
- Zhao JH, Brunner EJ, Kumari M, Singh-Manoux A, Hawe E, Talmud PJ, Marmot MG, Humphries SE. APOE polymorphism, socioeconomic status, and cognitive function in Mid-life: the Whitehall II longitudinal study. *Soc Psychiatry Psychiatr Epidemiol* 2005; 40: 557-563.