A Lifespan Perspective on Cognitive Reserve and Risk for Dementia

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For the IGEMS Consortium

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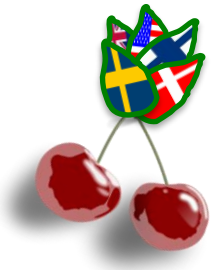
IGEMS consortium

National Institute on Aging



- **The Interplay of Genes and Environment across Multiple Studies (IGEMS) consortium**
- Brings together twin studies of adult development and aging from Sweden, Denmark, Finland, Australia, the U.S.
- Pedersen et al. *IGEMS: The Consortium on Interplay of Genes and Environment Across Multiple Studies — An Update*. Twin Research and Human Genetics, 2019.

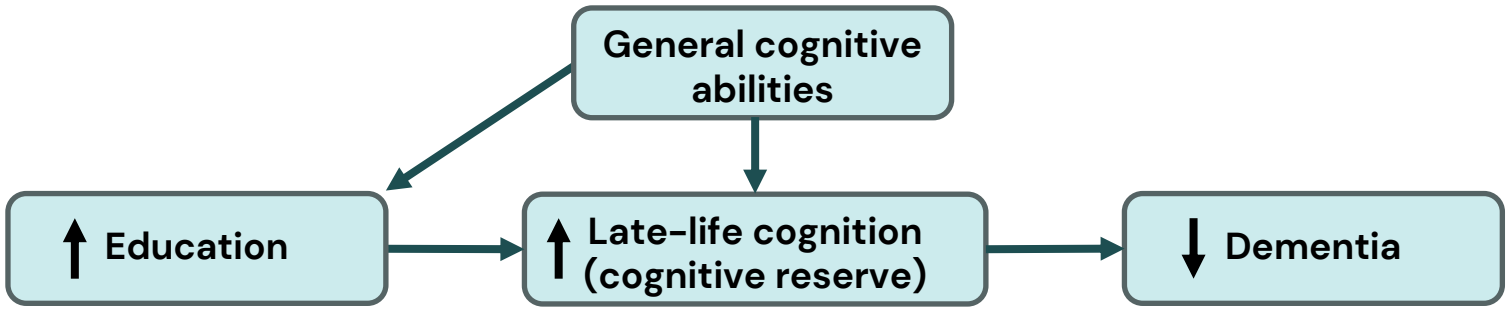
- **Current study:**
  - → Data from the Swedish Twin Registry
  - → Led by Matt Panizzon at UC San Diego

UC San Diego

Background and aims

- Higher education = well-established protective factor for dementia
- Higher education → cognitive reserve

- Causal association?
- Explained by higher cognitive abilities → higher education?



Background and aims

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- Higher education → cognitive reserve

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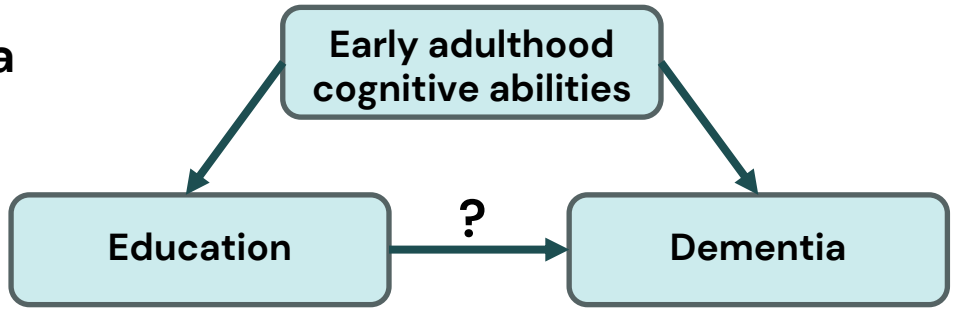
- **Does education predict dementia if we account for early adulthood cognitive abilities?**



Methods

- Swedish Twin Registry: Screening Across the Lifespan Twin (SALT) study, conducted 1998-2002
- Male twins born 1936-1958 → N = 13,771
- Mean age: 52.7 (standard deviation: 5.6)

- Education information → International Standard Classification of Education (ISCED) system

- In addition: occupational complexity, adult socioeconomic status

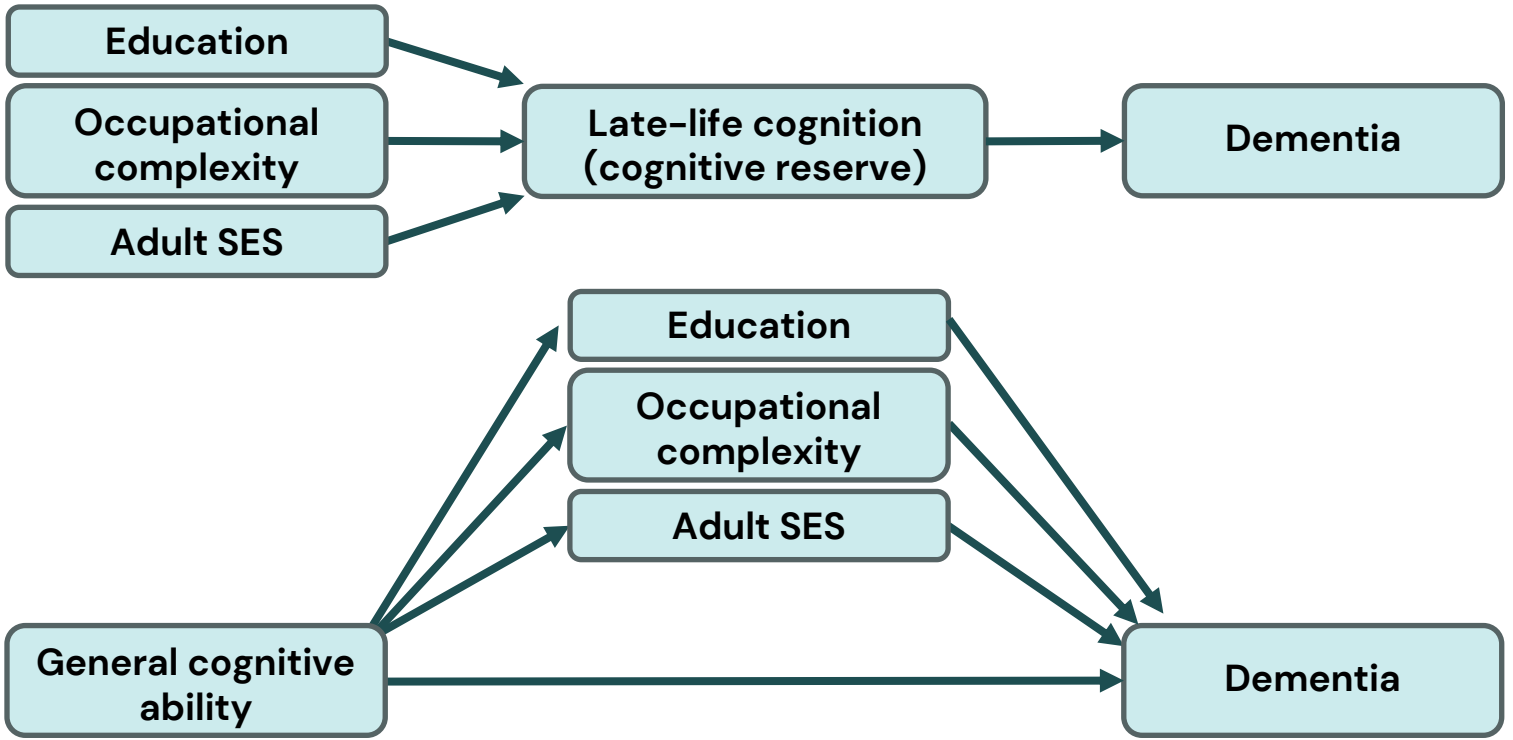
Methods

- Linkage to the Conscription Register → cognitive abilities in early adulthood

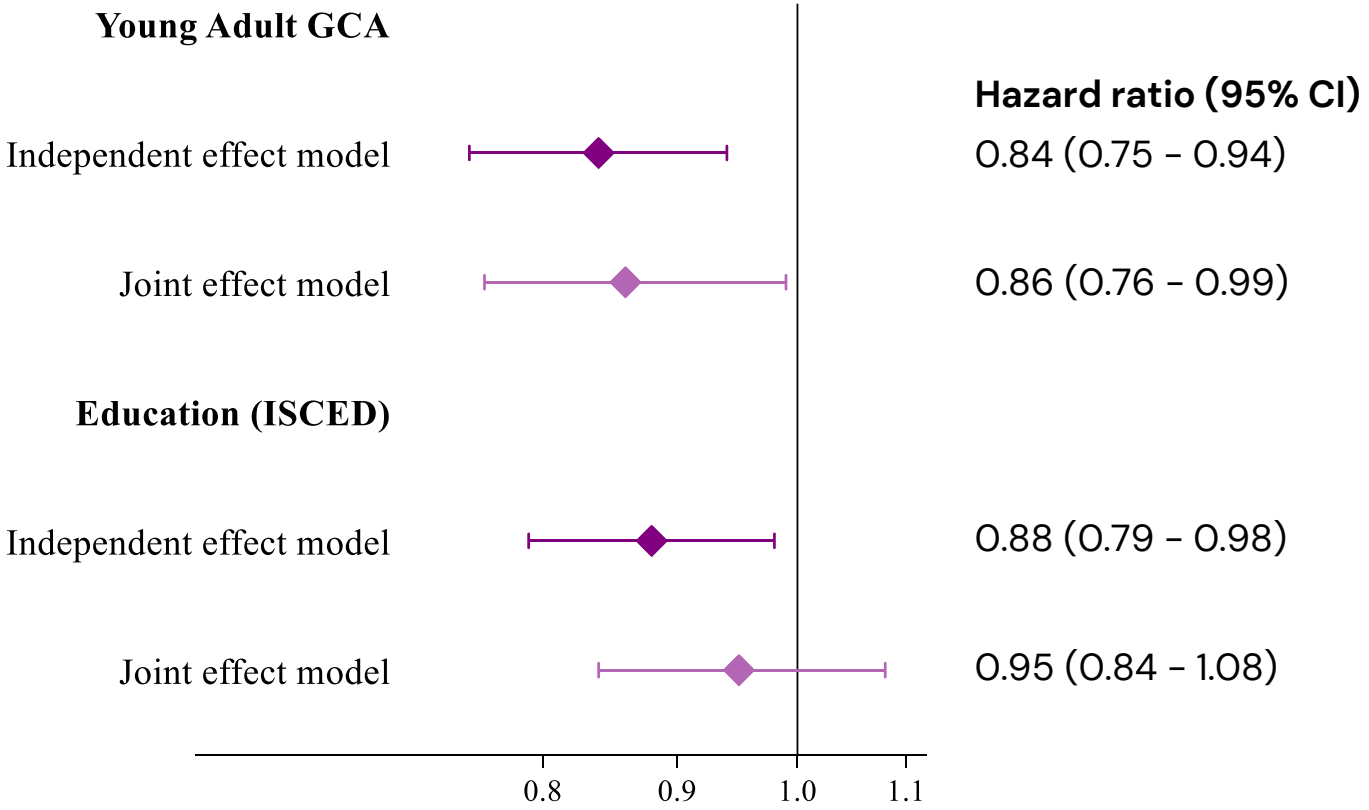
- Dementia diagnoses: National healthcare registers, linkage through 2016
  - → National Patient Register (inpatient + outpatient specialist care)
  - → Causes of Death Register
  - → Prescribed Drug Register (dementia medication, used as proxy for diagnosis)

- Cox proportional hazard model
  - → Followed from age ≥50 to dementia diagnosis, death, or end of follow-up

Methods


Education
Occupational complexity
Adult SES
Late-life cognition (cognitive reserve)
Dementia
Education
Occupational complexity
Adult SES
General cognitive ability
Dementia

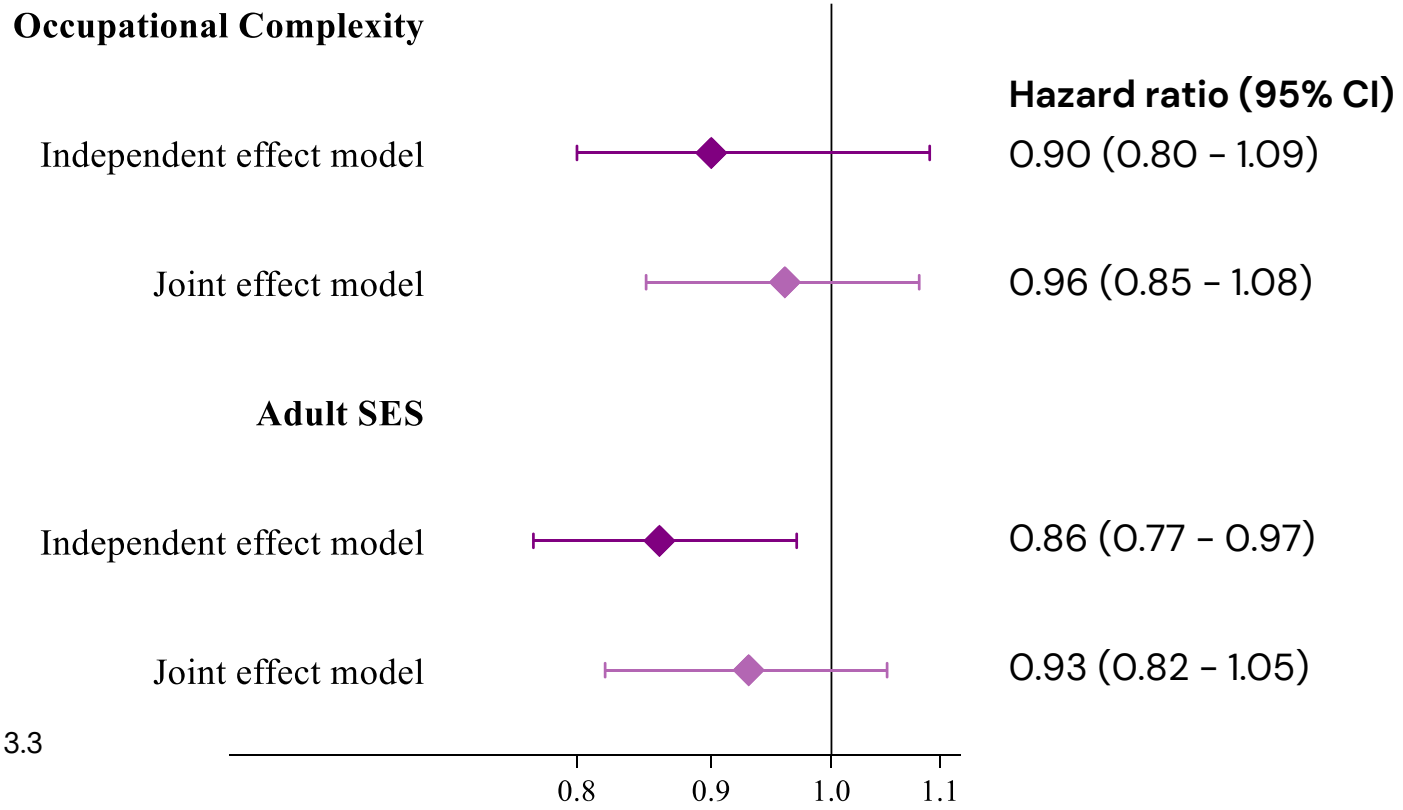
Results



Young adult general cognitive abilities: Continuous measure; mean 19.0 (SD 6.3)

Education (ISCED): Continuous measure, 5-point scale

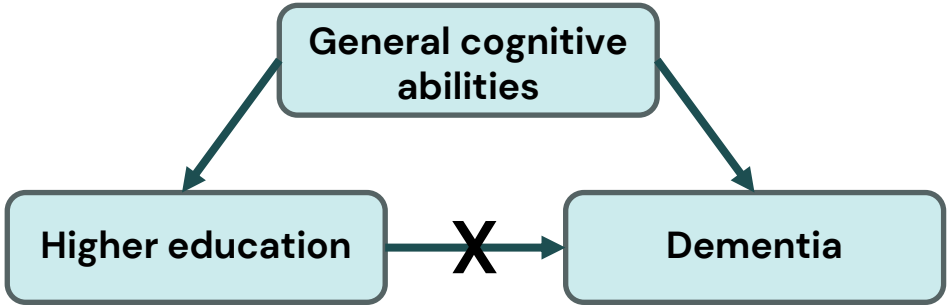
Results



Occupational complexity: Continuous measure; mean 3.3 (SD 0.4)

Adult SES: Continuous measure ; mean 46.2 (SD 21.3)

Discussion

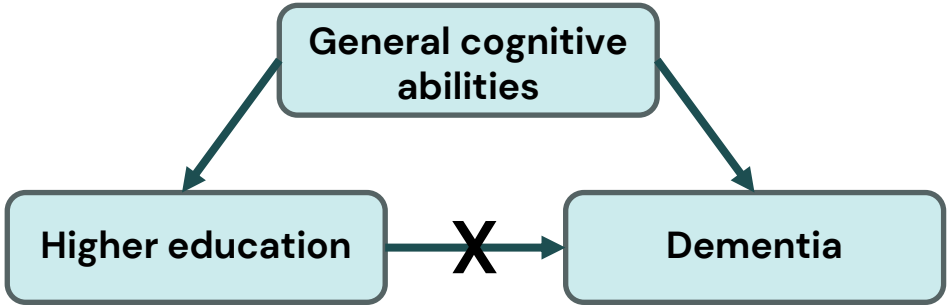


- Lower education is one of the most well-established modifiable risk factors for ADRD

- Current study: Higher education → lower risk of ADRD
- However: No association when accounting for early adulthood general cognitive abilities

→ Supports confounding through general cognitive abilities

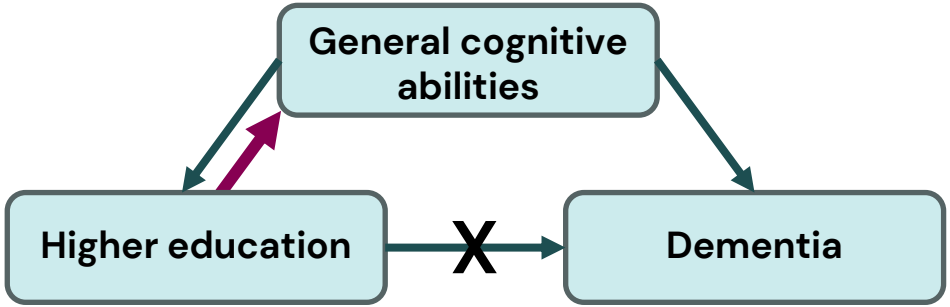
Discussion



- Further supported by similar findings for:
  - → Occupational complexity
  - → Adult socioeconomic status

- Findings align with prior work
  - → E.g. Kremen et al. *Influence of young adult cognitive ability and additional education on later-life cognition*. Proc Natl Acad Sci U S A. 2019.
  - → **Nygaard et al. *Influence of young adult cognitive ability on the association between lifetime education and later-life cognitive function – a study in Danish twins*. NKG, Thursday Ber2:P02; Poster tour: 12.45, Ber2:1.**

Conclusion



- NOTE! Bidirectional association: Higher education → increased general cognitive abilities
- Early adulthood cognitive abilities robustly associated with lower risk of dementia, even when controlling for education, occupational complexity, or adult SES
- Education → dementia = downstream of general cognitive abilities (same for occupational complexity and adult SES)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