Institute of Education

Using longitudinal studies to examine changes in health inequality: Cross-cohort differences in body mass index inequality

CENTRE FOR LONGITUDINAL STUDIES

David Bann

Cross-cohort analyses – prevalence and/or association changes

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Journal of the British Academy, 4, 89–111. DOI 10.5871/jba/004.089
Posted 18 July 2016. © The British Academy 2016

Social class mobility in modern Britain: changing structure, constant process

Lecture in Sociology read 15 March 2016

JOHN H. GOLDTHORPE

Psychological Medicine (2017), **47**, 291–303. © Cambridge University Press 2016
doi:10.1017/S0033291716002464

ORIGINAL ARTICLE

Psychological distress in mid-life: evidence from the 1958 and 1970 British birth cohorts

G. B. Ploubidis*, A. Sullivan, M. Brown and A. Goodman

Life-course body mass index trajectories and blood pressure in mid life in two British birth cohorts: stronger associations in the later-born generation

Leah Li,[1]* Rebecca Hardy,[2] Diana Kuh[2] and Chris Power[1]

PNAS

Decline in the negative association between low birth weight and cognitive ability

Alice Goisis[a,b,1], Berkay Özcan[a], and Mikko Myrskylä[a,b,c]

OPEN ACCESS Freely available online

PLoS MEDICINE

Life Course Trajectories of Systolic Blood Pressure Using Longitudinal Data from Eight UK Cohorts

Andrew K. Wills[1]*, Debbie A. Lawlor[2], Fiona E. Matthews[3], Avan Aihie Sayer[4], Eleni Bakra[3], Yoav Ben-

Consortia: HALCyon, FALCon, IALSA, CLOSER

BMI and health, inequality

Epidemiologic Reviews
Copyright © 2007 by the Johns Hopkins Bloomberg School of Public Health
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Vol. 29, 2007
DOI: 10.1093/epirev/mxm001
Advance Access publication May 2, 2007

Socioeconomic Status and Obesity

Lindsay McLaren

Epidemiologic Reviews
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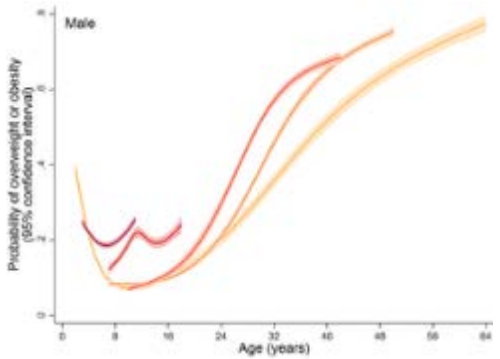
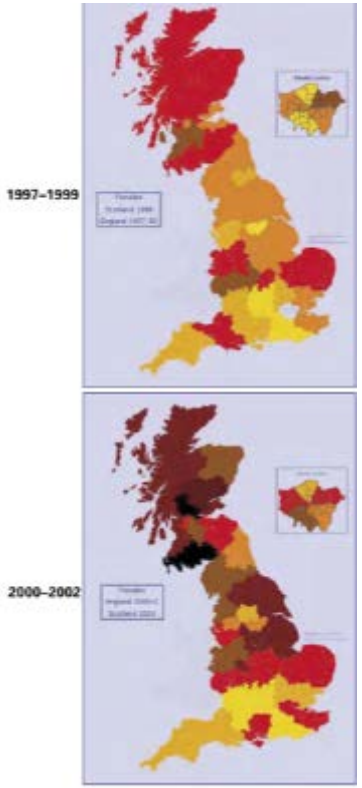
Vol. 31, 2009
DOI: 10.1093/epirev/mxp006
Advance Access publication July 31, 2009

Associations Between Childhood Socioeconomic Position and Adulthood Obesity

Laura C. Senese, Nisha D. Almeida, Anne Kittler Fath, Brendan T. Smith, and Eric B. Loucks



Johnson et al, 2015



Foresight, 2007

- Reducing inequalities in BMI is an important health policy goal
  - Evidence is needed to understand how these have changed
- Existing evidence - mostly repeated cross-sectional
  - Short-term changes (HSE started in 1991)
  - Do not examine childhood SEP
  - BMI at one point in adult life
- Hard to interpret given analytical differences (eg, scale)

Study objectives

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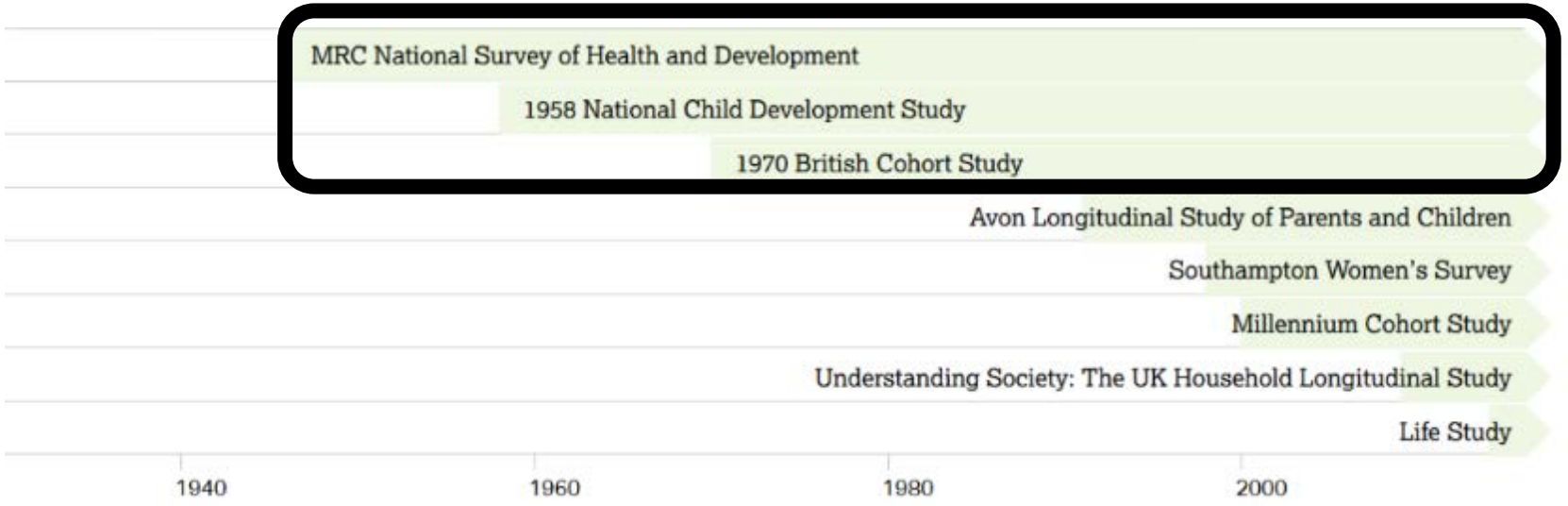
- Examine trends in the socioeconomic inequality of adult BMI, using data from British birth cohort studies, 1946, 1958, 1970

  - Hypothesized inequalities would be larger in cohorts born more recently
    - Fundamental cause hypothesis: ↑ public knowledge of obesity risks



Methods – data used

- BMI (kg/m^2):
  - 1946: 20, 26, 36, 43, 53, and 60–64y
  - 1958: 23, 33, 42, 44, and 50y
  - 1970: 26, 30, 34, and 42y
    - Standard cleaning procedure (Johnson et al, 2015)

- Continuous BMI used (similar results overweight/obese)

- Social class: I Professional … V unskilled (Dodgeon, forthcoming)
  - Childhood (father's class at 10/11y), own class (42/43y)
  - 1990 Office of Population, Censuses and Surveys

Challenges: differences between the cohorts (except birth year!)

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- Stratified sample in 1946 cohort (father's occupation), not 1958 or 1970
  - Used sampling weights to account for this
  - In pooled analyses, 1958 and 1970 cohorts given weight value of 1

- After study initiation, immigrants added to 1958 & 1970, but not 1946 cohort
  - Restricted sample to those included at birth

- Inclusion: non-married mothers not included in 1946 cohort
  - Challenging to account for as 'unmarried' group unlikely same across time
  - Interpretation: 1946 omits a small SES disadvantaged sub-group (underestimates inequality?)

- BMI mostly self-reported in 1970 compared with 1946 cohort
  - Checked if discrepancies differ by SEP where measured similarly (1958 cohort at 42 and 44)
  - No systematic evidence for this

Analytical strategy

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- Comparative and cohort-pooled analyses

- Social class in 6 categories: childhood (20y…) adulthood (42y…)
  - Separately in each sex given interaction

1. Multilevel models
   - Repeated BMI observations (level 1) within individuals (level 2)
   - Age, age^2, SEP * age terms
   - Mean BMI plotted in lowest and highest SEP group

2. Linear regression at comparable ages - 42/43y
   - Absolute (kg/m^2) & relative (%) differences in BMI

Childhood SEP and adult BMI – men

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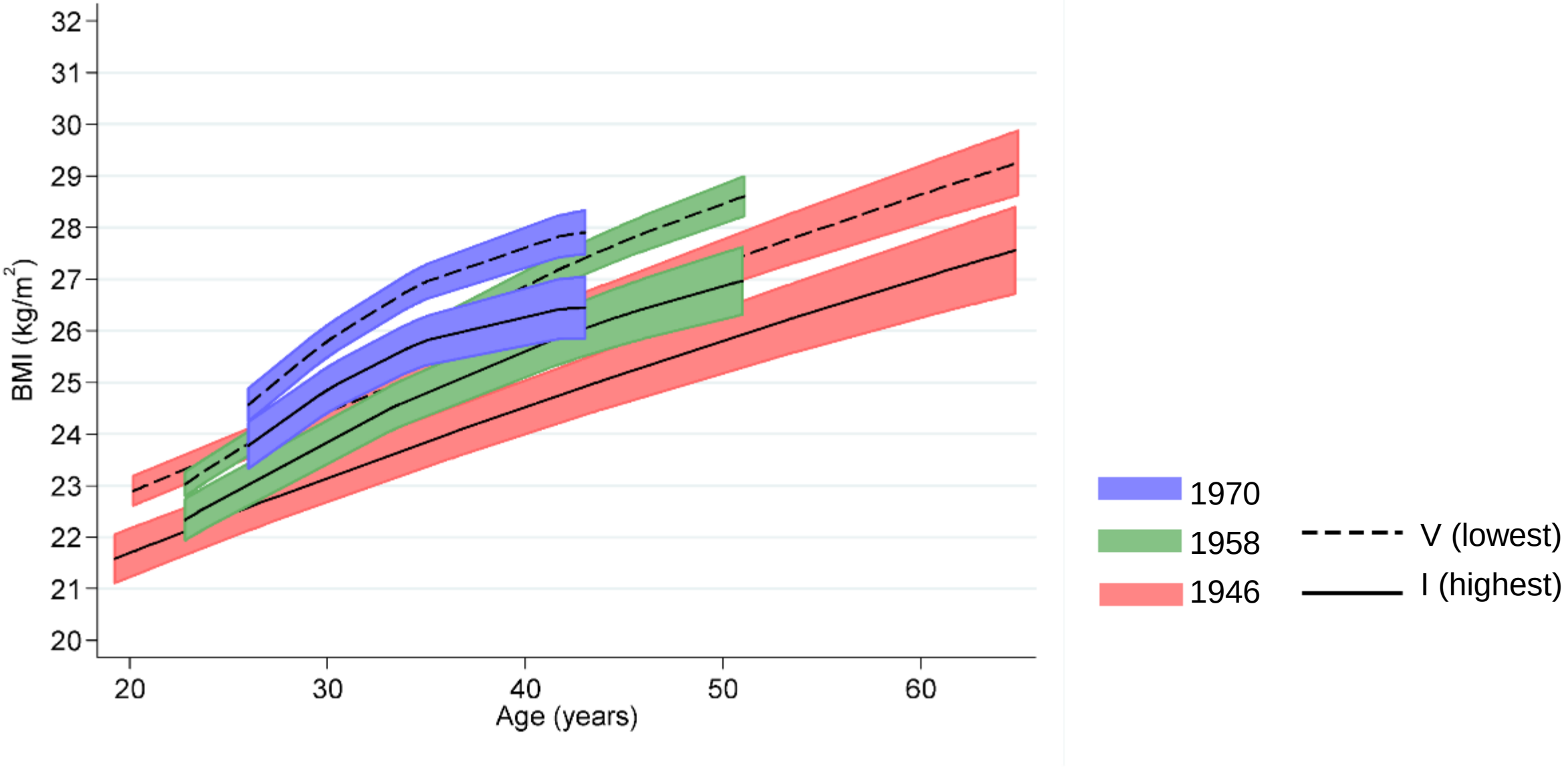

Childhood SEP and BMI at 42/43y – men
Differences between lowest (V) and highest (I) classes

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Cohort	kg/m²	%
1946	1.3 (0.2, 2.3)	4.9% (0.8, 9.0)
1958	1.4 (0.7, 2.2)	5.2% (2.6, 7.8)
1970	0.9 (0.0, 1.9)	3.4% (0.1, 6.6)

P (cohort x SEP interaction) = 0.3

Childhood SEP and adult BMI – women

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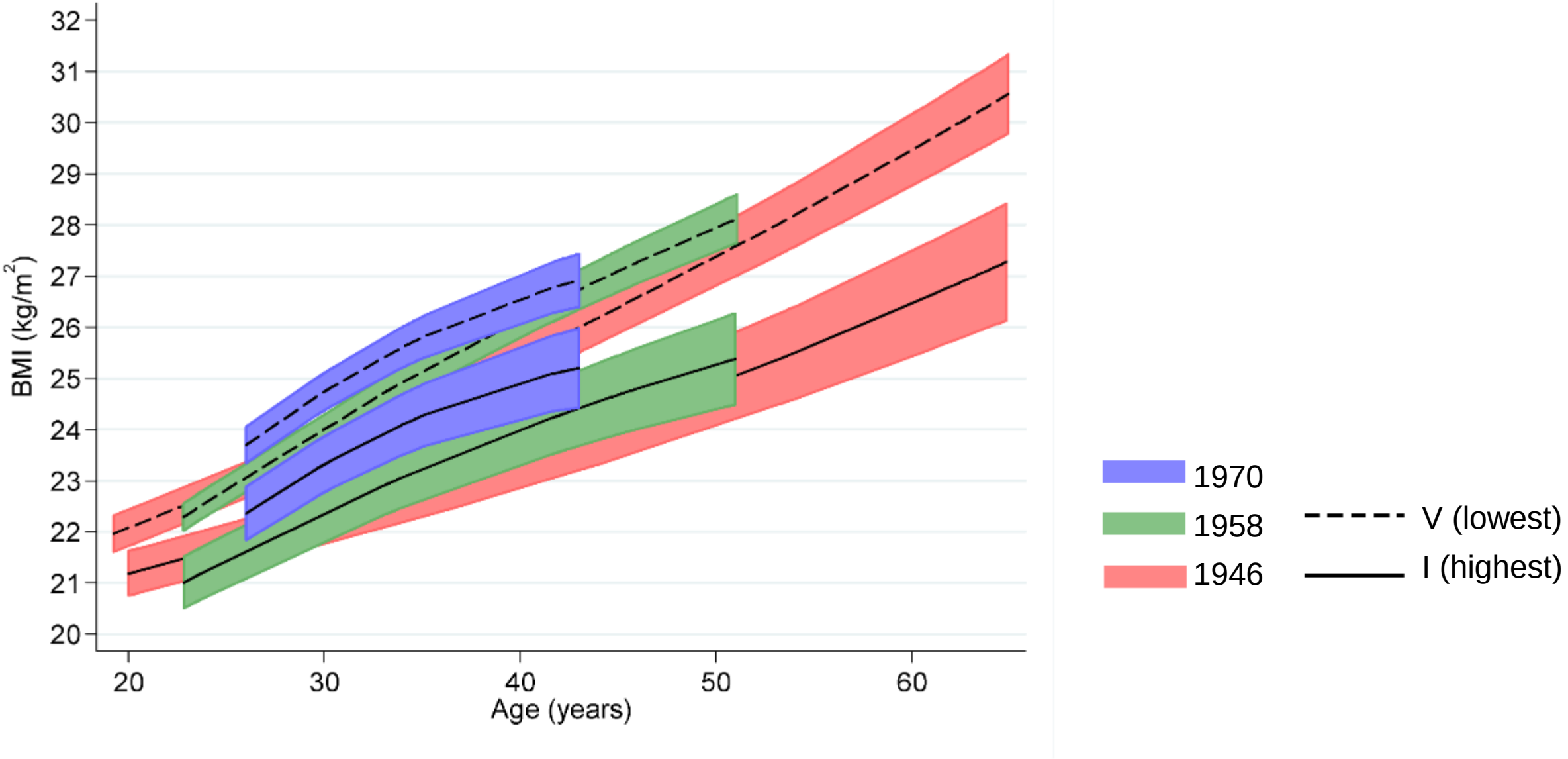

Childhood SEP and BMI at 42/43y – men
Differences between lowest (V) and highest (I) classes

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Cohort	kg/m²	%
1946	1.7 (0.2, 3.2)	6.5% (0.8, 12.1)
1958	1.5 (0.6, 2.5)	6.0% (2.5, 9.4)
1970	2.7 (1.6, 3.9)	12.3%(7.0, 17.7)

P (cohort x SEP interaction) = 0.2

Adult SEP (42/43y) and BMI ≥42y – men

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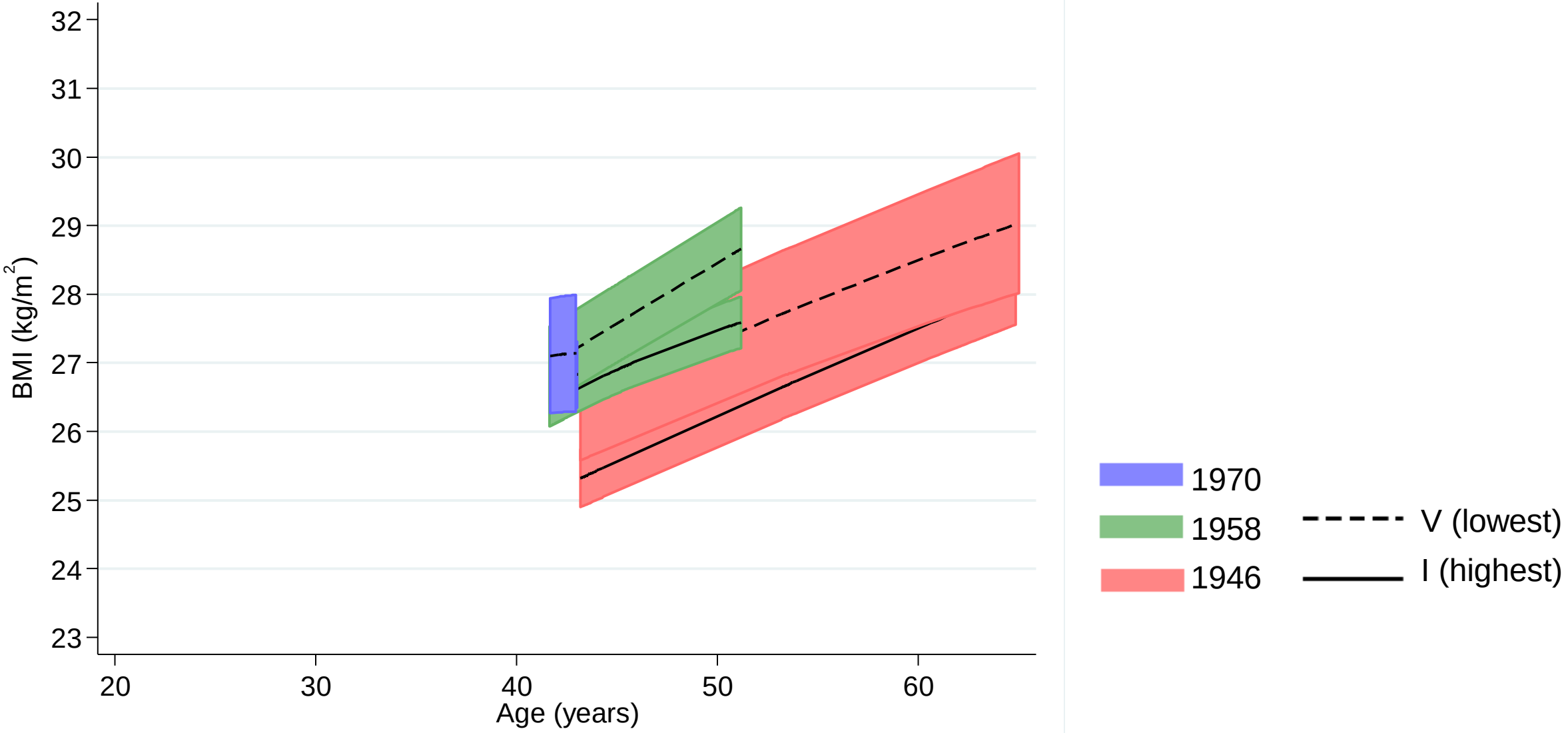

Adult SEP (42/43y) and BMI at 42/43y – men
Differences between lowest (V) and highest (I) classes

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Cohort	kg/m²	%
1946	0.0 (-1.5, 1.5)	0.4% (-6.3, 5.4)
1958	0.8 (0.0, 1.5)	2.5% (-0.4, 5.3)
1970	0.4 (-0.7, 1.5)	0.5% (-3.3, 4.4)

P (cohort x SEP interaction) = 0.7

Adult SEP (42/43y) and BMI ≥42y – women

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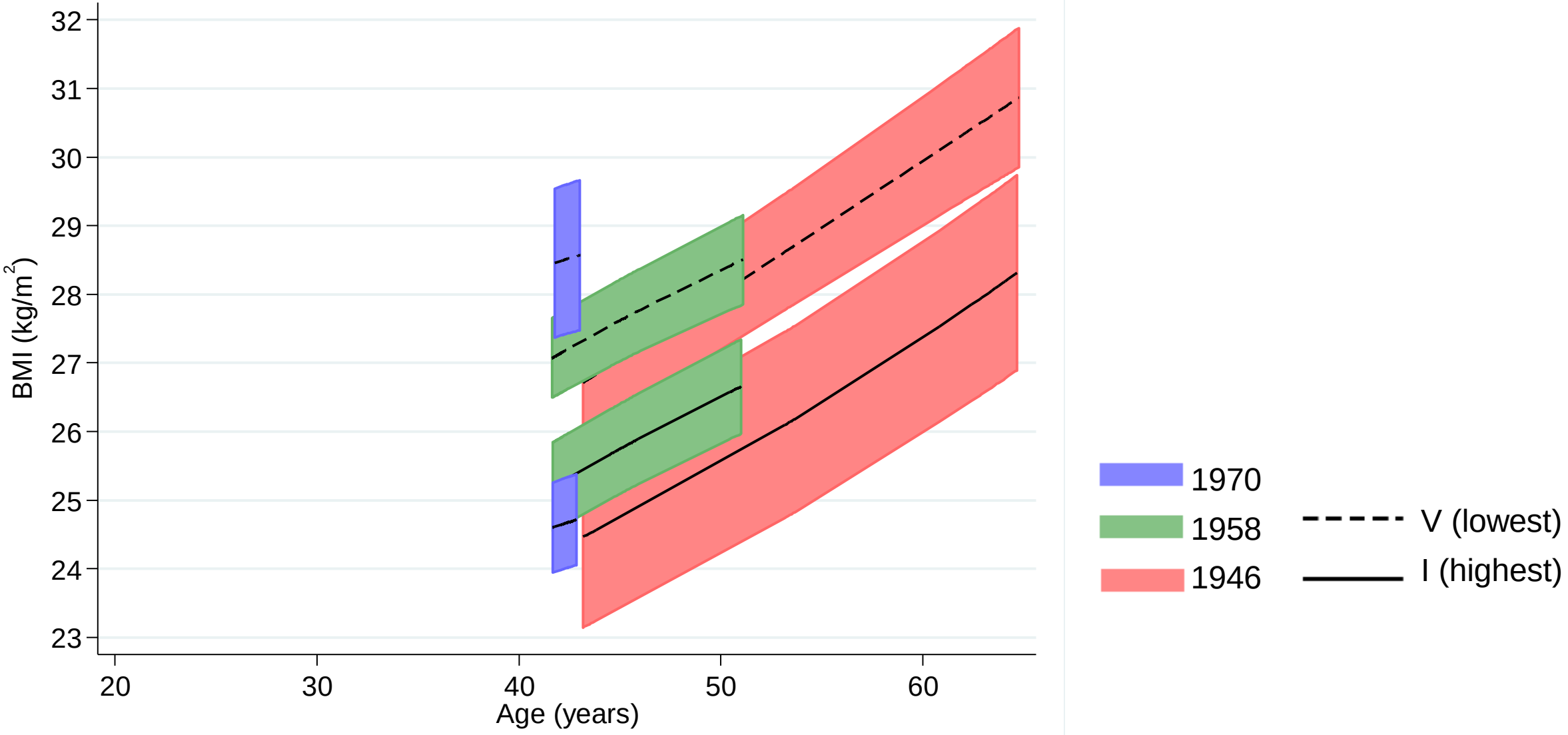

Adult SEP (42/43y) and BMI at 42/43y – women
Differences between lowest (V) and highest (I) classes

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Cohort	kg/m²	%
1946	2.0 (-0.1, 4.0)	6.4% (-1.3, 14.1)
1958	2.3 (1.1, 3.4)	8.1% (4.0, 12.3)
1970	3.9 (2.3, 5.4)	14.0% (8.5, 19.6)

P (cohort x SEP interaction) = 0.01

Summary of findings

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- Childhood SEP
  - Lower SEP -> higher adult BMI (20-64y), especially among women
  - Larger differences at older ages
  - Not fully explained by adult SEP
  - Little robust evidence for birth cohort differences

- Adult SEP
  - Lower SEP -> higher adult BMI (42-64y), especially among women
  - Among women, larger inequality in 70 compared with 58 or 46 cohorts

Explanation of findings

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- **Persisting inequality in BMI**
  - Suggest persisting inequalities in activity & diet

- **Increasing inequality: adult SEP among women**
  - SEP differentially affected by societal changes
    - ↑ costs of healthy diets, 1990-2010 (odi, 2015)
    - Women: ↑ expectations to be thin (Wiseman et al, 1992)
    - Men: ↑ expectations to be muscular (Pope et al, 99; Leit et al, 2001)

- **Labour market changes**
  - Women: increasing labour market participation
  - Conservative interpretation: BMI inequalities amongst those in work

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Strengths:

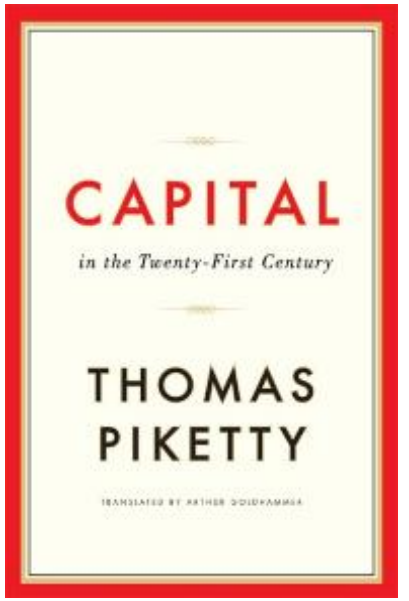
- Multiple birth cohort studies, ‘harmonised’; adds to cross-sectional evidence

Limitations:

- Social class only – other dimensions warrant investigation

- BMI strongly positively correlated with fat, but also includes muscle/bone
  - Larger inequalities with direct fat mass(Bann et al, *JECH* 2014)
  - Is BMI an equivalent fat measure in each cohort?

- Impact of missing data…



Potential implications & future plans

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- Persistent or widening BMI inequalities
  - Need for new/effective policies (up-stream & little individual agency)
  - Supports need for early intervention, since inequalities widened with age
  - Both childhood & adult SEP important: need to reduce inequalities in both

- (How) can inequalities be avoided in future health epidemics?

- Future plans
  - Further examination of adult BMI inequalities (different domains)
  - Inequality in childhood (growth in weight, height, BMI)

Acknowledgments

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  - Rebecca Hardy, William Johnson, Leah Li, Diana Kuh

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- Colleagues, participants

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RESEARCH ARTICLE

Socioeconomic Inequalities in Body Mass Index across Adulthood: Coordinated Analyses of Individual Participant Data from Three British Birth Cohort Studies Initiated in 1946, 1958 and 1970

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http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002214