CLOSER Conference

Health 4: BMI

Chair: **Will Johnson**

- The Role of Family structure in predicting overweight and obesity outcomes in children
  Ben Lawrence A. Kemah
- Socioeconomic inequalities in body mass index, weight, and height: coordinated analyses from four British birth cohort studies initiated in 1946, 1958, 1970, and 2000/1
  David Bann
- The impact of maternal employment on children's weight
  Emla Fitzsimons

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The Role of Family structure in Predicting childhood overweight/obesity: A secondary Analysis of the UK Millennium cohort study

Ben-lawrence A. Kemah MD MPH

Introduction

- There is a wealth of evidence suggesting that the rate of overweight and obesity are rising at alarming rates globally
- Estimates suggest more than a third of adults and 17 % of youths in the US are obese (Ogden et al, 2012).
- In 2015, 58% of women and 68% of men were overweight or obese. Obesity prevalence increased from 15% in 1993 to 27% in 2015 (HSE, 2015).

Introduction

- Perhaps of more urgent attention is the growing proportion of young children reported as either overweight or obese.
- In 2015/16, over 1 in 5 children in Reception, and over 1 in 3 children in Year 6 were measured as obese or overweight (HSE 2015).
- These findings are consistent with those from the national National Child Measurement Program for England (NCMP).

Introduction

- There is persistence of childhood obesity into adulthood, such that obese children are more likely to be obese adults (Lobstein et al, 2003, Singh et al, 2008).
- Transfer of of cardiovascular risk, premature mortality and other morbidities into adulthood with wider cost implications related to loss of productivity of working class populations (National Obesity Observatory, 2010).

Introduction

- Obesity and overweight are socially patterned and driven by socio-economic inequalities which drive these inequalities in a vicious cycle (White et al, 2007).
- Family structure is an understudied determinant of childhood obesity and overweight.
- Children in single mother homes have poorer health outcomes when compared to those from homes with two biological parents (Mathew, 2003, Blackwell et al, 2010).

Introduction

- Generally, the role of family structure in predicting obesity outcomes still presents a lot of research gaps and most research which has been done is inconclusive.
- Study findings will have implications for the planning of future interventions targeting obesity and support for single parent only families.

Objectives

- To determine:-
- Prevalence of obesity/overweight at the 2nd MCS when the children are aged 3.
- Prevalence of obesity/overweight at the 5th MCS when the children are aged 11.
- The independent effect of family structure on BMI at the 2nd and 5th MCS
- The independent effect of family structure at sweep 2 with a change in BMI from the 2nd to 5th survey.

Methods

- A secondary analysis of the MCS in a population based retrospective cohort design.
- The 2nd and 5th sweeps of the MCS are were used in the analysis.
- The 2nd sweep was conducted in 2003 – 2004. Data was collected from co-resident parents and measurements carried out by the interviewer. The 5th survey was conducted in 2012 – 2013. The data was collected from both the parents and these children

Methods

- Family structure which was defined as the number of parents in the household was the independent variable.
- BMI was the main dependent variable; expressed as a continuous variable or categorised by the MCS researchers based on the International obesity Task force cut-offs (Normal, Overweight and Obese).

Methods: Data Analysis

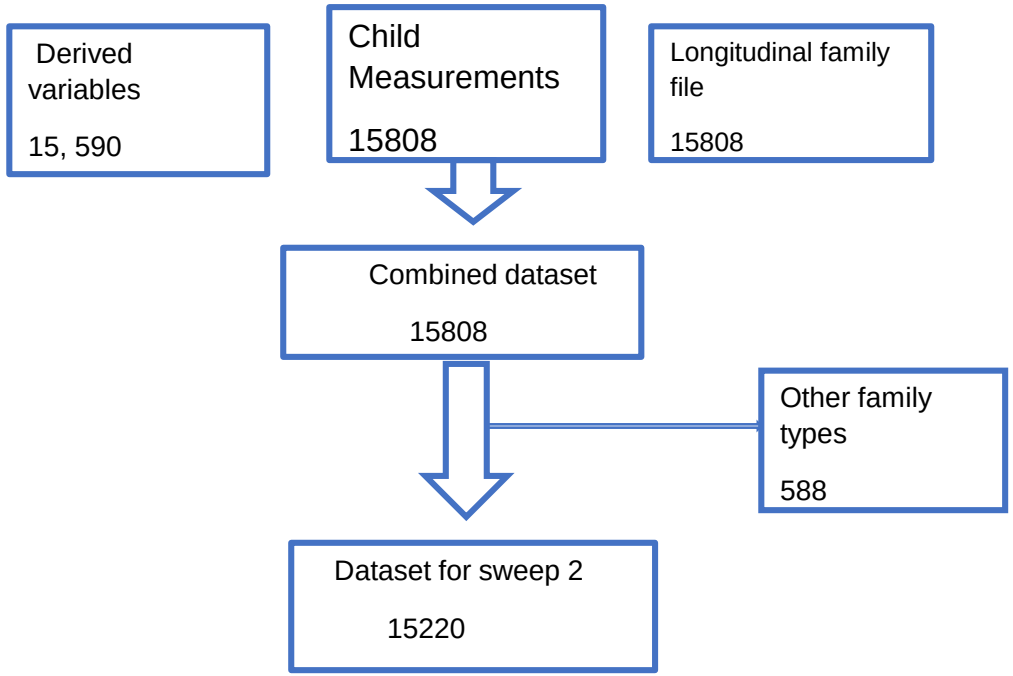
- The dataset was downloaded in STATA format from the UK data archive service after relevant protocols were met.
- The data management and analysis was done using Stata 14 Corp US.
- Multistage sampling and geographical clustering of the data was accounted for by using sampling and non-response weights.

Methods

- Sex was defined as an a priori confounder in univariate and multivariate linear regression models to predict the effect of family structure on BMI levels.
- A sensitivity analysis was done due to possible collinearity stemming from number of household members and number of cohort siblings
- Walds p-value and likelihood ratio p-values were used as appropriate. Level of statistical significant was set at 95% with a corresponding p-value of $p<0.05$.

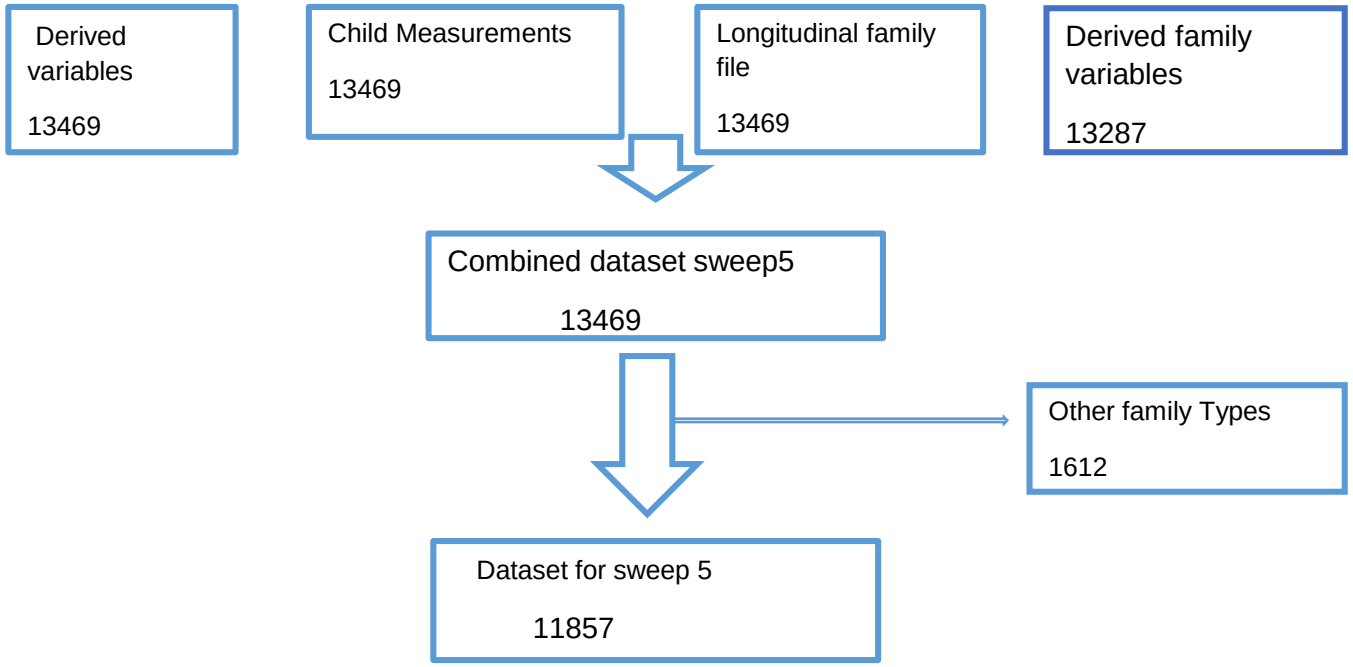
Results: Summary of Sample size for sweep 2

- Response rate = 96.28%



Results: Summary of sample size for sweep 5

- Response rate = 88.03%



Results: Summary of family structure sweep 2

Explanatory Variables	Categories	N	Percent (%)
Family Structure			
Number of parents	Two Natural parents	12544	82.2
	Natural mother	2676	17.8
Number of siblings	None	3870	25.5
	1	6794	45.6
	2 or more	4556	28.9
Number in Household	≤ 3	4162	27.6
	> 3	11058	72.4

Family structure of sweep 2

Results: Characteristics of sample in sweep 2

Other variables	Category	Frequency	Percentage (%)
Sex	Male	7742	50.9
	Female	7478	49.1
Ethnicity	White	12417	91.4
	Mixed	131	0.74
	India	378	1.46
	Pakistan	935	3.19
	Black	452	2.05
	Others	245	1.20
Income			
11.75 – <15.11	1st quartile	3706	22.5
15.11 - <334.12	2nd quartile	3688	23.5
334.12 - <1298.52	3rd quartile	3809	26.7
1298.52 – 1362.18	4th quartile	3829	27.3

Characteristics of Sweep 2

Results: Summary of family structure sweep 5

Explanatory Variables	Categories	N	Percent (%)
Family Structure			
Number of parents	Two parents	8886	71.0
	Natural mother	2971	29.0
Number of siblings	None	1376	11.6
	1	5208	44.1
	2 or more	5273	44.3
Number in Household	≤ 3	493	4.64
	> 3	11364	95.40

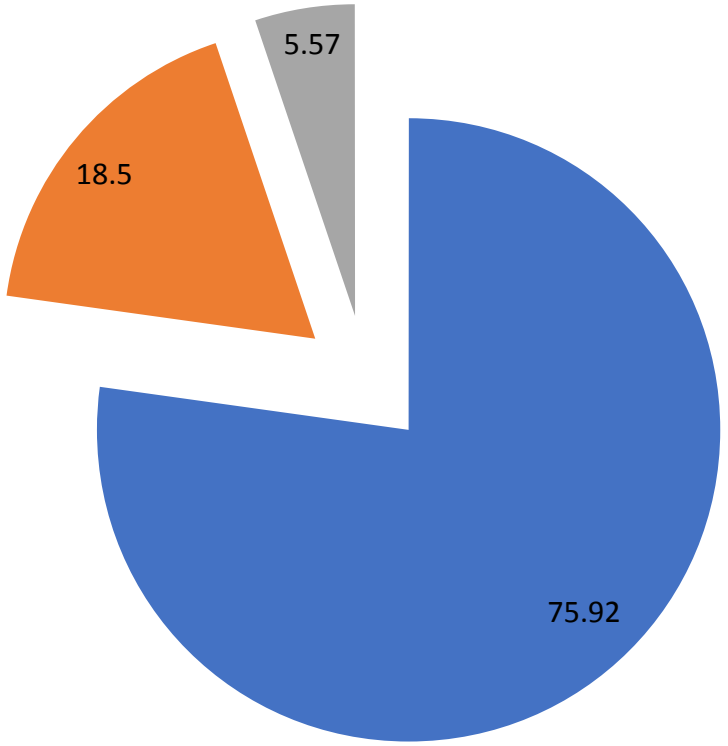
Family structure of sweep 5

Results: Characteristics of sample in sweep 2

Other variables	Category	Frequency	percentage
Sex	Male	5953	51.3
	Female	5904	48.7
Ethnicity	White	9676	83.2
	Mixed	339	3.48
	India	327	2.22
	Pakistan	923	5.66
	Black	405	3.75
	Other	185	1.65
Income			
4725.65 - <6050.02	1st quartile	2864	24.3
6050.02 – 27325.41	2nd quartile	2810	23.3
27325.41 – 74067.58	3rd quartile	3054	24.3
74067.58 – 788871.91	4th quartile	3189	28.1

Characteristics of Sweep 5

Results: Prevalence of overweight & Obesity (sweep 2)



N = 13998

Normal Weight
Overweight
Obesity

NW = 75.92 (CI: 75.05 – 76.77)

OW = 18.5 (CI: 17.08 – 19.25)

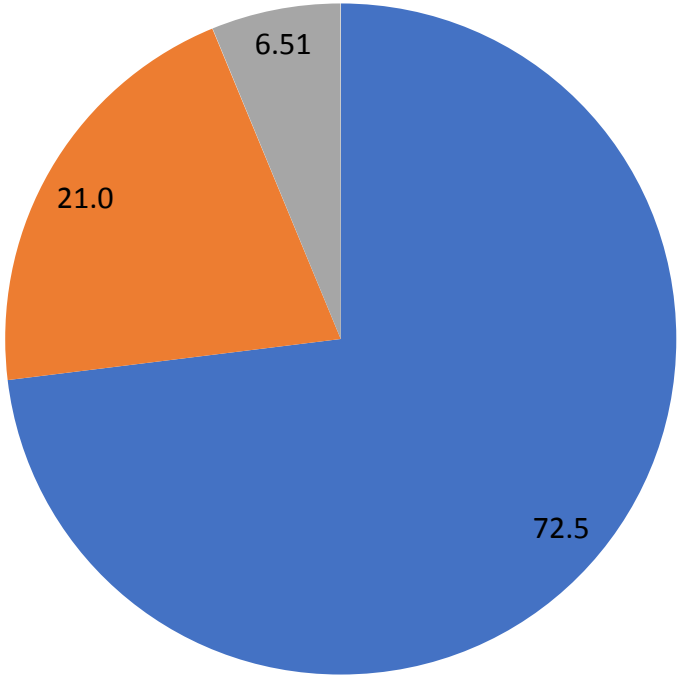
Obese = 5.57 (CI: 5.13 – 6.03)

Compare with CRPD, CDC and stamastakis et al

Prevalence of overweight & Obesity (sweep 2)

Results: Prevalence of overweight & Obesity (sweep 2)

N = 11492



NW = 72.5 (CI: 71.38 – 73.50)
OW = 21.0 (CI: 20.12 – 21.99)
Obese = 6.51 (CI: 5.94 – 7.13)

Compare with HSE and CDC (NHANES)

Prevalence of overweight and obesity in sweep 5

Results: Difference between Overweight/Obesity in both sweeps

		MCS SWEEP 2				
		Normal weight	Overweight	Obese	Total	
MCS SWEEP 5	Normal weight	5169	1067	187	6423	P<0.0001
	Overweight	768	523	165	1456	
	Obese	134	139	151	424	
	Total	6071	1729	503	8303	

Difference between overweight & obesity in sweep 2 & 5

Results: Effect of family structure on BMI in survey 2 in Univariate analysis

Explanatory Variables	Crude. Coef. (for family structure)- sex*	95% CI	p-value
Sex	0.160	-0.025 - 015	0.160
Age	0.070	-0.02 – 0.16	0.113
Ethnicity	-0.002	-0.06 – 0.21	0.960

* Sex – a priori confounder

Coefficient of family structure after adjusting for potential confounders in sweep 2

Results: Coefficient of family structure after adjusting for important confounders (Multivariate analysis)

Explanatory Variables	Adj. Regr. Coef. (with sex as a priori confounder)	p-value	95% CI
Family Structure			
Dual Parents	1.00	0.944	
Single parents	0.003		-0.92 – 0.10
Age	-0.114	0.194	-0.29 – 0.06
Ethnicity		<0.001	
White	1.00		
Mixed	0.11		-0.27 – 0.48
Indian	-1.09		-1.31 - -0.88
Pakistanis	-0.63		-0.78 - 0.48
Black/Black British	-0.17		-0.04 – 0.38

**Adjusted for age and ethnicity of cohort member

Chen et al, 2014
Ogden et al, 2014

Coefficient of family structure in multivariate analysis (sweep 2)

Results: Effect of family structure on BMI in survey 5 in Univariate analysis

Explanatory Variables	Crude. Coef. (for family structure – Sex*)	95% CI	p-value
Sex	0.64	0.48 – 0.79	P<0.001
Number of Siblings	0.57	0.41 – 0.72	P<0.001
Income	0.46	0.35 – 0.68	P<0.001
Number in Household	0.51	0.30 – 0.62	P<0.001
Ethnicity **	0.58	0.42- 0.74	P<0.001

* a priori confounder
** Not an important confounder

Summary of the effect of family structure on BMI in univariate analysis

Results: Coefficient of family structure after adjusting for important confounders (Multivariate analysis)

Explanatory Variables	Adj. Coef (for Important confounders – Sex*)	p-value	95% CI
Parenthood			
Dual Parents	1.00	0.003	
Single Parents	0.27		0.09 – 0.45
Number of Siblings			
None	1.00	<0.001	
1	-0.59		-0.85 - -0.32
2 or More	-0.89		-1.17 - -0.62
Income			
1	1.00	<0.001	
2	-0.05		-0.254 – 0.146
3	-0.36		-0.561 – 0.148
4	-1.01		-1.226 - -0.797
Number in Household		0.389	
≤3	1.00		
>3	-0.19		-0.63 – 0.25

Chen et al, 2014
Ogden et al, 2014

Multivariate effect of family structure on BMI (sweep 5)

Results: Sensitivity Analysis in sweep 5

Regression Coef (SE)		adj. Regr. Coef.	
Number of parents	**Crude Regr. Coef***	**All****	**All without HH*****
Two Parents	**1.00**	**1.00**	**1.00**
Mother Only	**0.64 (0.48 – 0.79)**	**0.27 (0.09 – 0.44)**	**0.29 (0.13 – 0.46)**

*adjusted for sex
** adjusted for sex, number of siblings, Number of household members, income
*** adjusted for sex, number of siblings, Income

Summary of effect of family structure on BMI in Multivariate Analysis

Results: Effect of family structure In Sweep 2 on the change In Obesity between Sweep 2 And Sweep 5

Explanatory Variables	Crude. Coef. (for family structure – Sex*)	95% CI	p-value
Sex	0.80	0.57 – 1.03	P<0.001
Maternal Age	0.72	0.48 – 0.96	P<0.001
Income	0.35	0.10 – 0.59	P=0.006
Number of siblings	0.75	0.53 – 0.78	P<0.001
Ethnicity	0.80	0.57 – 1.03	P<0.001
Age	0.79	0.57 – 1.01	P<0.001

*a priori confounder

Regr. Coef. of univariate effect of family structure after controlling for potential confounders

Results: The effect of family structure on BMI change between sweeps in multivariate analysis

Explanatory Variables	Adj. Regr. Coef. (for important confounders)	p-value	95% CI
Family Structure			
Dual Parents	1.00	0.009	
Single parents	0.35		0.09 – 0.61
Sex			
Male	1.00	<0.001	
Female	0.71		0.55 – 0.86
Maternal age			
<25	1.00	0.317	
25-34	-0.009		-0.22 – 0.20
>35	0.16		-0.11 – 0.43
Income		<0.001	
1	1.00		
2	-0.61		-0.41 – 0.09
3	-0.66		-0.90 - -0.39
4	-1.02		-1.28 - -0.76

Effect of family Structure on BMI change in multivariate analysis controlling for all important confounders

Conclusion

- Based on the finding of our study, we conclude on the following;
- The prevalence of overweight and obesity in the United Kingdom from the second sweep of the MCS data is 24.07%. This value is comparable but lower to that obtained from other studies.
- The prevalence of overweight and obesity in the UK from the 5th sweep of the MCS is 27.51 %. This value is also lower but comparable from that obtained from other studies.

Conclusion

- Overweight and obesity in the UK is on the rise when the two sweeps are compared.
- Children from natural mother only homes had a predicted BMI higher than that of those from two natural parent homes even though this was no relationship was not significant in sweep 2.
- There was a significant association between family structure and BMI change between sweeps.

Recommendations

- Family structure is potentially an area for intervention to address inequalities which drive childhood and adult obesity.
- The effect of family structure in predicting childhood obesity appear to be stronger distally therefore, future analysis of the MCS should consider analysis of more recent (distal) sweeps and making comparisons thereof.

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Institute of Education

Socioeconomic inequalities in body mass index, weight, and height: coordinated analyses from four British birth cohort studies initiated in 1946, 1958, 1970, and 2000/1

David Bann
William Johnson, Diana Kuh, Leah Li, Rebecca Hardy

CENTRE FOR LONGITUDINAL STUDIES

Barriuso et al. BMC Pediatrics (2015) 15:129
DOI 10.1186/s12887-015-0443-3

BMC Pediatrics

RESEARCH ARTICLE Open Access

Socioeconomic position and childhood-adolescent weight status in rich countries: a systematic review, 1990–2013

Laura Barriuso[1], Estrella Miqueleiz[2*], Romana Albaladejo[3], Rosa Villanueva[3], Juana M. Santos[3,4] and Enrique Regidor[3,4,5]

obesity reviews doi: 10.1111/obr.12360

Pediatric Obesity/Public Health

Trends in child and adolescent obesity prevalence in economically advanced countries according to socioeconomic position: a systematic review

A. Chung,[1] K. Backholer,[1] E. Wong,[1] C. Palermo,[2] C. Keating[3] and A. Peeters[4,5]

HM Government

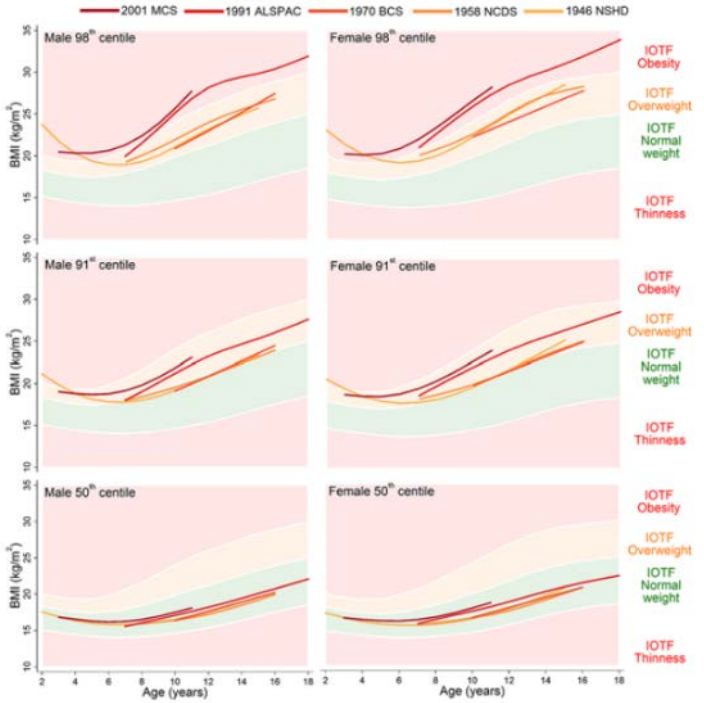
Childhood Obesity

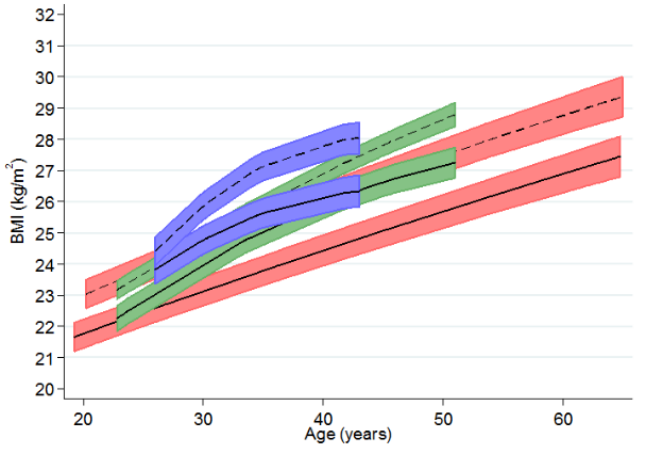
A Plan for Action

Background

- BMI inequalities exist, unclear how changed
  - Small timespan, gaps, & different methods

- Not well understood:
  1. Separate components of BMI: weight & **height**
  2. Nature of inequality across outcome distribution
     - Partly underlie increasing right-skew of BMI?
     - Not addressed using linear/logistic regression
  3. Δ age (not focus of this presentation)





Johnson et al, PLOS Med ,2015; Bann et al, PLOS Med, 2017

Objectives

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- Examine inequalities in child-adolescent height, weight & BMI
  - 1946 MRC National Survey of Health and Development
  - 1958 National Child Development Study
  - 1970 British Cohort Study
  - 2001 Millennium Cohort Study
    - Long-run comparison (1953 to 2015)
    - ~Nationally representative

Methods – data

- Weight, height and BMI measurement
  - 1946: 7, 11, 15 years
  - 1958: 7, 11, 16
  - 1970 10 16
  - 2001: 7, 11, 14

- Father's social class at 10/11y (RGSC)
  - Mother's used if no father-figure present in 2001 (N=1928)
  - Ridit score – slope index inequality

- Sensitivity analysis:
  - Repeated using maternal education; less missing data but less information (0/1) / comparable

Analytical strategy

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- Centered outcomes at same age: 11y
  - (Results similar before this, or when converting to z-scores)

- Cross-cohort comparability:
  - Participant selection: immigrants, NI, twins excluded
  - Survey weights: 1946, 2001

1. Mean difference in outcome in lowest/highest SEP: sex-adj linear regression

2. SEP differences at different points of the outcome distribution
   - Sex-adj quantile regression at 5th, 10th, 25th, 50th (median), 75th, 90th, 95th

Results: means at 11y

Cohort	N	BMI, kg/m^2	Weight, kg	Height, cm
1946	3629	17.4	35.2	141.6
1958	11193	17.3	35.1	142.3
1970	11231	17.4	35.8	142.2
2001	8820	18.9	40.5	145.7

Results: slope index of inequality at 11y

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Cohort	N	BMI, kg/m^2	Weight, kg	Height, cm
1946	3629	0.0 (-0.2, 0.3)	-1.9 (-2.7, -1.1)	-4.1 (-4.9, -3.3)
1958	11193	0.0 (-0.2, 0.1)	-1.8 (-2.3, -1.3)	-3.5 (-3.9, -3.0)
1970	11231	0.1 (0.0, 0.3)	-1.0 (-1.3, -0.6)	-2.7 (-3.1, -2.3)
2001	8820	1.3 (0.9, 1.6)	2.1 (1.2, 2.9)	-1.2 (-1.7, -0.6)

Results: histograms at 11y, by social class

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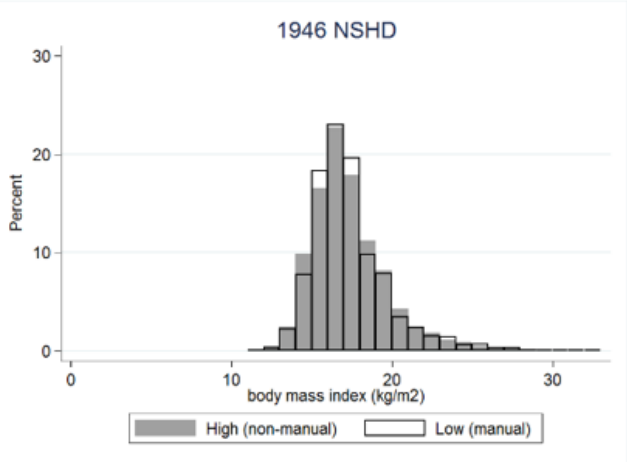

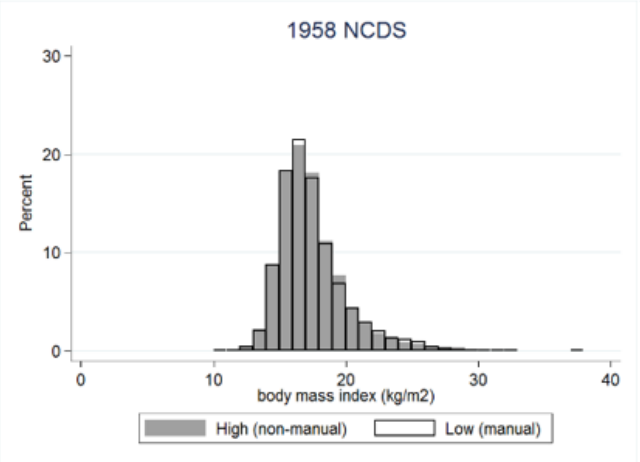

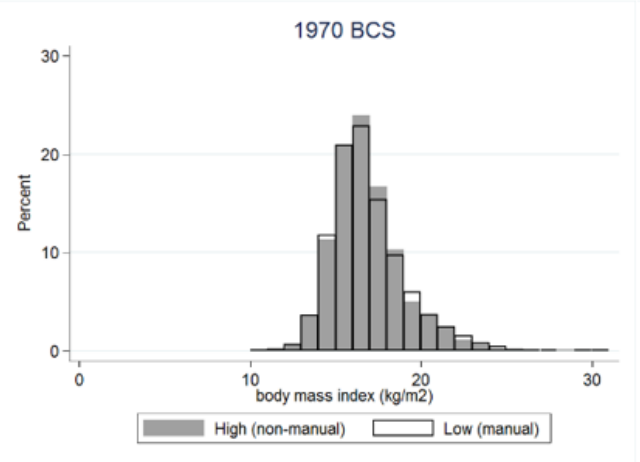

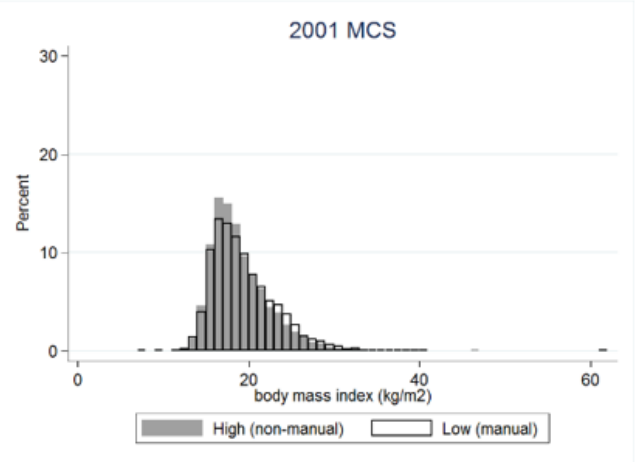

Results: quantile regression, height at 11y

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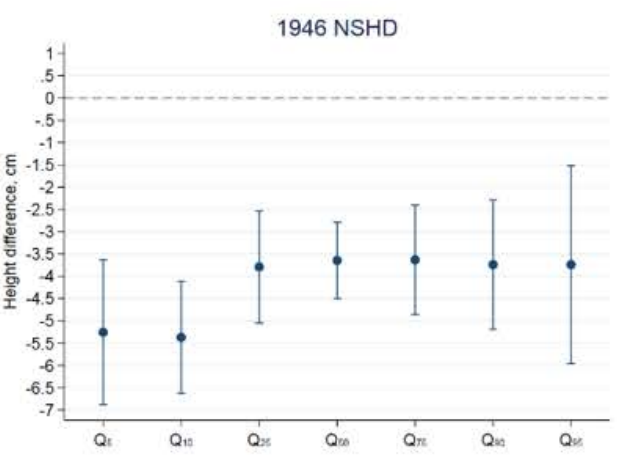

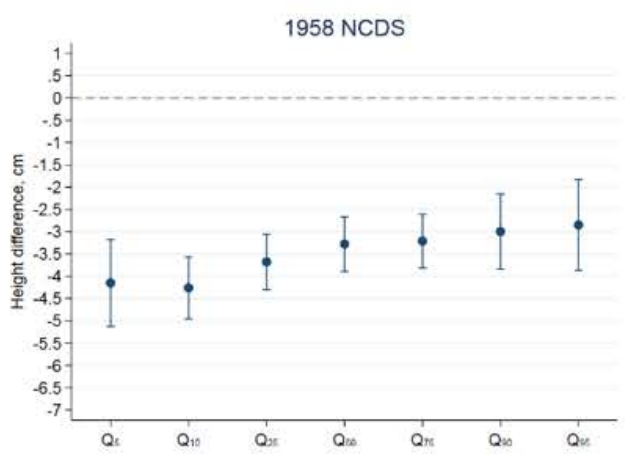

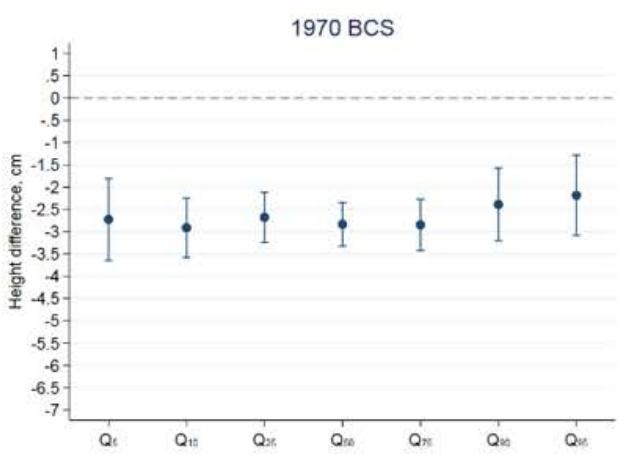

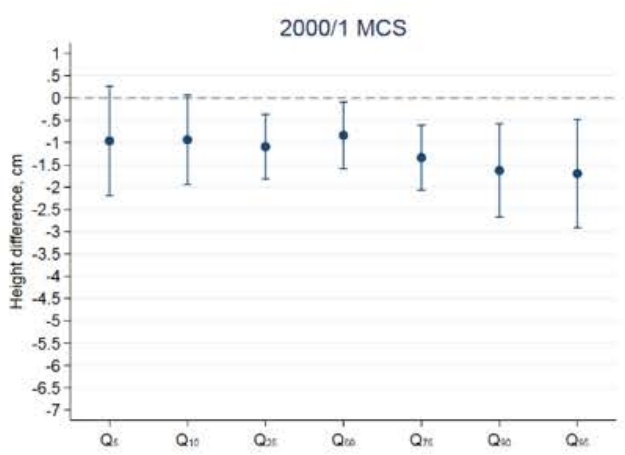

Coefficients are interpreted analogously to linear regression: eg, the median difference in BMI, 90th percentile difference in BMI
Quantiles at 5th, 10th, 25th, 50th (median), 75th, 90th, and 95th

Results: quantile regression, weight at 11y

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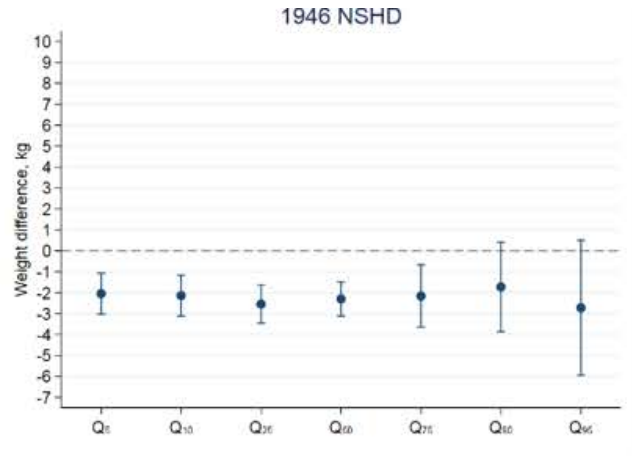

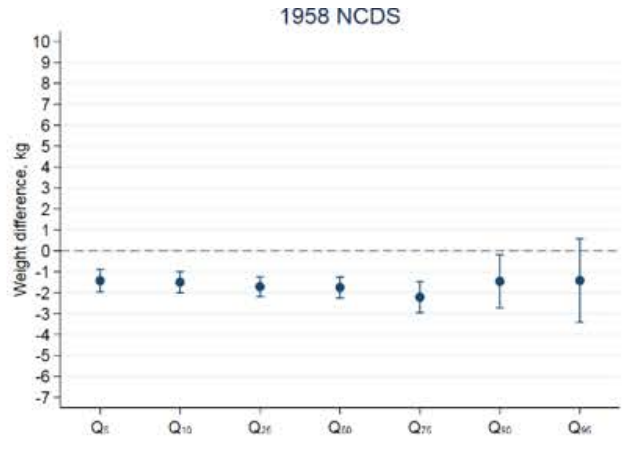

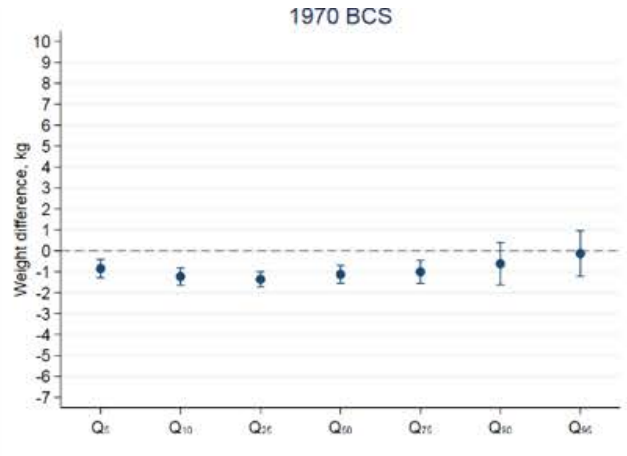

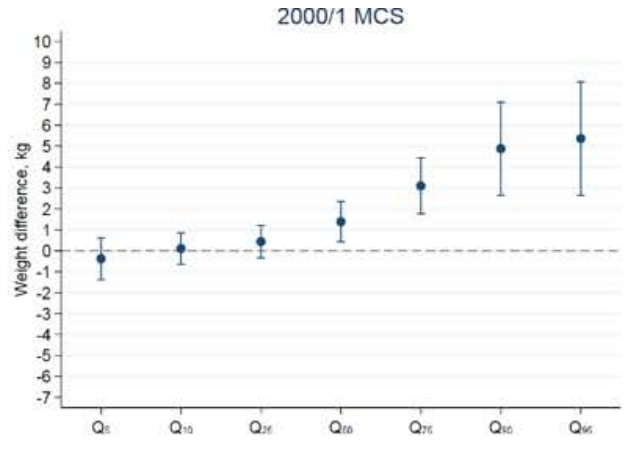

1.40 kg difference at the 50th percentile, 4.88 kg at the 90th

Coefficients are interpreted analogously to linear regression: eg, the median difference in BMI, 90th percentile difference in BMI
Quantiles at 5th, 10th, 25th, 50th (median), 75th, 90th, and 95th

Results: quantile regression, BMI at 11y

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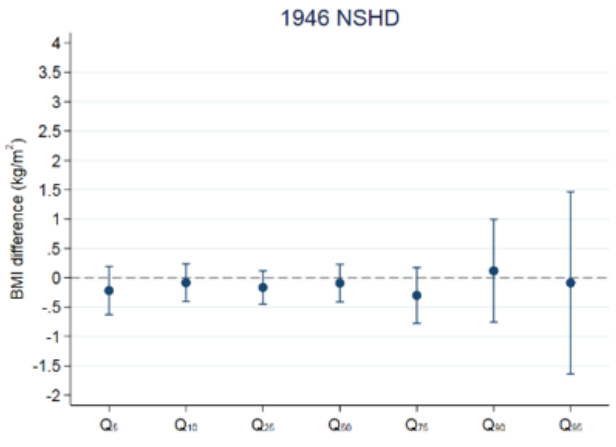

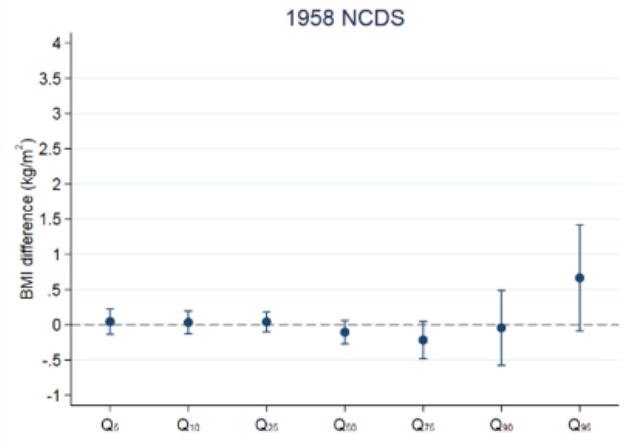

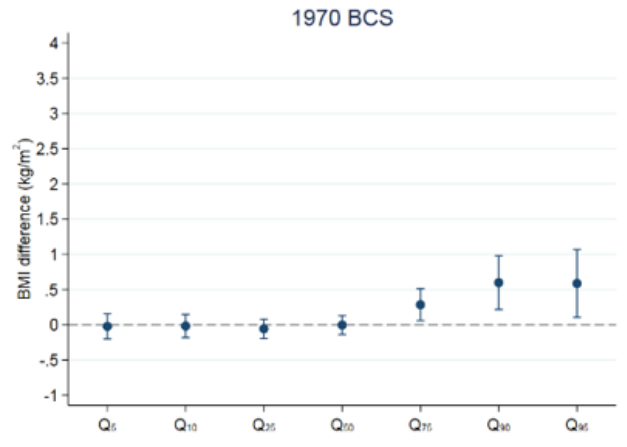

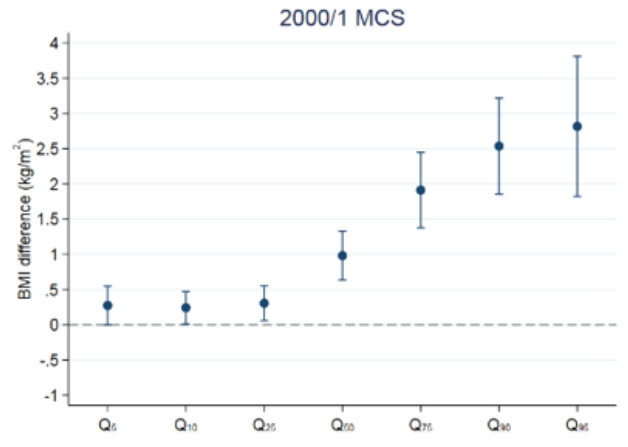

0.98 kg/m^2 difference at the 50th percentile, 2.54 kg/m^2 at the 90th

Coefficients are interpreted analogously to linear regression: eg, the median difference in BMI, 90th percentile difference in BMI
Quantiles at 5th, 10th, 25th, 50th (median), 75th, 90th, and 95th

Results: multilevel regression, 7-15y

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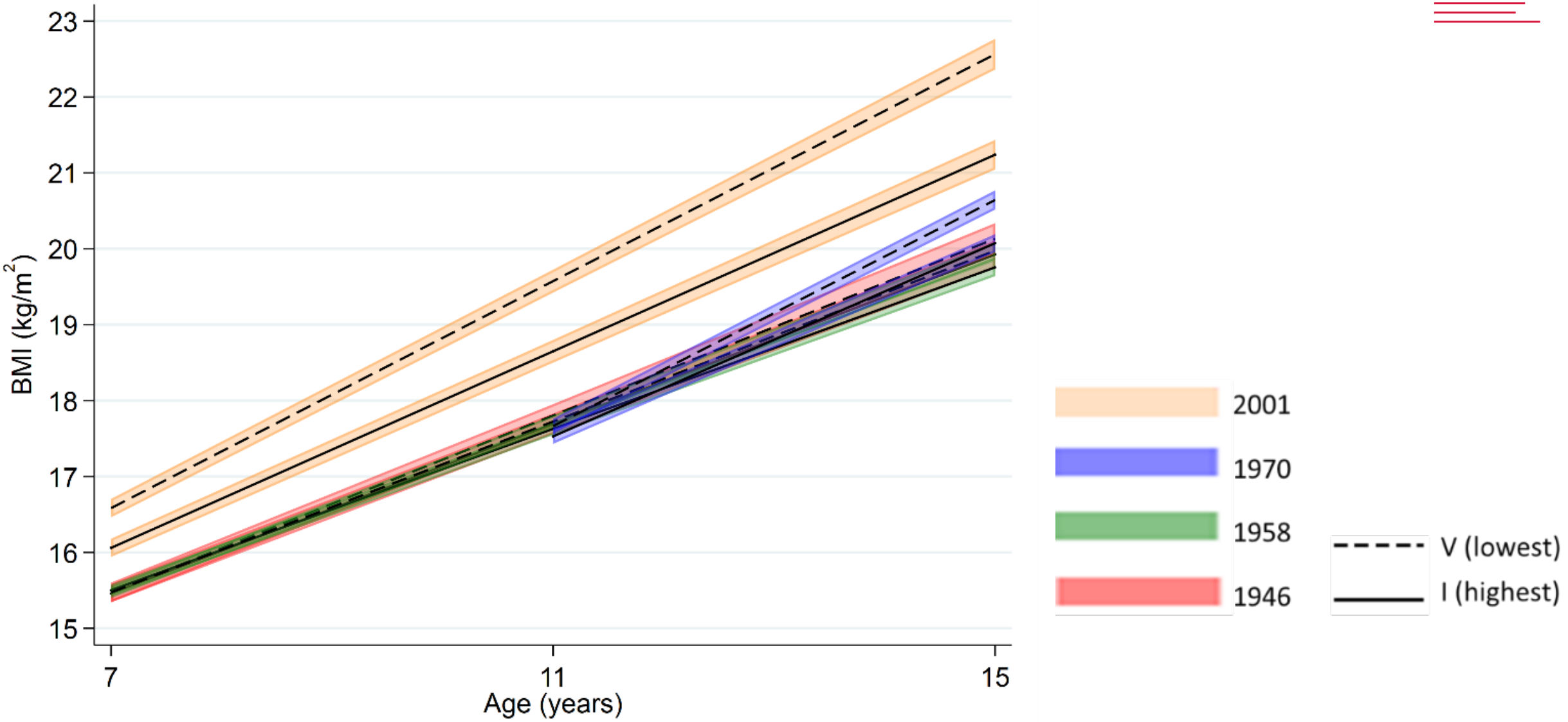

Body mass index (BMI) across childhood and adolescence in relation to father's social class in 1946, 1958, 1970, and 2001 British birth cohort studies. Note: lines show estimated BMI along with 95% confidence intervals at each age among women, estimated using multilevel general linear regression models (full model estimates shown in S3 Table).

Summary of findings & comparison

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- From 1953 to 2015, absolute inequalities in:
  - Height narrowed
  - Weight reversed
  - BMI emerged
    - Larger at higher end of distribution
    - Widened from childhood-adolescence

- Widening BMI inequalities in recent decades
  - Consistent with cross-sectional, 2-cohort comparisons
  - Distributional effects – may underlie secular skewing of BMI distribution

Stamatakis et al, 2010; White et al, 2016; Shackleton et al, 2015; Johnson et al, 2015

Potential explanations

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Social distribution of the determinants of weight/height

- Diet & PA challenging to measure
- Despite rationing, inequalities in diet evident at 4y in 1946c:
  - Lower SES -> ↓ total calories — likely reversed in 2001
    ↓ micronutrients (eg, Zinc) — potentially narrower in 2001
    lower infectious disease
    parental obesity in 2001

Distributional effects

- Larger SEP impact among those who…

  for environmental / genetic reasons, more susceptible to higher BMI

Prynne et al, 2002; Mayo-Wilson et al, 2014; Goisis et al, 2015; Costa et al, 2015

Strengths & limitations

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- 4 national studies, long-run investigation
  - Analyses underpowered to detect SES differences in thinness, ethnic modification
  - 30-year gap from 1970 to 2001

- Findings robust to fathers social class & maternal education
  - Still crude SEP indicators & BMI !=fat
  - Attrition could potentially bias

- Causality not empirically demonstrated

Policy considerations (assuming causal, robust etc)

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- Narrowing height inequalities vs emergence & widening BMI inequalities
  - BMI likely greater impact on population health

- Persistence of BMI inequalities to 2015
  - Widening w/age & expected to widen further (eg, to 60-64y in 2065)
  - Urgent need to reduce BMI inequalities via effective policies

Acknowledgments

- Co-authors
- CLOSER (ESRC & MRC)
- Colleagues, participants

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CALL FOR PAPERS

60 years of our lives: A scientific conference celebrating the National Child Development Study at 60

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Papers welcome on:

Finances and employment

Family, relationships and identity

Health, wellbeing and cognition

Applied statistical methods

Deadline for submissions: 20 November 2017
Conference: 8-9 March 2018
Website: www.cls.ioe.ac.uk

Richard Blundell &

Barbara Maughan

Panels including (a-z):

- Andrew Schwartz
- Chris Power
- Harvey Goldstein
- Heather Joshi
- Jane Elliot
- John Bynner
- John Goldthorpe
- Jordana Bell
- Michael Pluess
- Michael Rutter

Appendix

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Institute of Education

UCL

The impact of maternal employment on children's weight

Emla Fitzsimons, Benedetta Pongiglione

CENTRE FOR LONGITUDINAL STUDIES

CLOSER Conference

November 2017

Outline

- Background
- Aims
- Methods
  - Data and measures
  - Analysis
- Results
- Discussion

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Background

- Prevalence of childhood overweight and obesity has soared in recent decades:
  - ➢From 1965 to 2008, the proportion of 7-year-olds classified as obese and overweight had almost tripled, from 2% to 10%.
- Over the same period, female labour force participation has increased, especially amongst mothers with children:
  - ➢In 1965 30% of mothers of 7-year olds had ever done any paid work; in 2008, over 50% of mothers were employed.

→ Are the parallel rising trends in children overweight and maternal employment coincidental or there is a causal relationship?

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Background

- Anderson et al (2003) key in initiating the discussion on whether maternal employment influences child weight.

  → evidence of a positive impact of maternal work on probability child is overweight.

- Most subsequent studies confirm that when mothers work their children are more likely to be overweight/obese (e.g. Ruhm, 2008; Chia, 2008; Araneo, 2008; Hawkins, Cole, & Law, 2007).
- Literature notes challenges in identifying true causal effects, as opposed to associations.

Background

- Causality: mothers in employment are likely to be different from mothers not working. Such differences, rather than the employment patterns per se, could be influencing child outcomes.
- Reverse causality: children's health could influence maternal working patters, for example because children with poor health require more care.

→ **only a few studies attempt to develop an identification strategy** (see Ruhm 2004, Bishop 2011, Greve 2011)

Aim

- To estimate the causal effect of maternal employment on childhood weight.
- To investigate if there are differences in this relationship between single and partnered mothers.
- To explore the possible underlying mechanisms.

Possible Mechanisms

- Increased employment means parents spend less time at home, with less time allocated to housework (including meal preparation) (Cawley & Liu, 2007).
- Child will spend more time in the care of other family members and/or in childcare. Reduction in parental supervision may have adverse implications for food intake and/or physical activity of children (Klesges et al., 1991; Crepinsek & Burstein, 2004; Fertig et al., 2006).
- Increase in family income → may facilitate the adoption of healthier life styles (Wake et al., 2006; Wang, Patterson, & Hills, 2002).

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Methods

Data

- MCS: sweeps 2, 3, 4, 5 and 6, corresponding to ages 3, 5, 7 , 11 and 14

Sample

- Singleton children participating at sweep 2 with valid weight and health measures at each sweep.
- Longitudinal sample N=7,953 (out of 15,382 participants at age 3. Among those, 14,212 children had valid measure of BMI at the age of 3 and 10,825 at age 14).

Methods

Measures

- *Children BMI*: weight/squared height. BMI standardised by age and sex according to the 1990 British Growth Reference.
- *Maternal Employment*: self-reported hours worked per week by mothers. Those working 0 hours are classified “not working”; 1 to 34 hrs “working part time” and 35+ hrs “working full time”
- *Single status*: 1=mother is the only parent/carer in the HH 0=otherwise
- *Children’s health related behaviours*
    - Inactivity: hrs watching TV (3+hrs)
    - Physical activity: doing sport/exercising (1+ days a week)
    - Dietary habits: having breakfast everyday

Methods

Measures – cont'd

- *Covariates*
  - Time invariant: child's ethnicity, maternal education, survey time
  - Time varying: whether father works, grandparents living in the HH, number of siblings, maternal health (self-rated health and long lasting illness)

Methods

$$y_{it} = \alpha_0 + \alpha_1 E_{it} + \alpha_2 X_{it} + u_i + \varepsilon_{it}$$

where y_{it} denotes *i* child's BMI at age *t*. E_{it} denotes employment of (*i* child's) mother at (child's) age *t* (discrete), X_{it} denotes time varying characteristics, u_i fixed unobservables, and $\varepsilon_{it}$is an iid error term.

Issue: Correlation between u_i and E_{it} → α_1 biased (not causal)

Solution: Estimate using fixed effects

Key identifying assumption: changes in maternal work status over time are uncorrelated with changes in child's BMI. This would be violated if, for instance, unobserved time-varying shocks affect both maternal employment and child's weight.

Outline

- Background
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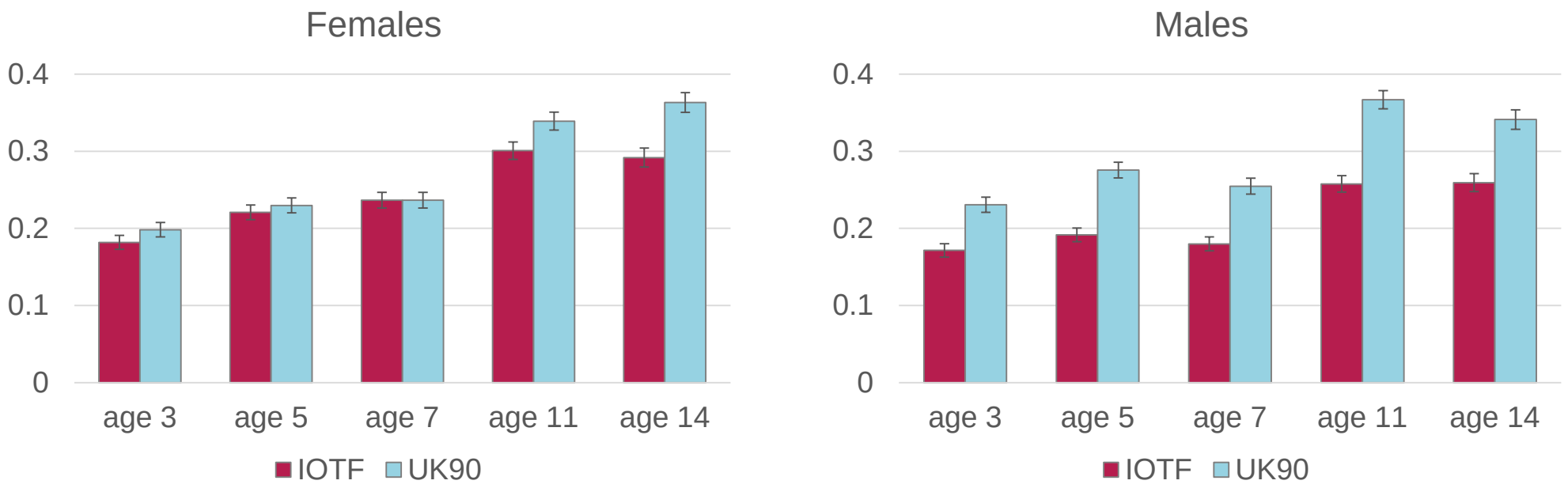
Results - descriptives

Proportion of overweight/obese children at each sweep according to two different criteria, by sex



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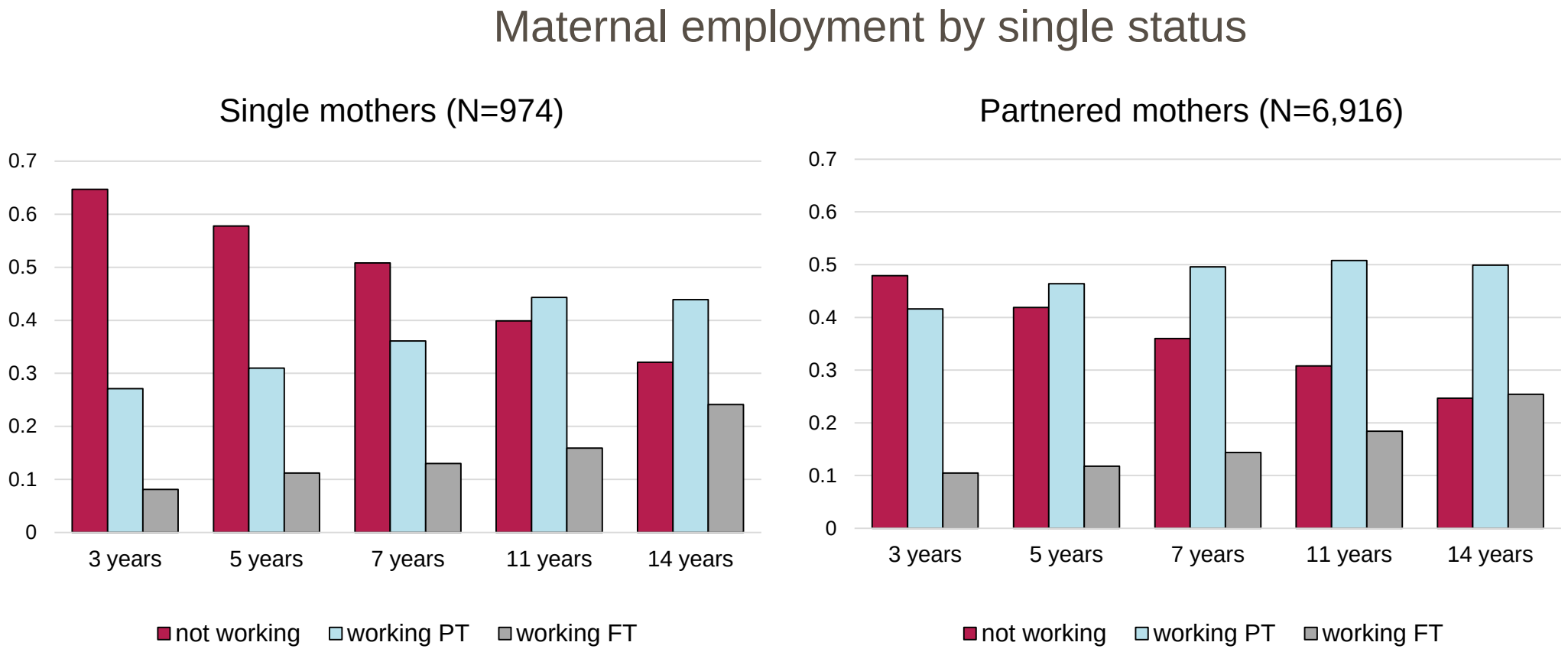
Results - descriptives



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Results – OLS and FE

Fully adjusted model: **outcome standardised BMI**

VARIABLES	OLS	FE
	β	β
Mum works PT§	0.014	0.085***
Mum works FT§	0.105***	0.135***
Single mum	0.080***	0.121***
Dad works	-0.076***	0.014
Grandpa in HH	0.12***	-0.121***
# siblings	-0.014**	0.019
Mum's long lasting illness	0.017	0.038**
Mum good heath	-0.100***	-0.018
Observations	38536	38536
Number of unique observations		7926

§ Ref. mum not working

CENTRE FOR LONGITUDINAL STUDIES

Results - OLS and FE

Model with interactions: **outcome standardised BMI**

VARIABLES	OLS	FE
	β	β
Single mum§	0.064**	0.057
Single mum works PT§	0.113***	0.227***
Single mum works FT§	0.166***	0.292***
Couple mum works PT§	0.005	0.062***
Couple mum works FT§	0.105***	0.104***
Dad works	-0.074***	0.023
Grandpa in HH	0.122***	-0.123***
# siblings	-0.014**	0.018
Mum's long lasting illness	0.017	0.039**
Mum good heath	-0.100***	-0.019
Observations	38536	38536
Number of unique observations		7926

§ Ref. couple mum not working

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Results - OLS and FE

Fully adjusted model: **outcome child's health related behaviours**

VARIABLES	TV watching (more than 3hrs per day)		Sport (more than once a week)		Regular breakfast	
	OLS	FE	OLS	FE	OLS	FE
Mum works PT	-0.003	0.048***	0.022***	0.170***	-0.003	-0.110***
Mum works FT	0.0123*	0.138***	0.00963	0.336***	-0.017***	-0.217***
Single mum	0.026***	0.034**	-0.021**	0.070***	-0.056***	-0.064***
Dad works	-0.048***	-0.003	0.043***	-0.019	0.012	-0.021
Grandpa in HH	-0.009	-0.059***	-0.012***	0.049***	-0.009***	-0.037***
# siblings	0.004**	0.016**	-0.016***	0.005	-0.023***	-0.043***
Mum's long lasting illness	0.002	0.018*	0.018**	-0.054***	0.040***	0.036***
Mum good heath	-0.038***	-0.028**	0.015	0.180***	0.859***	0.977***
Observations	38536	38536	38536	38536	38536	38536
N. unique observations		7926		7926		7926

CENTRE FOR LONGITUDINAL STUDIES

Results - OLS and FE

Model with interactions: **outcome child's health related behaviours**

VARIABLES	TV (more than 3hrs per day)		Sport (more than once a week)		Regular breakfast	
	OLS	FE	OLS	FE	OLS	FE
Single mum	0.037***	0.024	-0.011	0.065***	-0.045	-0.021
Single mum works PT	0.018*	0.080***	-0.000	0.258***	-0.059***	-0.179***
Single mum works FT	0.036***	0.194***	-0.019	0.371***	-0.084***	-0.309***
Couple mum works PT	0.002	0.046***	0.026***	0.164***	0.001	-0.094***
Couple mum works FT	0.017**	0.129***	0.016*	0.345***	-0.010	-0.192***
Dad works	-0.050***	-0.002	0.041***	-0.018	0.010	-0.026
Grandpa in HH	-0.008	0.059***	-0.012***	0.048***	-0.009***	-0.037***
# siblings	0.004**	0.016**	-0.016***	0.005	-0.023***	-0.043***
Mum's long lasting illness	0.002	0.018**	0.019***	-0.054***	0.041***	0.036***
Mum good heath	-0.037***	-0.028**	0.012	0.182***	0.857***	0.969***
Observations	38536	38536	38536	38536	38536	38536
N. unique observations		7926		7926		7926

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Outline

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Discussion

OLS downard biased

→ causal effect of maternal employment on BMI is ***larger*** once time-invariant unobserved heterogeneity (e.g.preferences) accounted for.

→ Effect particularly strong for single mothers.

Discussion –

- Mechanisms
  - Increased employment means parents spend less time at home, with less time allocated to housework (including meal preparation)

    ✓ children of mothers working PT or FT less likely to have breakfast everyday

  - Child will spend more time in the care of other family members and/or in childcare. Reduction in parental supervision may have adverse implications for food intake and/or physical activity of children

    ✓ children of mothers working PT or FT more likely to spend time watching TV

    ✘ children of mothers working PT or FT more likely to do physical activity
- Next steps: replicate the analysis for the 1970 British Cohort Study

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Thank you!

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