CLOSER Conference

Mental health and wellbeing 1

Chair: **Anne McMunn**

- Childhood correlates of mental wellbeing in adulthood: prospective evidence from three British birth cohorts
  Mai Stafford
- A structural equation modelling approach to understanding childhood influences on happiness, cognitive functioning and well-being in early old age
  Brian Dodgeon & Dick Wiggins
- Trajectories of Depressive Symptoms from Childhood to Young Adulthood: Evidence of Gender Differences from the Avon Longitudinal Study of Parents and Children (ALSPAC)
  Alex Kwong

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Childhood correlates of mental wellbeing in adulthood: prospective evidence from three British birth cohorts

Mai Stafford & Natasha Wood

David Bann, Rebecca Hardy, Catharine Gale & Alissa Goodman

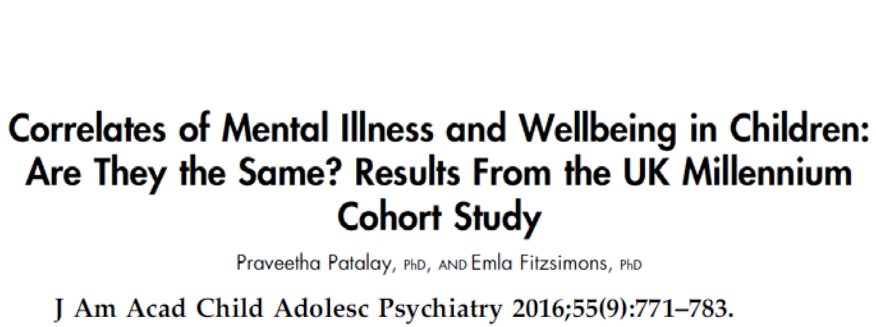
CLOSER conference, November 2017

Childhood environment and poor mental health in adulthood

- Life course epidemiology has established an association between adverse childhood environment and poorer mental health in adulthood
- Childhood adversities tend to co-occur (Repetti et al 2002; Bronfenbrenner 1986)
- A few studies considered multiple domains covering material and psychosocial risk factors and adult mental ill health (Fergusson et al 1994) (Rodgers 1990)
  - Family socioeconomic disadvantage
  - Family instability
  - Problems of parental adjustment
  - Impaired child-rearing
  - Antenatal or perinatal problems

Childhood environment across multiple domains and mental wellbeing

- Mental wellbeing is a key component of health (WHO) and is multidimensional
  - Positive emotions
  - Positive mental functioning
  - Realising one's potential
- Fewer studies on multiple domains of childhood environment and mental wellbeing in adulthood



Correlates of Mental Illness and Wellbeing in Children: Are They the Same? Results From the UK Millennium Cohort Study

Praveetha Patalay, PhD, AND Emla Fitzsimons, PhD

J Am Acad Child Adolesc Psychiatry 2016;55(9):771–783.

THE ECONOMIC JOURNAL

The Economic Journal, 124 (November), F720–F758. Doi: 10.1111/ecoj.12170 © 2014 Royal Economic Society. Published by John Wiley & Sons, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA 02148, USA.

WHAT PREDICTS A SUCCESSFUL LIFE? A LIFE-COURSE MODEL OF WELL-BEING*

Richard Layard, Andrew E. Clark, Francesca Cornaglia, Nattavudh Powdthavee and James Vernoit

Aims

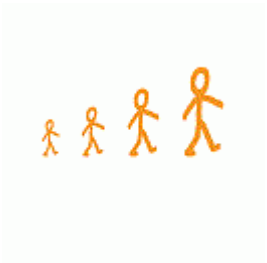
1. To collate (prospective) data on childhood domains likely to be of relevance for adult mental wellbeing
   - Family socio-economic circumstances
   - Child rearing and parenting
   - Family instability
   - Parental health and antenatal/perinatal problems
2. Using a coordinated approach to the analysis, to identify predictors of adult mental wellbeing from across these domains in 3 British birth cohorts

METHODS

Data

National Survey of Health and Development
b.1946

National Child Development Study
b.1958



British Cohort Study 1970
b.1970

1930	1940	1950	1960	1970	1980	1990	2000	2010

Warwick–Edinburgh Mental Wellbeing Scale (WEMWBS)

- 14 item scale
- Totaled score 14 – 70
- Measured at age:
  - 63 years - NSHD
  - 50 years - NCDS
  - 42 years - BCS70

STATEMENTS	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been feeling interested in other people	1	2	3	4	5
I've had energy to spare	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling good about myself	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been feeling confident	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been feeling loved	1	2	3	4	5
I've been interested in new things	1	2	3	4	5
I've been feeling cheerful	1	2	3	4	5

Family socio-economic measures

- Father's social class – harmonised in CLOSER WP2
- Parental education: age left full time continuous education - harmonised in CLOSER WP2
- Mean overcrowding (persons per room)
  - NSHD: 2, 4, 6, 8 and 11 years
  - NCDS: 7, 11 and 16 years
  - BCS70: 5 years

- Lacking household amenities: bathroom, kitchen, or hot water
  - NSHD: 2 and 11 years
  - NCDS: 7 and 11 years
  - BCS70: 5 and 10 years (age 10 only bathroom or kitchen)

- In rented accommodation
  - NSHD: 2 and 11 years
  - NCDS: 7 and 11 years
  - BCS70: 5 and 10 years
- Teen parents

Child-rearing and family instability

- Child rearing:
  - Whether breastfed or not
  - Parent's interest in child's education
  - Parental care and overprotection –NSHD and BCS70 only
  - Gets on well with parents – NCDS only
- Family instability:
  - Parental divorce up to age of 16 years
  - Whether ever separated from mother
  - Residential moves

Parental health and child health

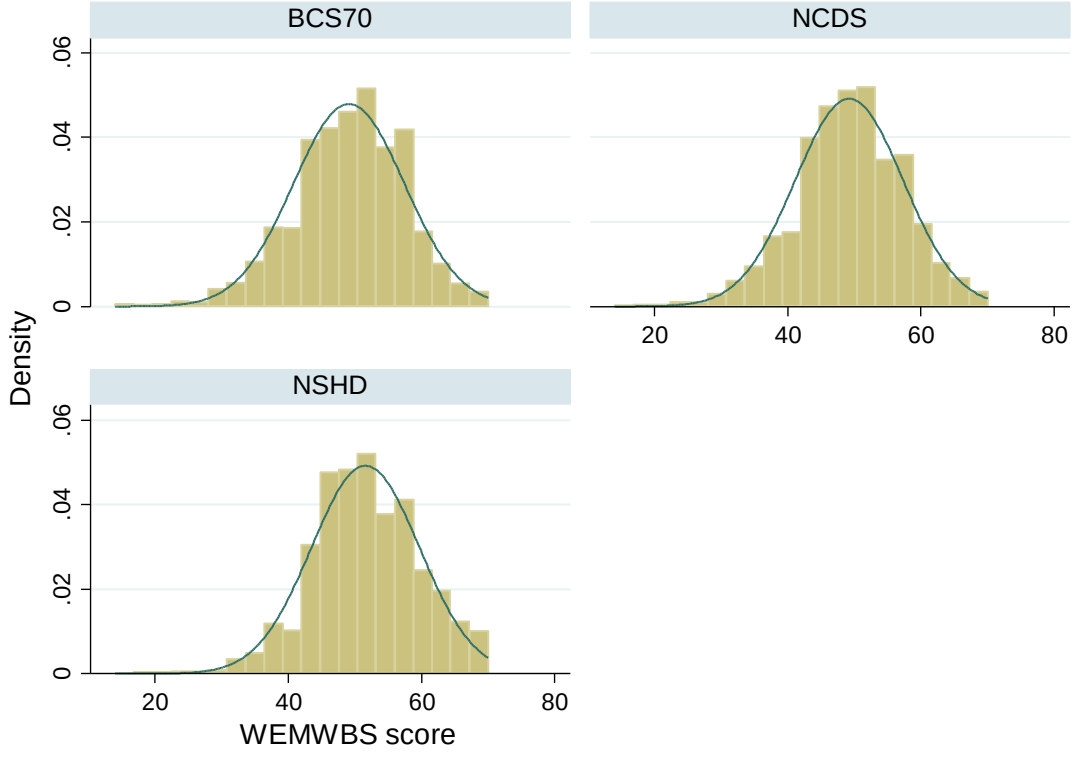
- Parental health:
  - Parent's chronic health conditions
  - Mother's / family mental health

- Antenatal/perinatal health:
  - Birthweight

- Other childhood indicators, maybe on explanatory pathway
  - Absence from school due to ill health
  - Child internalising and externalising symptoms

Sample and analytical method

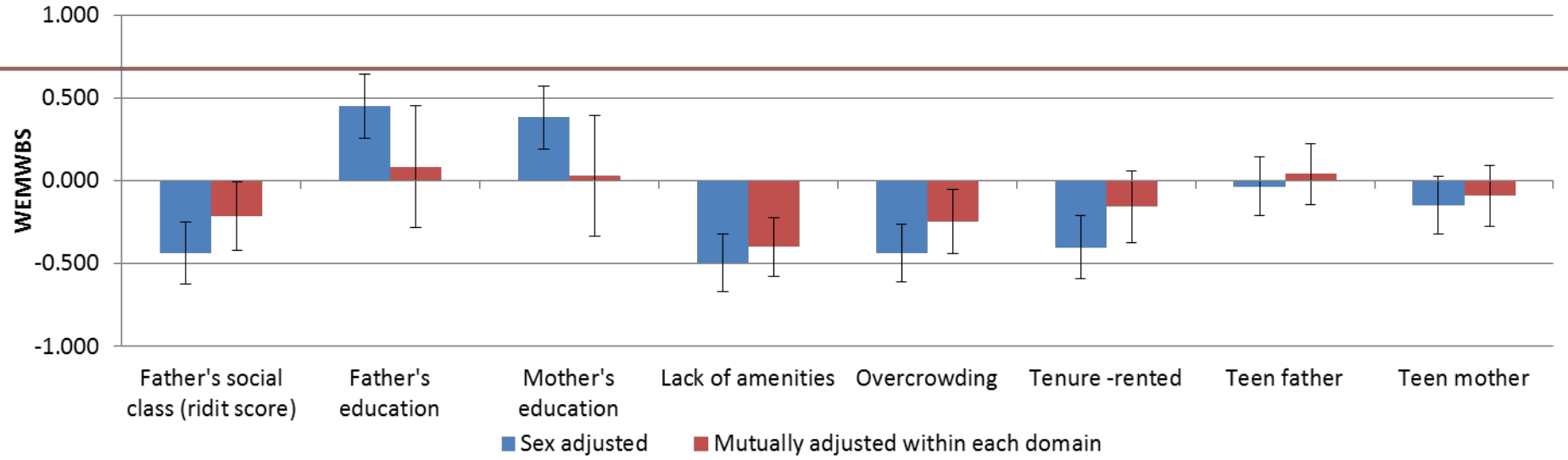
- Sample - all those with valid WEMWBS measure:
  - NSHD – 1,978
  - NCDS – 8,745
  - BCS70 – 8,589
- Missing data = Full Information Maximum Likelihood



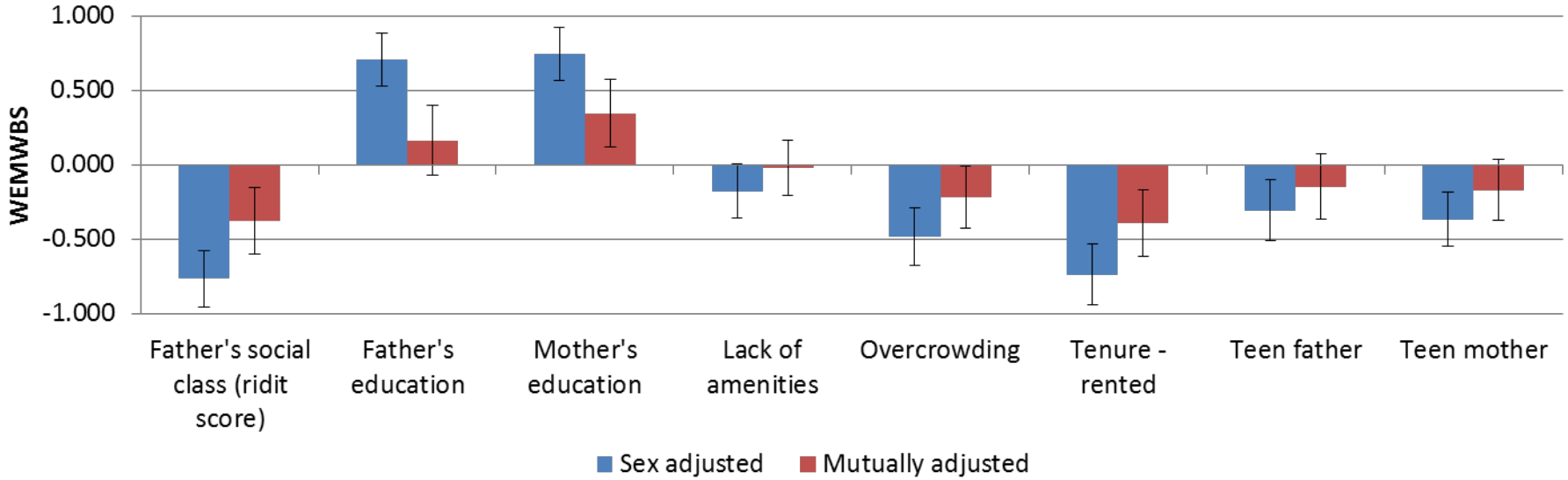
FINDINGS

Family SEP and adult mental wellbeing

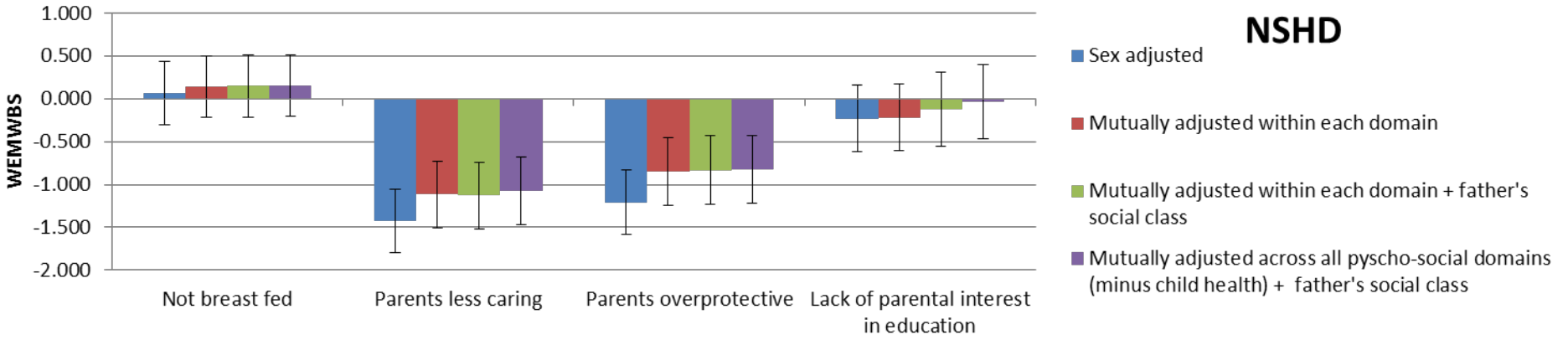
NCDS

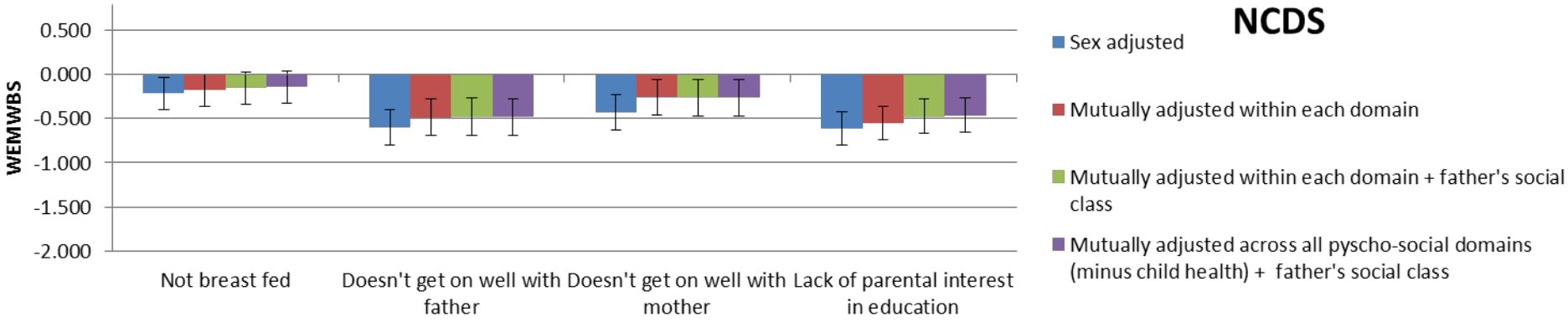


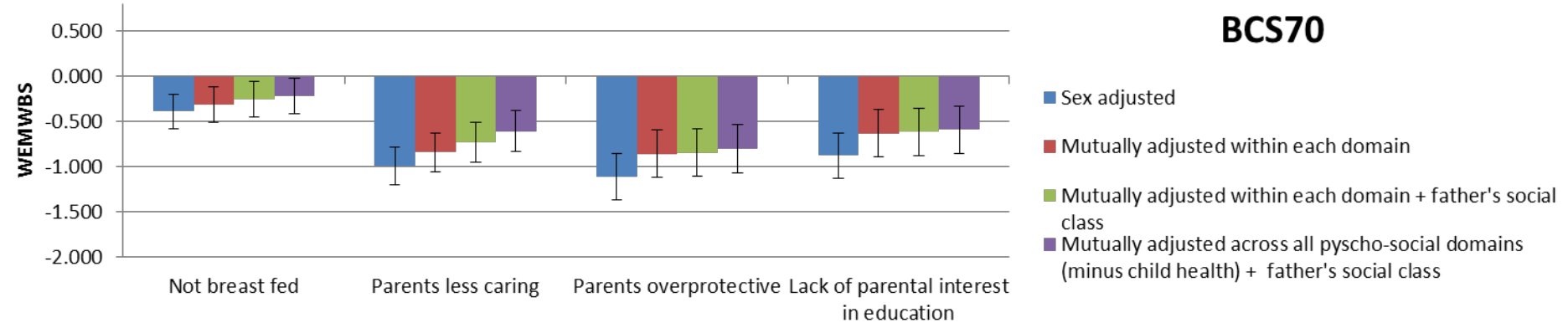
BCS70



Childrearing and adult mental wellbeing

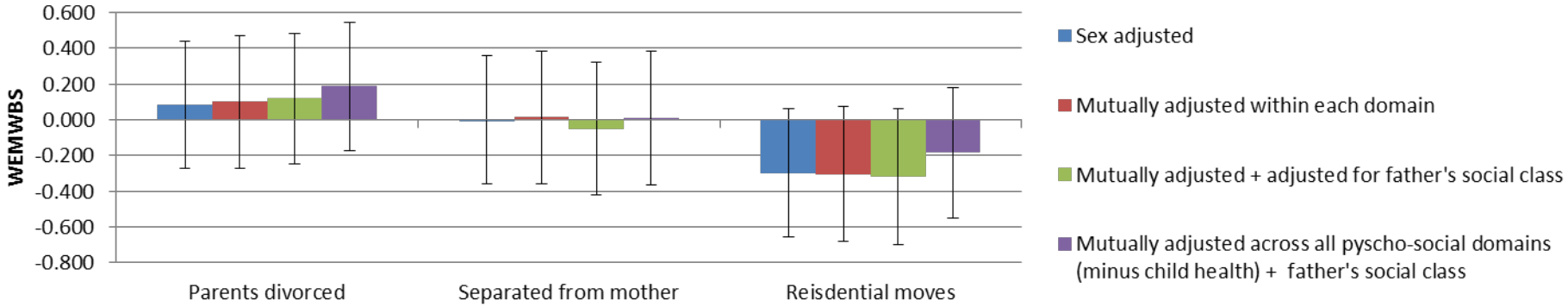




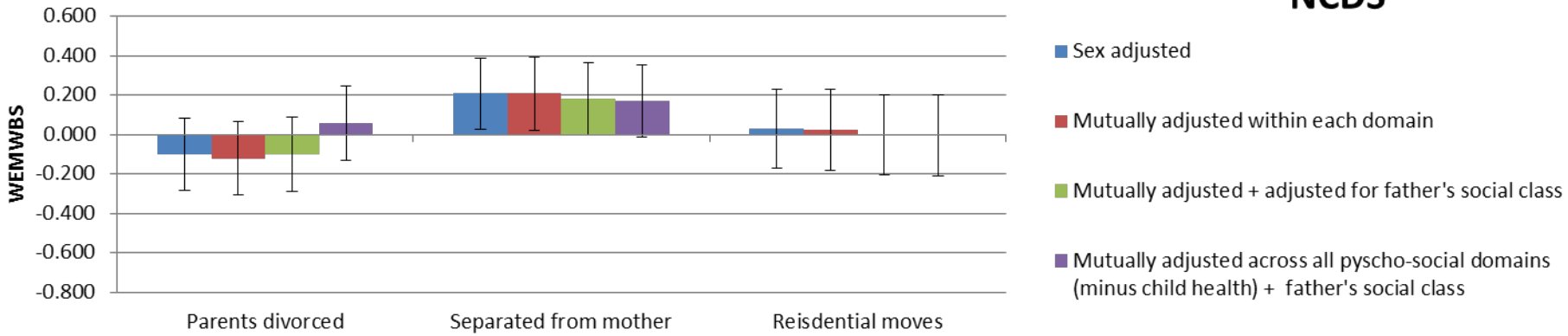


Family instability and adult mental wellbeing

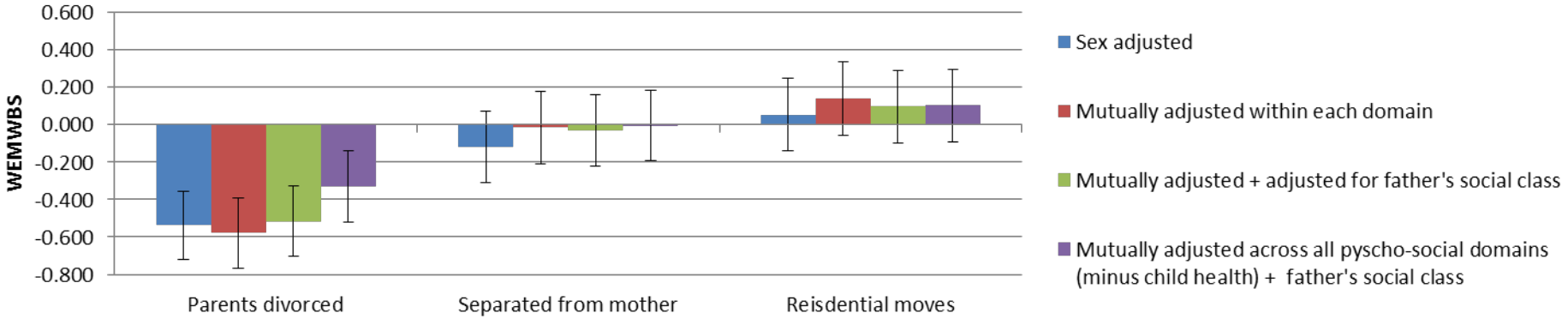
NSHD



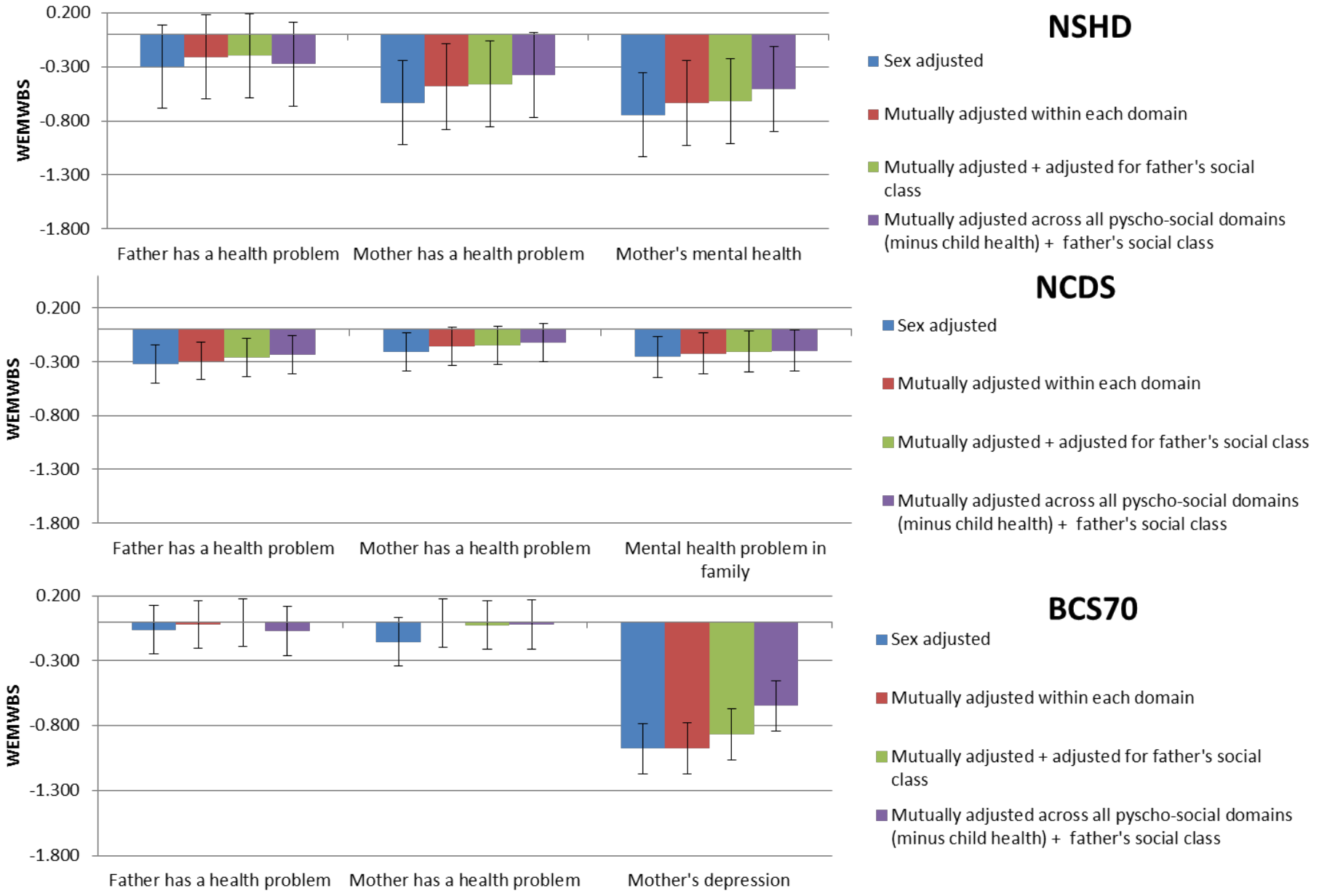
NCDS



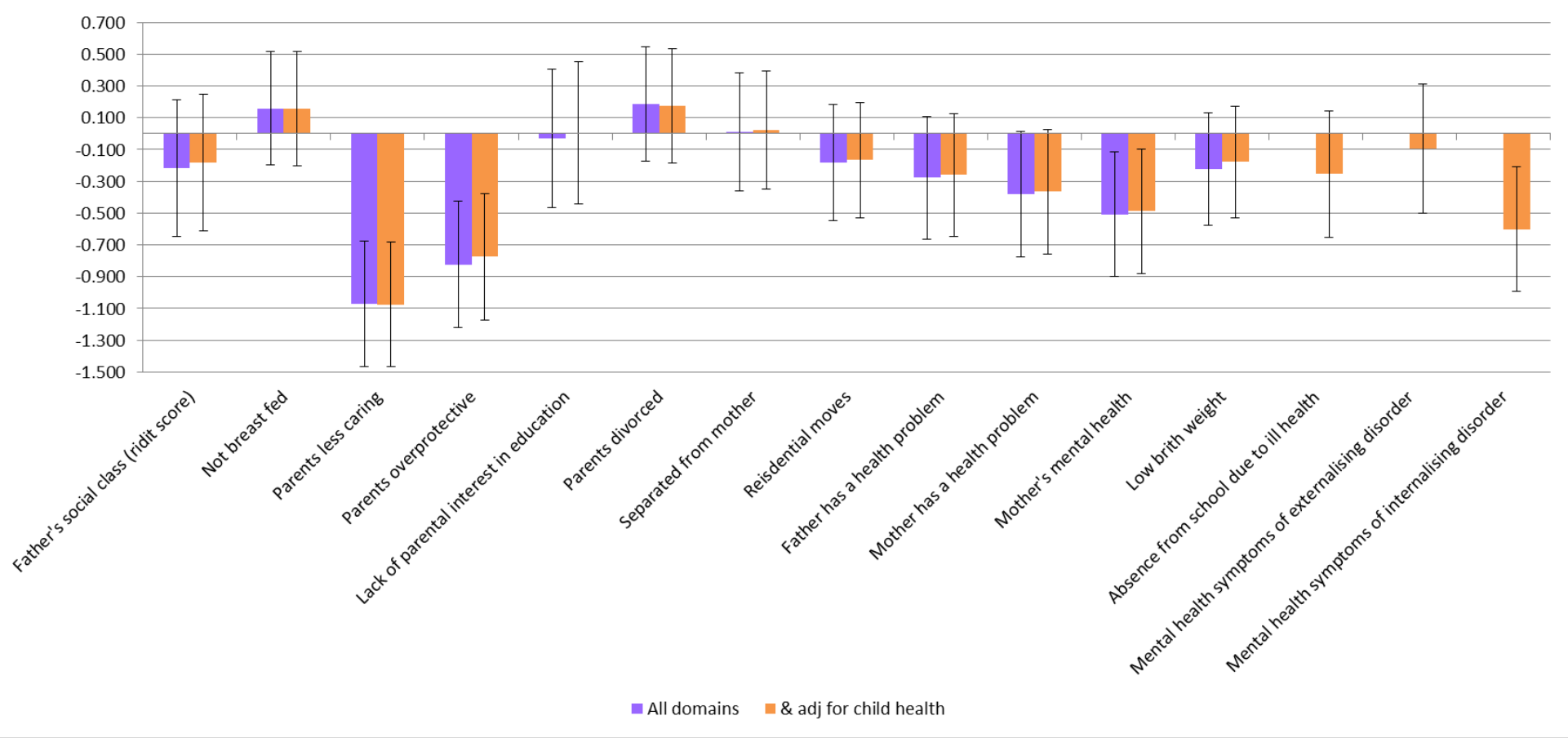
BCS70



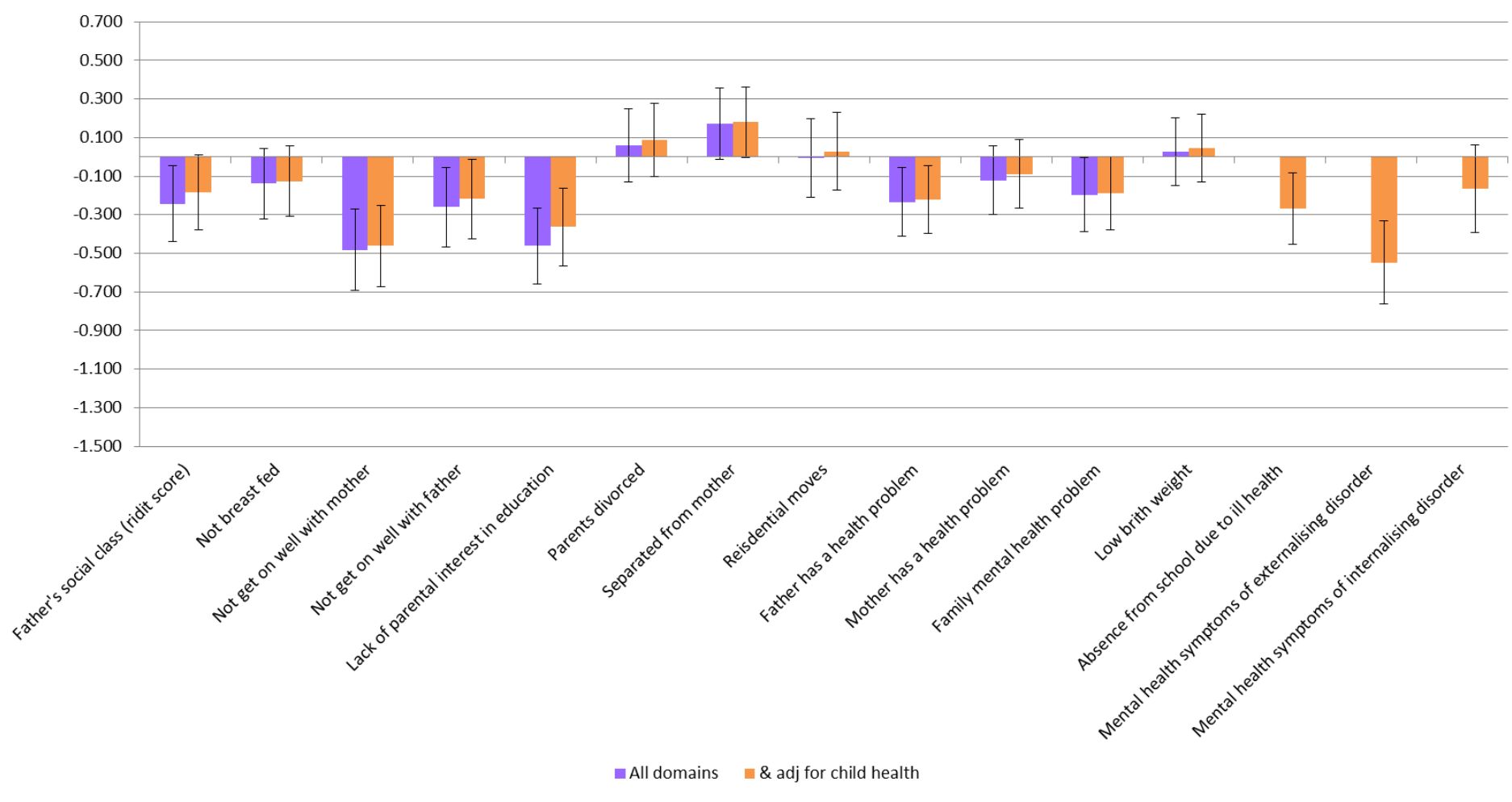
Parental health and adult mental wellbeing



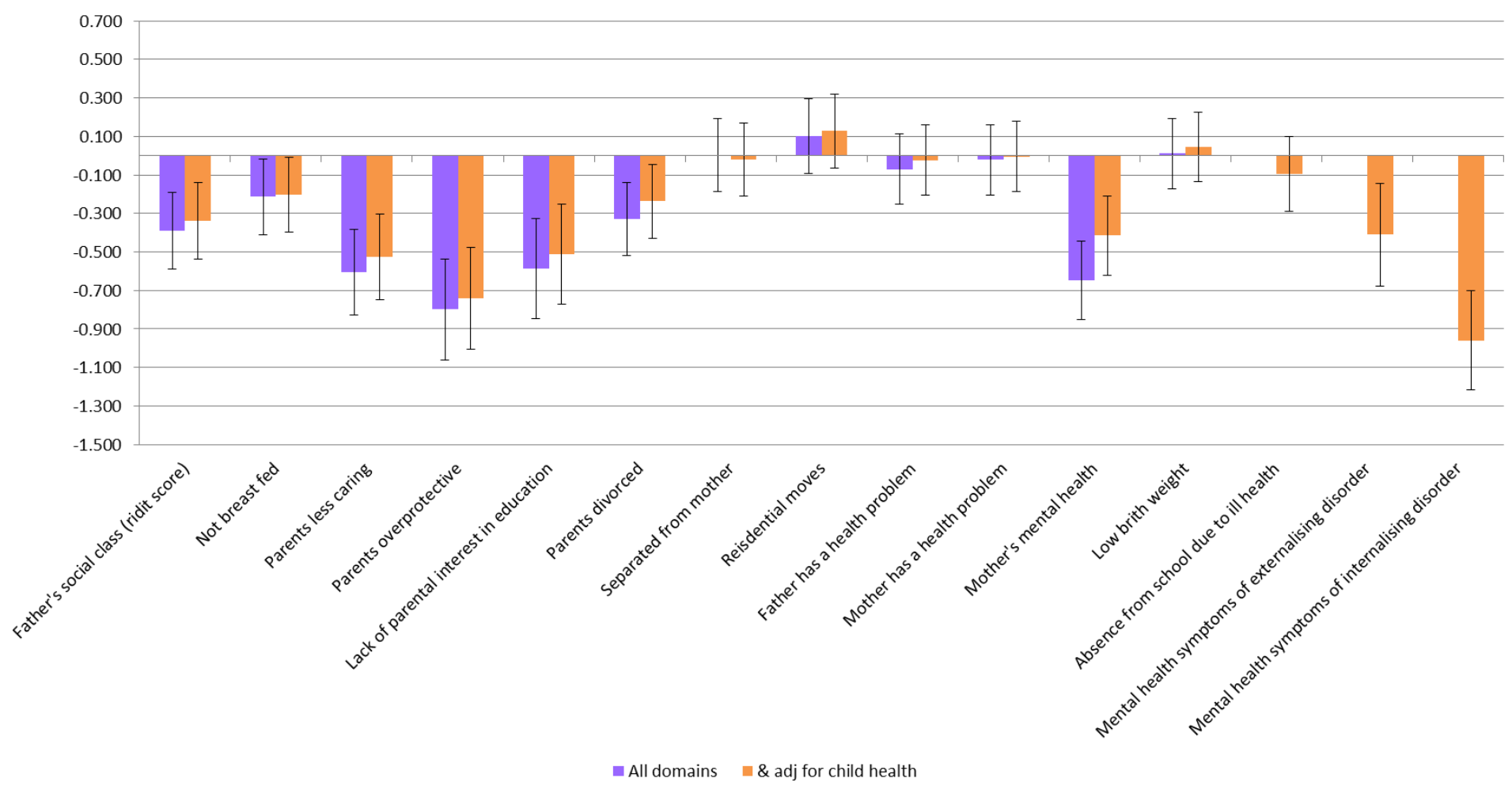
Fully adjusted: All domains (purple bars) and possible mediators (orange bars): NSHD



Fully adjusted: All domains (purple bars) and possible mediators (orange bars): NCDS



Fully adjusted: All domains (purple bars) and possible mediators (orange bars): BCS70



Summary

- Family psychosocial domains – challenges in ensuring comparability
- Despite this, poorer quality of the parent-child relationship was associated with lower adult mental wellbeing in all three cohorts
- Maternal or family mental ill health was also associated with lower wellbeing in all cohorts
- Little attenuation on adjustment for other childhood exposures
- Some attenuation on adjustment for childhood internalising and externalising symptoms (mediating pathway)
- Some additional predictors identified in BCS70
  - Father's social class/family socio-economic circumstances
  - Parental divorce
  - Will these differences persist as BCS70 participants reach their 50s and 60s?

Acknowledgements

- David Bann, Rebecca Hardy, Alissa Goodman and Catharine Gale
- Brian Dodgeon and Claire Crawford for the harmonised father's social class measure
- CLOSER

Institute of Education

A structural equation modelling approach to understanding childhood influences on happiness , cognitive functioning and well-being in early old age

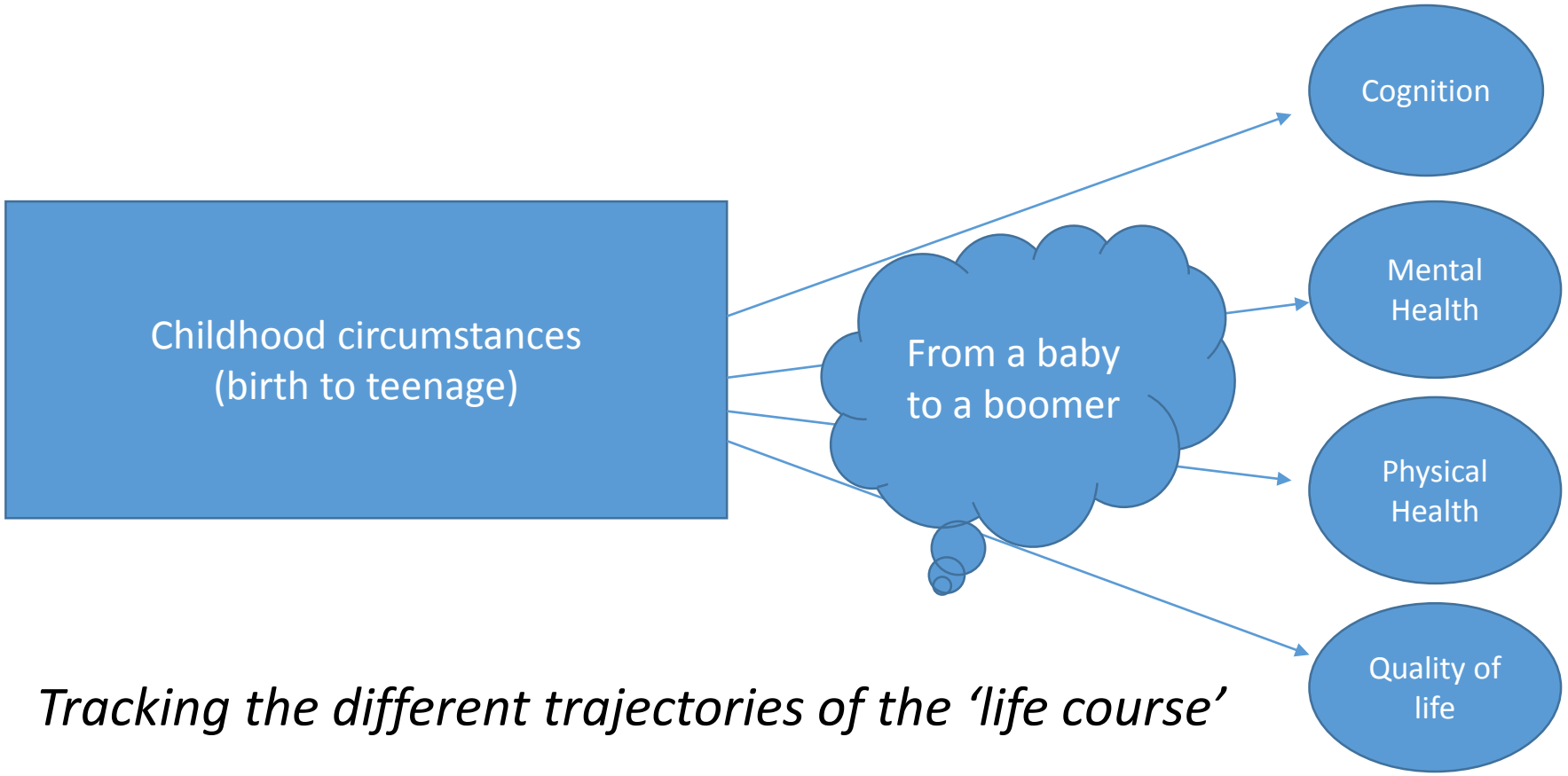
Brian Dodgeon, Praveetha Patalay, George Ploubidis & Dick Wiggins

Aims and objectives

Our aim is to explore the impact of aspects of childhood and early life on later ‘life’ (aka early old age, EOA) for a group of 50-year olds living in the UK in 2008. In particular to:

- Examine EOA outcomes including cognitive performance and key measures of health and well-being based upon the joint effect of :
- Early life indicators of social (dis)advantage, performance in cognitive assessments, family disruption, child and adolescent behaviour and expressions of unhappiness in childhood

Expressed as a ‘life course paradigm’



Tracking the different trajectories of the ‘life course’

Operationalising our conceptual framework in a Structural Equation Model (SEM)

- *Combining the interplay of relationship between latent and manifest variables. See Everitt (1984), Bijleveld et al (1998) & Little (2013).*
- *Modelling objective is to reproduce the correlation(covariance) matrix amongst our manifest variables;*
- *In the context of maximising the amount of information available*
- *All this translates into:*
- *Specifying the model*
- *Assessing 'goodness of fit'*
- *Having a strategy to handle item missingness*

Goodness of fit criteria

- **Root Mean Square Error of Approximation (RMSEA**); values< 0.05 regarded as ‘good fit’; <0.08 ‘reasonable fit’
- Also, comparative fit indices the **Tucker Lewis Index (TLI) and the Comparative Fit Index (CFI)** independent of sample size acceptable values >0.90

Handling item missingness

- Use of ***Full Information Maximum Likelihood (FIML)*** *technique maximises all available information under the assumption that data are Missing At Random (MAR). Adjusts mean and covariance structure. Anderson (1957), Arbuckle (1996), Wothke (1998)*
- *Unlike,* ***Multiple Imputation*** *which generates replicates of filled-in data. Again operates under the MAR assumption.*
- *For a debate on pros and cons see*

Enders, C.K. and Bandolos, D.L. (2001)

Participants

- 8555 at age 50 years from the **1958 British Cohort (NCDS**) who have the four outcomes at this sweep and are also present for the childhood sweeps
- Whole cohort: everyone born in GB in one week in 1958 (N=17415)
  - augmented up to age 16 by 925 immigrants born in that same week
- Attrition (not traced, refusal, emigration, death) reduces numbers:
  - Age 7: N=15425
  - Age 11: N=15337
  - Age 16: N=14654
  - Age 50: N= 9790
- Full Information Maximum Likelihood estimation (FIML) is applied wherever there are one or more items per life domain with a genuine response

Early-Life (childhood) circumstances -1

Starting to build our structural equation model, we first take four indicators of very-early circumstances:

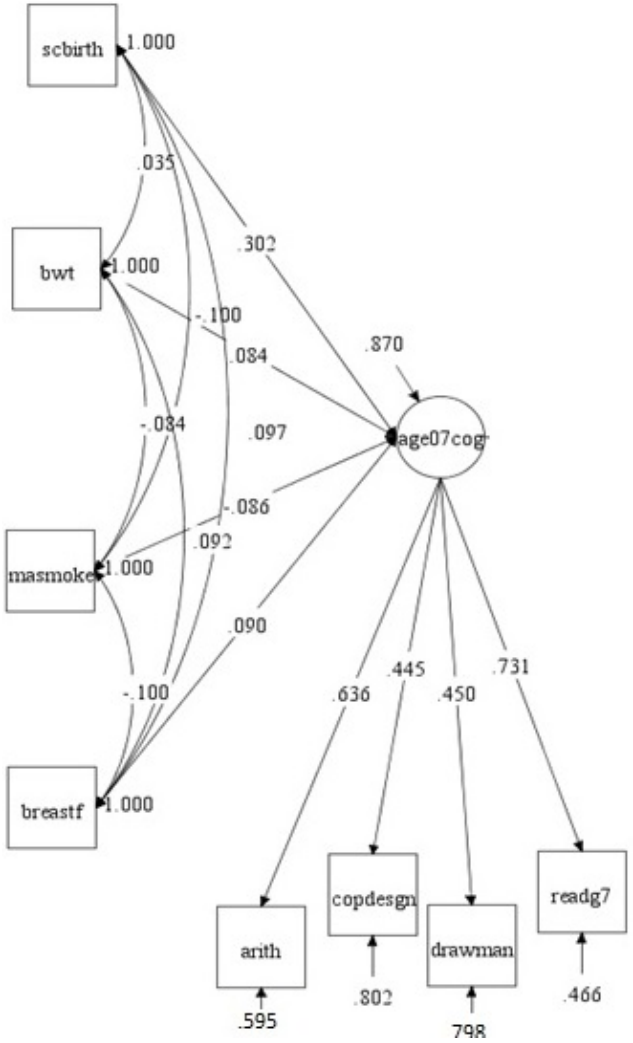
- Social class of parents at birth (variable ‘scbirth’)
- Birthweight (bwt)
- Whether mother smoked during pregnancy (masmoke)
- Whether breastfed (breastf)

Early-Life (childhood) circumstances -2

Our first childhood latent variable is ‘Age 7 success at cognitive tests’ (Age07cog), based on four manifest variables indicating test results:

- Problem Arithmetic test score (arith)
- Copying Designs test (copdesgn)
- ‘Draw-a-Man’ test (drawman)
- Southgate Reading Group test score (readg7)

Early-Life (childhood) circumstances -3



Age07 cognition is defined as a Latent Variable (LV) with four indicators. We regress Age07cognition on the four early-childhood variables.

Social class (.302) at birth has a relatively strong relationship with performance in cognitive ability tests at age 7 years; other predictors matter: breastfeeding (.090) and birthweight (.084) have positive loadings; mother smoking has a negative effect (-.086)

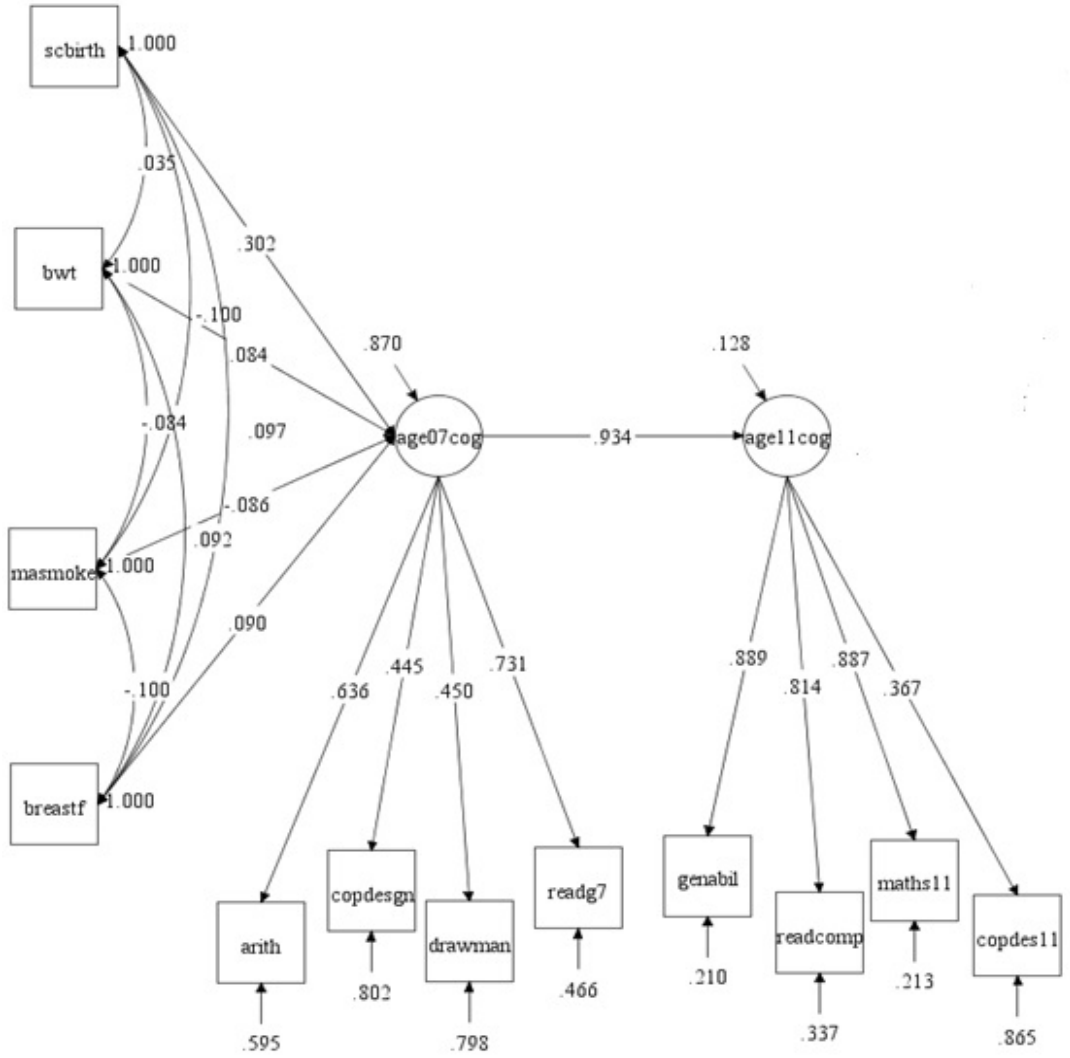
Early-Life (childhood) circumstances -4

Our second childhood latent variable for childhood cognition is ‘Age11cognition’, based on a child’s performance across four tests:

- NFER* General Ability Test (genabil)
- Copying Designs Test (copdes11)
- NFER Reading Comprehension Test (readcomp)
- NFER mathematics Test Score (maths11)

* National Foundation for Educational Research

Early-Life (childhood) circumstances -5



The model structure begins to deepen – we now model a direct path between Age07cog and Age11cog, unsurprisingly (perhaps) there's a strong relationship between the two performance measures (.934)

Defining our specific life domains and (global) life space measures in 'early old age' (EOA)

Specific Life Domains

Cognitive function at age 50 years

Physical Health (SF36 items)

Mental health (SF36 items)

General Life Space Domains

Quality of Life (CASP12v2)

Cognitive functioning

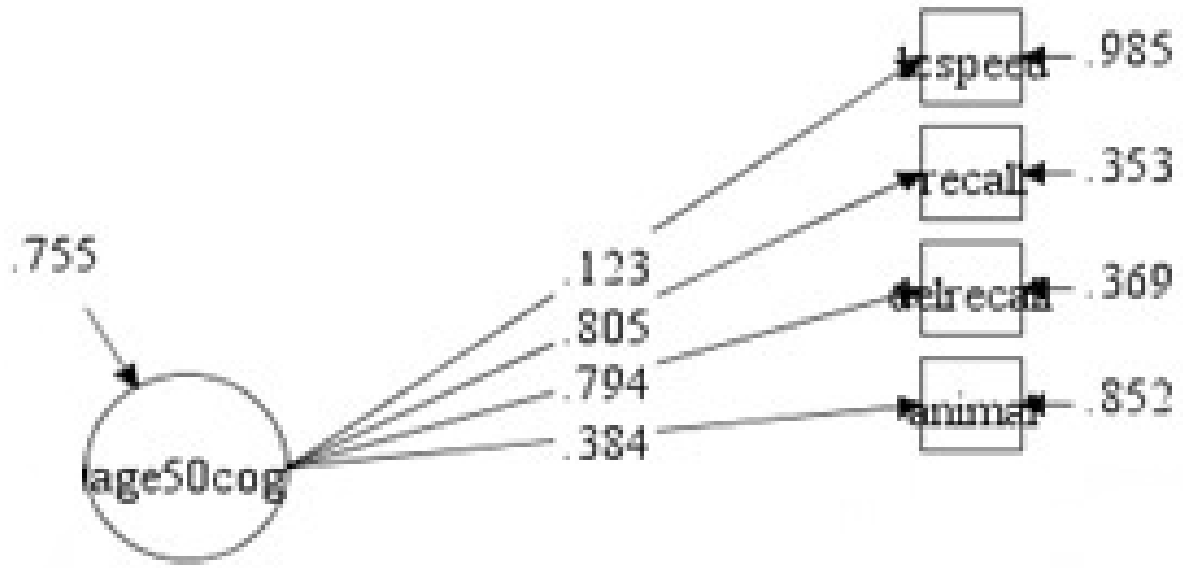
Tests at age 50

- Memory (10-word recall)
  - Instant (variable 'recall')
  - After 5 minutes' delay (delrecal)
- Executive function
  - Number of animals named in 60 seconds (animal)
- Mental acuity
  - Visual scanning of pages of letters
  - Objective - cross out all letters P and W encountered (lcspeed)

Our first EOA latent variable is based on these four manifest variables:
Recall; delrecall; animal; lcspeed

BROWN, M and DODGEON, B. (2010) NCDS Cognitive Assessments at Age 50: Initial Results. CLS Working Paper 2010/1. London: Centre for Longitudinal Studies.

EOA: Cognitive functioning Latent Variable (Age50cog)



Reasonably, well defined

Self-rated health

SF36 scale consists of 8 scores on health status (range 0-100 each):

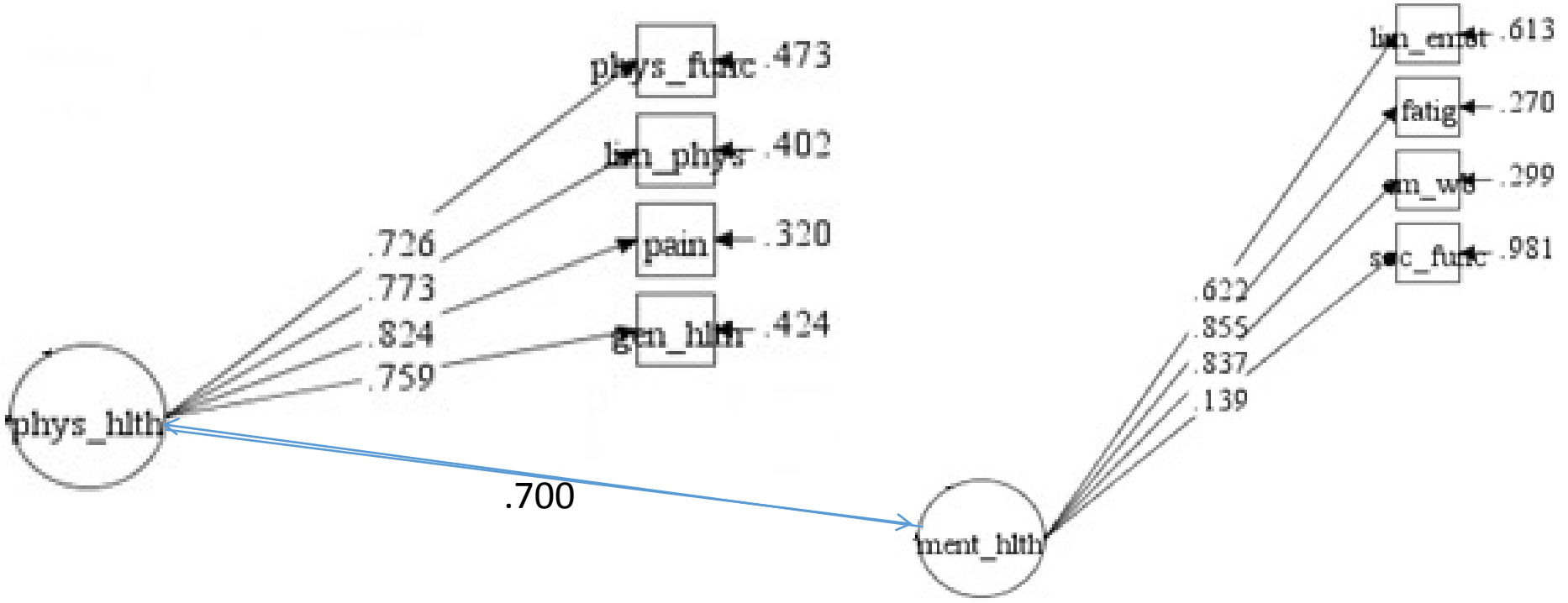
- Physical functioning (phys_func)
- Role-limitations due to physical health (lim_phys)
- Pain score (pain)
- General health (gen_hlth)
- Role-limitations due to emotional problems (lim_emot)
- Energy/fatigue (fatig)
- Emotional Well-Being (em_wb)
- Social Functioning (soc_func)

We separate the items as two domains covering physical and mental health:
PHYS_HLT based on the first four (phys_func to gen_hlth);
MENT_HLTH based on the last four (lim-emot to soc_func) in the list above.

Jenkinson, C., Wright, L. and Coulter, A. (1994). Criterion validity and reliability of the SF-36 in a population sample. Quality of Life Research 3.1 : 7-12.

Brazier, J.E. et al (1992). Validating the Sf-36 health survey questionnaire: new outcome measure for primary care. BMJ 305.6846: 160-164.

EOA: Latent Variables for physical (Phys_hlth) and mental health (Ment_hlth) taken from eight self-rated items in SF36



General Life Space : Quality of Life (CASP12v2)

CASP12v2

12 item 4-point Likert scale (3 questions for each area)

C- control - *I feel what happens to me is out of my control* (vars 'control1-3')

A- autonomy – *I can do the things I want to do* (autonmy1-3)

S- self realisation – *I feel that life is full of opportunities* (slfreal1-3)

P – pleasure – *I feel that my life has meaning* (pleasur1-3)

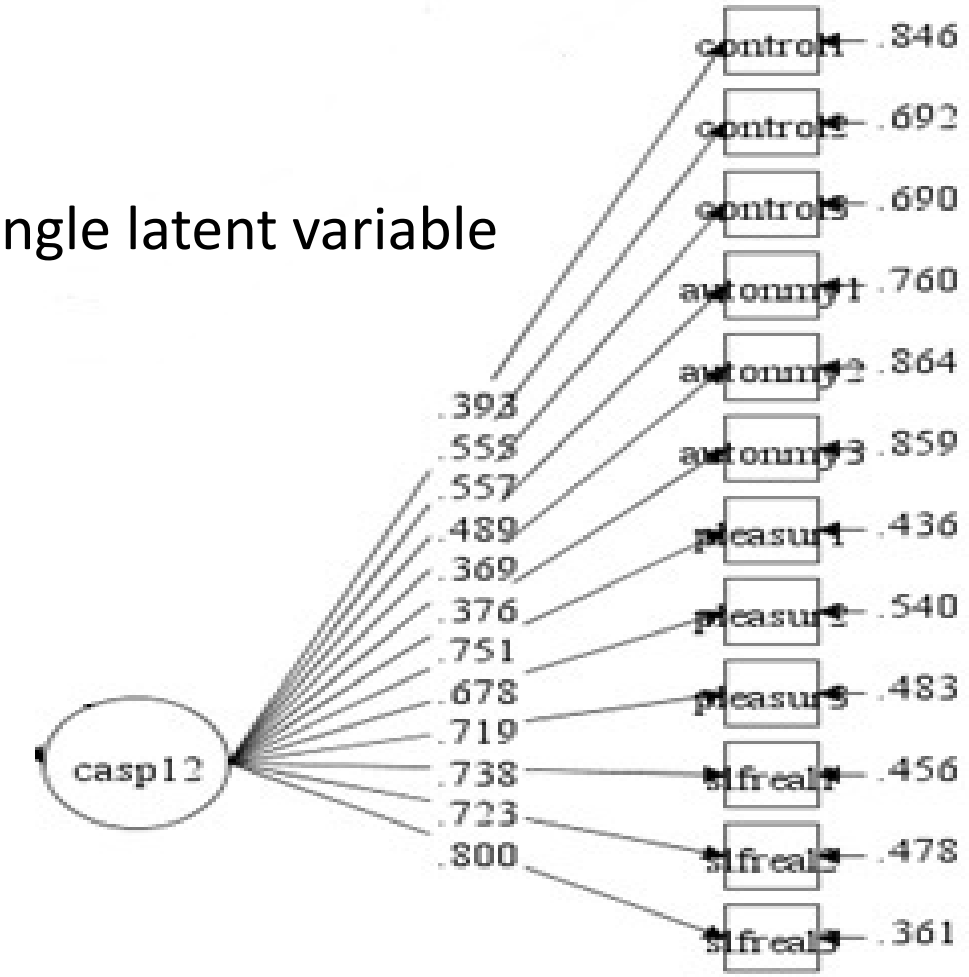
Our final EOA latent variable is based on these twelve manifest variables.

Wiggins, R.D., Netuveli, G., Hyde, M., Higgs, P. And Blane, D. (2008). The evaluation of a self-enumerated scale of quality of life (CASP-19) in the context of research on ageing: a combination of exploratory and confirmatory approaches. Social Indicators Research 89, 1, 61-77.

Also, for history and development see www.casp19.com

EOA: Quality of Life Latent Variable (CASP12)

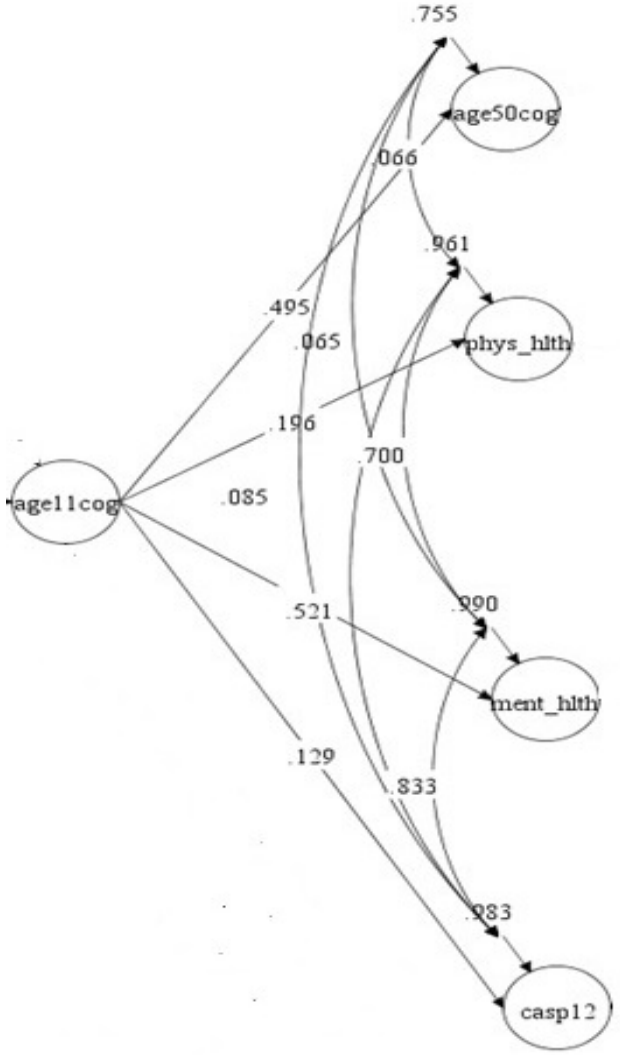
Applied here as a single latent variable



Modelling our Early-Old Age (EOA) domains as a ‘first order factor analytic’ model

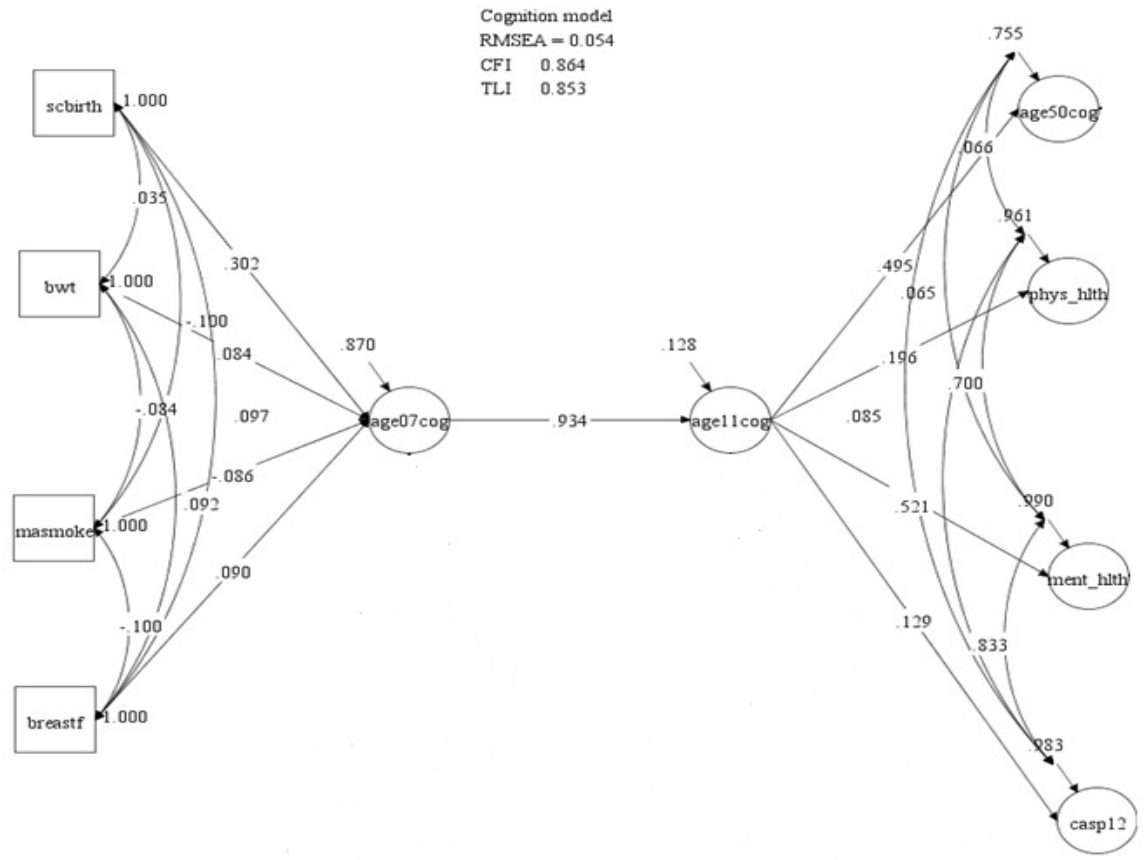
We regress our four ‘outcome’ LVs onto age11cog:

The four direct paths are all positive: 0.495 for Age50 cog, 0.196 for Phys_hlth, 0.101 for Ment_hlth and ,0.129 for CASP12v2. ‘All other things being equal over four decades’ your cognitive performance at age 11 years has benefits for your performance at age 50 years, your physical and mental health as well as your quality of life.



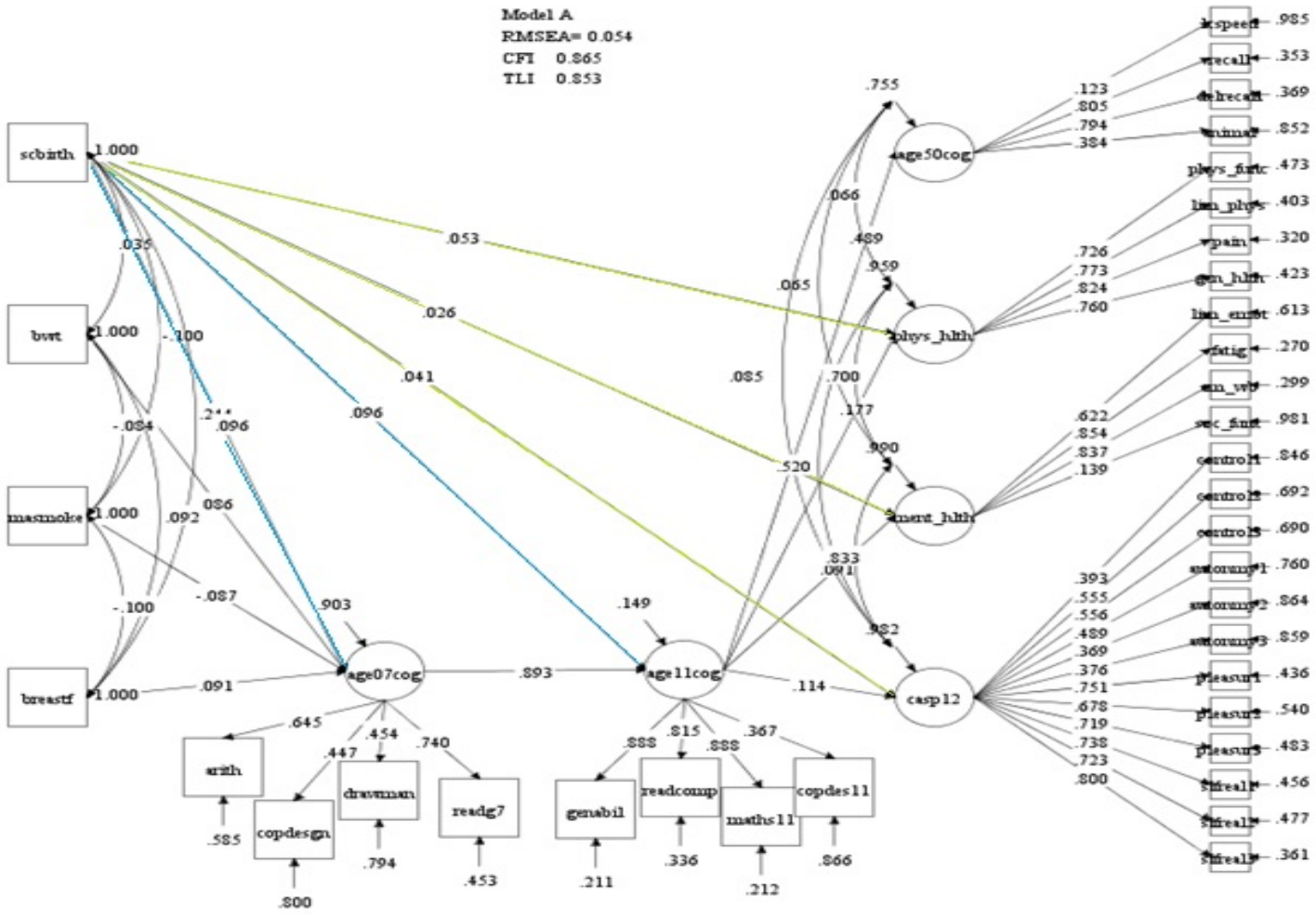
Connections between early life and early old age

We join the EOA outcomes to the rest of the model



A full SEM focusing upon birth circumstances, age 07 and age11 cognition performance and EOA outcomes

The model fits reasonably well; RMSEA=0.054, TLI=0.86, CFI= 0.85.



More about childhood and adolescence

Behaviour (parental view)

Rutter scores at age 7, 11 and 16

Unhappiness at school

A report from age 7 and age 16

Family disruption

Report at age 7 years (divorce, separation, desertion)

Whether or not child was ever in care by age 11

Cognition at age 16

Maths & English tests (age16mat, age16eng) + teacher's ratings of Maths and English ability (mathabil, engabil)

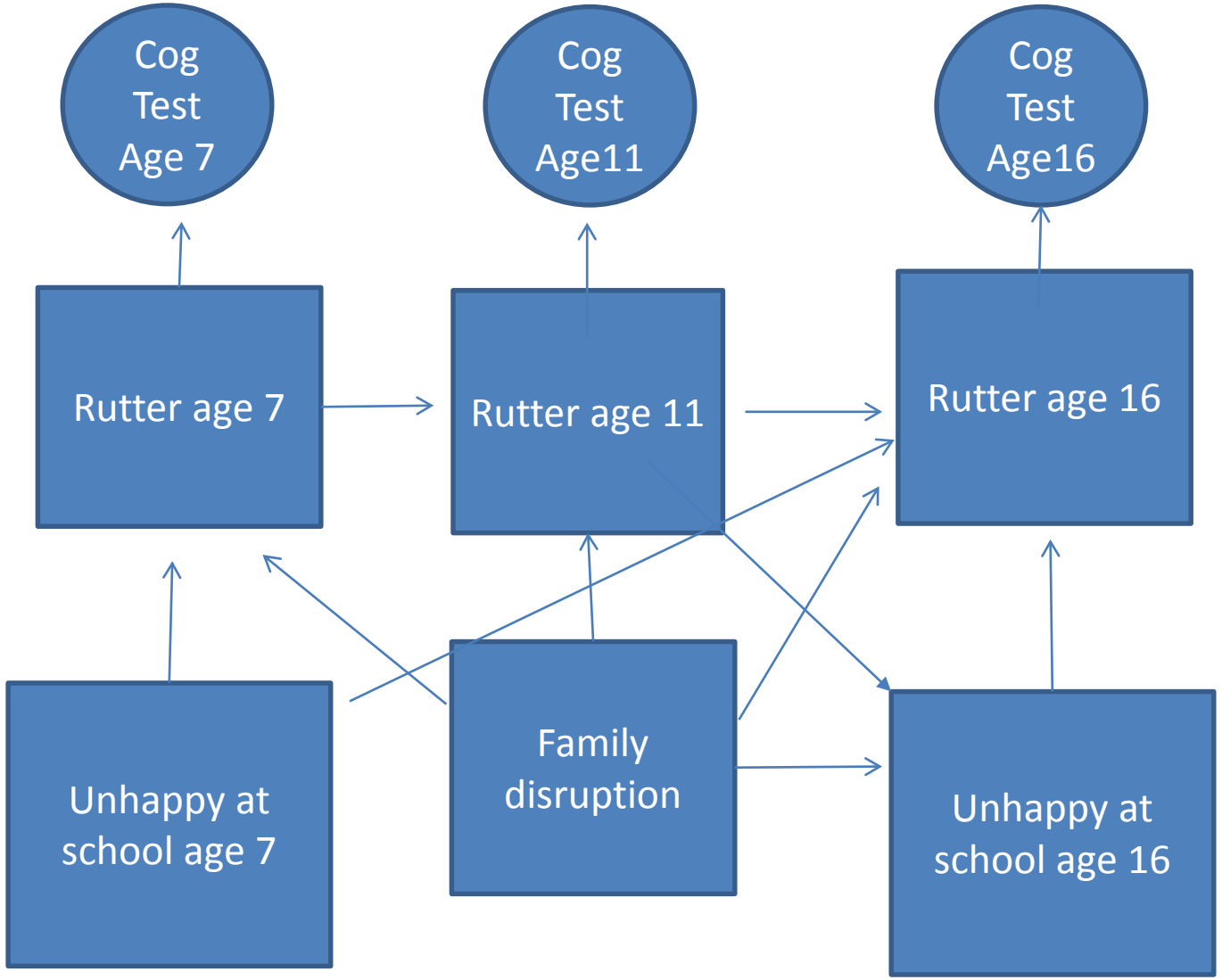
Rutter 14-point score (ages 7 & 11)

- To what extent is it true that the child:
  (0 does not apply/1 applies somewhat/2 certainly applies')

  - has difficulty in settling to anything for more than a few moments
  - is bullied by other children
  - is miserable or tearful
  - worries about many things
  - is irritable, quick to fly off the handle
  - has twitches or mannerisms of the face, eyes or body
  - fights with other children
  - bites nails

Rutter, M (1967) *A children's behaviour questionnaire for completion by teachers: preliminary findings. Journal of Child Psychology & Psychiatry 8(1) 1-11.*

Family disruption, behaviour and unhappiness



Cognition legacy

- The latent variable for age 16 years cognition is important as a ‘second order factor’ in its relationship with all four early old age outcomes
- A driver of age 50 years cognition performance (.519) but also relates to:
- Physical health (.184), Mental health (.058) and Quality of life (.091)

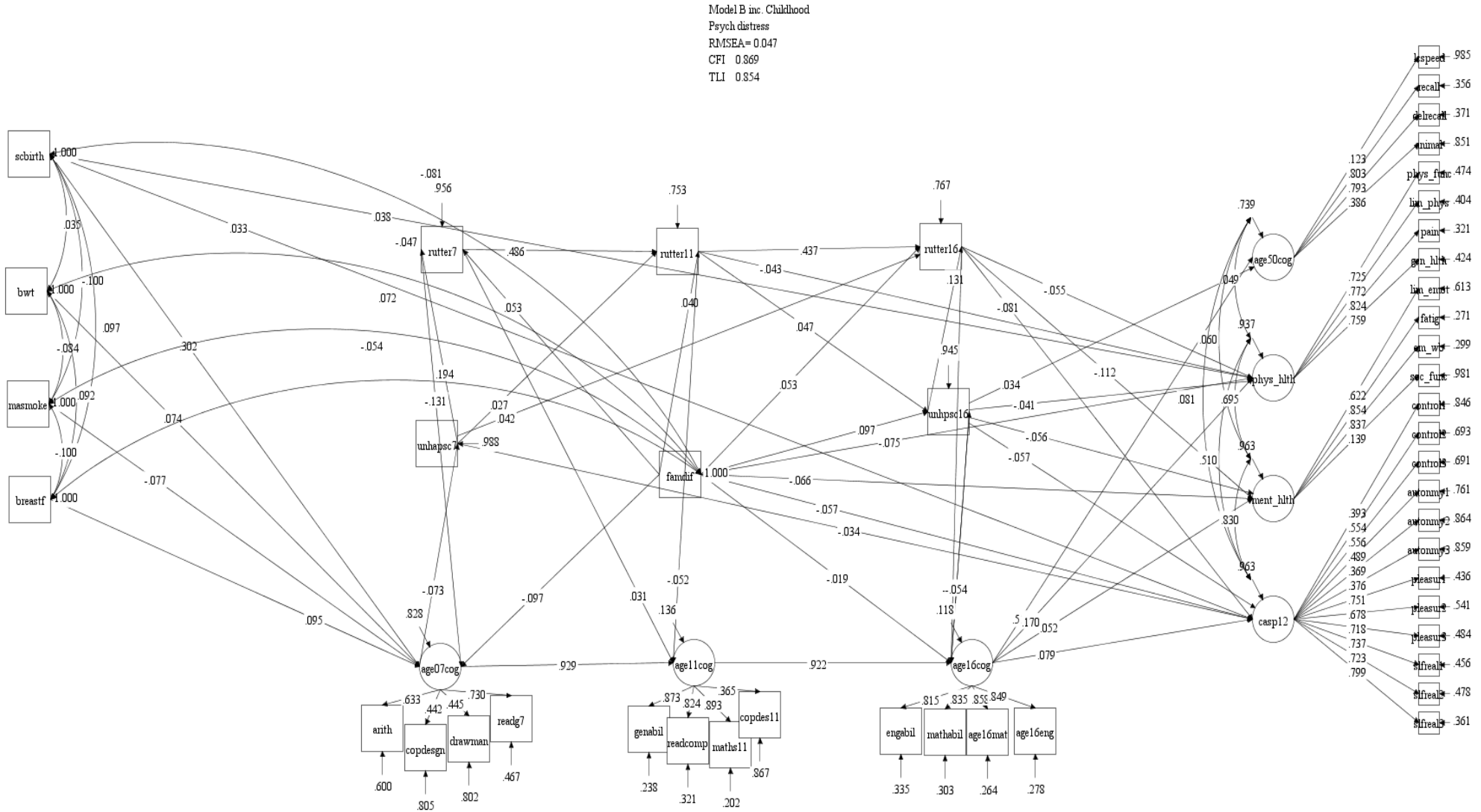
Conclusions

- Social advantage at birth has a positive return for performance in cognitive testing from an early age
- Performance in cognitive tests is sustained throughout the ‘teenage’ years
- Cognitive performance at age 16 years is strongly predictive of cognitive performance at age 50 years
- Cognitive performance at age 50 years relates to both physical and mental health as well as quality of life

More conclusions

- Family disruption impacts upon childhood and adolescent behaviour, affects cognitive performance and has small negative consequences for EOA
- Being unhappy at school casts a minor shadow over EOA quality of life as well as physical and mental health

Best model so far - birth circumstances, age 07,11,16 cognition, childhood psych distress, family disruption and EOA outcomes



Thank you !!

Contact : b.dodgeon@ucl.ac.uk

Trajectories of Depressive Symptoms From Childhood to Young Adulthood: Evidence of Gender Differences from the Avon Longitudinal Study of Parents and Children (ALSPAC)

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Why study depression?

- Depression is a common mental illness which affects more than 300 million people worldwide (World Health Organisation, 2017)
- Associated with:
  - Increased substance use
  - Impaired educational attainment
  - Increased risk of suicide (Thapar et al., 2012)
- Predicted by:
  - Gender
  - Genetics
  - Early life experiences
- Identifying mechanisms is important for treatments and interventions

Identifying depression early

- Childhood and adolescent depression is a *potentially* modifiable risk factor for adulthood depression (Birmaher et al., 2004)
- Critical period of development that has implications for later depression
- What age may we potentially be able to intervene with the most efficacy?

Trajectories of depressive symptoms

- Trajectories or growth curve models can be used
  - Popular tool in epidemiology
  - Normally used for measuring childhood growth like height or weight
- Can be used for depressive symptoms
  - Normally used in latent class growth models (LCGM)
    OR general growth mixture models (GGMM)
    - “low, moderate and high” – “high and increasing, low and stable”
  - But there may be issues with using these models (Bauer 2007)

Trajectories of depressive symptoms (cont…)

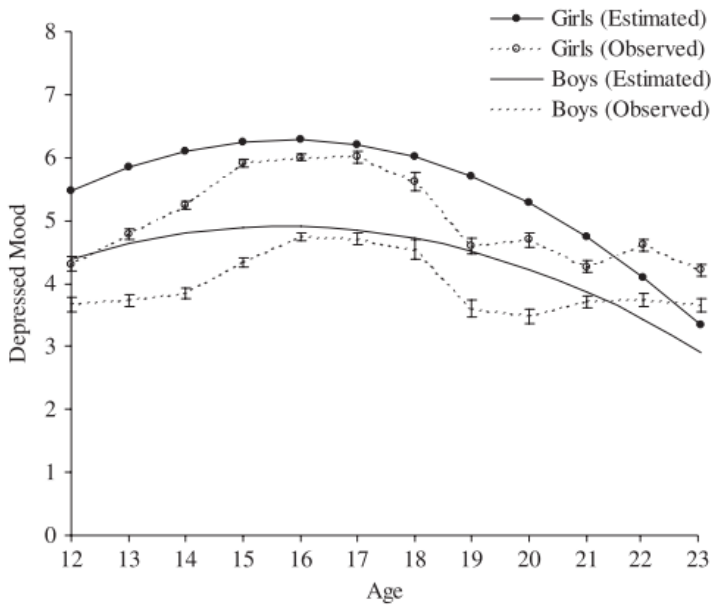
- ALSO – trajectories tell us about rate of change, baseline and maximum points, therefore:
  - We are then able to calculate things like
    - 1) the age of peak velocity of DS (at what age DS is increasing most rapidly)
    - 2) age at peak DS
- Not widely examined in the DS literature but a potential tool for aiding treatments and interventions
- Can we use multilevel modelling to estimate trajectories?

Gender differences and trajectories

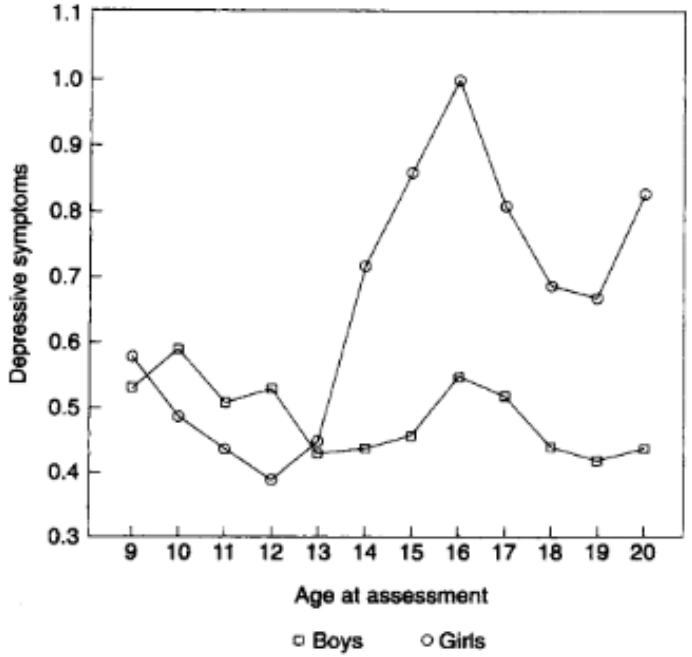
- Different trajectories exist between males and females
- Females typically have higher trajectories and commence on these trajectories earlier than males (Natsuki et al., 2009)
- Yet not universal and not clear why:
  - Mechanisms not fully understood
  - More research needed to understand the nature of the DS change

Gender differences and trajectories (cont…)

- Natsuki et al., 2009



- Ge et al., 1994



The current study

- 1) Understand the nature of DS trajectories between males and females using longitudinal data
  - Examining change across childhood to young adulthood
- 2) Can we use MLM to model something like DS
- 3) Are there key features from the trajectory that might further explain how trajectories differ between males and females?

Methods

- Participants were from the Avon Longitudinal Study of Parents and Children (ALSPAC)
- Outcome:
  - Depressive symptoms – measured via the short mood and feelings questionnaire (SMFQ)
    - A 13 item questionnaire, validated in numerous studies (Turner et al., 2014; McKenzie et al., 2012): 0-26 where 26 = max depression
    - Measured on 8 occasions – from late childhood (10.65 years) to young adulthood (22.8 years)
- Predictors/covariates:
  - Gender – identified from birth notifications at time of birth
  - Maternal SES, parity, housing tenure, financial difficulties, maternal smoking, maternal pre/post depression & SMFQ source

Statistical methods & trajectory features

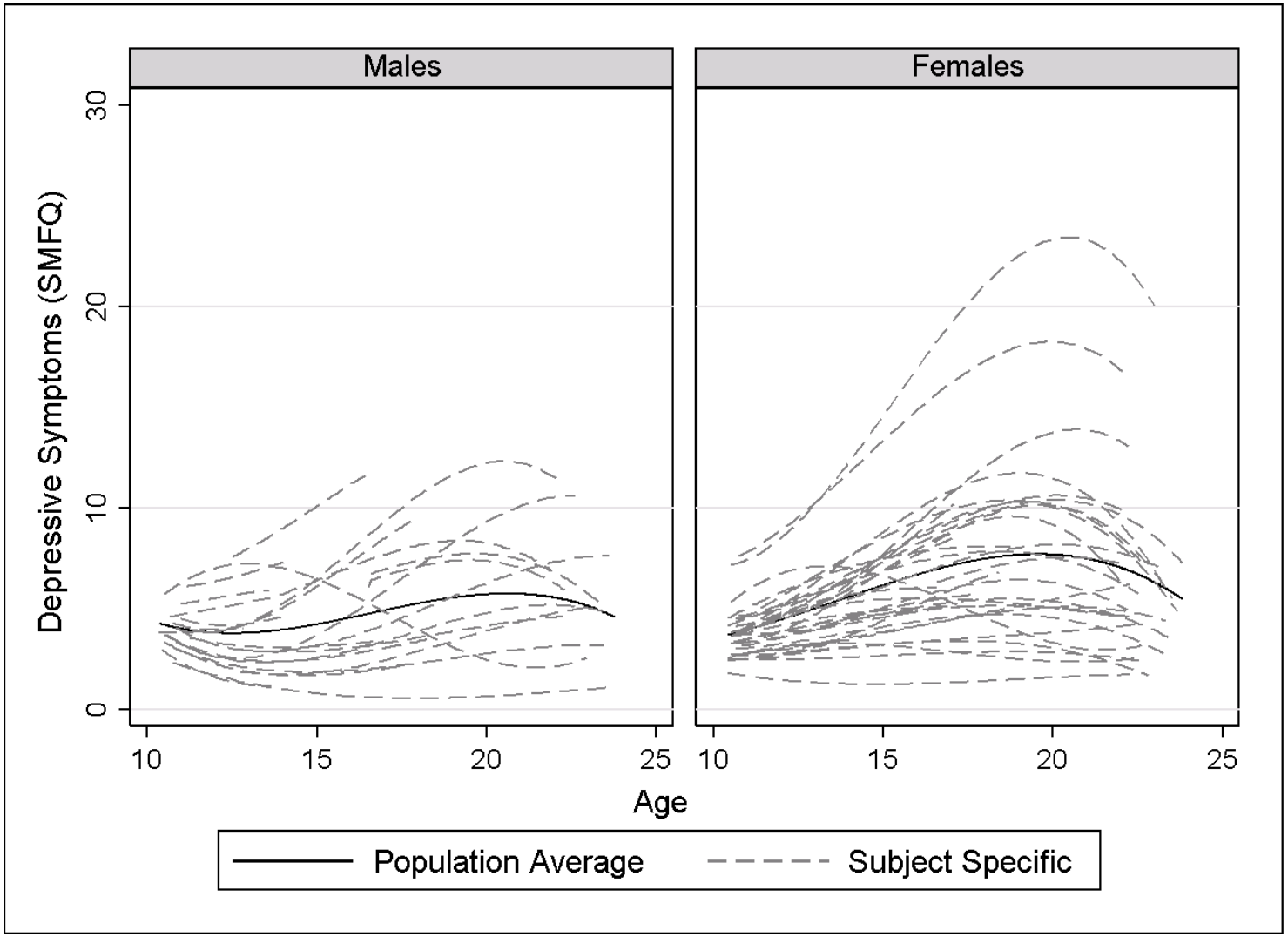
- Used multilevel modelling with a random intercept and random slope model to estimate trajectories of DS
  - 2 level longitudinal model
    - **Occasions** within **individuals**

- We were interested in calculating the following:
- 1) The age of peak velocity of DS
  - Age at where DS is increasing the most rapidly
- 2) The age of maximum DS
  - Age where DS are highest on the trajectory
- 3) The DS score at the age of peak velocity
- 4) The DS score at the age of maximum DS

Sample description

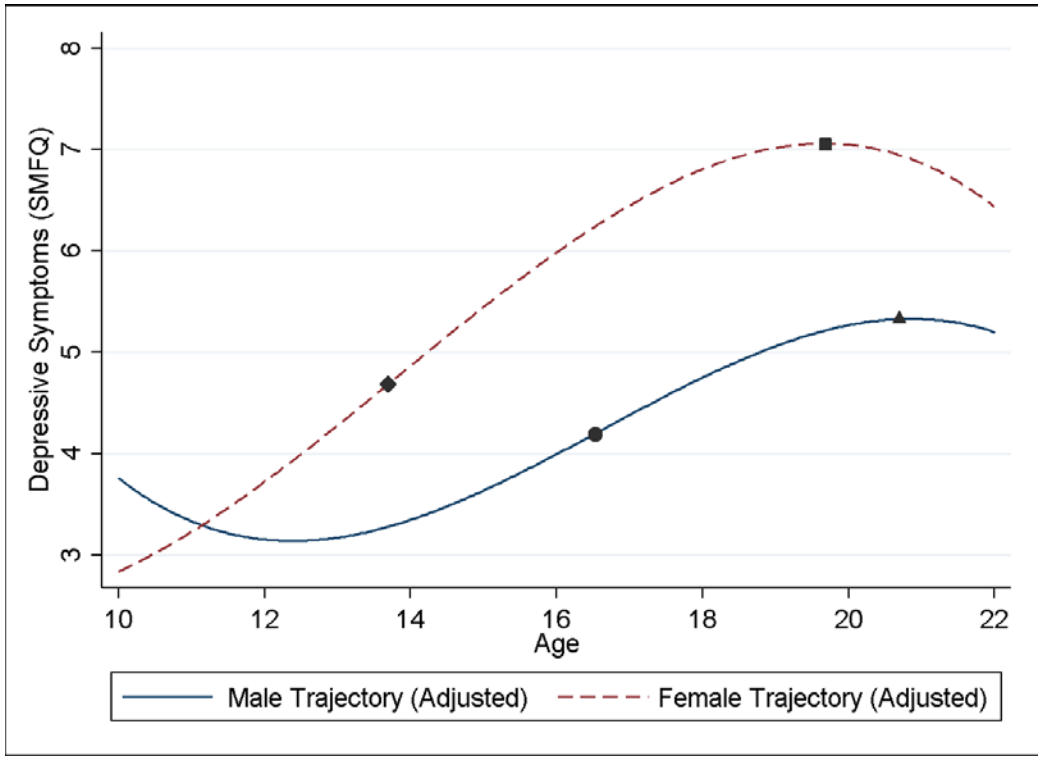
- We had 9301 individuals with data on gender and at least one measurement of the SMFQ
  - Resulting in 39,942 measurements (17,362 male/22,580 female).
- The total sample with covariates was 6097
  - 27,952 measurements (12,362 male/15,590 female)

Results


Males
Females
Depressive Symptoms (SMFQ)
0
10
20
30
10
15
20
25
Age
Population Average
Subject Specific

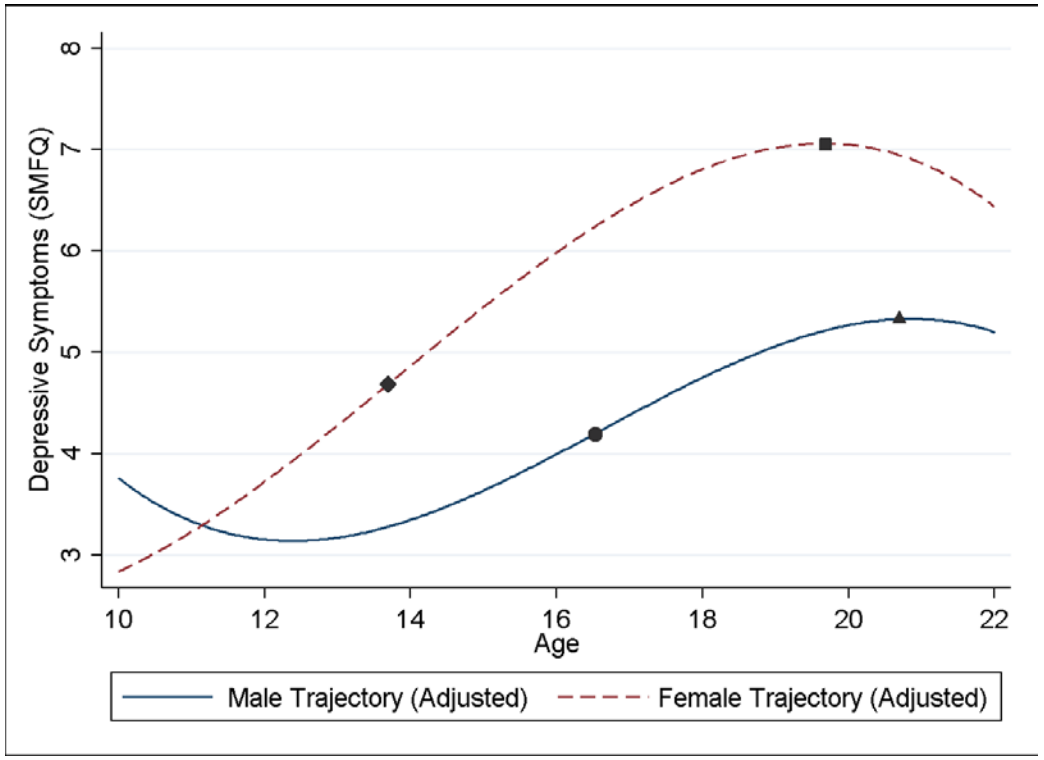
Results (cont…)

- The correlation between the intercept and the slope was .52 (SE = .025) – individuals with higher DS had higher trajectories
- Females were associated with higher DS at 16 years of age (centered) compared to males ($p < .001$)



Results

- ● Male age of peak velocity of depressive symptoms.
- ▲ Male age of maximum depressive symptoms.
- ♦ Female age of peak velocity of depressive symptoms.
- ■ Female age of maximum depressive symptoms.



Features from the Trajectories								
	Unadjusted (n=9301)				Adjusted (n=6097)			
	Males	Females	Difference	*p* -value	Males	Females	Difference	*p* -value
Age of Peak Velocity in SMFQ	16.36 (.09)	13.51 (.32)	2.85 (.34)	<.001	16.44 (.12)	13.66 (.36)	2.78 (.37)	<.001
Age of Maximum SMFQ	20.42 (.14)	19.61 (.5)	0.8 (.55)	0.141	20.68 (.18)	19.68 (.58)	.99 (.65)	0.125
SMFQ at Peak Velocity	4.76 (.07)	5.42 (.06)	0.66 (.09)	<.001	4.24 (.11)	4.77 (12)	0.54 (.12)	<.001
SMFQ at Maximum Point	5.75 (.1)	7.7 (.09)	1.95(.14)	<.001	5.33 (.13)	7.06 (.12)	1.73 (.16)	<.001

Discussion - varying trajectories

- Our results show that males and females have distinctively different trajectories of DS between late childhood and young adulthood
- Females had an earlier age of peak velocity of DS and age of maximum DS compared to males
  - Although weak evidence for this last feature

Discussion (cont…)

- Our findings support previous research
  - In particular that females have higher trajectories than males
  - Similar peaks for males and females in other studies (Hankin et al., 1998; Sutin et al., 2013)
- Our findings extend upon previous research
  - We show how DS change between late childhood – young adulthood
  - To the best of our knowledge, this is the first study to calculate the age of peak velocity of DS
  - MLM can be used for other forms of childhood growth

Age of peak velocity of DS

- The age of peak velocity (the age at where DS are increasing most rapidly) was earlier for females
- Likely to coincide with pubertal timing/status
- It may be useful to identify this age in order to prevent/limit DS and depression from progressing
  - But targeting groups specifically at these ages
    - Support from schools/parents

Explanations

- The age of peak velocity tends to match the varying ages in which males and females transition through puberty
  - With females transitioning earlier and males later
  - However this doesn’t explain why females have higher trajectories
- One possible explanation is that experiencing higher DS earlier in life may result in a longer recovery period (time taken for trajectory to decrease)
  - We find that individuals with higher starting points have higher slopes

Potential mechanisms

- New findings:
- The earlier the age of peak velocity of DS is associated with higher depression (measured via the CISR)
- In girls, a later age of menarche is associated with a later age of peak velocity of DS
  - Which supports our idea that higher DS earlier in life may contribute to higher trajectories
  - Later menarche may protect against DS
  - Earlier menarche may be a risk factor for depression
    - Mediated by age of peak velocity?

Strengths and weaknesses

- We use rich longitudinal data that ranges over 10 years and captures growth over a critical period of development
- Large starting sample of 9301
  - > 6000 when including covariates
- MLM can model DS and it would be easy to explore this with other predictors

- However, attrition plays a role and may bias our results to those who responded (or didn't respond)
- Is a cubic model the best model to use?
  - Too restrictive?
    - Perhaps fractional polynomial or spline function may be more appropriate for future analysis?

Conclusion

- Males and females have distinct and varying trajectories of DS throughout late childhood to young adulthood
  - With females being associated with higher trajectories
  - Pubertal timing is likely to underlie this association
- The age in which DS is increasing most rapidly is earlier for females (13.6 years old) compared to males (16.4 years old)
- The age at which DS is the highest is similar for females (19 years old) and males (20 years old)
- MLM can be used for examining behavioural traits like DS
- Implications for services, parents and schools
  - Targeting males and females at different ages

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