Breakout sessions: Socioemotional skills 1

Bronte

14:00-15:20

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The impact of income-related inequality on the behavioural and emotional development of children: a decomposition analysis of the UK Millennium Cohort Study

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Background

- Recent government reports (Child Poverty Act 2010; Child Poverty strategy 2014-2017) calls for the implementation of policies and programmes to reduce socioeconomic inequalities in child outcomes.

- *Rationale:* reducing poverty is seen as an effective way to improve children's health, educational and labour market outcomes.

  ⇒ *But….how to make well-informed decisions?*

- Policymakers' recommendations and decisions ideally rely on objective evidence-based information provided by research results on specific relevant issues.

- **FOCUS OF OUR RESEARCH**: relationship between income inequalities and child's behavioural and emotional development at age 11.

Previous research

Well established empirical result: significant association between family income and children's developmental and behavioural outcomes.

- **Developmental psychologists**:
  - family processes that mediate the association
- **Economists**:
  - best model specification
  - most appropriate measure of income
  - adequate methods to address potential endogeneity of family income
  - policy implications of statistical estimates

HOWEVER…

→ ongoing disagreement about the precise nature, strength and size effect of the association between family income and children's outcomes motivates further investigation

Our original contribution

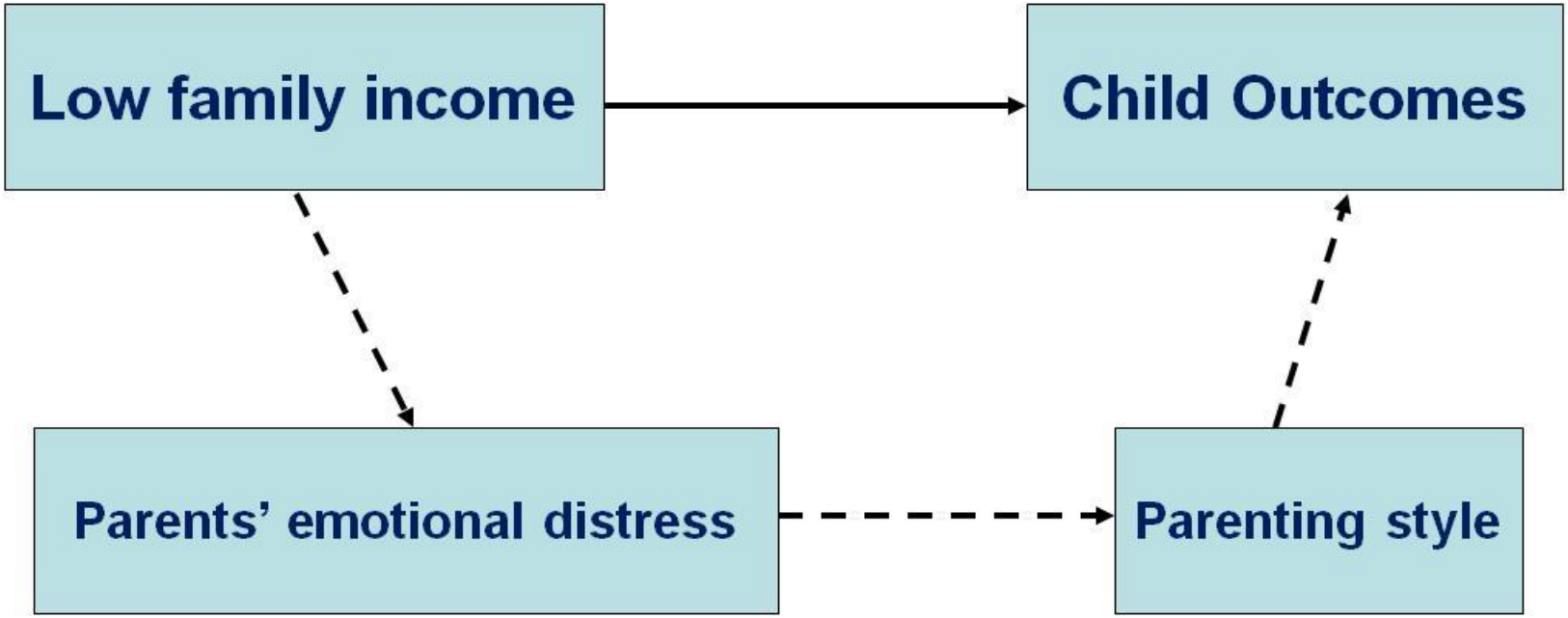
- Comprehensive analysis of the 'family income-child behavioural/emotional development' nexus at age 11 using data on contemporary UK (MCS)

- Combines economists' and developmental psychologists' perspectives in a unifying analysis to understand the pathways that mediate the association between income and child well-being

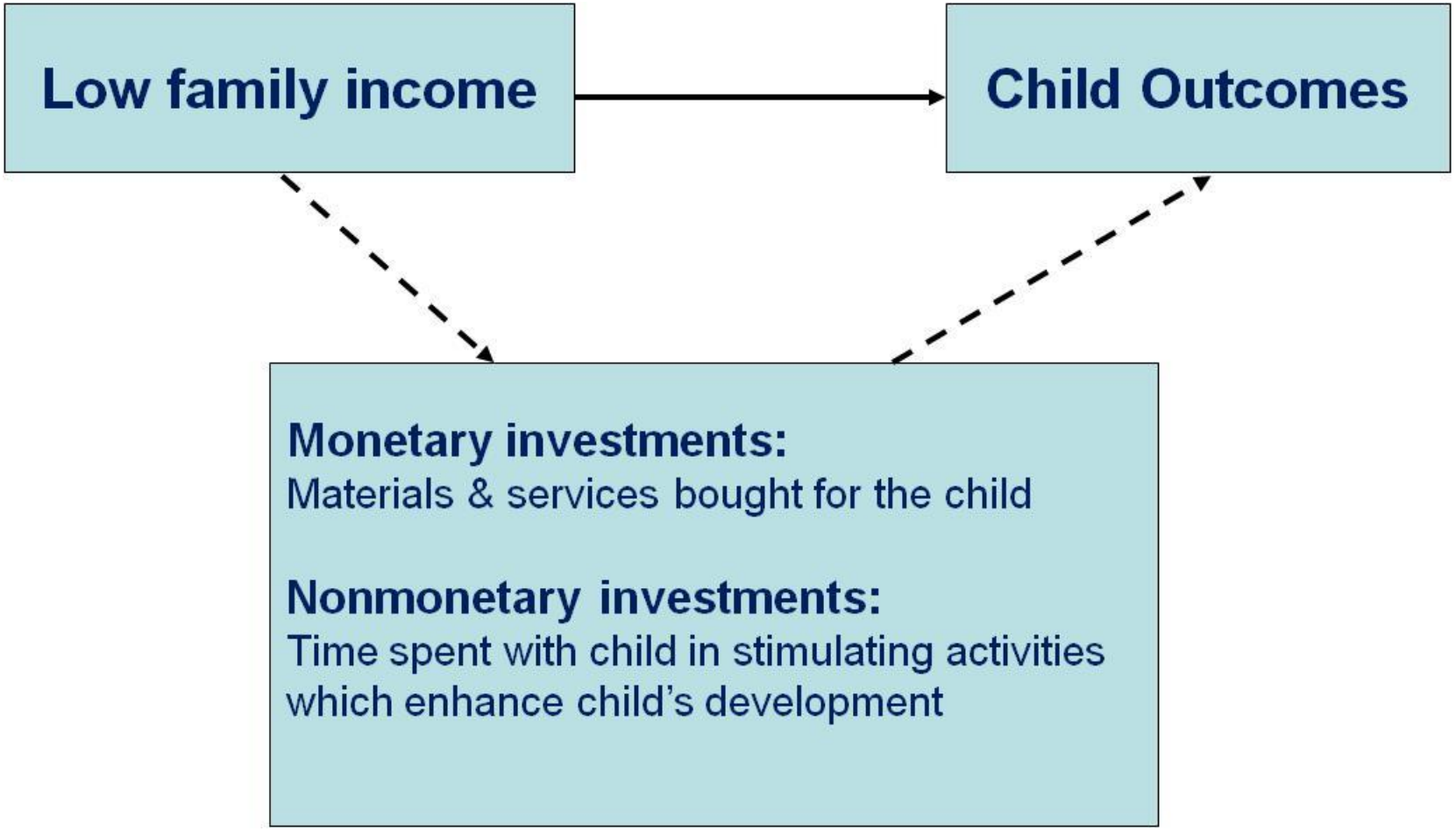
HOW?

- Multivariate logit regression analysis to model the probability that the child has socio-emotional problems – Grossman (child) health production function
- Wagstaff Concentration Index to measure income inequalities in child socio-emotional outcomes
- Decomposition analysis to identify the key factors underpinning observed inequalities

Theoretical background: parental stress model



Theoretical background: parental investment model



The bullying/social interactions pathway?

- Evidence that exposure to bullying is patterned by socioeconomic status – adolescents from families of low affluence report higher prevalence of being victims of bullying (Due et al. 2009 – multi-country comparative study)

- Evidence on the association between bullying and behavioural problems among primary school children - all children involved in direct bullying had significantly increased total behavioural problems compared to those not involved in bullying (Wolke et al. 2000)

- Evidence on the importance - since very young age - of social competence/successful interactions with age-mates as predictor of later mental health and well-being (Denham et al. 2003)

Data

DATASET: Millennium Cohort Study

- Nationally representative birth cohort study collecting information on health, wealth, education, family and employment from parents of almost 19,000 children born in the UK in 2000-2001 – five surveys carried out so far – at age 9 months, 3, 5, 7 and 11 years

VARIABLES:

Child socio-emotional health at age 11

- Derived from parent-reported responses to the Strengths and Difficulties Questionnaire (SDQ) . A Total Difficulty Score (TDS) was generated by summing the scores from the emotional, conduct, peer problems and hyperactivity scale. Sub-scales scores also used in the analyses.

  SDQ-TDS: 0 if normal score (1 to16)

  SDQ-TDS: 1 if abnormal score (17 to 40)

Family income

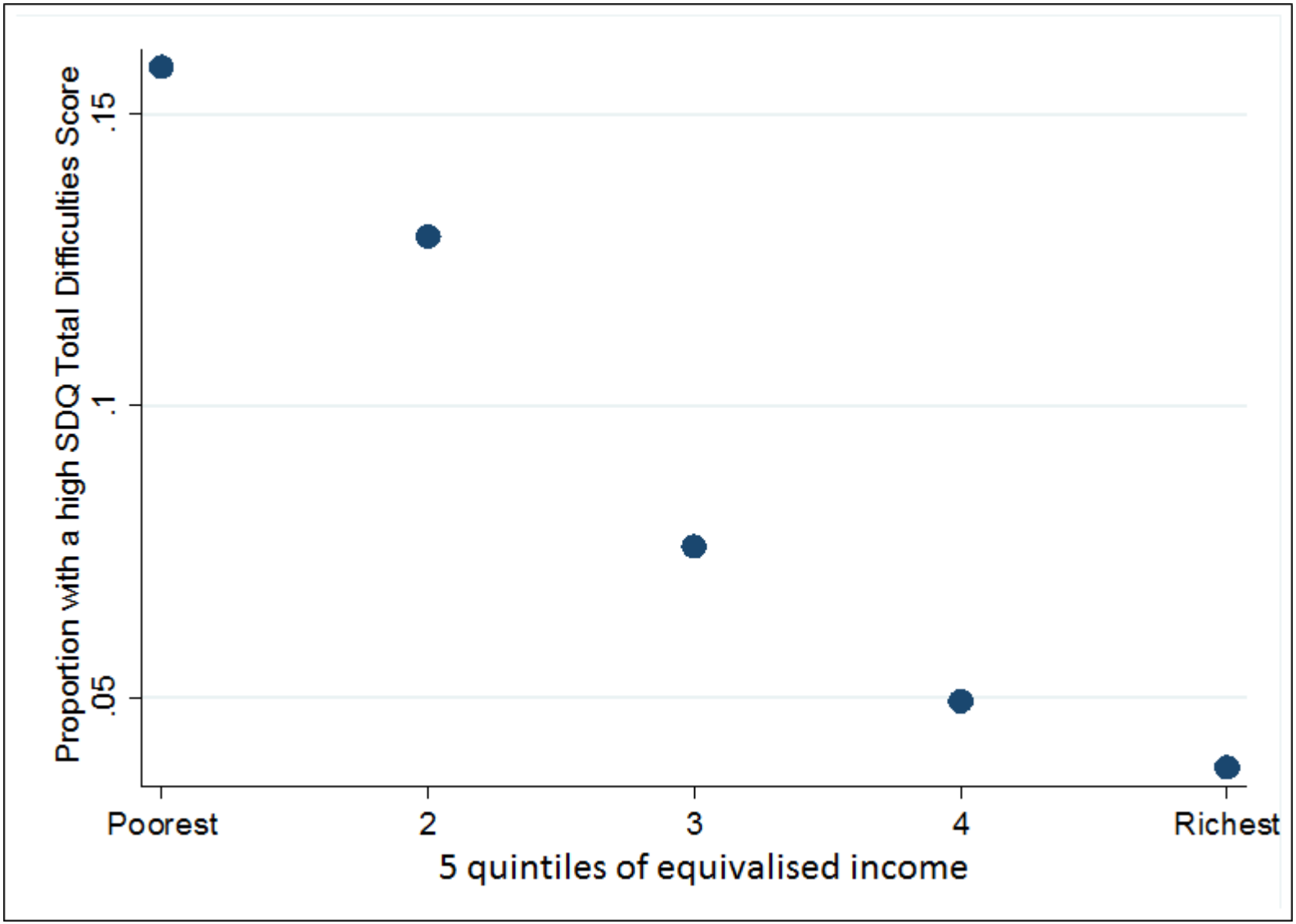
- Logarithm of family income equivalised to account for family composition
- Equivalised income quintiles

Child health production function: multivariate analysis

Model specification	Regressors
Model specification S1	**Raw correlation** between family income and child outcomes
Model specification S2	***family income*** (log of equivalised family income) ***child characteristics*** (gender, ethnicity, number of older sibling, current health) ***child's initial stock of health*** (birthweight, gestational age at birth) ***standard socioeconomic controls*** (mother's education, maternal age at child birth)
Model specification S3	*Same variables as in S2* **+ *'parental stress' variables*** (mother' s depression, parenting practices, discipline, child-parent relationship)
Model specification S4	*Same variables as in S2* **+ *the 'parental investment' variables*** (house tenure, indicators of quality and quantity of time spent by mothers with their children in intellectually stimulating activities)
Model specification S5	*Same variables as in S2* **+ *the bullies/bullied and social interaction variables*** (child bullies/is bullied, time spent with friends, special needs at school, child participation in sport)
Model specification S6	*Same variables as in S2* **+ *'other family-related pathways' variables*** (maternal smoking and drinking during pregnancy, length of breastfeeding, mother's self-reported general health and longstanding illness, maternal change of relation status since previous wave)
Model specification S7	S2 + S3 + S4 + S5 +S6

RESULTS

High SDQTD Score Across Incomes



Preliminary results: multivariate analysis (I)

Explanatory variables (model specification 7)	Odds ratio	P-value
Income	1.12	0.74
Gender(male)	1.26*	0.08
Child ethnicity		
Black/Black Caribbean (vs White)	3.40***	0.002
Other ethnicity(vs White)	0.04***	0.01
Child current general health		
Good (vs Excellent)	1.92***	0.002
Fair (vs Excellent)	2.25***	0.008
Child current longstanding illness	1.40**	0.04
Child has one sibling (vs no siblings)	0.70**	0.05
Maternal drinking during pregnancy		
Light drinking (vs no drinking)	0.67**	0.02
Moderate/heavy drinking (vs no drinking)	1.53**	0.03
Maternal post-natal depression	1.08**	0.05
Maternal current depression		
Medium (vs no depression)	2.31***	<0.001
High (vs no depression)	4.74***	<0.001

Preliminary results: multivariate analysis (II)

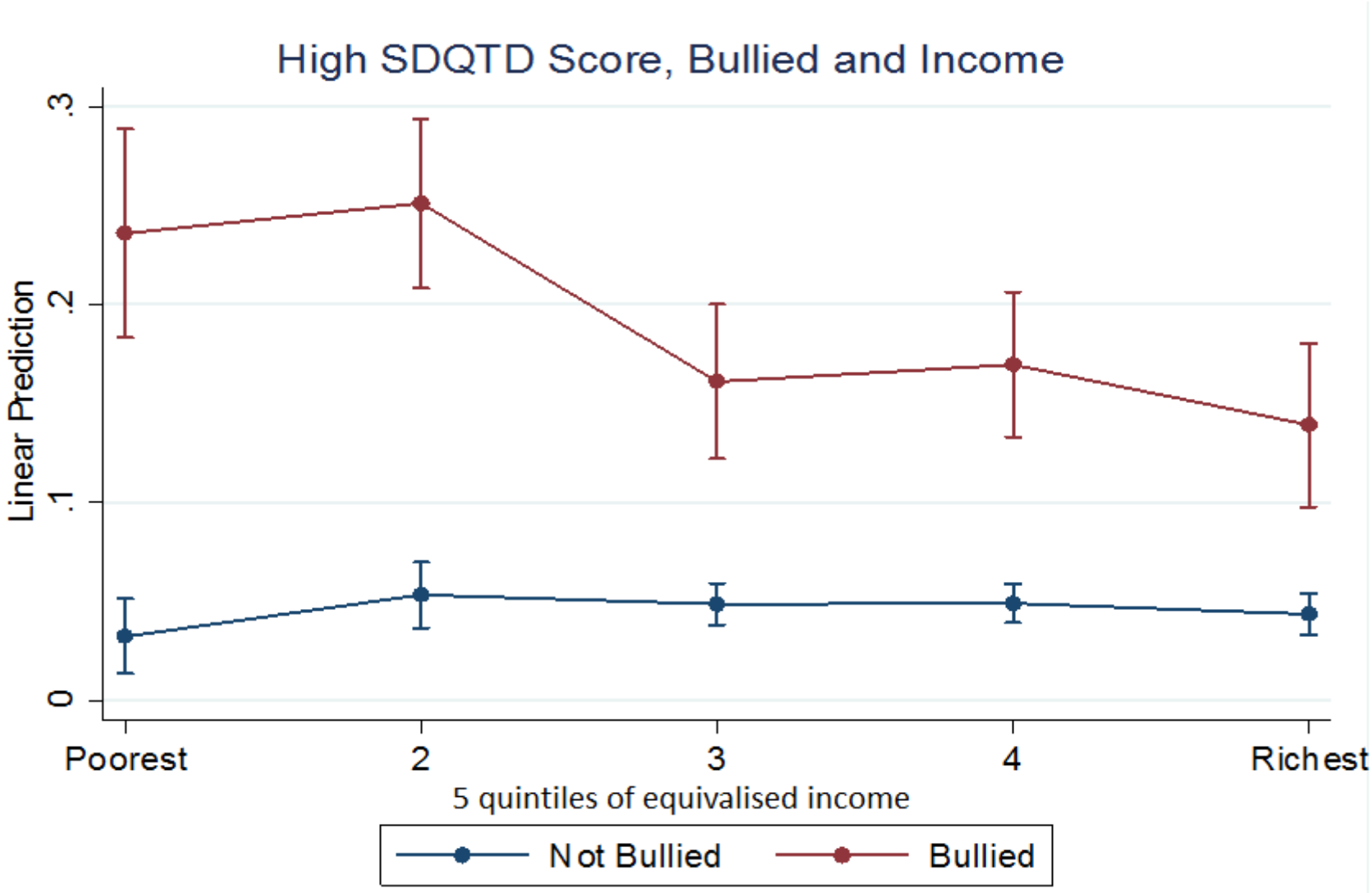
Explanatory vars	Odds ratio	P-value
Maternal CPRS when child aged 3 years	0.81***	0.005
Maternal relational status change since child aged 7		
Become partnered (vs become single)	1.81*	0.08
Maternal time currently spent with child		
Just enough (vs plenty)	1.56***	0.014
Not enough (vs plenty)	1.82***	0.001
Current house tenure		
Other (vs own/mortgaged)	0.26**	0.03
Child has special needs at school	4.26***	< 0.001
Child time with friends		
1 to 4 times per month(vs less than once a month)	0.65*	0.08
More than once per week (vs less than once a month)	0.55**	0.02
Child bullied		
Somewhat bullied (vs not bullied)	6.54***	<0.001
Certainly bullied (vs not bullied)	21.09***	<0.001
Don't know (vs not bullied)	5.39***	<0.001
Child bullies		
Somewhat bullies (vs doesn't bully)	9.39***	<0.001
Certainly bullies (vs doesn't bully)	26.58***	<0.001
Don't know (vs doesn't bully)	4.73**	0.020

Preliminary results: multivariate analysis (III)

Explanatory Variables	Coefficient	P-value
Income		
Poorest	Base	Base
2	0.010	0.424
3	0.005	0.641
4	-0.001	0.910
Richest	-0.006	0.645
Bullied	0.260***	<0.001
Poorest/Bullied	-	-
2/Bullied	0.019	0.625
3/Bullied	-0.121***	0.001
4/Bullied	-0.116***	0.002
5/Bullied	-0.147***	<0.001

 # Controlling for variables listed above

Bullying and Income



 # Controlling for variables listed above

Endogeneity

- Being "Bullied" and having a high SDQTD score may have an endogenous relationship:
  - Reverse Causality: The traits that lead to a high SDQTD score may increase probability of being bullied

- Solution:

1. Instrumental Variables
   - No Appropriate IVs found
   - Binary Endogenous variable

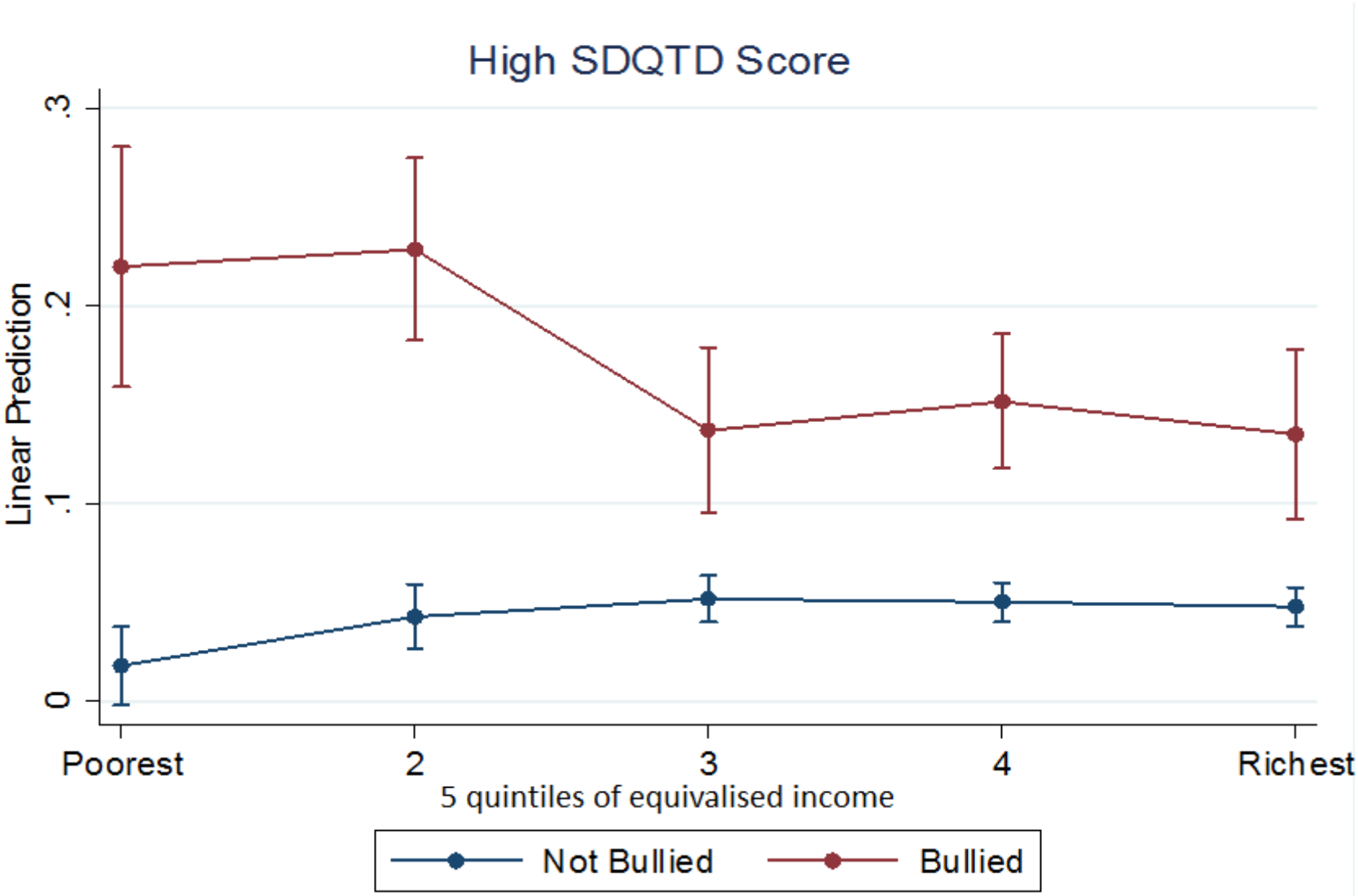
2. Lagged Variable:
   - Bullied in the previous 2 periods
   - SDQTD Score at age 3. PRIOR to attending school

Preliminary results: multivariate analysis (IV)

Explanatory vars	Coefficient	P-value
Income		
Poorest	Base	Base
2	0.025**	0.030
3	0.034***	0.003
4	0.032***	0.008
Richest	0.030**	0.021
Bullied	0.202***	0.000
Poorest/Bullied	-	-
2/Bullied	-0.016	0.000
3/Bullied	-0.117***	0.003
4/Bullied	-0.100***	0.001
5/Bullied	-0.114***	0.000

 # Controlling for variables listed above AND, Bullied lags + SDQTD Score at age 3

Bullying and Income



 # Controlling for variables listed above AND, Bullied lags + SDQTD Score at age 3

Concentration index (I)

Concentration Index (CI)

- Measures inequalities in the distribution of a health variable (*y*) across the income distribution, with individuals ranked from poorest to richest (*R*).

$$CI = \frac{2cov(y, R)}{\mu_y}$$

→ **CI < 0** (**'pro-poor'** inequality)

→ **CI > 0** (**'pro-rich'** inequality)

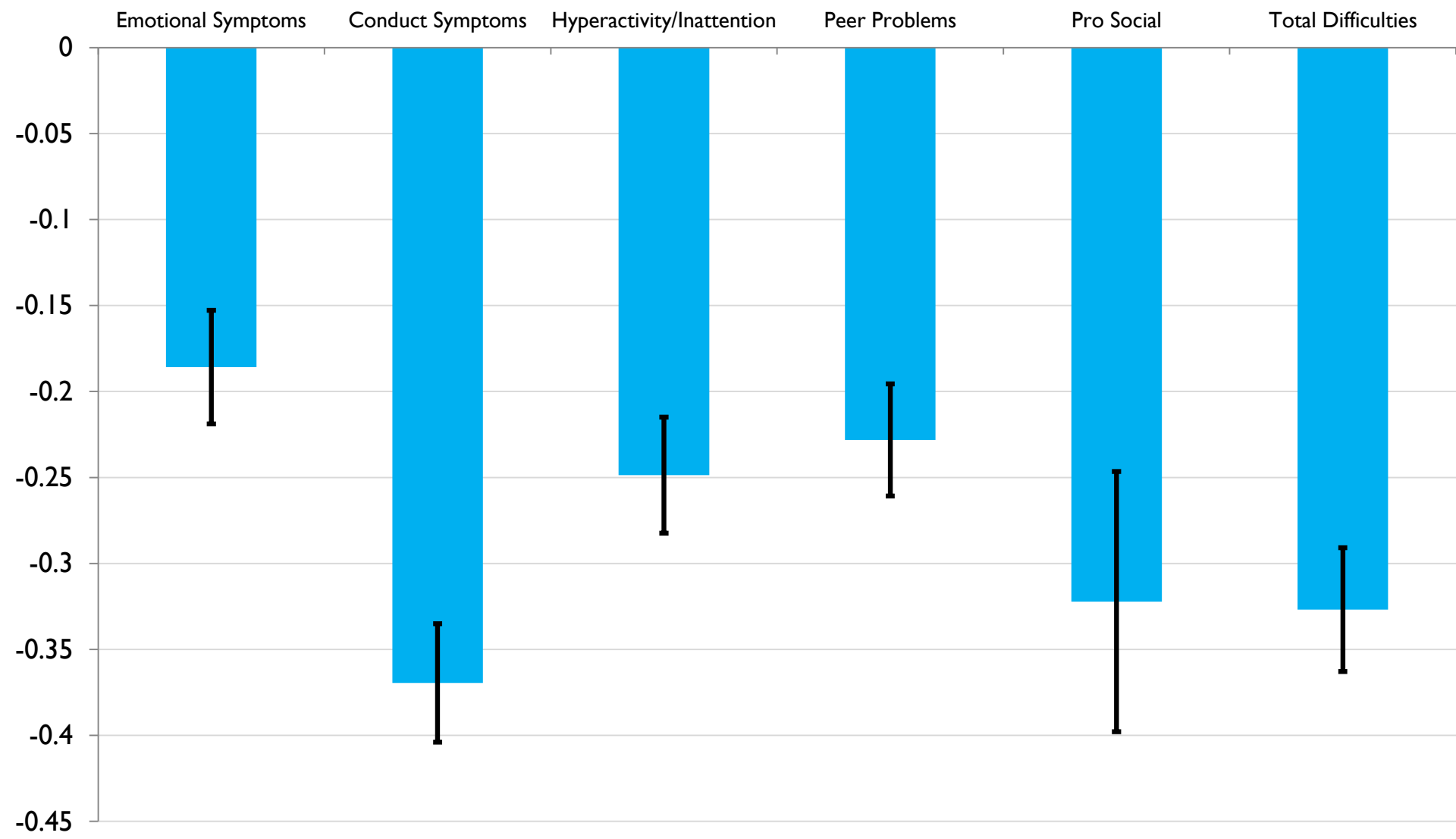
→ **CI = 0** perfect equality across the income distribution

- As the variable of interest is binary, we undertake a Wagstaff normalisation

$$CI_W = \left(\frac{2cov(y, R)}{\mu_y}\right) / (1 - \mu_y)$$

- Results in the study relate to Wagstaff Index CI_W

Concentration index (II)

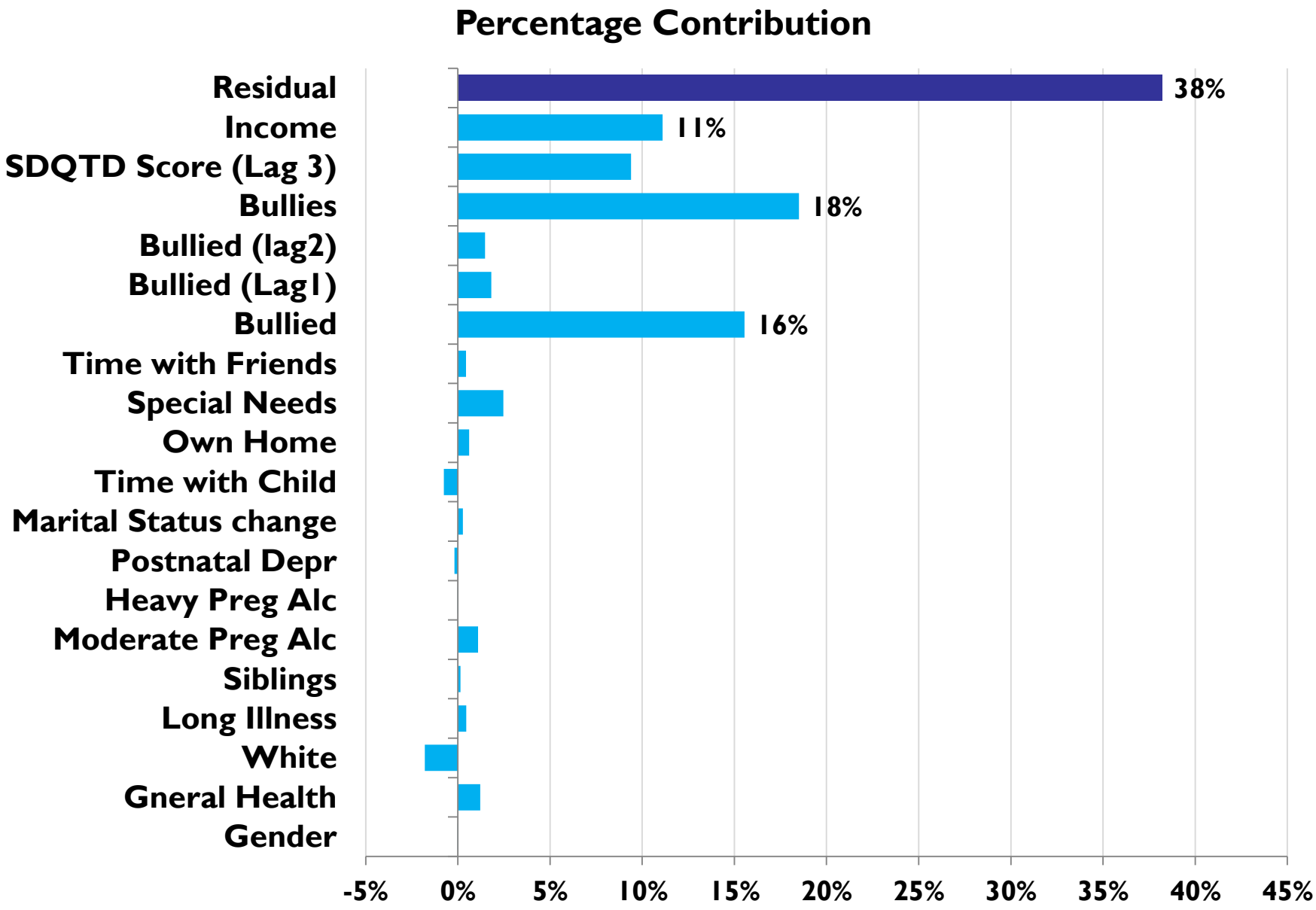


Decomposition analysis

- Partitions the inequality from the concentration index into contributions
- Contributions calculated across other pertinent socioeconomic variables

- Decomposition has three components
  - Elasticity – Relationship between health and covariates
  - Inequality – Relationship between Income (*R*) and covariates
  - Residual – Part of concentration index not explained by covariates

Decomposition analysis



Conclusions and policy implications

- There exists a 'child behavioural outcomes /family income gradient'.

- However, after controlling for variables that operationalise the 3 theoretical frameworks identified, association with income weakens. All 3 sets of variables play an important role, with strongest association brought about by the bullying variables. Maternal mental health emerges as another strong factor in the multivariate analyses.

- Importance of early childhood years for later childhood outcomes

⟶ Importance of public health/educational policies that may positively impact on poor children's lives beyond what income redistribution can achieve

Limitations

- Work in progress, so results still provisional
- Multivariate analysis:
  - correlation between variables that operationalise the constructs of the 3 theoretical framework
  - endogeneity between SDQ-TD and bullying (partially addressed)
- CI and decomposition analysis
  - Model specification issue? (high percentage of residual inequality)
  - endogeneity between SDQ-TD and bullying (partially addressed)
- Overall - associations rather causal relationships

Thank you!

Additional Material

Formulae

for

decomposition analysis

Elasticity

- Regression of High SDQTD Score on the regressors
- GLM Regression with Binomial Family and Probit Link
- Marginal Effects calculated:

$$h = \alpha + \sum_{k} \beta_k x_k + \varepsilon$$

$$Elasticity = \frac{\beta_k \bar{x}_k}{\bar{h}}$$

Inequality

- Measure the distribution of each k regressor across the Ranking variable
- Calculate a Concentration Index for each k regressor

$$CI_k = \frac{2}{n\bar{x}} \sum_{i=1}^{k} \left[\frac{x_i}{\bar{x}} (2R_i - 1) \right]$$

Residual

- Generalised concentration index of error term
- Distribution of error across the ranking variable
- Unobserved part of the concentration index

$$GC_{\varepsilon} = \frac{2}{n} \sum_{i=1}^{k} \varepsilon_i R_i$$

Decomposition

- Contribution of covariate to the inequality = $\frac{\beta_k \bar{x}_k}{\bar{h}} * CI_k$
- If the contribution decreases (increases) the concentration index will decrease (Increase) by the same amount
- If either the elasticity or inequality (CI_k) is zero, the contribution is zero

$$CI_W = \sum_k \frac{\beta_k \bar{x}_k}{\bar{h}\,(1-\bar{h})} CI_k + \frac{GC_\varepsilon}{\bar{h}}$$

Family and Neighbourhood Risk and Children's Problem Behaviour: The Moderating Role of Intelligence

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This research was supported by a grant from the ESRC to Eirini Flouri, Heather Joshi, Alice Sullivan, Richard Wiggins, and Nikos Tzavidis.

Background

- Poverty (family and neighbourhood) and family adversity can have deleterious effects on children's emotional and behavioural problems
- However, children experiencing severe risk also vary in their response
- School-age children with higher general intelligence (or cognitive ability) may be protected from the harmful effects of risk

Research questions

- Is general intelligence also protective for younger children?
- Can higher general intelligence change the course of development for children exposed to severe risk?
- Does the protective effect depend on developmental period?
- Are there gender differences in the protective effect?

Data: Millennium Cohort Study (MCS)

- Longitudinal study following the lives of around 19,000 children born in four UK countries in 2000-2002.

- Oversampled families from:
  - Areas of high proportions of ethnic minorities
  - Areas of high child poverty, and
  - Wales, Scotland and Northern Ireland.

- Interviewed at 9 months, 3, 5 and 7 years.

- Sample: 16,916 families with data on dependent variable

Emotional and Behavioural Problems (Ages 3, 5 and 7)

- Strengths and Difficulties Questionnaire (SDQ)

Externalising = Conduct Problems items + Hyperactivity items (ranges 0-20)

Internalising = Emotional Symptoms items + Peer Problems items (ranges 0-20)

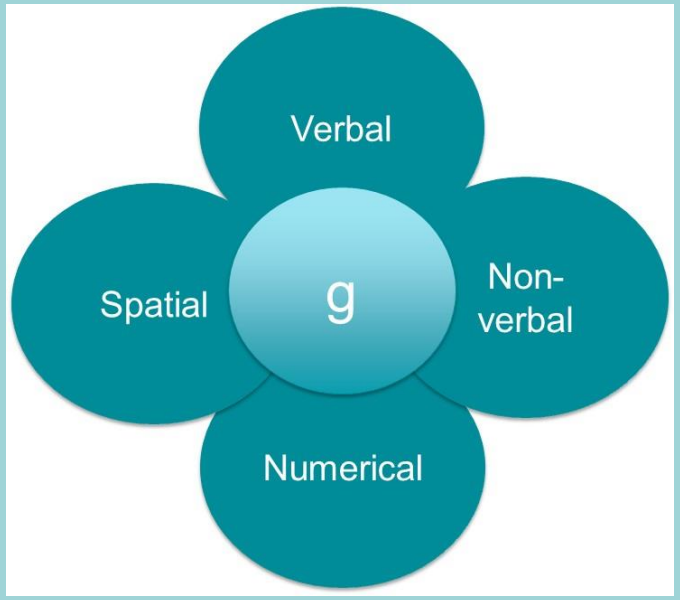
- Measured at ages 3, 5 and 7 to explore trajectories in difficulties from pre-school to primary school

Risk Measures (Ages 3, 5 and 7)

Family poverty	Neighbourhood poverty	Family adversity
(Composite score of four indicators)	(Median income in deciles)	(# of events experienced)

Measuring General ('g') Intelligence

- Factor regression scores derived from principal components analysis (PCA) at each age, based on several age-adjusted ability scores
- Converted to standardized IQ score, M=100, SD=15 (Hanscombe et al. 2012)

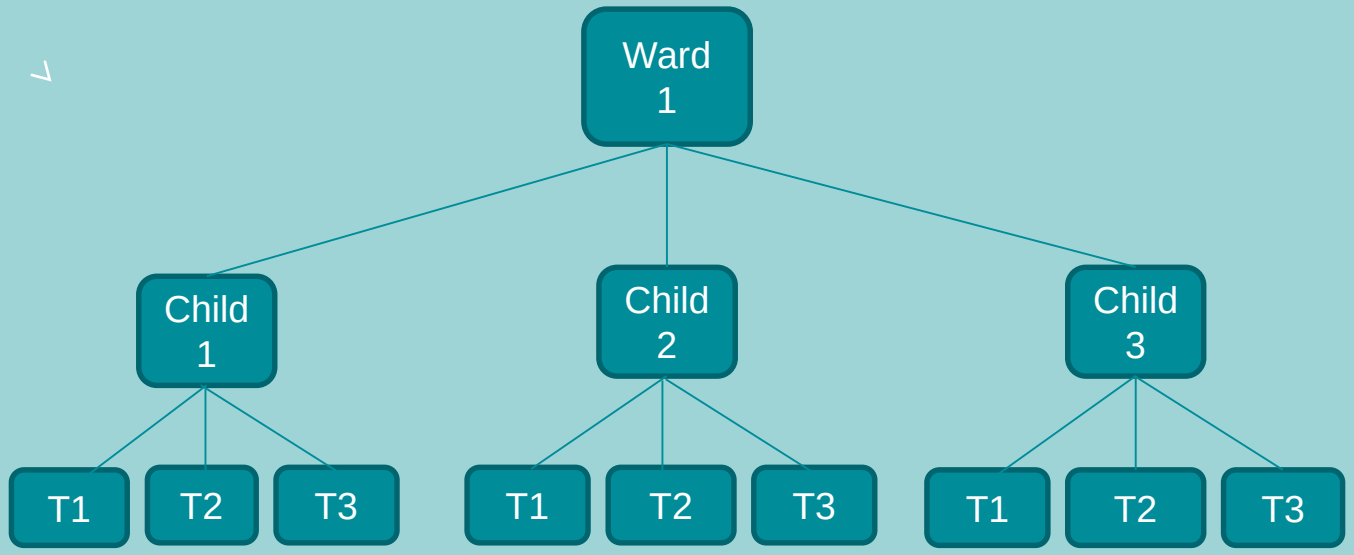


Three-level Growth Curve Model

Level 3: Ward

Level 2: Child

Level 1: Occasion



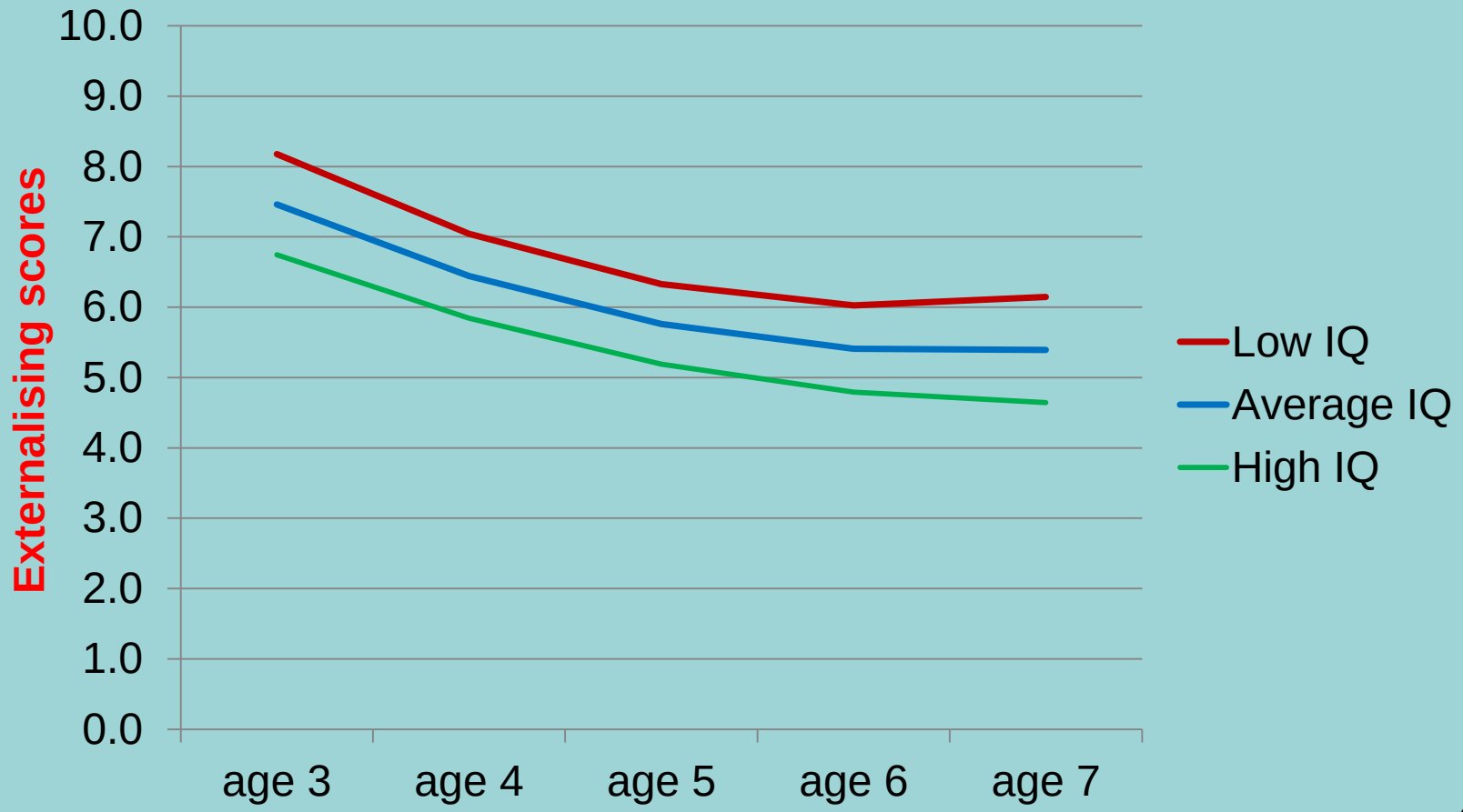
Random intercept and slope (for time variable, age)

Main models – Fixed effects

1. Adjusted	**2. Adjusted + Interactions of Risk and IQ**
Age + age^2 + risk factors + risk factors x age + risk factors x age^2 + intelligence + intelligence x age + intelligence x age^2 + key covariates*	Adjusted model + intelligence x risk factors + intelligence x risk factors x age + intelligence x risk factors x age^2

*Multiply imputed missing data on covariates

Intelligence is related, contemporaneously, to externalising problems in the adjusted model



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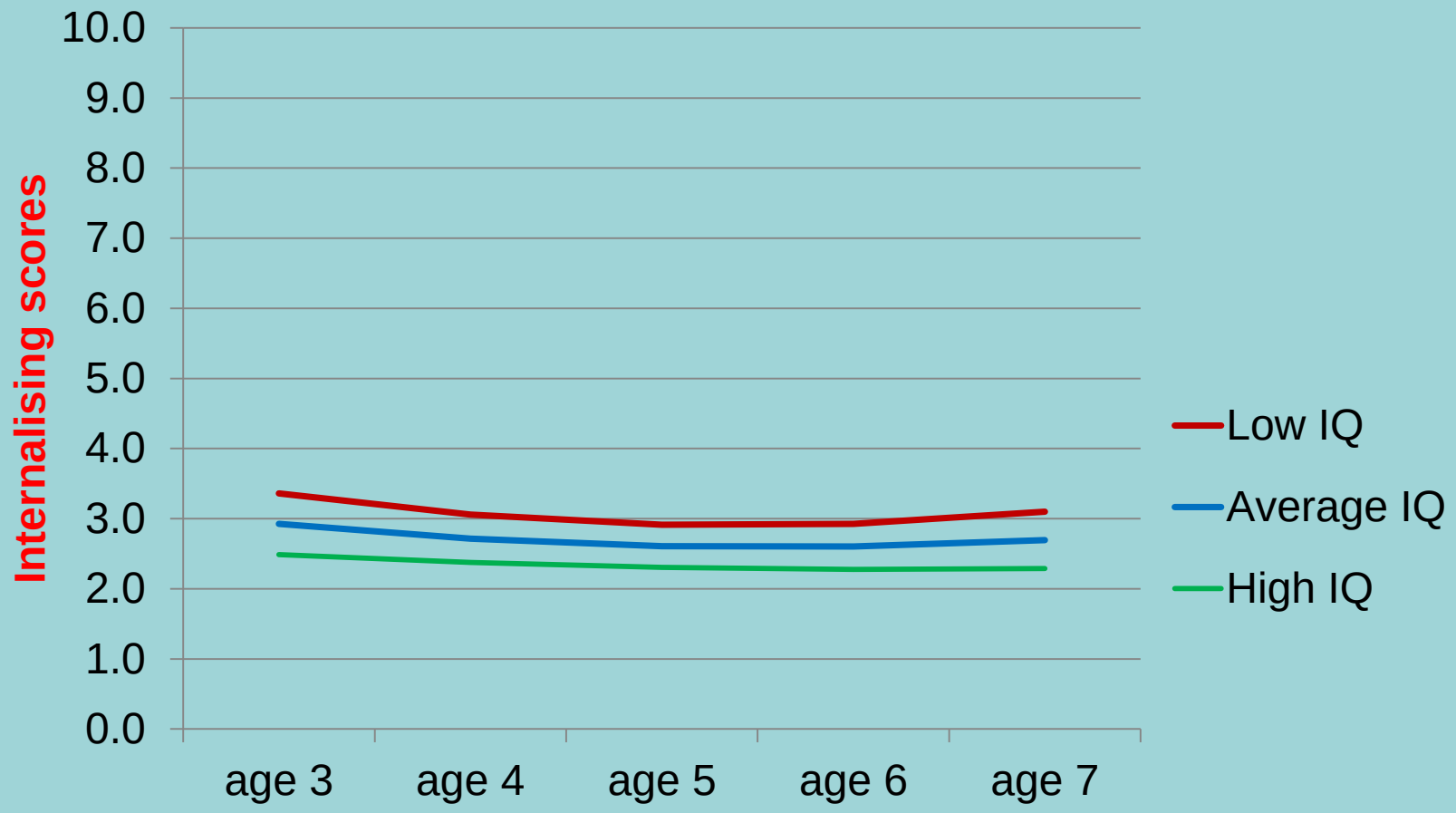
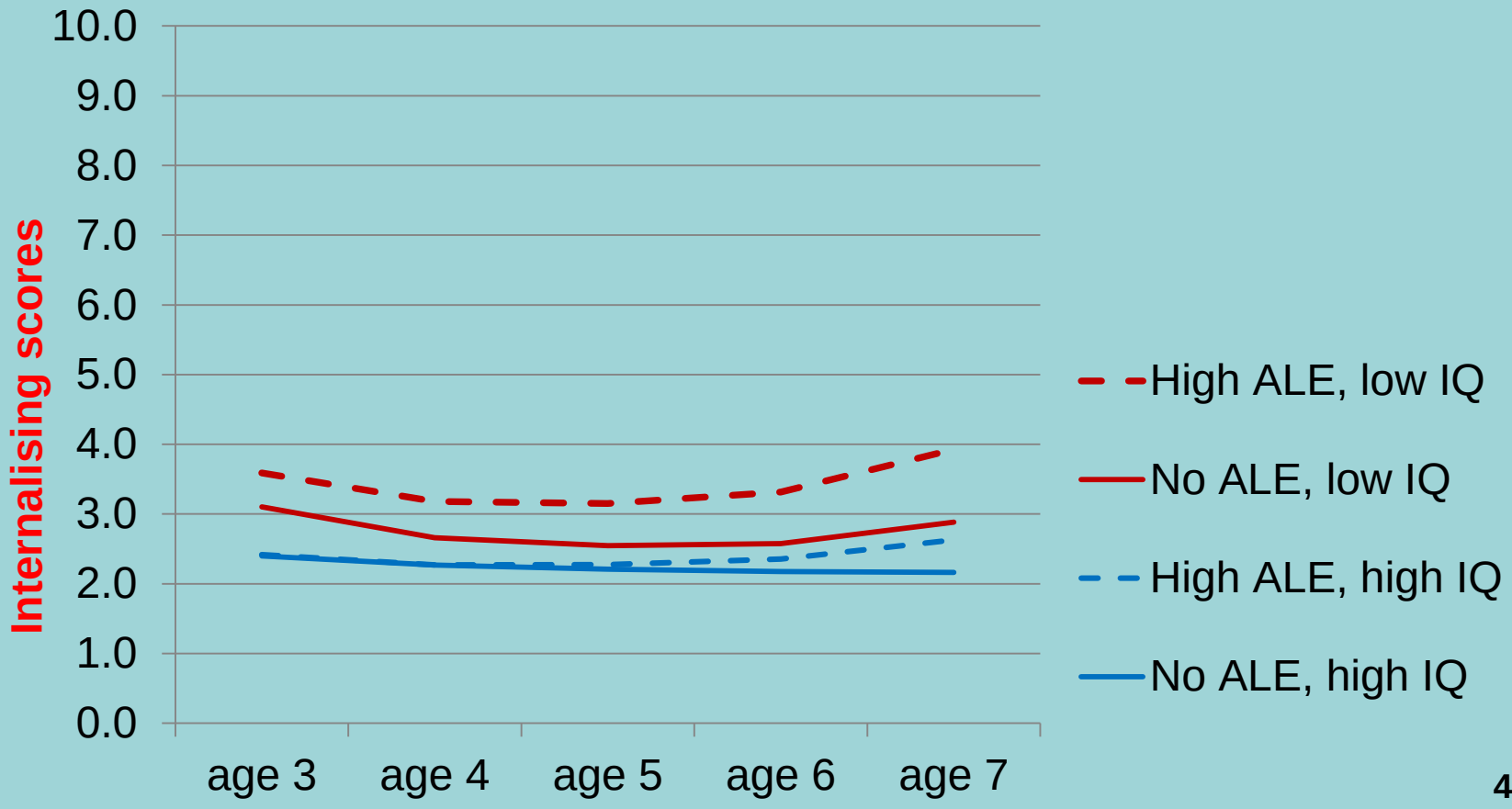
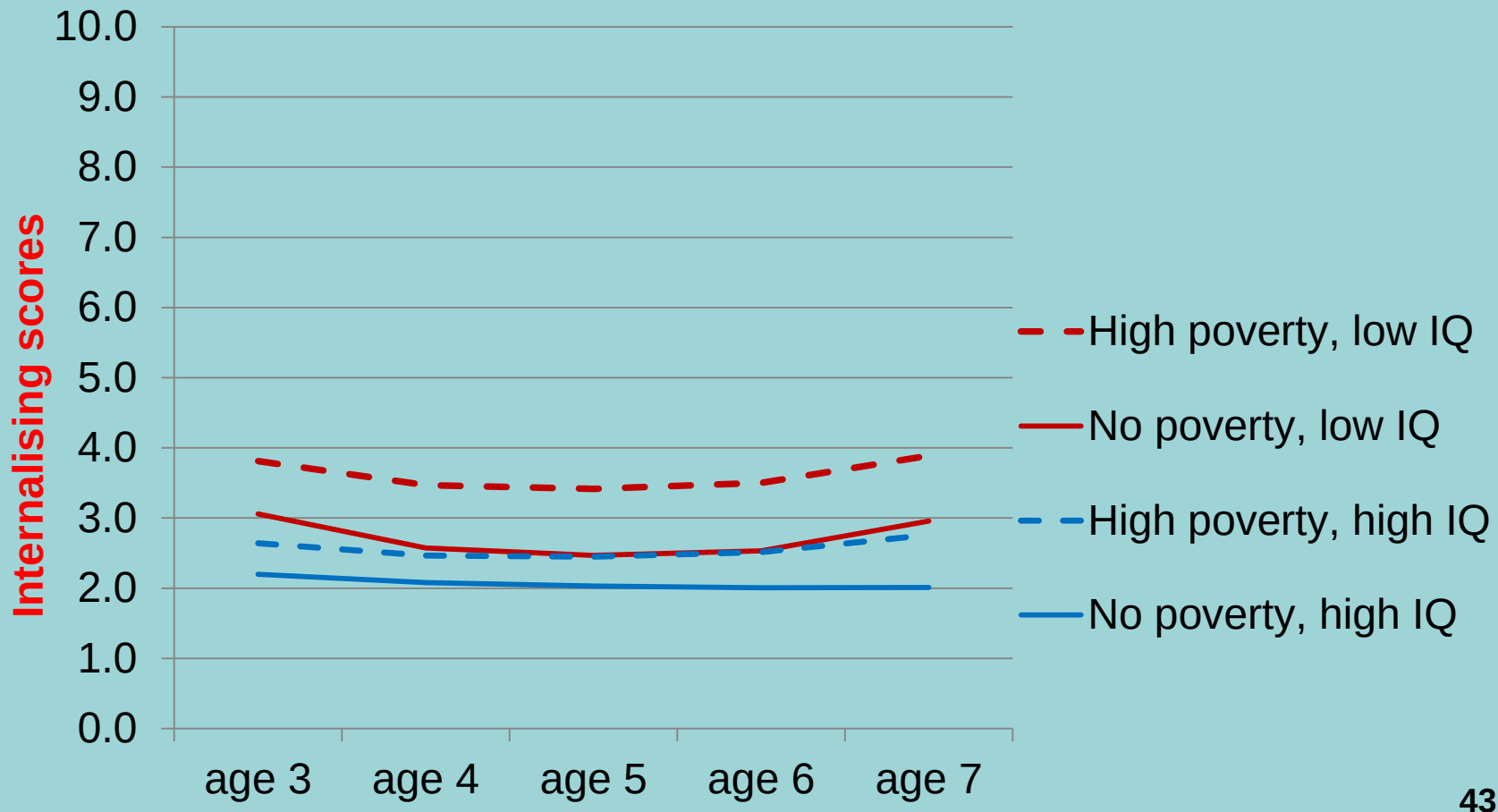


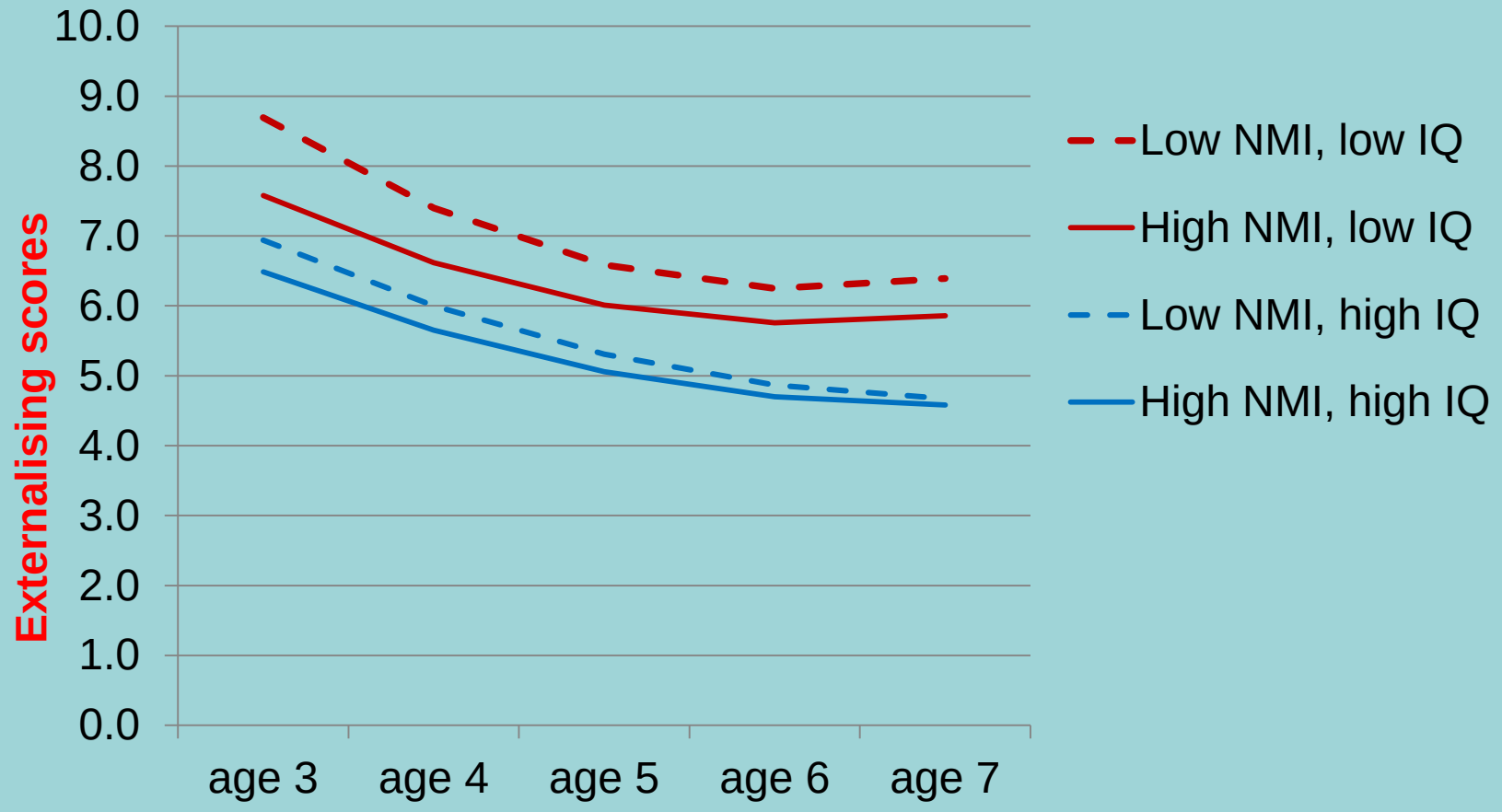
At ages 3, 5 and 7, IQ differentiates more the level of internalising problems for children experiencing **high adversity** than no adversity



At age 5, IQ differentiates more the level of internalising problems of **poor** children than **non-poor** children



At ages 3 and 7, IQ differentiates more the level of externalising problems of children in **poor neighbourhoods** than those in rich n'hoods



Gender differences

- The models were estimated separately for girls and boys

- The buffering role of IQ appears to primarily benefit girls, consistent with research on adolescents

Main findings

- IQ appears to consistently buffer the negative impact of experiencing adversity on internalising problems across early-to-middle childhood
- IQ also moderated the impact of poverty (both family and neighbourhood poverty) at school entry only
- IQ did not alter the course of developmental trajectories for children experiencing risk
- The buffering role of IQ appears to primarily benefit girls

Conclusions

- IQ appears to be particularly important for children experiencing family stressors at any point in early-to-middle childhood
- For children experiencing family poverty and/or adversity, the transition to school at around age 5 may be especially difficult and helped by higher IQ
- Any benefits IQ may have seem to be in place by the time the child turns age 3

Opportunities for cross-cohort work

- AVON Longitudinal Study of Parents and Children

- 1970 British Cohort Study

Thank you for listening

Flouri, E., Midouhas, E., & Joshi, H. (2015). Family and neighbourhood risk and children's problem behaviour: The moderating role of intelligence.

Intelligence, *53*, 33-42.

AWAITING PRES 4 Warrinnier

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Cohort & Longitudinal Studies Enhancement Resources

Tea/coffee break and poster session

15:20-15:50

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