Long term associations of behavioural problems in early childhood

Evidence from the 1970 British Cohort Study and Millennium Cohort Study

Health and behavioural problems in early childhood can cast a long shadow on a wide range of outcomes over the lifecourse.[1,2,3,4,5] Poor childhood behavioural adjustment in particular has been shown to be associated with substantial social and economic detriments in adult life.[6]

Children and young people's mental health and behavioural problems are a matter of growing concern internationally, as the numbers affected have increased dramatically.[7,8,9,10] Current estimates for the UK suggest as many as one in eight children and young people have mental health problems[11] and rates of psychiatric disorders in young people are also rising.[12,13,14]

Many young people also experience physical health problems. It is estimated that 12% of young people in the UK live with a long-term condition,[15] and the presence of a chronic condition increases the risk of mental health problems.[16,17]

This research examines two questions. First, what is the relationship between poor parent and child physical and mental health in early childhood and conduct, hyperactivity and emotional problems in mid-childhood? Second, what is the relationship between conduct and hyperactivity problems at school entrance, and vocabulary acquisition in adolescence?

We compare results across two generations of British children born 30 years apart: participants in the 1970 British Cohort Study (BCS70) and in the Millennium Cohort Study (MCS). For both studies, data was collected in early childhood (at age five), in mid-childhood (at age 10 for BCS70 and age 11 for MCS), and mid-adolescence (at age 16 for BCS70 and age 14 for MCS).

A great strength of this research lies in the fact that we were able to employ near identical measures of conduct, hyperactivity and emotional problems, identical measures of vocabulary performance and a wide range of comparable individual and family characteristics.

Key findings

- A child's own poor health and earlier behavioural problems at age five were associated with conduct, hyperactivity and emotional problems in mid-childhood (age 10/11) in both generations.
- In both generations, children were at greater risk of conduct, hyperactivity and emotional problems at age 10/11 if their mother had mental ill-health.
- Children who had conduct and hyperactivity problems at age five tended to gain lower scores in a vocabulary assessment at age 14/16.
- Out of 12 words, children with severe problems knew one word fewer in both studies: a 12% gap in vocabulary acquisition.
- Importantly, teenagers today knew two words fewer compared to teenagers born 30 years earlier: this represents a 17% word gap.
- For all of these findings, only a small part of the association was explained by differences in social background.

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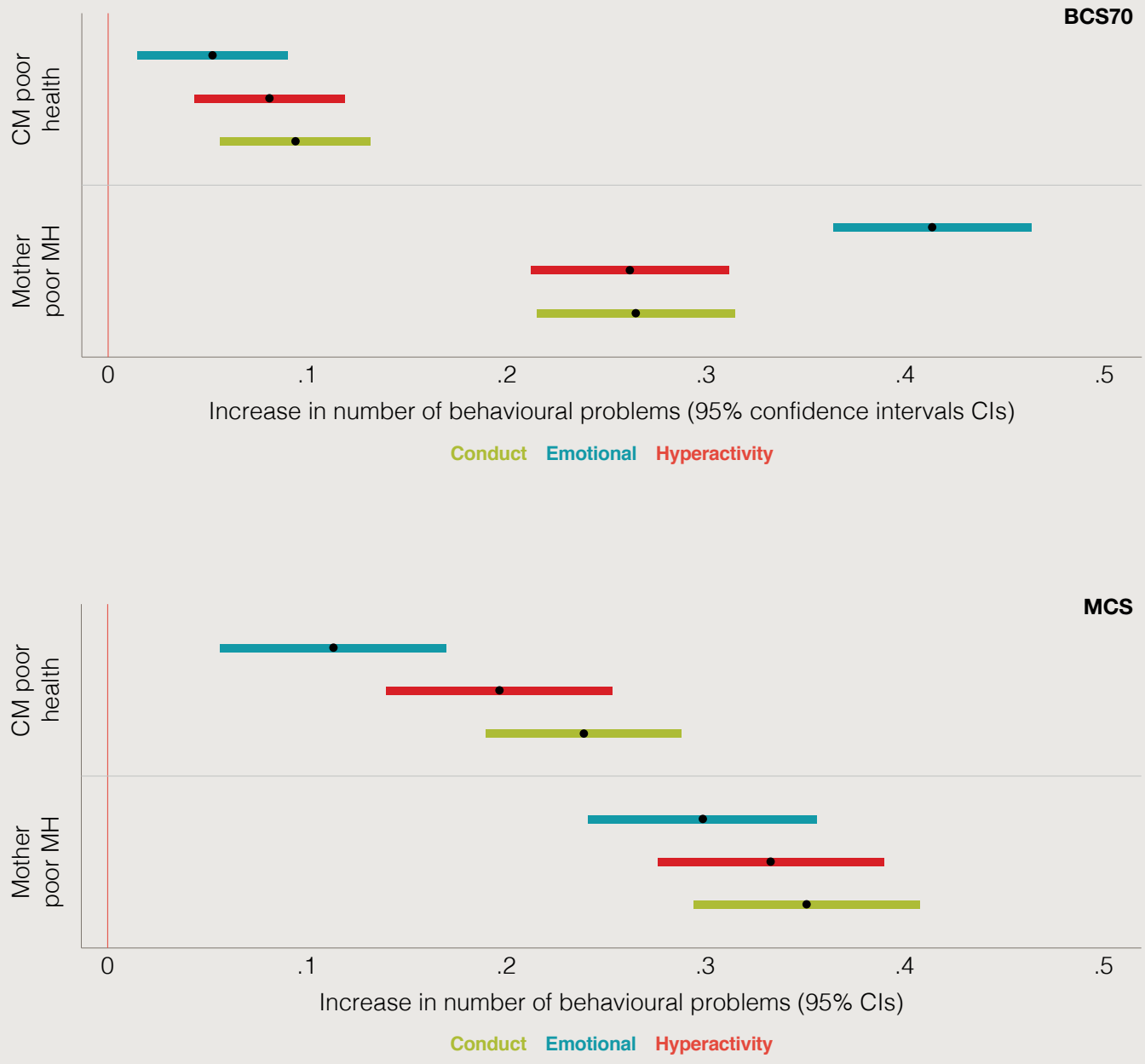
Behavioural problems in mid-childhood

Having poor physical health in early childhood (age five) was significantly related to behavioural problems for children near the end of primary education (age 10/11). Having a mother with a high level of psychological distress in early childhood was also strongly associated with later behavioural problems for both generations of children.

Figure 1 shows that these relationships between child physical health and maternal mental health and later behavioural problems remained even when controlling for a rich set of factors, including family socioeconomic circumstances and individual characteristics.

FIGURE 1: PREDICTORS OF BEHAVIOURAL PROBLEMS IN MID-CHILDHOOD



> “Having poor physical health in early childhood was significantly related to behavioural problems for children near the end of primary education”

Vocabulary in adolescence

Young people who had behavioural problems at school entrance achieved lower vocabulary scores at age 14/16. For each 1-point increase in conduct problems, children in BCS70 knew 0.30 fewer words at age 16 compared to 0.19 fewer words in MCS at age 14. For each 1-point increase in hyperactivity problems, children in MCS knew 0.21 fewer words at age 14 compared to 0.08 fewer in BCS70 at age 16.

We were able to account for other factors such as individual characteristics and socioeconomic circumstances and earlier test scores. This allowed us to address the question of whether young people with behavioural problems did less well in their vocabulary scores towards the end of compulsory schooling, even taking into account the fact that they already tended to gain lower test scores at the start of secondary school.

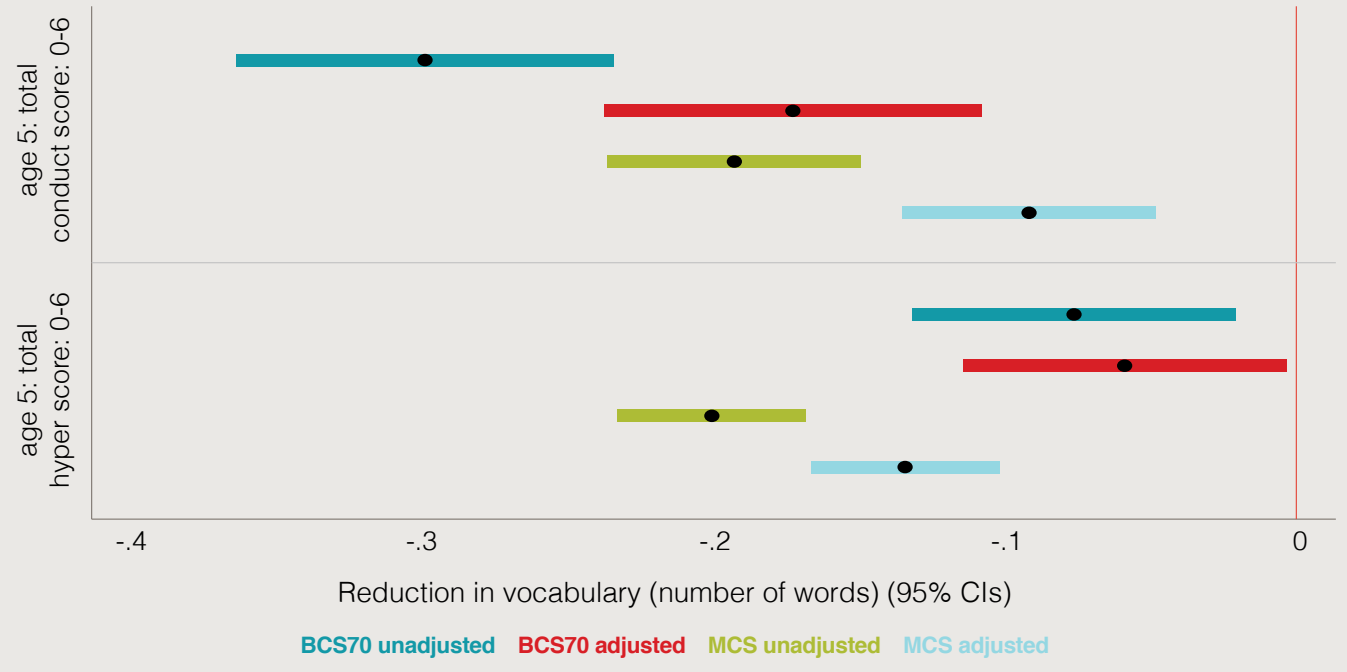
We found that, controlling for earlier test scores and a wide range of socioeconomic factors, for each 1-point increase in conduct problems, children in BCS70 knew 0.17 words fewer at age 16 compared to 0.08 words fewer in MCS at age 14. For each 1-point increase in hyperactivity problems, children in MCS knew 0.15 words fewer at age 14 compared to 0.06 words fewer in BCS at age 16.

This translates to a child with severe conduct problems in the earlier born group knowing approximately one word fewer (1.02 words) in a test of 12 words compared with children with no conduct issues.

Among the later born cohort, children with hyperactivity problems also knew one word fewer (0.90 words) than their peers without these issues. When considering the combined impact of conduct and hyperactivity problems on vocabulary, the results indicate it was identical in both generations, which translates to 1.4 words fewer for those with severe conduct and hyperactivity problems.

Comparing the two generations, when all other individual and family characteristics were taken into account, including earlier vocabulary acquisition at age five and 10/11, the more recent generation of MCS teenagers knew 2.09 words fewer, on average, than their counterparts born 30 years earlier. Although we acknowledge that the results would be more robust if the identical assessment of vocabulary had included a wider range of words, two words fewer out of a maximum of 12 represents a substantial 17% gap in vocabulary.

FIGURE 2: RELATIONSHIP BETWEEN BEHAVIOURAL PROBLEMS AND VOCABULARY ACQUISITION



Methods

Behavioural assessment

We measure behavioural problems at age five in BCS70 using the Rutter Behavioural scales[17,18] and in MCS, the Strengths and Difficulties Questionnaire (SDQ).[19,20] The SDQ was developed from the long-established Rutter questionnaires. We derived harmonised scales for both cohorts based on three comparable questions in each scale. Scores were summed across questions in each sub-scale, with a high score indicating higher problems. Scores ranged from 0-6 and mean scores were higher in the older cohort.

Vocabulary assessment

In 1986 BCS70 cohort members, then age 16, had their vocabulary assessed via the 75-item Applied Psychology Unit (APU) Vocabulary Test, a standardised test produced by the University of Edinburgh[21], where each item was a word followed by a multiple-choice list from which the respondent had to choose, from a set of five synonyms, the one with the same meaning as the first word. Test items became progressively more difficult and 15 minutes were permitted to answer the questions.

In 2015/6, aged 14, MCS cohort members had their vocabulary assessed from a sub-set of 20 questions that had been chosen from the BCS70 vocabulary assessment, and delivered in the same format, albeit on a computer tablet rather than on paper as for BCS70. Four minutes were allowed to answer the 20 questions.

After running exploratory factor analysis (EFA) on the items in MPlus,[22] we derived harmonised scales for both cohorts based on twelve questions, giving a score range from 0-12. Mean scores in the 12-item scale were significantly higher in the BCS70 cohort: (6.99, sd = 2.85) than in MCS (5.44, sd = 2.23).

Controlling for other factors

The social gradient in physical and mental health is well established and in this research we controlled for parent(s) occupation, parent(s) qualification, family income, single or two-parent household, housing tenure and overcrowding in the home. Following a review of the literature we also controlled for an individual's sex, age (MCS), ethnicity, birth order, birthweight, breastfeeding and cognition, which are all related to childhood and adolescent behavioural adjustment and cognitive performance.

Samples

Our research is based on those living in Great Britain at baseline (those living in Northern Ireland in MCS were dropped for comparability). In BCS70 we also exclude those who had died by age 10 (3.5%) or age 16 (3.6%), with the overwhelming majority of these having died during the first few days or months of life. As recruitment to MCS was conditional on being alive at nine months, this exclusion did not apply. To minimise the impact of missing data, we used Multiple Imputation (MI) to deal with attrition and item non-response.

Dealing with missing data

We used Multiple Imputation (MI) to deal with attrition and item non-response, adopting a chained equations approach[23] under the assumption of 'missing at random' (MAR), which implies that the most important predictors of missing data are included in our models. In order to maximise the plausibility of the MAR assumption we also included a set of auxiliary variables in our imputation model. All reported analyses are averaged across 20 replicates based upon Rubin's Rule for the efficiency of estimation under a reported degree of missingness across the whole data of around 0.20.[24]

Causality

As this is an observational study, researchers did not control what the participants were exposed to. Instead, they observed what happened to the different groups of people without intervening. The authors were able to use detailed data to account for a range of factors that may have influenced the link between health and behavioural problems in early childhood and later outcomes. However, it would be impossible to rule out every influence with absolute certainty.

> "The findings demonstrate the complex inter-relationships between young people's family circumstances, their physical and mental health, and their learning during their school careers."

TABLE 1: THE 12 INDIVIDUAL VOCABULARY ASSESSMENT ITEMS

WORD	OPTIONS	BCS %	MCS %
QUICK	ALWAYS	0.18	0.33
	BEST	0.14	0.20
	NEAT	0.45	0.13
	SICK	0.22	0.16
	FAST	99.01	99.18
TIDINGS	STEPS	3.09	18.20
	REASON	6.90	22.68
	JETTY	5.31	12.10
	MOUNTAINS	1.95	11.25
	NEWS	82.75	35.77
CONCEAL	ADVISE	3.10	5.77
	HIDE	89.85	76.82
	GATHER	2.21	6.49
	FREEZE	1.59	2.21
	CONCILIATE	3.25	8.72
UNIQUE	SEVERAL	1.31	2.10
	MATCHLESS	82.18	70.10
	SIMPLE	5.09	8.61
	ANCIENT	8.17	6.22
	ABSURD	3.26	12.97
DUBIOUS	TAWNY	3.00	7.69
	OBSTINATE	8.90	13.16
	GLOOMY	5.19	24.16
	MUDDY	1.63	3.28
	DOUBTFUL	81.29	51.71
ORTHODOX	**CONVENTIONAL**	68.61	48.76
	ANGULAR	5.13	13.41
	BOHEMIAN	8.90	9.91
	LITURGICAL	10.95	17.05
	AMAZING	6.41	10.88
PLAUSIBLE	AGGRESSIVE	6.38	8.74
	HUMANE	12.20	16.89
	SHALLOW	6.60	13.05
	WIDE	4.59	5.83
	CREDIBLE	70.22	55.49
SIGNIFY	DETER	8.34	9.23
	SUBSCRIBE	21.40	19.27
	AVAIL	7.25	14.85
	SUBMIT	13.00	42.39
	DENOTE	50.01	14.25
PRECEDENCE	GUESS	6.84	16.10
	PRIORITY	66.37	40.03
	CLEVERNESS	12.14	24.12
	SYMPATHY	7.39	13.60
	REGALIA	7.26	6.15

TABLE 1: THE 12 INDIVIDUAL VOCABULARY ASSESSMENT ITEMS

WORD	OPTIONS	BCS %	MCS %
SEETHE	SOFTEN	13.96	24.58
	MOW	9.59	7.20
	BOIL	52.08	23.03
	SURROUND	9.75	22.17
	PERCEIVE	14.62	23.02
OBSOLETE	EXECRABLE	10.59	13.05
	SECRET	21.85	29.22
	INNOCUOUS	19.52	22.45
	RIGID	9.17	14.47
	REDUNDANT	38.87	20.81
ERUDITE	**LEARNED**	25.12	22.36
	SPASMODIC	17.27	15.87
	SUPERFLUOUS	19.73	18.28
	PATHETIC	24.99	28.69
	SPURIOUS	12.89	14.80

Conclusion and discussion

The early years provide the best opportunity to promote children's resilience and wellbeing and to minimise the development of entrenched negative behaviours and their subsequent individual and social costs.

Children whose mothers had suffered depression were more likely to exhibit behavioural difficulties. Children with physical health problems were also more likely to have behavioural problems.

Children with emotional and behavioural problems at age five (the start of primary school) went on to have relatively limited vocabulary as teenagers, and children with serious conduct and hyperactivity problems actually scored 12% lower on a multiple-choice vocabulary test at age 14 and 16. These findings held true for two nationally representative cohorts from two generations born 30 years apart in 1970 and 2000.

The findings demonstrate the complex inter-relationships between young people's family circumstances, their physical and mental health, and their learning during their school careers.

Both schools and policymakers need to be aware of these intertwined factors. For schools, behavioural issues are inevitably experienced primarily as a challenge to classroom management, but it is important not to lose sight of the difficulties faced by the individual young person, and the barriers that behavioural difficulties present to their learning.

Our study relies on parental reports of children's emotional and behavioural difficulties, suggesting that parents are well aware of their children's problems before they start school.

Good communication between the home and the school is likely to be useful for teachers in order to address problems as early as possible.

Schools with high numbers of children with behavioural problems are likely to require additional resources in order to deal with the challenges posed. Childhood behavioural problems and poor language skills come at a high economic and social cost, therefore such investment is likely to be warranted.

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Parsons, S, Sullivan, A, Fitzsimons, F, and Ploubidis. G (2021). The role of parental and child physical and mental health on behavioural and emotional adjustment in mid-childhood: a comparison of two generations of British children born 30 years apart. Longitudinal and Life Course Studies.

Parsons, S, Sullivan, A, Moulton, V, Fitzsimons, F, and Ploubidis. G (2021). The relationship between child behaviour problems at school entrance and teenage vocabulary acquisition: a comparison of two generations of British children born 30 years apart. The British Educational Research Journal.

About the 1970 British Cohort Study

The 1970 British Cohort Study (BCS70) is following the lives of more than 17,000 people born in England, Scotland and Wales in a single week of 1970. Since the birth survey in 1970, there have been nine further surveys of all cohort members at ages 5, 10, 16, 26, 30, 34, 38, 42 and 46-48. Over the course of cohort members' lives, BCS70 has collected information on health, physical, educational and social development, and economic circumstances, among other factors.

About the Millennium Cohort Study

The Millennium Cohort Study (MCS) is following the lives of 19,517 individuals born across England, Scotland, Wales and Northern Ireland in 2000-02. MCS provides multiple measures of the cohort members' physical, socio-emotional, cognitive and behavioural development over time, alongside detailed information on their daily life, behaviour and experiences. There have been seven main sweeps of MCS to date, at ages 9 months, 3, 5, 7, 11, 14 and 17 years.

Cohort members in both studies are taking part in an online survey across the five British cohorts during the COVID-19 pandemic, providing vital data on how the pandemic is affecting different generations.

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