



The double disadvantage faced by adolescents from low socioeconomic backgrounds with mental health problems affects earnings up to mid-life

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ABSTRACT

Early childhood socioeconomic disadvantage and mental health problems are both important determinants of adult social and economic experiences, but little is known about how they interact in this respect. We aimed to assess whether poor mental health in adolescence exacerbates labour market inequalities originating from low socioeconomic status (SES) in childhood. We use a birth cohort of individuals born in 1958 in England and follow their employment experiences and cumulative earnings up to age 55. We proxy low SES in childhood with father's occupational class at the time the respondent was aged 11, and use caregiver (usually, parent) ratings of the Rutter inventory at age 16 to identify mental health problems in adolescence. We fit ordinary least squares (OLS) models to estimate the effect of growing up in a low-SES family and experiencing mental health problems (conduct or emotional problems) in adolescence on cumulative earnings (log-transformed). We use an interaction term to test whether the association between mental health problems (conduct and emotional separately) and earnings differed by socioeconomic group. Individuals who experienced conduct problems in adolescence had lower cumulative earnings and employment levels up to age of 55. Moreover, the association between mental health problems and cumulative earnings was higher among individuals who also experienced low SES in childhood. Families from a higher socioeconomic group may have more effective means to counteract the adverse impacts of adolescent mental health problems, likely due to broader access to resources, support systems and opportunities. This underscores the role of structural supports in addressing socioeconomic inequalities in mental health outcomes and their long-term implications.

1. Introduction

Early childhood socioeconomic disadvantage and mental health problems are both important determinants of adult social and economic experiences, but little is known about how they interact to affect life chances across the lifespan. We examine whether adolescent mental health problems exacerbate the effects of childhood socioeconomic status (SES) on adulthood outcomes, creating a double disadvantage for individuals who experience both low SES and mental health problems in their early lives.

Mental health problems during childhood or adolescence are common (Polanczyk et al., 2015) and can have lasting consequences for individuals' health, education and employment opportunities across the life course (Hoffmann et al., 2023; Knapp et al., 2011; Richards and Abbott, 2009; Rivenbark et al., 2018; Thompson et al., 2023). Child and adolescent mental health problems also impose substantial societal costs

(McDaid and Evans-Lacko, 2021), stemming from treatment, care and support responses (Snell et al., 2013), as well as long-term economic impacts associated with lower levels of academic attainment (Mojtabai et al., 2015), with knock-on effects on future employment, earnings and other life chances (Richards and Abbott, 2009).

Individuals from lower socioeconomic backgrounds tend to have lower levels of human capital, social capital and worse health outcomes than those from higher socioeconomic status (SES) backgrounds, which can limit their opportunities and life chances (Villadsen et al., 2023). Childhood socioeconomic disadvantage is not only a predictor of adult socioeconomic outcomes, as suggested by an endowments and investments approach to intergenerational inequalities (Cardak et al., 2013), but also a risk factor for adolescent mental health problems – the so-called social causation hypothesis (Dohrenwend et al., 1992). For example, externalising problems (e.g., attention-deficit hyperactivity disorder, oppositional defiant disorder and conduct disorders) are five

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times more common among the lowest compared to the highest socioeconomic quintile groups (Piotrowska et al., 2015), and are associated with adverse future socioeconomic outcomes (Hoffmann et al., 2023; Thompson et al., 2023).

The question we address here is whether adolescent mental health problems and childhood SES are jointly associated with future social and economic experiences in adulthood. Such associations are suggested by a number of theoretical frameworks. Adolescent mental health problems could damage *mental capital* (encompassing both cognitive and emotional resources), with consequences for achievements in adulthood (Beddington et al., 2008) consistent with Grossman’s (1972) classic model of human capital accumulation and health, applicable specifically to mental health (Currie and Stabile, 2006). Bouts of mental illness interrupt participation in education through difficulty concentrating, pessimistic approaches to learning, sleep problems and school absenteeism. Human capital theory would suggest strong links between educational attainment and earnings in adulthood (Becker, 1993). Strong continuities in mental health across the life-course are posited by theories of brain development, emerging psychopathology and progression to adulthood (Uhlhaas et al., 2023). The social drift hypothesis is that poor physical and mental health in adulthood will impact on social and economic characteristics, including earnings (Dohrenwend et al., 1992).

Potentially overlaying these conceptual frameworks is the theory of cumulative disadvantage/advantage: “the systemic tendency for inter-individual divergence in a given characteristic (e.g., money, health, or status) with the passage of time” (Dannefer, 2003 p.S327). In this theoretical approach to understanding patterns over time, the emphasis is on divergence stemming from the interaction of multiple societal, collective forces rather than just extrapolation of individual trends. This might suggest widening of earnings differentials as cohorts age through adulthood.

We quantify the extent to which adolescent mental health problems exacerbate socioeconomic inequalities over the lifespan for a nationally representative cohort of individuals born in 1958 in the UK. We do this by examining whether presence of adolescent mental health problems (at age 16) moderates the relationship between socioeconomic status (measured by father’s occupational class at the time the respondent was aged 11) and cumulative earnings (up to age 55). We hypothesise that the association between cumulative earnings and mental health problems is greater for individuals from low SES vs high SES backgrounds, and that this group experiences a double disadvantage in relation to cumulative earnings. We further examine whether the cumulative earnings gap differs by type of mental health problem (emotional versus behavioural problems) and severity of problem.

2. Methods

2.1. Conceptual framework

As noted earlier, there are potentially a number of theoretical

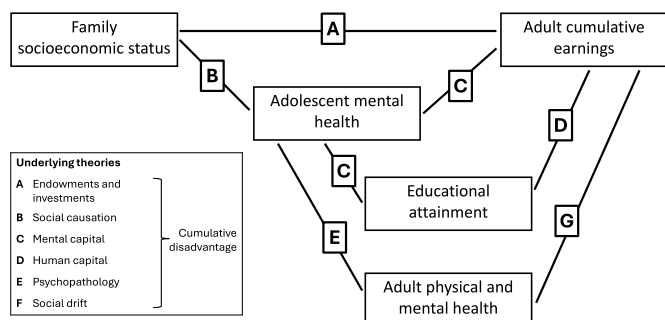


Fig. 1. Conceptual framework.

frameworks relevant to the question addressed in this paper, summarised in Fig. 1. The lines connecting boxes in Fig. 1 represent associations and no causal direction is implied. This figure is obviously not a comprehensive representation of all possible associations – for example, it does not detail all the individual and societal factors associated with onset or severity of adolescent mental illness, nor all the determinants of earnings in adulthood.

2.2. Data and measures

We used the National Child Development Study (NCDS) which follows the lives of a single cohort of 17,415 children born in Britain during one week in March 1958. Participants were followed up with multiple data collection sweeps throughout their lives, with the last available data collected when respondents were aged 55 years. In addition to the core datasets, we used the activity history dataset which records work and non-work activities lasting at least one month. It provides further detail on the duration of activity, whether full- or part-time status, activity type and includes a socioeconomic classification for work activities (Standard Occupational Code for 1990, 2000 and 2010).

2.3. Low SES in early-life

Low SES in childhood was proxied by father’s occupational class at the time the respondent was aged 11. This variable was obtained from the CLOSER Work Package 2, 2018 harmonised socioeconomic dataset. (“CLOSER Work Package 2: Harmonised Socio-Economic Measures in Four Longitudinal Cohort Studies,” 2018) We defined someone as having high SES background when the father had a professional, managerial and technical, or skilled occupation, and low SES background when the father had a partly-skilled or unskilled occupation. One quarter of the sample were thereby classified as having high socioeconomic status during childhood (Table S1).

2.4. Adolescent mental health problems

Adolescent conduct problems and emotional problems were measured by caregiver (usually parent) ratings of the Rutter inventory at age 16 (Elander and Rutter, 1996; Richards and Abbott, 2009). In general, conduct problems were summarised by items assessing unpunctuality, restlessness, truancy, daydreaming, indiscipline and disobedience; and emotional problems by items on anxiety, timidity, fearfulness, diffidence and avoidance of attention. We used established cut-offs to define level of problem severity (Richards and Abbott, 2009). Conduct problems were categorised as absent (0th-75th percentile), mild (76th-93rd percentile) or severe (94th percentile or higher). Emotional problems were categorised as absent (0–50th percentile), mild (51st-87th percentile) or severe (88th percentile or higher). We created an additional binary variable reflecting presence of any mental health problem. Participants who had mild or severe conduct or emotional problems were considered to have a mental health problem.

2.5. Earnings and employment

The Activity Histories dataset records self-reported economic activities from age 16 onwards. We calculate cumulative earnings from age 16 to age 55 by matching Standard Occupational Classification (SOC) codes in periods of employment or self-employment with the Annual Survey of Hours and Earnings (ASHE). The latter provides average annual gross pay by occupation, gender and type of contract (full-time or part-time). Data are available from 1999, with occupations coded according to SOC 2010. Earnings prior to 1999 were estimated by discounting the 1999 earnings by the average annual growth rate in each year. Estimates are displayed in 2016 prices. We excluded participants who classified themselves as caregivers or on disability benefits from our analysis. This was to ensure the focus remained on earnings from

employment, as disability benefits and caregiving subsidies differ substantially from earned income.

To complement the cumulative earnings analyses, we also analysed cumulative months in employment as an additional outcome measure. Cumulative months in employment was calculated based on self-reported employment histories collected at each survey wave.

2.6. Analyses

Cohort participants are described in terms of socio-demographic and mental health characteristics (based on variables we used in our model). Here and throughout the paper, we examined associations for males and females separately because both the risk for mental health problems and the earnings and employment patterns differ by sex. Ordinary least squares (OLS) models were fitted to estimate the effect of growing up in a low-SES family and experiencing mental health problems (conduct or emotional problems) in adolescence on cumulative earnings (log-transformed). We used an interaction term to test whether the association between mental health problems (conduct and emotional) and earnings differed by socioeconomic group. A negative interaction term would indicate that mental health problems had a larger negative effect on earnings for those with low-SES backgrounds than for those with

higher-SES backgrounds. We adjusted for a set of covariates, including individual's birth order, parity (number of live births mother had), whether the mother was married at birth, mother's age at birth of the sample member, whether the mother left school after the minimum age, and dummies for region of residence at age 16. We estimated the model of cumulative earnings at three different ages (35, 45 and 55), and showed estimates both with the exclusion and inclusion of controls. We used inverse probability weighting to adjust for sample attrition. Weights were derived from logistic regression analyses predicting availability of information on earnings at different time points during adulthood. Unless otherwise stated, weighted estimates are presented.

2.7. Sensitivity analyses

We performed sensitivity analyses in which we included additional SES measures and cut-offs. First, we defined low SES based on a combination of father's occupation and mother's education (mother leaving school early before age 16). We examined whether the associations between SES and mental health with future earnings were stronger for those with low SES and a mother leaving education early as a marker of facing more economic disadvantage. Second, we varied the occupational status cut-off for fathers. Here we split the skilled occupation group into

Table 1
SES in childhood, adolescent conduct problems, and cumulative earnings.

	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
	35y	45y	55y	35y	45y	55y
Low SES	-0.073*** (0.027)	-0.110*** (0.026)	-0.139*** (0.029)	-0.088** (0.037)	-0.067* (0.036)	-0.081** (0.037)
Conduct problem	-0.070 (0.046)	-0.085* (0.045)	-0.093** (0.045)	0.001 (0.073)	-0.018 (0.073)	-0.033 (0.078)
Conduct problem X Low SES	-0.090* (0.052)	-0.089* (0.052)	-0.095* (0.053)	-0.216*** (0.083)	-0.217*** (0.083)	-0.237*** (0.089)
Emotional problem	-0.002 (0.020)	-0.031 (0.020)	-0.041* (0.023)	-0.012 (0.029)	-0.004 (0.029)	-0.017 (0.031)
Controls	✓	✓	✓	✓	✓	✓
Observations	3891	3955	3967	3719	3859	3873
R2	0.039	0.061	0.068	0.048	0.040	0.047

Note: Results estimated with OLS regressions of the log of cumulative earnings on the experience of socio-economic deprivation in childhood, conduct problems during adolescence, and the interaction of the two. Conduct and emotional problems are measured via caregiver ratings of the Rutter inventory at age 16. Socioeconomic status is measured using father's occupational class at the time the respondent was aged 11. Controls include individual's birth order (parity), whether the mother was married at birth and her age at birth, whether the mother left school after the minimum age, and dummies for region of residence at age 16.

*p < 0.1, **p < 0.05, ***p < 0.01. Robust standard errors in parentheses.

Table 2
SES in childhood, adolescent emotional problems, and cumulative earnings.

	Males			Females		
	(1)	(2)	(3)	(4)	(5)	(6)
	35y	45y	55y	35y	45y	55y
Low SES	-0.099*** (0.031)	-0.114*** (0.031)	-0.134*** (0.033)	-0.157*** (0.046)	-0.127*** (0.045)	-0.149*** (0.047)
Emotional problem	-0.005 (0.040)	0.004 (0.038)	0.010 (0.040)	-0.045 (0.055)	-0.024 (0.052)	-0.042 (0.055)
Emotional problem X Low SES	0.005 (0.046)	-0.045 (0.044)	-0.068 (0.048)	0.045 (0.065)	0.028 (0.063)	0.034 (0.066)
Conduct problem	-0.139*** (0.023)	-0.154*** (0.023)	-0.168*** (0.024)	-0.172*** (0.036)	-0.191*** (0.036)	-0.222*** (0.038)
Controls	✓	✓	✓	✓	✓	✓
Observations	3891	3955	3967	3719	3859	3873
R2	0.038	0.061	0.067	0.047	0.038	0.045

Note: Results estimated with OLS regressions of the log of cumulative earnings on the experience of socioeconomic deprivation in childhood, emotional problems during adolescence, and the interaction of the two. Emotional and conduct problems are measured via caregiver ratings of the Rutter inventory at age 16. Socioeconomic status is measured using father's occupational class at the time the respondent was aged 11. Controls include individual's birth order (parity), whether the mother was married at birth and her age at birth, whether the mother left school after the minimum age, and dummies for region of residence at age 16.

*p < 0.1, **p < 0.05, ***p < 0.01. Robust standard errors in parentheses.

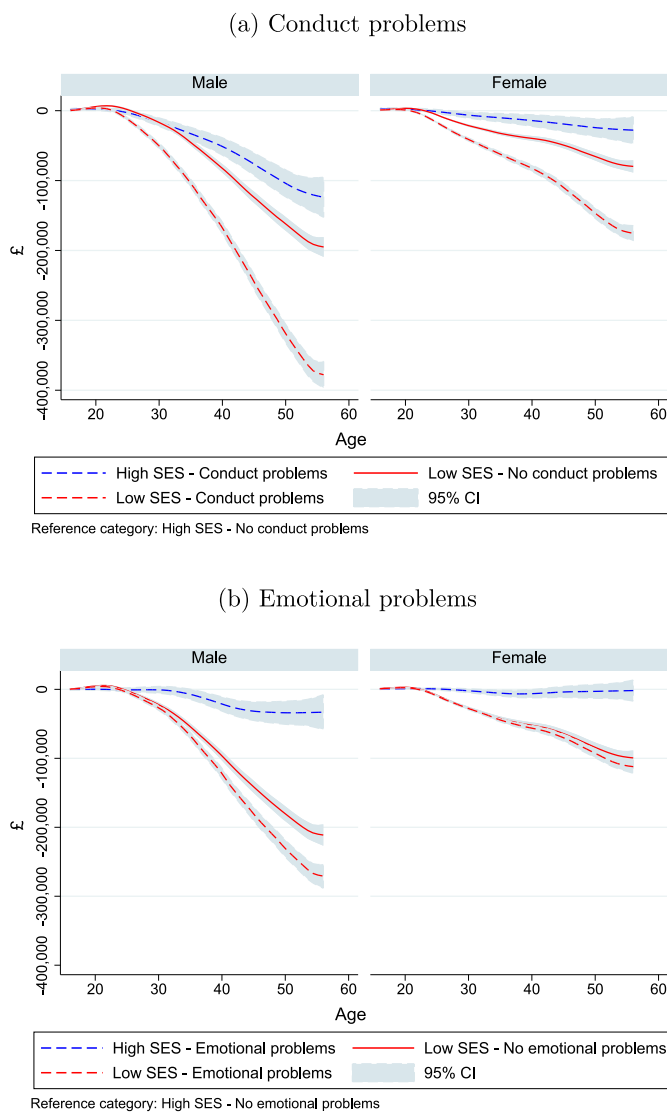


Fig. 2. Difference in cumulative earnings by childhood SES and adolescent mental health.

Note: Panel (a) shows the relation between cumulative earnings and age for the different combinations of conduct problems and SES groups using a local polynomial smooth. Panel (b) shows the relation between cumulative earnings and age for the different combinations of emotional problems and SES groups using a local polynomial smooth. Conduct and emotional problems are measured via caregiver ratings of the Rutter inventory at age 16. Socioeconomic status is measured using father’s occupational class at the time the respondent was aged 11.

two categories: skilled non-manual (higher class) and skilled manual (lower class). This revised definition is represented by the following classification: *High SES* refers to professional, managerial, technical, skilled non-manual and *Low SES* refers to skilled manual, partly-skilled, unskilled, other.

3. Results

Descriptive data on covariates and adolescent prevalence of conduct and emotional problems by severity and in relation to SES, by gender and covariates, are presented in [Supplementary Table 1](#). Conduct and emotional problems were three to four times more prevalent in low-SES than high-SES males and females. The number of observations increases with age due to a slight increase in the likelihood of observing earnings data. This trend is likely because unemployment or unavailability for

employment associated with mental illness becomes slightly less prevalent as individuals move through adulthood. Consequently, more individuals report earnings in later adulthood compared to earlier periods.

3.1. Association between adolescent conduct problems, low SES and interplay between the two

[Table 1](#) describes how low SES during adolescence, conduct problems and their interaction affect cumulative earnings at ages 35, 45 and 55 for males and females. We found main effects for both low SES and conduct problems. Males from low-SES families had lower cumulative earnings than males from high-SES families throughout adulthood, regardless of conduct problems: 7.3% lower by age 35 and 13.9% lower by age 55. The gap in cumulative earnings for adolescent males who experienced conduct problems (relative to those who did not experience conduct problems) did not emerge until age 45. Males who experienced adolescent conduct problems had 8.5% lower cumulative earnings by age 45 and 9.3% by age 55 relative to males without conduct problems. The interaction between low-SES and conduct problems was also significant and increased over time: males from low-SES families who also had conduct problems had 16% lower cumulative earnings by age 35 than males from high-SES families with no conduct problems. This earnings gap increased to 18.5% by age 55. (Note: [Supplementary Tables 2 and 3](#) provide the estimates of the associations in [Tables 1 and 2](#) without controlling for the ‘other’ mental health problem).

Experience of childhood low SES was also associated with lower cumulative earnings for females, regardless of conduct problems. Cumulative earnings among females growing up in low-SES families who did not experience adolescent conduct problems were between 6.7% and 8.8% lower than those growing up in a high SES household over the study period. On their own, adolescent conduct problems did not affect cumulative earnings for females from high-SES families by ages 35, 45 or 55. However, females from low-SES families who also experienced adolescent conduct problems had lower cumulative earnings compared to those with low SES on its own: 21.6%, 21.7% and 23.7% by ages 35, 45 and 55, respectively.

3.2. Association between adolescent emotional problems, low SES and interplay between the two

There was no association between adolescent emotional problems and cumulative earnings in adulthood for either males or females ([Table 2](#)). When testing the interaction with SES, unlike for conduct problems, adolescents with emotional problems from low-SES households did not experience a negative impact on cumulative earnings.

[Figs. 2–4](#) visually depict the differences in cumulative earnings by childhood SES and adolescent conduct and emotional problems for males and females when the reference category is individuals from a high-SES background with no history of adolescent mental health problems. In general, they illustrate how earnings trajectories are markedly lower for both males and females growing up in low-SES families (red lines). However, there was an additional difference in earnings associated with adolescent mental health problems. [Fig. 2](#) shows the monetary value difference in cumulative earnings: by age 55, males with adolescent conduct problems had £185,996 lower cumulative earnings, while females had £95,496 lower earnings. For emotional problems the differences for males and females were £55,156 and £17,292, respectively ([Supplementary Fig. 1](#) describes this in terms of relative fraction of cumulative earnings.). [Figs. 3 and 4](#) plot the estimated coefficients in [Tables 1 and 2](#)

3.3. Association between adolescent mental health problem severity, low SES and interplay between the two

We further examined whether severity of adolescent mental health

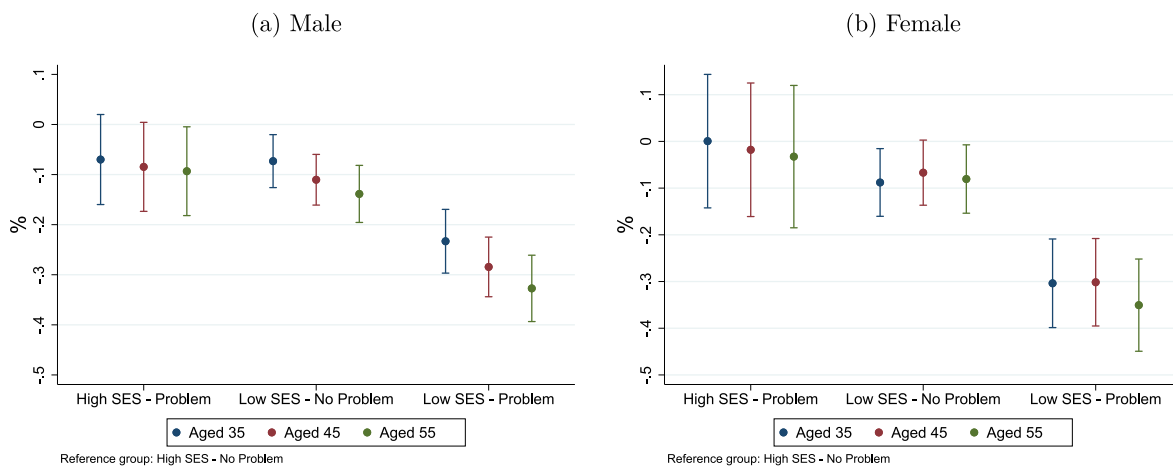


Fig. 3. Evolution of cumulative earnings by conduct problems and SES.

Note: Results estimated with OLS regressions of the log of cumulative earnings on the experience of socio-economic deprivation in childhood, conduct problems during adolescence, and the interaction of the two. Conduct problems are measured via caregiver ratings of the Rutter inventory at age 16. Socioeconomic status is measured using father’s occupational class at the time the respondent was aged 11. Regressions control for the experience of emotional problems, individual’s birth order (parity), whether the mother was married at birth and her age at birth, whether the mother left school after the minimum age, and dummies for region of residence at age 16. 95% confidence intervals displayed.

problems, alone and in relation to family SES, played a role in shaping earnings trajectories in adulthood (Tables S4–S7). Those with severe conduct problems experienced lower cumulative earnings than those with mild conduct problems (Table S4). Moreover, the lower cumulative earnings associated with a low-SES background was mainly driven by its effect on males with severe conduct problems (Table S6). Among females, the effect was concentrated among those with mild conduct problems. We observed that males with severe emotional problems also had lower cumulative earnings at ages 45 and 55 (Table S5). There was no association for females.

3.4. Sensitivity analyses

The results from our sensitivity analyses, where low SES was defined based on a combination of father’s occupation and mother’s education, remained robust (see Supplementary Tables S10 and S11). Additionally, when varying the occupational status cut-off for fathers, the significant effects were reinforced (see Supplementary Tables S18 and S19). The

cumulative earnings association at age 55 for males with conduct problems and low SES increased from -0.098 (Table S8) to -0.15 (Table S18), while for females, the association remained relatively stable.

Additional analyses using continuous SES variables and categorical distinctions reinforced our findings. Interaction effects were significant for females but not for males when using continuous raw cumulative earnings (see Supplementary Tables S12 and S13). Stronger negative associations were observed for the combined paternal and maternal low SES category (see Supplementary Tables S14 and S15).

We also expanded our analysis to include cumulative months in employment (Tables S16 and S17). Table S16 suggests that individuals who had conduct problems and were from low-SES backgrounds had fewer months in employment. Interestingly males from low-SES backgrounds and males with conduct problems only, worked more months before age 35, likely due to leaving school earlier and entering the labour market sooner. Table S17 shows no significant effects of emotional problems on cumulative months in employment, consistent with our

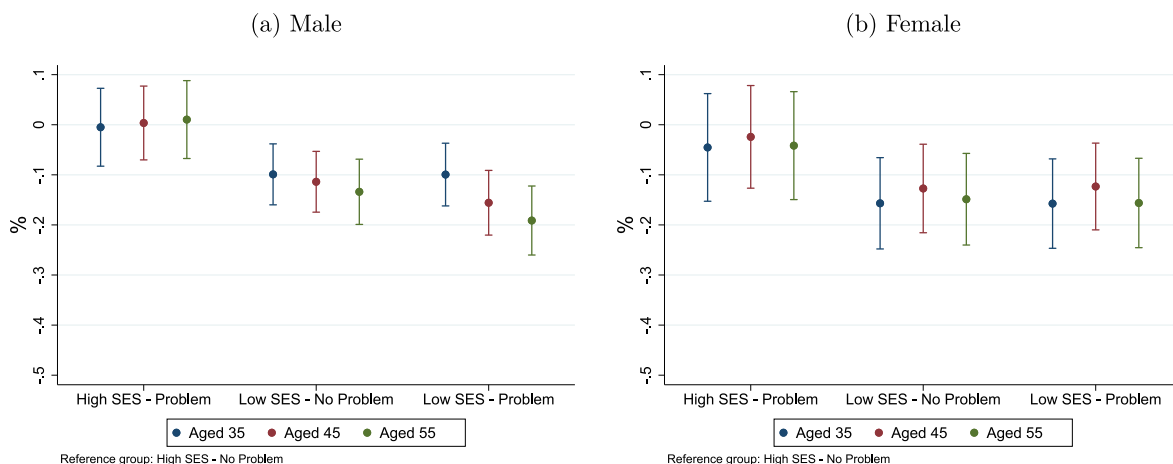


Fig. 4. Evolution of cumulative earnings by emotional problems and SES.

Note: Results estimated with OLS regressions of the log of cumulative earnings on the experience of socio-economic deprivation in childhood, emotional problems during adolescence, and the interaction of the two. Emotional and conduct problems are measured via caregiver ratings of the Rutter inventory at age 16. Socioeconomic status is measured using father’s occupational class at the time the respondent was aged 11. Regressions control for the experience of conduct problems, individual’s birth order (parity), whether the mother was married at birth and her age at birth, whether the mother left school after the minimum age, and dummies for region of residence at age 16. 95% confidence intervals displayed.

findings for cumulative earnings.

4. Discussion

Mental health problems in adolescence can have lasting effects on many dimensions of people's lives, including earnings in adulthood (Goodman et al., 2011; Knapp et al., 2011; Vergunst et al., 2023). However, these effects may vary depending on socioeconomic background, which is also a key determinant of mental health and well-being. Drawing on a range of theories and some of the empirical evidence they have stimulated, we examined how adolescent conduct and emotional problems and low SES interact to affect cumulative earnings up to age 55 in a British birth cohort. We found that conduct problems in adolescence were negatively associated with cumulative earnings, especially for individuals from low-SES families. This suggests a double disadvantage for individuals who experienced both early socioeconomic disadvantage and adolescent conduct problems. In contrast, emotional problems in adolescence did not affect cumulative earnings or interact with socioeconomic background, except in the case of males with severe emotional problems. These findings contribute to existing evidence on the long-term impacts of adolescent mental health problems and, by measuring cumulative earnings, to our understanding of the extent to which these problems affect productivity and income into midlife, and hence shape other adulthood opportunities.

One of our main findings was that having conduct problems during adolescence was negatively associated with cumulative earnings up to age 55. This is consistent with human capital theory and previous studies that found that adolescent conduct problems are associated with lower probability of employment and lower earnings into adulthood (Knapp et al., 2011; Vergunst et al., 2019, 2023). Our study adds to this evidence by showing that the association between conduct problems and earnings accumulates over the life course long into mid-adulthood, supporting both theories of mental capital (and damages to it from psychopathology) (Beddington et al., 2008) and cumulative disadvantage (DiPrete and Eirich, 2006). Importantly, our study shows that the association between conduct problems and earnings is moderated by socioeconomic background, an interaction that has not previously been explored in detail, suggesting that conduct problems, which are particularly associated with poverty (Piotrowska et al., 2015; Ziebold et al., 2021), may exacerbate existing socioeconomic inequalities and create a vicious cycle of poor mental health and low income (Ridley et al., 2020), supporting both the social causation and social drift hypotheses. The effect was greater for females than for males. In addition to cumulative earnings, we found that both males and females who had conduct problems and were from low-SES backgrounds also had fewer months in employment overall.

In contrast, we found that adolescent emotional problems were not associated with cumulative earnings and did not interact with socioeconomic background except for males with severe emotional problems. This is intriguing given the extensive research focused on gender differences highlighting the greater prevalence of emotional problems among females over the lifespan (Parker and Brotchie, 2010). Nonetheless, while less prevalent among males, significant emotional difficulties during adolescence among this group could lead to significant and persistent impacts. Few studies have looked at the impact of adolescent emotional problems on later earnings or employment or directly compared the impacts of child and adolescent conduct and emotional problems on later earnings (Clayborne et al., 2019a). Richards and Abbott (2009) found that adolescent conduct problems were associated with lower hourly earnings up to age 42, but found no association between adolescent emotional problems and adult hourly earnings. They did, however, find other long-term adverse experiences associated with early emotional problems such as increased likelihood of adult psychopathology (Richards and Abbott, 2009). Other studies among older adolescents and young adults (i.e., ages 15–30 years) (Hakulinen et al., 2016) and which look at persistent depressive disorder

(Philipson et al., 2020) found that these are negatively associated with later adult earnings. Although the link between early emotional problems and cumulative earnings was not as pronounced as that of conduct problems, we acknowledge that emotional problems may also have other long-term consequences for mental health and well-being (Clayborne et al., 2019b). For example, several studies have shown that emotional problems during childhood or adolescence are linked with adult psychopathology (Johnson et al. (2018) and that adult depression can impair workplace productivity (Evans-Lacko and Knapp, 2016; Johnston et al., 2019).

A few other studies have examined the link between both conduct and emotional problems on adult earnings. For instance, Knapp et al. (2011) found that attention deficit and conduct problems in childhood were associated with lower employment probability, while anxiety and attention deficit were associated with lower earnings. However, among the employed males, those with conduct problems had higher earnings at age 30 than those without. Vergunst et al. (2023) found that conduct and emotional problems in childhood and adolescence (age 6 to 12) were associated with lower earnings between ages 19 and 37. They found emotional problems had a larger negative effect than conduct problems. However, neither of these studies examined the interaction with low SES, which was the focus of our study.

A possible difference between these studies and ours is that they measured mental health problems at earlier ages, which may capture different developmental trajectories and consequences of mental health problems over the life course. We assessed conduct and emotional problems at age 16, while Knapp et al. (2011) assessed them at age 10 and Vergunst et al. (2023) assessed them repeatedly from ages 6 to 12. Externalising problems tend to have earlier onset than emotional problems (Erskine et al., 2017; Solmi et al., 2022), but some conduct problems may be limited to childhood and not affect adult social outcomes (Dalsgaard et al., 2020). Emotional problems may be less common and more severe in childhood than in adolescence (Kessler et al., 2012). These factors may influence the long-term association with adulthood earnings, depending on type, timing and severity of mental health problems. Our study may be capturing more severe or persistent conduct disorders that continue from childhood into adolescence. These persistent conduct disorders may hence have more pronounced long-term effects on adulthood earnings. Conversely, emotional problems often have later onset around adolescence and so may be captured at an earlier, milder stage in our study.

Moreover, age of onset may also affect availability and effectiveness of interventions and services for mental health problems (Cuijpers et al., 2020), which may influence long-term outcomes and recovery. Another possible explanation is that both Knapp et al. and Vergunst et al. focused on teacher ratings of mental health problems, while we used caregiver (usually parent) reports. Teachers and caregivers may have different perceptions of the severity and impact of mental health problems, depending on the context and the source of information. This may also affect the association with earnings in adulthood. For instance, Hoffmann et al., (2023) found teacher reports were associated with a broader array of mid-life outcomes than parent reports, suggesting that they, and the school environment, have a key role in the detection of specific youth mental health problems.

Interestingly, the association between conduct problems and low SES on earnings appears stronger for females than for males while the absolute magnitude of earnings is lower for females compared to males, suggesting that females with conduct problems from low-SES backgrounds may experience greater challenges in their earnings trajectories but have lower earnings overall. Given that women typically earn less and have more intermittent employment patterns than men due to differences in labour market participation, wage gaps, and career interruptions due to caring responsibilities, the relative impact of adolescent mental health problems on their earnings might also differ. This is particularly relevant for the 1958 British birth cohort because individuals born in 1958 experienced significant gender differences in

labour market opportunities and societal expectations about traditional gender roles (Joshi et al., 2021).

4.1. Strengths and limitations

This study was based on data from a large nationally representative prospective birth cohort that followed participants up to age 55 using face-to-face interviews. The mental health of participants at age 16 was reported by their parents. However, our study has limitations.

First, we relied on the Annual Survey of Hours and Earnings to estimate participant earnings; this was not available before 1999. Thus, we had to estimate earnings prior to 1999 by discounting the average annual earnings growth for each year. This involves deflating earnings from 1999 onwards and applying average growth rates from historical data.

Second, our estimates only take into account paid activities and do not consider other sources of income or benefits. We did not include participants who classified themselves as caregivers or on disability benefits. Given that people with mental health problems are more likely than people without mental health problems to not be seeking employment because of long-term disability, or to be on paid sick leave or to have premature death while still of working age (OECD/European Union, 2016; Walker et al., 2015), there are likely to be several additional negative economic impacts which could also reduce employment prospects and earnings of the sample.

Third, due to sample size limitations, our analyses did not consider the specific role of comorbidity. To estimate the independent effects of each type of mental health problem, we included dummy variables for each type of problem, but this may not capture the complexity and heterogeneity of mental health problems.

Fourth, we used a dichotomous measure of father's SES which does not allow a test of whether the association of SES with earnings was monotonic; however, this allowed us to explore the interaction with mental health problems and ensured enough power for statistical analysis.

Finally, we cannot rule out the possibility of reverse causation or omitted variable bias, as there may be other factors that affect both socioeconomic group and mental health problems in childhood and adolescence, as well as earnings in adulthood. For example, genetic factors, personality traits, cognitive abilities or family dynamics may influence the development and outcomes of mental health problems and socioeconomic status. However, we think our findings are plausible as they are consistent with previous studies that found similar associations between socioeconomic status and mental health problems, and with the mechanisms underlying these associations.

4.2. Policy implications

Substantial evidence supports investing in the prevention of mental health problems in childhood and adolescence as a way to mitigate their short- and long-term adverse impacts (Mcdaid et al., 2019). Our findings suggest that this could also be important for reducing the enduring socioeconomic inequalities that originate early in life. Similarly, addressing earnings inequality could also be important for preventing and mitigating the long-term effects of mental health problems and their longer-term impacts. However, generic interventions may not improve the outcomes of low-SES groups, given the complex interplay of early disadvantage and conduct problems on earnings. This requires more attention to the intricate processes and pathways linking mental health and socioeconomic status (Evans-Lacko et al., 2023).

Future policy and research might better address these issues in a number of ways. First, there should be greater mental health promotion and prevention initiatives targeted on adolescents from low socioeconomic backgrounds, particularly focused on preventing conduct problems.

Second, efforts should be made to facilitate engagement and access

to care for youth from low socioeconomic backgrounds, who face more barriers to adequate, high-quality care. While studies have highlighted SES inequalities in mental health care access among adults (Evans-Lacko et al., 2018; Lopes et al., 2023), these challenges are also pertinent to youth (Knapp et al., 2015) ensuring services consider orientation, expectations and ease of participation. One aspect of this would be to address the long waiting lists for public services such as the UK's National Health Service that may disadvantage people from low socioeconomic groups who cannot afford private services. The allocation of NHS funding for mental health services is ostensibly linked to need, but may not be adequately (Knapp et al., 2015), compensating for socioeconomic disadvantage as a particular 'need' in relation to conduct problems and their long-term effects (Charlesworth et al., 2021).

Third, mental health services should be tailored to the needs and challenges of low socioeconomic groups, and intersectoral cooperation between, for example, health, education, social care and other sectors that influence the social determinants of mental health should be fostered. Recognising this interplay in how we support youth in need could help to improve mental health outcomes and reduce social inequalities for children and adolescents across the socioeconomic spectrum.

Our findings, based on data from individuals whose mental health was assessed in 1974, remain highly relevant today. Income inequality, which was measured in 1969 when cohort members were aged 11, is wider now than it was then, exacerbating socioeconomic disparities (Bourquin et al., 2022). Although mental health services for adolescents have improved since 1974, many still face long waiting lists and inadequate access to care and support. The prevalence of mental illness among adolescents is increasing (Collishaw, 2015; Patalay and Gage, 2019), highlighting the need for effective interventions and policies. Additionally, the core structure of mental health services in the UK, predominantly delivered through the NHS and funded by general taxation, with resources allocated based on need remains similar and despite these policies, challenges in equitable access and service provision persist. Thus, our study underscores the need for policies that address the compounded disadvantages faced by adolescents from low socioeconomic backgrounds who experience mental health problems, to mitigate enduring socioeconomic inequalities.

CRedit authorship contribution statement

Sara Evans-Lacko: Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Data curation, Conceptualization. **Paulino Font Gilabert:** Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Conceptualization. **Martin Knapp:** Writing – review & editing, Supervision, Methodology, Funding acquisition, Conceptualization.

Ethics statement

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures were approved by the London School of Economics and Political Science, Care Policy and Evaluation Centre, self-certification process.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2024.117385>.

Data availability

The authors do not have permission to share data.

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