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The Longitudinal Association Between Health and Labour Market Participation:

A Study of English Millennials

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Author contributions

AFWWU: conceptualisation, data curation, formal analysis, methodology, project administration, writing – original draft, writing – review and editing; MH: conceptualisation, data curation, funding acquisition, methodology, project administration, supervision, writing – original draft, writing – review and editing; BW: conceptualisation, methodology, writing – original draft, writing – review and editing; SD: conceptualisation, methodology, writing – original draft, writing – review and editing.

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Abstract

Young adults in England face increasing health and labour market challenges, yet little is known about how health throughout the life course is associated with adulthood employment. This study examines the longitudinal association between prior health problems and labour market participation at age 32, focusing on the timing and accumulated health disadvantages among English Millennials. Using the Next Steps study data, we focused on three health indicators: long-term illness, self-rated general health, and mental health, measured in childhood, adolescence, and early adulthood. Multinomial logistic regressions evaluated timing and accumulated health disadvantage, adjusting for gender, ethnicity and parental education and occupation during adolescence. Poor health across all three life stages was consistently associated with increased risk of economic inactivity. In contrast, associations with unemployment were more selective, with health problems in early adulthood, but not in adolescence, remaining significant after accounting for earlier health issues. Accumulated exposure to all three health issues across life stages was also significantly associated with an increasing risk of unemployment and inactivity at age 32. Gender differences were observed: the association between poor health and later economic inactivity was generally stronger among men than women. However, for timing and accumulated mental health disadvantages, women showed a stronger link with unemployment. These findings emphasise the importance of adopting a life course perspective to understand the relationship between health and employment. Early support for health across dimensions during childhood and early adulthood could be essential for addressing later labour market inequalities and disengagement.

Keywords: life course, labour market participation, health inequality, longitudinal study, young adults

Highlights

- Poor childhood and early-adult health linked to age-32 inactivity and unemployment.
- Adolescent health matters to age-32 inactivity, but not unemployment, after controlling for childhood health.

- Accumulated health problems increase the risk of poor job outcomes at 32.
- Gender differences found in how past health shapes work participation.

Introduction

Enhancing labour market participation, including increasing the number of people who have paid work and reducing those who are inactive (neither working nor looking for jobs), on a macroeconomic level, boosts economic growth, reduces welfare dependency, and strengthens tax revenues. However, the number of economically inactive people in mid-2024 was 600,000 more than before the pandemic in 2019. Among inactive individuals, the proportion who said their economic inactivity was due to health issues increased and reached the highest point in 2024 since 1993 (Office for National Statistics, 2024). Notably, during the COVID-19 pandemic, adults aged 25-34 in the UK experienced the largest percentage point increase in long-term sickness-related inactivity compared to other age groups (Office for National Statistics, 2022). This is concerning, as early adulthood is crucial for establishing long-term labour market attachment (Murray et al., 2019; Øivind Nilsen et al., 2011).

Guided by the life course framework, which suggests that health and labour market engagement interact throughout life, this study investigates the associations between early health problems and later labour market participation among English Millennials. Utilising data from the Next Steps longitudinal cohort, which follows individuals born in 1989/90, we analyse how health problems are associated with age-32 labour market participation. Specifically, we examine how previous health problems at different life stages (timing) and accumulated health problems across three life stages, including long-term illness, poor self-rated health, and poor mental health from childhood to early adulthood, relate to labour market participation in adulthood.

Health and labour market participation

The number of individuals who reported having a long-term illness has increased since 2019, from 29% of the working-age population (i.e. aged 16-64) reporting a long-term illness in 2016 to 36% reporting having one in 2023 (Casey et al., 2023). This increase is a cause for concern for labour markets in the UK (Casey et al., 2023; Office for National Statistics, 2023). Specifically, a recent UK government report suggested that while most inactive groups, including those looking after family,

studying or in training, have reduced in size, the number of people who are inactive due to sickness was stable before the COVID-19 pandemic and even increased after the pandemic (Casey et al., 2023). In 2022, the Office for National Statistics reported that 28% of economically inactive individuals cited long-term sickness as the primary reason for being inactive, a notable increase from 21% in 2019 (Office for National Statistics, 2022). This increasing trend continued until August 2024, leading the number of inactive people for health reasons to reach its highest point since records began in 1993 (Office for National Statistics, 2024). However, there is some debate as to whether the observed increases are solely due to rises in poor health, or whether other factors, such as non-response bias or changes to the benefits system, have also contributed (Corlett, 2024). Nevertheless, we are observing the significant role of health in shaping labour market participation, regardless of whether the overall health trend and health-related benefit system are changing.

Empirical research on the association between health problems and labour market participation has primarily focused on employment status (whether in paid work or not) as the primary outcome, revealing consistent links between health problems and labour market disengagement. Junna et al. (2022) tracked Finnish working-age residents from 2009 to 2018 and found that those with health problems, especially those with psychiatric conditions, were less likely to be in paid work two years later. Similarly, a systematic review of 44 articles published before July 2013 identified poor self-perceived health, mental health problems, and chronic disease as significant risk factors for exiting employment for unemployment, sick pension or early retirement (van Rijn et al., 2014). These findings cohere with Sergio Salis et al. (2021). Their analysis of the Understanding Society dataset from 2009 to 2017 further illustrates how health deteriorations, including self-rated general health, mental health issues, and chronic illnesses, influence employment transitions. They found that the onset of health problems, including poor self-rated general health, mental distress, long-term illnesses and limitation by long-term illnesses, markedly increased the likelihood of transitioning from active to inactive status and from employment to not in paid work. These studies not only suggested the adverse effects of health problems on labour market participation but also collectively highlighted that a comprehensive approach to documenting health is essential, as

different health problems may show distinct contributions to labour market participation.

The life course framework: timing and accumulation

The life course framework suggests that health and socioeconomic status dynamically interact across developmental stages, with early health problems potentially disrupting later employment, either directly or indirectly through diminished human capital (i.e., education, skills, or training) (Mayer, 2009). Specifically, the framework emphasises that the timing of events (at particular life stages) and accumulated disadvantages (adversities that build over time) may 'scar' employment prospects, especially when poor health impedes critical skills acquisition (Øivind Nilsen et al., 2011; Virtanen et al., 2024).

Previous studies have employed the life course framework to explore the timing and accumulated effects but primarily focused on mental health. For example, de Groot et al. (2021), using a Dutch population-based cohort study tracking individuals from 11 to 26 years old, found that recent and extended periods of previous poor mental health experience were significantly associated with labour market participation at age 26. In contrast to mental health research, studies examining other health dimensions often rely on two-time-point measures or aggregated health metrics. For example, Karbownik & Wray (2019) showed that individuals hospitalised during childhood in England between 1870 and 1902 experienced downward social mobility and lower income in adulthood compared to their non-hospitalised siblings, partly due to poorer educational attainment. Another study used the National Longitudinal Study of Youth 1997 in the United States and combined the timing and persistence of health impairments into a single variable (Mann & Honeycutt, 2014). They found that persistent physical and mental impairments during childhood and adolescence reduced the likelihood of employment in adulthood. While these findings suggest that early health issues can have lasting adverse effects on labour market outcomes, they lack the nuance to pinpoint the critical timing and accumulative impact of health problems on labour market participation.

To address these gaps, we draw on longitudinal data from the Next Steps cohort and apply a life-course modelling approach that distinguishes between the timing and accumulation of health problems. We formalise this temporal structure using a series

of directed acyclic graphs (DAGs) (Figure 1), which clarify the theoretical causal ordering between early-life health, later health, and labour-market outcomes. In our models, health at earlier stages is treated as a potential confounder of later health and employment, while later health may lie on the causal pathway from earlier exposures to labour-market participation. This structure allows us to estimate the total effects of health at specific life stages while accounting for the role of earlier health experiences.

Building on this framework, the current study investigates three key research questions (RQs):

1. What are the patterns of long-term illness, self-reported health and mental health by life stage (timing) and accumulation (counts, indicating the number of health adversities that build over time)?
2. To what extent are health problems arising at each life stage (childhood, adolescence, and early adulthood) associated with unemployment or economic inactivity at age 32, after accounting for demographic background and earlier-stage health, as specified by the study's life-course DAG (Figure 1)?
3. What is the association between the accumulation of prior health problems and labour market participation at age 32 after adjusting for demographic factors?

Data & Methods

Next Steps (formerly known as the Longitudinal Study of Young People in England, LSYPE) is a large longitudinal cohort study that records the life experience of English people born in 1989-90 since 2004 (when the cohort members were 14 years old) (Wu et al., 2024). In Sweep 1 (age 14), a total of 15,770 cohort members and their parents were interviewed. At Sweep 4, 352 Black Caribbean/African boost interviews were added, resulting in a total of 16,122 cohort members. The most recent Next Steps data collection (Sweep 9) took place in 2022/23 when the study members were 32, and 7279 members completed it. Next Steps data are available, free of charge, to researchers and can be accessed through public repositories (Centre for Longitudinal Studies, 2025).

In this paper, we employed four life stages: 1) childhood: Sweeps 1 (age 14), 2 (age 15), 3 (age 16), and retrospective childhood experience (ages 0-16) measured at Sweep 9; 2) adolescence: Sweep 4 (age 17); 3) early adulthood: Sweep 8 (age 25), and 4) adulthood: Sweep 9 (age 32). We refer to participants' ages when describing the sweep datasets in the following sections for consistency. Notably, the term childhood here encompasses both childhood and early adolescence. However, we opted to use childhood to align with the terminology used in the questionnaire (i.e. "The next questions ask you to think back to your childhood, that is from when you were born up to and including age 16.") when referring to early life experiences.

Measures

Labour market participation

Economic activity: The cohort members were asked about their current main activity at age 32. Following Office for National Statistics (2023)., the activities are divided into three groups: 1) employed: those who are currently in paid work and were coded 0; 2) unemployed: those who are unemployed (unemployed and seeking work) and were coded 1, and 3) inactive: those who were not working and not looking for work, including sick/disabled, looking after home, students, on government training scheme, doing an apprenticeship or other were coded 2. This classification aligned with international labour standards (International Labour Organization, 2016). Compared to binary measures (in paid work versus not in paid work or active versus inactive), this is more policy-relevant and improves theoretical understanding by capturing diverse employment transitions and the intersectional effects of gender, age, and health (Gerbery & Miklošovič, 2020).

Health measures

Long-term illness: The cohort members were asked if they had any long-term physical or mental health conditions lasting or expected to last 12 months (1 = yes, 0 = no). We use their answers from childhood (14, 15 and 0-16), adolescence (17) and early adulthood (25). To improve data accuracy and minimise recall bias, we combine information from ages 14 and 15 with retrospective reports (0-16) collected at age 32. Specifically, if cohort members reported having long-term health conditions at one of these ages, they were considered to have long-term health conditions during childhood.

Self-rated general health: The cohort members were asked to rate their current general health from one (Very good) to four (Not good at all) at ages 15, 16 and 17, and from one (Excellent) to five (poor) at age 25. Between ages 15 and 17, those who reported good or very good are classified as being in good health (0), while those who said their health was not good or not good at all are considered poor (1). As for the response at age 25, those who reported good, very good or excellent are classified as good (0), while those who said their health was fair or poor are considered poor (1). We use their answers from childhood (15, 16 and 0-16),

adolescence (17) and early adulthood (25). To represent childhood self-rated general health, we combine information from ages 15 and 16 with retrospective reports (0-16) at age 32 using the same method as for the childhood long-term illness.

Mental health: Mental health is measured by a self-reported standardised questionnaire, the General Health Questionnaire (GHQ). GHQ is a valid and reliable measure for mental health problems and consists of 12 items, each rated on a four-point Likert scale. Each item was coded with a higher number indicating more severe symptoms. We follow Shelton & Herrick (2009) and transform each item into a binary score. The first two responses, indicating low frequency of psychological symptoms, to each question are assigned a value of 0, and the third and fourth responses, suggesting high frequency of symptoms, are assigned a value of 1. We then sum the scores and use a threshold (four or more) to indicate whether the cohort member has poor mental health (1 = poor, 0 = good). We use their answers in childhood (15), adolescence (17) and early adulthood (25), respectively. Notably, GHQ was not measured in other sweeps before age 16 (except age 15) nor retrospectively at age 32. As a result, we only had the measure at age 15 to represent childhood mental health.

Following de Groot et al. (2021), we derive timing variables to capture when individuals experienced poor health at a specific life stage. However, each developmental stage presents distinct challenges and changes (Lapid & Olsen, 2015), such as puberty and unique social dynamics in adolescence, factors that do not present in childhood or adulthood. Therefore, instead of indicating specific ages, we create timing variables aligned with previous developmental stages to reflect these distinct periods better. This results in three variables for each health dimension across the developmental stages (childhood, adolescence, and early adulthood). De Groot et al. (2021) indicate duration (i.e. accumulation) if they observe poor health in more than three consecutive waves; however, due to differences in the data, we measure accumulated disadvantages for each health aspect by counting incidences of health problems, ranging from 0-3, and the accumulation variables were treated as continuous variables.

Control variables

To better isolate the relationship between health and employment status and employment activity, we include several control variables in the models: gender (1 = female; 0 = male, measured at age 14), ethnicity (six ethnic categories, including White, African/Caribbean, Indian, Mixed, Pakistani/Bangladeshi, and Others, a variable derived from the information collected at ages 14-17). We also include parental socioeconomic status, encompassing parental education (1 = have a degree or higher; 0 = do not have a degree, a variable derived using the parental education information measured at age 14) and parental occupation levels (0 = not in employment/never worked, 1 = routine/semi-routine, 2 = intermediate, 3 = higher managerial, administrative and professional occupations, a variable derived using the parental National Statistics Socioeconomic Classification information measured at age 14. We derive this variable following the approach taken by Thomas et al. (2022), but we separate the not-in-paid work, including 'never worked', 'long-term unemployed' or 'full-time students', from routine/semi-routine.

Analytical plan

We apply random-forest multiple imputation (RFMI) to all variables on the 16,122 cohort members to minimise the potential bias from item-missing data (see Table A1 for more information on levels of missing data). Recommended by Silverwood et al. (2024), we include auxiliary variables, such as socioeconomic disadvantage, changing address, living in rented housing, older age of the main parent, and childhood behavioural problems in the imputation model. MI is the preferred method to address missingness, including in situations where there is a relatively high percentage of missing data (Hyuk Lee & Huber Jr., 2021). Notably, the need to perform gender-stratified analyses influenced the decision to use RF for MI. RF's ability to model complex, non-linear relationships ensures that the imputation process respects the inherent differences between these subgroups, leading to more accurate and reliable imputations (Hong & Lynn, 2020; Shah et al., 2014). RFMI for missing data was performed 50 times. We use Rubin's rule to combine the estimates from each imputed dataset, thereby accounting for the variability across imputations (Rubin, 1987).

To address RQ1 (i.e., the patterns of health timing and accumulation), we conduct descriptive analyses of the multiple-imputed data to document the health of English Millennials, including the frequency of each stage and the number of health problem incidents throughout the early life stage (from childhood to early adulthood). We focus on three health measures: long-term illness, self-rated health and mental health. The analysis examines these health measures for the whole sample and then by age-32 economic activities (i.e. employment, unemployment and inactivity). The descriptive analyses are also carried out among the covariates for the whole sample, by age-32 economic activities and by age-32 health measure (see Table A2). We also conduct correlation analyses among health measures to explore the relationships between different stages of health problems, as previous health statuses are associated with later health outcomes (Andersen & Gunes, 2018; Haas, 2007).

To answer RQ2 (i.e. the associations between timing of health problems and economic activity at age 32), we estimate multinomial logistic regression models to assess the association between previous health and economic activity at age 32. Employment served as the reference category. Following the temporal structure in Figure 1, we fitted three sequential models for each health measure:

- Model M1 (Figure 1a): childhood health only.
- Model M2 (Figure 1b): childhood and adolescent health.
- Model M3 (Figure 1c): childhood, adolescent, and early-adult health.

To aid interpretation of attenuation across life stages, we also fitted two additional models that included only adolescent health or only early-adult health, each adjusted for demographic controls (gender, ethnicity, parental occupation, and education), but not for prior health stages. These additional models (Model M2a: adolescence only; Model M3a: early adulthood only) are not part of the formal life-course framework but help establish baseline associations prior to adjustment. They serve as a reference for interpreting how associations change when prior health is accounted for in the sequential life-course models. As per our theoretical model and DAGs (Figure 1), the main analytical strategy estimates three sequential models for each health measure: Model M1 includes childhood health only; Model M2 adds adolescent health (adjusting for childhood); and Model M3 adds early-adult health (adjusting for

childhood and adolescence). This stepwise approach enables us to examine whether health at a later stage (e.g., early adulthood) remains associated with economic activity after adjusting for earlier health, and to distinguish total from direct effects. In each model, we focus on interpreting the total effect of the most recent life stage included (e.g., adolescent health in M2; early-adult health in M3), while earlier-stage variables are interpreted in the context of adjustment only. All models are adjusted for gender, ethnicity, parental education, and parental occupational class.

To answer RQ3 (i.e. the associations between timing of health problems and economic activity at age 32), we fitted additional multinomial logistic regression models using accumulated health burden from childhood to early adulthood as the key exposure, separately for each health domain. These models were also adjusted for the same demographic covariates as above.

All models were run separately for long-term illness, self-rated general health and mental health, recognising that these health measures overlap but may relate differently to labour-market participation (Ambresin et al., 2014). We conducted the same set of analyses stratified by gender, as previous research indicates that men and women follow distinct employment and health trajectories (Andres, 2024). Moreover, unadjusted single-stage models are also conducted.

Finally, we conducted sensitivity analyses adjusting for economic activity at age 25, highest qualification achieved by age 32, and concurrent health at age 32 to assess whether earlier health remains associated with labour-market participation after accounting for these potential mediators. Detailed coding and derivation of these variables are provided in the Appendix, and the descriptive, correlation and regression results are presented in Tables A5-A8.

Results

The sample comprises 16,122 cohort members (49.1% female), and the majority are employed (89.9%). Table 1 presents descriptive statistics for demographic covariates and health measures of the full sample and stratified by economic activity (employed, unemployed, and inactive). There are notable demographic and health differences across economic activity groups. While gender distribution is similar among the employed and unemployed, women comprise a significantly larger proportion of the inactive group than men (70% versus 30%). This might be because females are more likely to look after the family than males.

RQ1: Patterns of Health Timing and Accumulation

More individuals report having long-term illnesses during childhood (14.9%) and early adulthood (12.8%) compared to adolescence (5.9%). In contrast, poor self-rated general health and mental health exhibit a different pattern; the number of people who reported poor self-rated general health or mental health had small fluctuations through life stages, ranging between 5.6 – 6.6% for self-rated health and between 16.2 – 19.4% for mental health. The count distribution of health problems varied across the three dimensions: long-term illness, self-rated poor health, and poor mental health. Across the different health measures, most individuals report no health problems, ranging from 62.1% (mental health) to 84.6% (self-rated health). A smaller proportion experience one instance of health problems, ranging from 12.4% (poor self-rated general health) to 24.9% (poor mental health). Fewer individuals report two instances, ranging from 2.6% (poor self-rated general health) to 9.9% (poor mental health), or all three instances, ranging from 0.4% (poor self-rated general health) to 3.1% (poor mental health). All types of health problems at any stage are more common among those who were inactive and unemployed at age 32 (except self-rated general health in adolescence) than those employed. Accumulative health problems, that is, having two or more instances of health problems across childhood, adolescence and early adulthood, are observed at higher rates among those who were inactive and unemployed at age 32.

Tetrachoric correlation analyses reveal that all stages of health problems are significantly associated (see Table 2). For long-term illness and mental health, the

strength of association between stages diminishes as the time gap increases. In other words, individuals with health problems at one stage are more likely to experience them in the next, but this continuity weakens as the time between assessments grows. Self-rated general health follows a different trajectory: the associations between childhood self-rated health and that in later stages (adolescence and early adulthood) become stronger over time. This suggests that individuals' early perceptions of their health may hold predictive value for their later self-assessments. One possible explanation is that the subjective nature of self-rated health may lead to greater consistency as individuals develop a stable health perception shaped by past experiences and expectations. In contrast, the relationship between adolescent self-rated health and subsequent stages weakens. This could be associated with adolescence being a transitional period, where self-perceptions of health are more influenced by temporary factors (e.g., puberty, peer comparisons, or short-term stressors) rather than long-term health trajectories. As individuals move into early adulthood, these adolescent assessments may become less reflective of their actual health status.

RQ2: Associations Between Timing of Health Problems and Labour Market Participation

We estimated multinomial logistic regression models for each health measure (long-term illness, self-rated health, and mental health), focusing on these stage in each model: childhood in M1, adolescence in M2 (adjusting for childhood health) and early adulthood in M3 (adjusting for both childhood and adolescence health). Employment served as the reference category. We also report results for all and note where gender-specific differences emerge. Full regression models and unadjusted single-stage models are available in Tables A3a–c.

Long-term illness

M1 shows that childhood long-term illness is associated with both unemployment and inactivity at age 32, with inactivity having a higher adjusted *OR* (2.39, 95% *CI* 2.01–2.83) than unemployment (adjusted *OR* =1.75, 95% *CI* 1.29–2.35). In M2, after controlling for childhood health, the associations between long-term illness during adolescence and unemployment become weaker compared with M2a (adolescence

only model), with an adjusted *OR* close to 1. In contrast, the association between adolescent long-term illness and economic inactivity at age 32 remains significant (adjusted *OR* = 1.78, 95% *CI* 1.38–2.29). Regarding early-adult health, after controlling for previous health and demographic covariates, the associations remain significant (M3) compared with M3a (early adulthood only model), and the association with inactivity is stronger (adjusted *OR* = 2.78, 95% *CI* 2.28–3.38) than that of unemployment (adjusted *OR* = 2.45, 95% *CI* 1.77–3.40). These findings suggest that childhood and early adulthood may be a particularly sensitive period when health problems are closely linked to later labour market outcomes, while the influence of adolescent health appears more relevant for inactivity than for unemployment at age 32.

Self-rated health

M1 shows that childhood self-rated general health is associated with both unemployment and inactivity at age 32, with inactivity having a higher adjusted *OR* (2.71, 95% *CI* 2.19–3.35) than unemployment (adjusted *OR* =2.32, 95% *CI* 1.65–3.25). In M2, again, after controlling for childhood health, the adjusted *OR* of adolescence becomes close to 1 compared to M2a. In contrast, the association between adolescent self-rated general health and economic inactivity at age 32 remains significant (adjusted *OR* = 1.44, 95% *CI* 1.11–1.85). Regarding early-adult health, after controlling for previous health and demographic covariates, the associations remain significant (M3) compared to M3a, and the association with inactivity is stronger (adjusted *OR* = 4.19, 95% *CI* 3.35–5.24) than that of unemployment (adjusted *OR* = 3.55, 95% *CI* 2.55-4.93). These findings are similar to those of long-term illness, suggesting that childhood and early adulthood may be a sensitive period when health problems are closely linked to later labour market outcomes, while the influence of adolescent health appears more relevant for inactivity than for unemployment at age 32.

Mental health

M1 shows that childhood mental health is associated with both unemployment and inactivity at age 32, with unemployment having a higher adjusted *OR* (1.45, 95% *CI* 1.09–1.94) than inactivity (adjusted *OR* =1.34, 95% *CI* 1.12–1.61). As with long-term illness and self-rated general health, M2 shows that the association between

adolescent mental health and unemployment weakens after adjusting for childhood health compared to M2a, while the link with inactivity remains significant (adjusted *OR* = 1.26, 95% *CI* 1.04–1.52). Regarding early-adult health, after controlling for previous health and demographic covariates, the associations remain significant (M3) compared to M3a, with unemployment being stronger (adjusted *OR* = 2.40, 95% *CI* 1.84–3.14) than inactivity (adjusted *OR* = 1.86, 95% *CI* 1.56-2.22). Notably, this pattern contrasts with the other health dimensions, where associations were generally stronger for inactivity. These findings suggest that poor mental health may be more directly linked to barriers in entering or sustaining employment, while other health issues may relate more to longer-term labour market withdrawal.

Gender-stratified models across three health dimensions reveal similar overall trends, although odds ratios were slightly larger for men across the models. This might also be related to the employment trajectories between the two genders. For example, men may be more likely to follow continuous full-time employment pathways, making poor health more disruptive to their labour market outcomes. In contrast, women's employment patterns may already involve greater discontinuity due to caregiving or part-time work, potentially buffering or diffusing the observed associations. However, we exercise some caution in making direct comparisons of *OR* magnitudes across these separate gender models due to differences in covariate distributions or outcome prevalence.

Overall, our results answer RQ2, showing that the associations between health and age-32 economic activity varied across life stages. Health at all three life stages is consistently associated with inactivity at age 32. In contrast, only childhood and early-adult health (adjusting for prior stages) show significant associations with unemployment, while adolescent health does not. This suggests that the association between adolescent health and unemployment may reflect earlier problems, and that unemployment at age 32 is more sensitive to health issues in childhood and early adulthood than it is during adolescence.

Our findings also indicate that the associations vary across health dimensions. Specifically, the association between mental health and unemployment during childhood (M1) and early adulthood (M3) is stronger than that with inactivity during the same periods, whereas the opposite pattern is observed for long-term illness and

self-rated health, with stronger links with inactivity. This pattern suggests that poor mental health may be more disruptive to individuals actively seeking work or maintaining labour market engagement, while other health issues are more strongly linked to complete withdrawal from the labour market. These differences highlight the distinct pathways through which various health problems influence employment outcomes.

Notably, our sensitivity analyses reveal significant links between early-adult health and unemployment at age 32, and between childhood and early-adult health and inactivity at age 32, even after adjusting for age-25 economic activity, highest qualification, and age-32 health. These findings suggest that early adulthood is a critical period for health-related disadvantages to manifest in employment outcomes, likely owing to its proximity to labour market entry and the consolidation of adult roles. In contrast, the impact of childhood and adolescent health may be indirect or mediated by educational, social and later health pathways. Gender differences in associations also underscore the importance of considering gendered life course trajectories and work expectations in understanding health-employment links.

RQ3: Associations Between Accumulated Health Problems and Labour Market Participation

Table 4 presents the results from multinomial logistic regressions, where the count of health problems (ranging from 0 to 3 across childhood, adolescence, and early adulthood) is used as a continuous predictor. Given the similar patterns observed for long-term illness and self-rated general health, we report these two dimensions together, while mental health results are discussed separately. Full adjusted and nd unadjusted models are available in Tables A4a-c.

Long-term illness and self-rated general health

As the individual accumulation score for long-term illness or self-rated general health increases by one, the likelihood of being unemployed and inactive significantly increases, with a greater increase in risk of inactivity than for unemployment (long-term illness: adjusted $OR_{unemployment}$ = 1.62 (95% *CI* 1.39–1.89)*;* $OR_{inactivity}$ = 1.94 (95% *CI* 1.77–2.12); self-rated general health: adjusted $OR_{unemployment}$ = 1.95 (95% *CI* 1.63–2.33)*;* $OR_{inactivity}$ = 2.29 (95% *CI* 2.04–2.57)). This suggests that having

increasing incidences of long-term illness or poor self-rated general health could relate to later increasing likelihood of being unemployed and inactive at age 32, and this association is more pronounced in inactivity.

Mental health

For mental health, the accumulation is also significantly associated with economic activity at age 32 but with a stronger association with unemployment (adjusted *OR* = 1.46, 95% *CI* 1.38–1.67) than inactivity (adjusted *OR* = 1.34, 95% *CI* 1.24–1.46). This contrasts with other health dimensions, which show stronger associations with inactivity. The pattern suggests that poor mental health may be more directly linked to difficulties entering employment, whereas other health issues may lead to longer-term withdrawal from the labour market.

Gender-stratified models showed consistent patterns. For long-term illness and self-rated health, the associations with inactivity were stronger than those with unemployment, and the odds ratios were generally larger among men than women. In contrast, for mental health, accumulated problems were more strongly associated with unemployment among women and with inactivity among men. This divergence may reflect gendered differences in employment trajectories, societal expectations, or the way health problems influence labour market engagement and re-entry for men and women.

These findings indicate that health accumulation plays a significant role in shaping subsequent labour market outcomes. The effects are consistent across all health indicators. This supports the notion that chronic or recurrent health problems throughout the life course may have a compounding impact on disengagement from the labour market. Our sensitivity analysis results (further adjusted for age-25 economic activity, highest education and age-32 health) show that the adjusted *OR*s of long-term illness and self-rated general health in unemployment at age 32 become insignificant, indicating that the indirect pathways (i.e. educational, social and later health pathways) might be more essential to unemployment than inactivity at age 32.

Discussion

This study explores the timing and accumulation of health problems among millennials in England and their associations with labour market participation at age 32. Regarding the first research question about the timing and accumulation of health problems, our results showed that while most participants reported good health across childhood, adolescence, and early adulthood, the proportions vary by health measure and stage. Long-term illness was more commonly reported in childhood and early adulthood compared to adolescence, whereas the prevalence of poor self-rated general and mental health remains relatively stable across stages.

Our findings underscore the importance of timing in shaping labour market outcomes, addressing RQ2. Poor health across all three dimensions, long-term illness, self-rated health, and mental health, was associated with increased risks of both unemployment and inactivity at age 32. However, the associations between adolescent health problems and unemployment weakened and became non-significant after accounting for childhood health, suggesting that these may reflect earlier-life disadvantages. In contrast, health problems in adolescence remained consistently associated with later inactivity. Gender-stratified models show similar patterns across men and women, but associations were generally stronger for men, potentially reflecting more continuous employment trajectories that are more vulnerable to disruption by poor health. In contrast, women's labour market participation may be shaped by a broader set of factors beyond health alone.

Accumulated health problems were also consistently associated with both unemployment and inactivity, answering RQ3. For long-term illness and self-rated health, the associations were stronger for inactivity than for unemployment, and the effect sizes were larger for men than for women. In contrast, for mental health, accumulated problems were more strongly linked to unemployment among women and to inactivity among men. These findings suggest that different health problems are associated with labour market outcomes in distinct, gendered ways, reinforcing the need for tailored support strategies that account for both life-course timing and accumulation of health disadvantage.

Our correlation analyses among health outcomes at different stages align with previous studies (Case & Paxson, 2010; Flores & Wolfe, 2023), confirming that early health status is associated with later health. These associations may result from both direct impact and indirect pathways influenced by other factors, such as low socio-economic status, challenging family environment, and poor healthcare accessibility (Haas, 2007). For example, previous studies found that poor early-life health can affect physical growth, cognitive development, and immune function, increasing the risk of poor health and related challenges, such as lower educational attainment and employment difficulties, in adulthood (Case et al., 2005; Conti & Heckman, 2010). Furthermore, financial difficulties in early life may amplify these effects by limiting access to adequate nutrition, healthcare, and support systems (Elo, 2009). These results highlight the critical need to address health issues at any stage to prevent the accumulating impact on future health and labour market participation.

Our timing results of poor mental health corroborate previous findings on the associations between mental health's 'recency effect' and labour market participation (de Groot et al., 2021; Narusyte et al., 2017). Specifically, after adjusting for covariates and previous health (childhood and adolescence), the associations of poor mental health during early adulthood and age-32 unemployment and inactivity are significant and the strongest compared with those of childhood and adolescence (adjusted for childhood health). Similarly, the results of long-term illness and poor self-rated general health indicate that health problems during early adulthood have the strongest association with the risk of being unemployed and inactive at age 32. This suggests that early adulthood could be a critical period during which health-related disadvantages can manifest in employment outcomes. However, it can also be that economic activity may be more immediately sensitive to recent health challenges. Moreover, the role of earlier health should not be neglected, as its associations with unemployment and inactivity remain significant after controlling for demographic correlates. Although the effects of earlier health may be indirect through later health or mediated by educational and social pathways, they remain vital. Together with our findings on accumulation, these results suggest that improving employment outcomes should consider the long-term implications of early-life health disadvantages. Supporting young people with ongoing health issues may help address long-term economic inactivity. Moreover, preventative strategies

targeting health in childhood could play a crucial role in breaking the chain of disadvantage that leads to labour market detachment in adulthood.

Gender differences are also identified. The associations of all three health problems with inactivity are generally stronger for men than for women, suggesting that men's engagement in the labour market may be more sensitive to health disruptions, particularly when these affect physical functioning or work capacity. Furthermore, women show an opposite pattern in the effects of mental health compared with men: their mental health in early adulthood is associated with a higher risk of unemployment than of inactivity. This suggests that women with poor mental health may still seek to remain in the labour force but face challenges in securing or sustaining employment. Our findings align with previous studies, suggesting that health problems have a more significant adverse influence on men's participation in the labour market compared to women's. One possible explanation is that the reasons for inactivity among women could be more diverse (including health problems and family care), whereas, for men, inactivity is more closely linked to health constraints (International Labour Organization, 2024). Additionally, men are more likely to work in physically demanding jobs (Campos-Serna et al., 2013), where health limitations may have a greater impact on employment prospects and work capacity. This highlights the necessity of promoting gender-sensitive employment and health policies, which may assist in mitigating the longer-term impacts of ill health on work, especially for those at risk of becoming economically inactive.

The strengths of this study include a longitudinal design, a large sample size, moderate loss to follow-up, and vital, repeated measures across different life stages. These features enable a robust exploration of the timing and accumulation of health problems and their associations with labour market participation at age 32. Additionally, our measure of economic activity is independent of participants' benefit receipt, making it less directly influenced by changes in government policies. This approach offers a broader perspective on labour market participation, capturing patterns that may not be fully represented in statistics shaped by policy-driven definitions. Furthermore, compared to previous binary measures of labour market participation, our nuanced measure provides insight into the unique patterns of associations among different health and economic activities. Future studies should

consider employing more nuanced measures of economic activity to capture the varied roles of health in labour market participation.

However, this study has some limitations. Since the Next Steps study started tracking participants at age 14, childhood experiences were measured retrospectively, possibly introducing recall bias. Here, we included information from ages 14 to 16 to maximise the information on childhood experiences and minimise the potential bias. Additionally, while our nuanced categorisation of labour market participation captures distinct health effects on those "not in paid work," the inactive group is heterogeneous, facing varied barriers to employment. For example, women may be inactive due to a combination of care responsibilities and health issues, whereas men are more likely to be inactive due to health constraints alone. Moreover, the term "hidden unemployed" refers to individuals who have health limitations that allow them to work but face challenges finding employment. This distinguishes them from people whose health completely prevents them from working, or those who are officially classified as unemployed and actively seeking work. These hidden unemployed individuals encounter structural barriers, such as a lack of suitable job opportunities and employer biases, which may ultimately influence their choice to exit the workforce (Beatty & Fothergill, 2005). Future studies could consider this heterogeneity to identify the obstacles and provide tailored support for diverse groups.

In conclusion, our results highlight the importance of the timing and accumulation of health problems on labour market participation at 32 health-related disadvantages, particularly in childhood and early adulthood, which require greater attention and targeted support. The results also demonstrate variation across health dimensions and employment outcomes, emphasising the need to consider multiple health indicators when examining these associations. Future studies could consider including multiple health measures and nuanced labour market outcomes to understand the associations comprehensively. Finally, further studies are needed to explore the potential pathways between education, gender, ethnicity, parental occupation, previous poor labour market participation, current health, previous health and labour market participation. Such work can inform intervention development,

especially long-term prevention opportunities, to boost population health and labour market sustainability.

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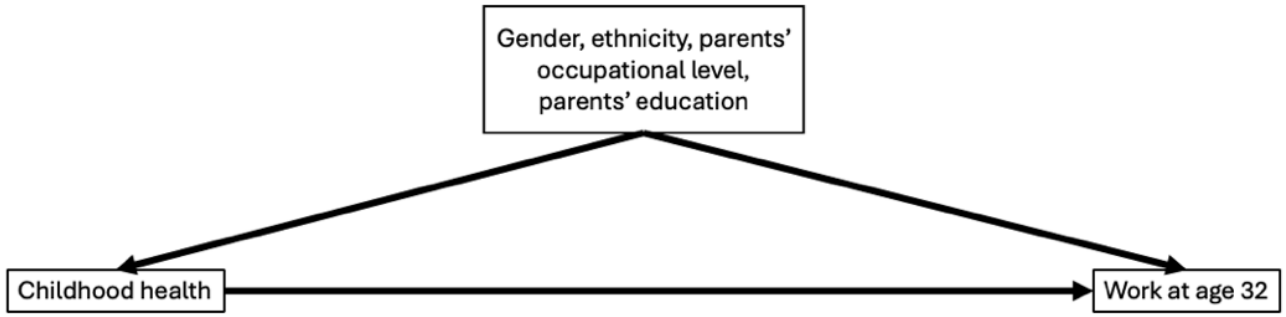
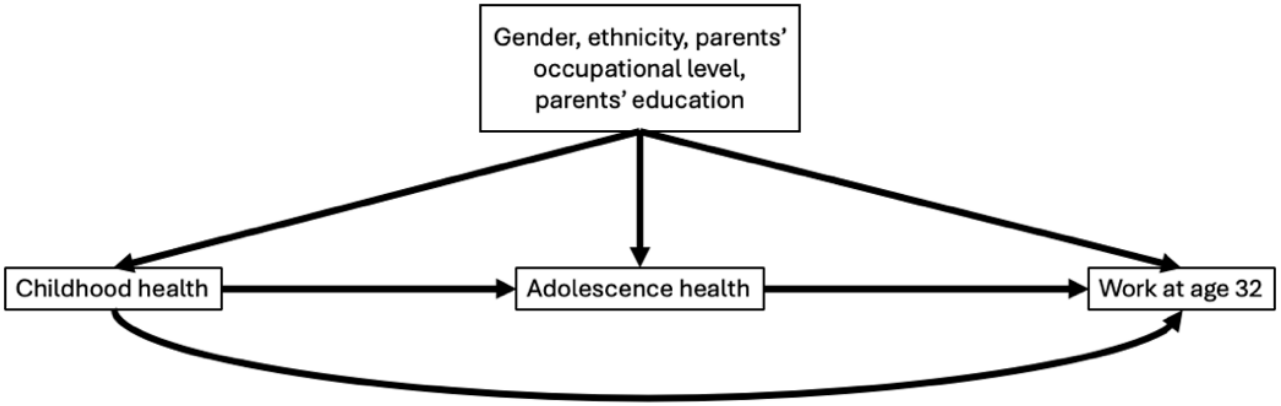
Figure 1. Directed acyclic graphs of the potential causal pathways between health in the previous three stages and economic activity.

(a) Childhood health only yields the total effect of childhood health.



(b) Childhood + adolescent health yields the total effect of adolescent health and the direct effect of childhood health net of mediation through adolescent health.



(c) Childhood + adolescent + early-adult health yields the total effect of early-adult health and direct effects of childhood and adolescent health.

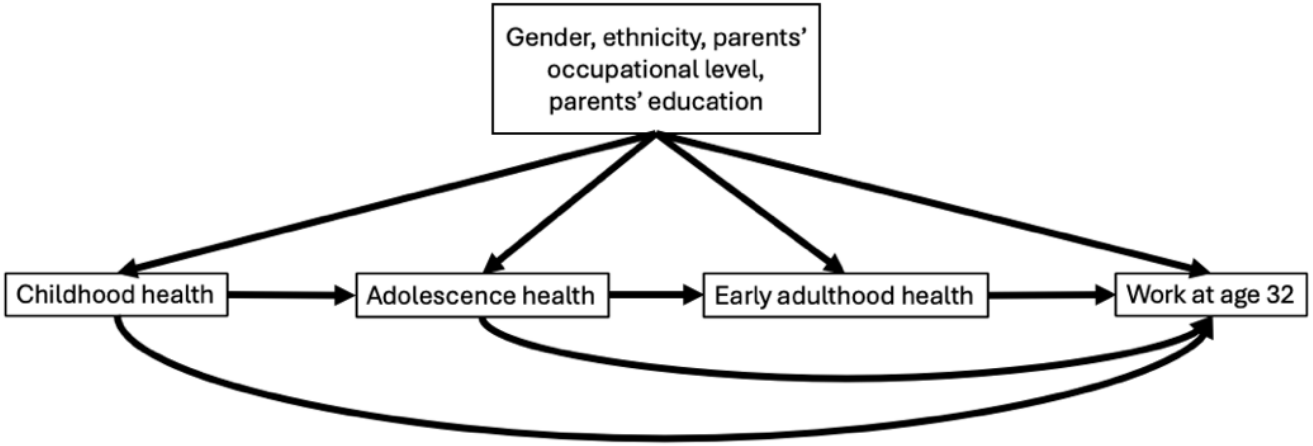


Table 1. Descriptive Statistics by Economic Activity

		All	Economic Activity (32)		
			Employed	Unemployed	Inactive
Gender, N(%)	**Male**	8204(50.9)	7647(52.8)	194(45.9)	363(30)
	Female	7918(49.1)	6841(47.2)	229(54.1)	848(70)
Ethnicity, N(%)	**White**	10573(65.6)	9566(66)	253(59.8)	755(62.3)
	Mixed	816(5.1)	731(5)	28(6.6)	57(4.7)
	Indian	1020(6.3)	952(6.6)	20(4.7)	47(3.9)
	Pakistani/Bangladeshi	1709(10.6)	1427(9.9)	69(16.3)	213(17.6)
	Black	1575(9.8)	1429(9.9)	40(9.5)	105(8.7)
	Other	430(2.7)	382(2.6)	13(3.1)	34(2.8)
	Poor	3620(22.5)	2976(20.5)	184(43.5)	460(38)
Mother's education (13), N(%)	**Not having a degree**	14603(90.6)	13066(90.2)	397(93.8)	1140(94.2)
	Having a degree or above	1519(9.4)	1423(9.8)	26(6.2)	71(5.8)
Father's education (13), N(%)	**Not having a degree**	14240(88.3)	12731(87.9)	398(94.1)	1112(91.8)
	Having a degree or above	1882(11.7)	1758(12.1)	25(5.9)	99(8.2)
Mother's occupation level (13), N(%)	**Not working**	2461(15.3)	2063(14.2)	104(24.6)	294(24.3)
	Routine/semi-routine	5083(31.5)	4485(31)	152(36.1)	445(36.8)
	Middle	4321(26.8)	3964(27.4)	97(23)	259(21.4)
	High	4258(26.4)	3976(27.4)	69(16.3)	213(17.6)
Father's occupation level (13), N(%)	**Not working**	829(5.1)	698(4.8)	35(8.2)	96(7.9)
	Routine/semi-routine	3874(24)	3344(23.1)	136(32.2)	395(32.6)
	Middle	5964(37)	5366(37)	161(38.1)	436(36)
	High	5455(33.8)	5081(35.1)	91(21.5)	284(23.4)

		All	Economic Activity (32)		
			Employed	Unemployed	Inactive
Long-term illness (Childhood), N(%)	**Not having**	13726 (85.1)	12489 (86.2)	335 (79.2)	902(74.5)
	Having	2396(14.9)	2000(13.8)	88(20.8)	309(25.5)
Long-term illness (Adolescence), N(%)	**Not having**	15170(94.1)	13717(94.7)	387(91.6)	1066(88)
	Having	952(5.9)	771(5.3)	36(8.4)	145(12)
Long-term illness (Early adulthood), N(%)	**Not having**	14051(87.2)	12870(88.8)	321(75.9)	860(71)
	Having	2071(12.8)	1619(11.2)	102(24.1)	351(29)
Long-term illness (Accumulation between childhood and early adulthood), N(%)	**0**	12111(75.1)	11144(76.9)	262(61.9)	705(58.2)
	1	2882(17.9)	2484(17.1)	110(26.1)	287(23.7)
	2	848(5.3)	675 (4.7)	36 (8.6)	137(11.3)
	3	280(1.7)	185 (1.3)	14 (3.3)	81(6.7)
Self-rated general health (Childhood), N(%)	**Good**	15058(93.4)	13659(94.3)	369(87.4)	1030(85)
	Poor	1064(6.6)	829(5.7)	53(12.6)	181(15)
Self-rated general health (Adolescence), N(%)	**Good**	15217(94.4)	13724(94.7)	398(94.1)	1095(90.5)
	Poor	905(5.6)	764(5.3)	25(5.9)	116(9.5)
Self-rated general health (Early adulthood), N(%)	**Good**	15073(93.5)	13763(95)	349(82.7)	960(79.3)
	Poor	1049(6.5)	725(5)	73(17.3)	251(20.7)
Self-rated general health (Accumulation between childhood to early adulthood), N(%)	**0**	13640(84.6)	12525(86.4)	304(71.8)	812(67.1)
	1	2002(12.4)	1640(11.3)	89(21)	273(22.6)
	2	423(2.6)	292(2)	28(6.7)	103(8.5)
	3	57(0.4)	32(0.2)	2(0.5)	23(1.9)
Mental health (Childhood), N(%)	**Good**	13511(83.8)	12236(84.5)	332(78.6)	943(77.9)
	Poor	2611(16.2)	2253(15.5)	90(21.4)	268(22.1)
Mental health (Adolescence), N(%)	**Good**	12991(80.6)	11766(81.2)	323(76.5)	902(74.5)
	Poor	3131(19.4)	2723(18.8)	99(23.5)	309(25.5)

		All	Economic Activity (32)		
			Employed	Unemployed	Inactive
Mental health (Early adulthood), N(%)	**Good**	13152(81.6)	12023(83)	279(66.1)	850(70.2)
	Poor	2970(18.4)	2466(17)	143(33.9)	361(29.8)
Mental health (Accumulation between childhood and early adulthood), N(%)	**0**	10009(62.1)	9210(63.6)	198(46.8)	600(49.6)
	1	4013(24.9)	3516(24.3)	139(32.9)	358(29.6)
	2	1602(9.9)	1361(9.4)	63(15)	178(14.7)
	3	498(3.1)	401(2.8)	23(5.3)	75(6.2)
Total N(%)		16122(100)	14488(90)	423(2.5)	1211(7.5)

Table 2. Tetrachoric correlations of health problems across different life stages

Long-term illness			
	Childhood	**Adolescence**	**Early adulthood**
Childhood	1	0.62***	0.43***
Adolescence		1	0.47***
Early adulthood			1
Self-rated general health			
	Childhood	**Adolescence**	**Early adulthood**
Childhood	1	0.38***	0.43***
Adolescence		1	0.28***
Early adulthood			1
Mental health			
	Childhood	**Adolescence**	**Early adulthood**
Childhood	1	0.51***	0.30***
Adolescence		1	0.37***
Early adulthood			1

***p ≤ .001, **p ≤ .01, *p ≤ .05

Table 3. Multinomial logistic regressions predicting economic activity (at age 32) by the timing of health problems.

			M1 Childhood only adjusted		M2a Adolescence only adjusted		M2 Childhood + Adolescence adjusted		M3a Early adulthood only adjusted		M3 Three stages adjusted	
Independent variable		**Activity (ref: employment)**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
Long-term illness	**All**	**Childhood**	1.75** [1.29, 2.35]	2.39** [2.01, 2.83]			1.64** [1.20, 2.25]	2.08** [1.72, 2.51]			1.39 [1.00, 1.94]	1.70** [1.40, 2.06]
		Adolescence			1.68* [1.07, 2.63]	2.52** [2.00, 3.17]	1.33 [0.83, 2.15]	1.78** [1.38, 2.29]			1.08 [0.67, 1.76]	1.41** [1.09, 1.82]
		Early Adulthood							2.68** [1.97, 3.66]	3.35** [2.77, 4.05]	2.45** [1.77, 3.40]	2.78** [2.28, 3.38]
	Female	**Childhood**	1.61** [1.53, 1.70]	2.09** [2.04, 2.15]			1.51** [1.43, 1.59]	1.89** [1.84, 1.95]			1.31** [1.24, 1.38]	1.60** [1.55, 1.64]
		Adolescence			1.62** [1.51, 1.74]	2.07** [1.99, 2.14]	1.35** [1.25, 1.45]	1.53** [1.48, 1.59]			1.16** [1.07, 1.25]	1.28** [1.23, 1.34]
		Early Adulthood							2.11** [2.01, 2.21]	2.52** [2.45, 2.58]	1.93** [1.84, 2.03]	2.15** [2.09, 2.21]
	Male	**Childhood**	1.87** [1.78, 1.96]	2.95** [2.85, 3.05]			1.77** [1.68, 1.86]	2.43** [2.35, 2.52]			1.48** [1.40, 1.55]	1.89** [1.82, 1.96]
		Adolescence			1.72** [1.60, 1.85]	3.41** [3.27, 3.56]	1.31** [1.22, 1.41]	2.22** [2.12, 2.33]			0.99 [0.92, 1.07]	1.55** [1.48, 1.63]
		Early Adulthood							3.64** [3.47, 3.81]	5.84** [5.66, 6.04]	3.34** [3.18, 3.50]	4.63** [4.47, 4.79]
Self-rated general health	**All**	**Childhood**	2.32** [1.65, 3.25]	2.71** [2.19, 3.35]			2.33** [1.66, 3.29]	2.56** [2.06, 3.18]			1.84** [1.28, 2.63]	1.94** [1.54, 2.44]
		Adolescence			1.10 [0.66, 1.82]	1.74** [1.36, 2.22]	0.94 [0.56, 1.57]	1.44** [1.11, 1.85]			0.83 [0.50, 1.39]	1.25 [0.96, 1.64]
		Early Adulthood							3.91** [2.84, 5.36]	4.84** [3.90, 6.02]	3.55** [2.55, 4.93]	4.19** [3.35, 5.24]
	Female	**Childhood**	2.10** [1.99, 2.22]	2.28** [2.21, 2.35]			2.13** [2.01, 2.25]	2.16** [2.09, 2.23]			1.71** [1.61, 1.82]	1.72** [1.66, 1.78]
		Adolescence			1.07 [0.99, 1.15]	1.58** [1.53, 1.64]	0.92* [0.85, 0.99]	1.33** [1.29, 1.38]			0.84** [0.77, 0.90]	1.21** [1.16, 1.25]
		Early Adulthood							3.46** [3.29, 3.65]	3.80** [3.69, 3.91]	3.17** [3.00, 3.34]	3.35** [3.25, 3.45]
	Male	**Childhood**	2.75** [2.58, 2.93]	3.96** [3.80, 4.13]			2.74** [2.57, 2.92]	3.73** [3.58, 3.90]			2.13** [1.99, 2.27]	2.59** [2.48, 2.71]

			M1 Childhood only adjusted		M2a Adolescence only adjusted		M2 Childhood + Adolescence adjusted		M3a Early adulthood only adjusted		M3 Three stages adjusted	
		Adolescence			1.17** [1.06, 1.29]	2.29** [2.17, 2.42]	1.03 [0.94, 1.14]	1.90** [1.80, 2.01]			0.87** [0.79, 0.96]	1.49** [1.41, 1.58]
		Early Adulthood							4.52** [4.28, 4.78]	7.35** [7.09, 7.63]	4.06** [3.84, 4.29]	6.06** [5.83, 6.30]
Mental health	**All**	**Childhood**	1.45* [1.09, 1.94]	1.34** [1.12, 1.61]			1.37* [1.01, 1.85]	1.25* [1.03, 1.51]			1.23 [0.91, 1.67]	1.16 [0.96, 1.41]
		Adolescence			1.34* [1.01, 1.77]	1.34** [1.12, 1.60]	1.23 [0.92, 1.65]	1.26* [1.04, 1.52]			1.04 [0.76, 1.40]	1.12 [0.92, 1.37]
		Early Adulthood							2.49** [1.92, 3.24]	1.95** [1.65, 2.31]	2.40** [1.84, 3.14]	1.86** [1.56, 2.22]
	Female	**Childhood**	1.26** [1.21, 1.32]	1.22** [1.19, 1.25]			1.21** [1.15, 1.26]	1.16** [1.13, 1.19]			1.08** [1.03, 1.13]	1.09** [1.07, 1.12]
		Adolescence			1.21** [1.16, 1.26]	1.22** [1.19, 1.25]	1.15** [1.10, 1.20]	1.16** [1.14, 1.19]			0.97 [0.93, 1.02]	1.06** [1.04, 1.09]
		Early Adulthood							2.31** [2.22, 2.40]	1.68** [1.64, 1.72]	2.39** [2.29, 2.49]	1.67** [1.63, 1.71]
	Male	**Childhood**	1.91** [1.81, 2.01]	1.86** [1.78, 1.93]			1.75** [1.66, 1.85]	1.63** [1.57, 1.70]			1.59** [1.51, 1.69]	1.49** [1.43, 1.56]
		Adolescence			1.59** [1.50, 1.67]	1.81** [1.74, 1.88]	1.40** [1.32, 1.48]	1.62** [1.56, 1.68]			1.17** [1.10, 1.23]	1.37** [1.31, 1.42]
		Early Adulthood							2.65** [2.54, 2.77]	2.61** [2.52, 2.70]	2.46** [2.35, 2.57]	2.37** [2.29, 2.45]

***p ≤ .001, **p ≤ .01, *p ≤ .05

Models are adjusted for gender (included only in models for the full sample), ethnicity, parental education and parental occupation level

Table 4. Multinomial logistic regressions predicting economic activity (at age 32) by accumulated health problems.

Reference category: employed		Unemployment	Inactivity
Long-term illness	**All**	1.62** [1.39, 1.89]	1.94** [1.77, 2.12]
	Female	1.48** [1.45, 1.52]	1.70** [1.67, 1.72]
	Male	1.79** [1.74, 1.83]	2.44** [2.40, 2.48]
Self-rated general health	**All**	1.95** [1.63, 2.33]	2.29** [2.04, 2.57]
	Female	1.76** [1.71, 1.81]	1.95** [1.92, 1.98]
	Male	2.31** [2.23, 2.39]	3.24** [3.17, 3.31]
Mental health	**All**	1.46** [1.28, 1.67]	1.34** [1.24, 1.46]
	Female	1.35** [1.32, 1.38]	1.24** [1.22, 1.25]
	Male	1.68** [1.64, 1.73]	1.72** [1.69, 1.75]

***p ≤ .001, **p ≤ .01, *p ≤ .05

Models are adjusted for gender (included only in models for the full sample), ethnicity, parental education and parental occupation level.

Appendix

Table A1. Missing rate of each variable

Variable (age)	Missing Rate (%)
Gender (14/17 for boost)	2.21
Ethnicity (14/17 for boost)	0.16
Education (32)	55.86
Mother's education (13)	11.87
Father's education (13)	37.99
Mother's occupation level (13)	11.57
Father's occupation level (13)	36.94
Retrospective measure of childhood long-term illness (32)	59.65
Long-term illness (15)	16.7
Long-term illness (17)	28.32
Long-term illness (25)	53.39
Long-term illness (32)	56.16
Retrospective measure of childhood self-rated general health (32)	59.48
Self-rated general health (15)	22.64
Self-rated general health (16)	23.87
Self-rated general health (17)	28.97
Self-rated general health (25)	53.4
Self-rated general health (32)	56.08
Mental health (GHQ) (15)	21.18
Mental health (GHQ) (17)	31.98

Variable (age)	Missing Rate (%)
Mental health (GHQ) (25)	54.34
Mental health (GHQ) (32)	57.42
Economic activity (25)	52.44
Economic activity (32)	55.32

Table A2. Descriptive statistics by age-32 health measure

			Childhood		Adolescence		Early adulthood	
			No health problem	Having health problem	No health problem	Having health problem	No health problem	Having health problem
Long-term illness	Gender, N (%)	Male	6889 (50.2)	1315 (54.9)	7714 (50.9)	490 (51.4)	7305 (52)	899 (43.4)
		Female	6836 (49.8)	1082 (45.1)	7455 (49.1)	463 (48.6)	6746 (48)	1172 (56.6)
	Ethnicity, N (%)	White	8733 (63.6)	1840 (76.8)	9855 (65)	718 (75.4)	9031 (64.3)	1542 (74.5)
		Mixed	681 (5)	135 (5.6)	763 (5)	52 (5.5)	690 (4.9)	126 (6.1)
		Indian	937 (6.8)	83 (3.5)	988 (6.5)	32 (3.4)	925 (6.6)	95 (4.6)
		Pakistani/Bangladeshi	1568 (11.4)	141 (5.9)	1641 (10.8)	68 (7.1)	1581 (11.3)	128 (6.2)
		Black	1411 (10.3)	164 (6.8)	1511 (10)	64 (6.7)	1433 (10.2)	141 (6.8)
		Other	396 (2.9)	33 (1.4)	411 (2.7)	18 (1.9)	391 (2.8)	39 (1.9)
	Having a degree (32), N (%)	Not having a degree	7712 (56.2)	1526 (63.7)	8639 (57)	598 (62.8)	8011 (57)	1227 (59.2)
		Having a degree or above	6014 (43.8)	870 (36.3)	6530 (43)	354 (37.2)	6040 (43)	845 (40.8)
	Economic activity at 25, N (%)	Employed	11968 (87.2)	1898 (79.2)	13159 (86.7)	708 (74.3)	12365 (88)	1502 (72.5)
		Unemployed	564 (4.1)	147 (6.1)	631 (4.2)	80 (8.4)	553 (3.9)	158 (7.6)
		Inactive	1193 (8.7)	351 (14.7)	1379 (9.1)	165 (17.3)	1133 (8.1)	412 (19.9)
		Not having	11471 (83.6)	1466 (61.2)	12418 (81.9)	519 (54.5)	12177 (86.7)	760 (36.7)

			Childhood		Adolescence		Early adulthood	
			No health problem	Having health problem	No health problem	Having health problem	No health problem	Having health problem
	Long-term illness (32), N (%)	Having	2255 (16.4)	931 (38.8)	2752 (18.1)	433 (45.5)	1874 (13.3)	1311 (63.3)
	Self-rated general health (32), N (%)	Good	12625 (92)	1935 (80.7)	13803 (91)	758 (79.6)	13105 (93.3)	1455 (70.3)
		Poor	1100 (8)	461 (19.3)	1367 (9)	195 (20.4)	946 (6.7)	616 (29.7)
	Mental health (32), N (%)	Good	10833 (78.9)	1669 (69.6)	11837 (78)	665 (69.9)	11234 (80)	1268 (61.2)
		Poor	2892 (21.1)	727 (30.4)	3333 (22)	287 (30.1)	2817 (20)	803 (38.8)
	Mother's education (13), N (%)	Not having a degree	12445 (90.7)	2158 (90)	13754 (90.7)	849 (89.1)	12755 (90.8)	1848 (89.2)
		Having a degree or above	1281 (9.3)	239 (10)	1416 (9.3)	103 (10.9)	1296 (9.2)	223 (10.8)
	Father's education (13), N (%)	Not having a degree	12115 (88.3)	2125 (88.7)	13411 (88.4)	829 (87.1)	12431 (88.5)	1809 (87.3)
		Having a degree or above	1610 (11.7)	272 (11.3)	1759 (11.6)	123 (12.9)	1619 (11.5)	262 (12.7)
	Mother's occupation level (13), N (%)	Not working	2209 (16.1)	252 (10.5)	2353 (15.5)	108 (11.3)	2233 (15.9)	228 (11)
		Routine/semi-routine	4264 (31.1)	819 (34.2)	4742 (31.3)	340 (35.7)	4407 (31.4)	676 (32.6)
		Middle	3655 (26.6)	666 (27.8)	4073 (26.8)	248 (26)	3779 (26.9)	542 (26.1)
		High	3599 (26.2)	659 (27.5)	4001 (26.4)	257 (26.9)	3632 (25.8)	626 (30.2)
	Father's occupation level (13), N (%)	Not working	724 (5.3)	104 (4.4)	783 (5.2)	46 (4.8)	741 (5.3)	88 (4.2)
		Routine/semi-routine	3257 (23.7)	618 (25.8)	3633 (24)	241 (25.3)	3352 (23.9)	522 (25.2)
		Middle	5108 (37.2)	856 (35.7)	5618 (37)	345 (36.3)	5257 (37.4)	706 (34.1)
		High	4636 (33.8)	819 (34.2)	5135 (33.8)	321 (33.7)	4700 (33.5)	755 (36.5)
	Total n, N (%)		13725 (85.1)	2397 (14.9)	15170 (94.1)	952 (5.9)	14051 (87.2)	2071 (12.8)

			Childhood		Adolescence		Early adulthood	
			No health problem	Having health problem	No health problem	Having health problem	No health problem	Having health problem
Self-rated general health	Gender, N (%)	Male	7753 (51.5)	451 (42.4)	7858 (51.6)	346 (38.3)	7725 (51.3)	479 (45.7)
		Female	7305 (48.5)	613 (57.6)	7360 (48.4)	558 (61.7)	7348 (48.7)	570 (54.3)
	Ethnicity, N (%)	White	9846 (65.4)	727 (68.3)	9961 (65.5)	612 (67.7)	9841 (65.3)	732 (69.8)
		Mixed	759 (5)	57 (5.3)	778 (5.1)	38 (4.2)	759 (5)	57 (5.4)
		Indian	952 (6.3)	68 (6.4)	971 (6.4)	49 (5.4)	979 (6.5)	41 (3.9)
		Pakistani/Bangladeshi	1599 (10.6)	110 (10.4)	1612 (10.6)	96 (10.7)	1601 (10.6)	108 (10.3)
		Black	1497 (9.9)	78 (7.3)	1502 (9.9)	72 (8)	1490 (9.9)	85 (8.1)
		Other	405 (2.7)	24 (2.3)	393 (2.6)	36 (4)	402 (2.7)	27 (2.6)
	Having a degree (32), N (%)	Not having a degree	8568 (56.9)	670 (63)	8701 (57.2)	537 (59.4)	8528 (56.6)	710 (67.6)
		Having a degree or above	6490 (43.1)	394 (37)	6517 (42.8)	368 (40.6)	6545 (43.4)	340 (32.4)
	Economic activity at 25, N (%)	Employed	13075 (86.8)	792 (74.5)	13151 (86.4)	715 (79.1)	13201 (87.6)	665 (63.4)
		Unemployed	632 (4.2)	79 (7.4)	666 (4.4)	45 (5)	593 (3.9)	118 (11.2)
		Inactive	1351 (9)	193 (18.1)	1400 (9.2)	144 (15.9)	1278 (8.5)	266 (25.3)
	Long-term illness (32), N (%)	Not having	12363 (82.1)	574 (53.9)	12348 (81.1)	589 (65.1)	12540 (83.2)	397 (37.9)
		Having	2695 (17.9)	491 (46.1)	2870 (18.9)	316 (34.9)	2533 (16.8)	652 (62.1)
	Self-rated general health (32), N (%)	Good	13836 (91.9)	725 (68.1)	13824 (90.8)	736 (81.4)	14035 (93.1)	526 (50.1)
		Poor	1222 (8.1)	339 (31.9)	1393 (9.2)	169 (18.6)	1038 (6.9)	523 (49.9)
	Mental health (32), N (%)	Good	11841 (78.6)	661 (62.2)	11923 (78.4)	579 (64)	11938 (79.2)	564 (53.7)
		Poor	3217 (21.4)	403 (37.8)	3294 (21.6)	325 (36)	3134 (20.8)	485 (46.3)
		Not having a degree	13625 (90.5)	978 (91.9)	13807 (90.7)	796 (88)	13648 (90.5)	955 (91)

			Childhood		Adolescence		Early adulthood	
			No health problem	Having health problem	No health problem	Having health problem	No health problem	Having health problem
	Mother's education (13), N (%)	Having a degree or above	1433 (9.5)	86 (8.1)	1411 (9.3)	109 (12)	1425 (9.5)	94 (9)
	Father's education (13), N (%)	Not having a degree	13274 (88.2)	966 (90.8)	13447 (88.4)	793 (87.7)	13284 (88.1)	956 (91.2)
		Having a degree or above	1784 (11.8)	98 (9.2)	1771 (11.6)	111 (12.3)	1789 (11.9)	93 (8.8)
	Mother's occupation level (13), N (%)	Not working	2309 (15.3)	152 (14.3)	2319 (15.2)	142 (15.7)	2297 (15.2)	164 (15.6)
		Routine/semi-routine	4704 (31.2)	379 (35.6)	4824 (31.7)	259 (28.7)	4723 (31.3)	360 (34.3)
		Middle	4041 (26.8)	280 (26.3)	4067 (26.7)	254 (28)	4059 (26.9)	261 (24.9)
		High	4004 (26.6)	253 (23.8)	4008 (26.3)	250 (27.6)	3993 (26.5)	264 (25.2)
	Father's occupation level (13), N (%)	Not working	769 (5.1)	60 (5.6)	787 (5.2)	42 (4.7)	774 (5.1)	56 (5.3)
		Routine/semi-routine	3587 (23.8)	287 (27)	3663 (24.1)	211 (23.3)	3552 (23.6)	322 (30.7)
		Middle	5573 (37)	391 (36.7)	5625 (37)	339 (37.4)	5607 (37.2)	357 (34)
		High	5129 (34.1)	326 (30.6)	5143 (33.8)	313 (34.6)	5140 (34.1)	315 (30)
	Total n, N (%)		15058 (93.4)	1064 (6.6)	15217 (94.4)	904 (5.6)	15073 (93.5)	1048 (6.5)
Mental health	Gender, N (%)	Male	7338 (54.3)	866 (33.2)	7084 (54.5)	1120 (35.8)	6924 (52.6)	1280 (43.1)
		Female	6173 (45.7)	1745 (66.8)	5907 (45.5)	2011 (64.2)	6227 (47.4)	1691 (56.9)
	Ethnicity, N (%)	White	8866 (65.6)	1707 (65.4)	8579 (66)	1994 (63.7)	8589 (65.3)	1984 (66.8)
		Mixed	641 (4.7)	174 (6.7)	623 (4.8)	193 (6.1)	651 (4.9)	165 (5.6)
		Indian	880 (6.5)	140 (5.4)	824 (6.3)	196 (6.3)	861 (6.5)	159 (5.4)
		Pakistani/Bangladeshi	1446 (10.7)	263 (10.1)	1371 (10.6)	338 (10.8)	1410 (10.7)	299 (10.1)
		Black	1338 (9.9)	237 (9.1)	1274 (9.8)	301 (9.6)	1300 (9.9)	275 (9.3)

			Childhood		Adolescence		Early adulthood	
			No health problem	Having health problem	No health problem	Having health problem	No health problem	Having health problem
		Other	340 (2.5)	90 (3.4)	320 (2.5)	110 (3.5)	341 (2.6)	88 (3)
	Having a degree (32), N (%)	Not having a degree	7850 (58.1)	1387 (53.1)	7648 (58.9)	1589 (50.8)	7524 (57.2)	1714 (57.7)
		Having a degree or above	5660 (41.9)	1224 (46.9)	5343 (41.1)	1542 (49.2)	5628 (42.8)	1256 (42.3)
	Economic activity at 25, N (%)	Employed	11740 (86.9)	2127 (81.5)	11297 (87)	2570 (82.1)	11614 (88.3)	2253 (75.8)
		Unemployed	578 (4.3)	133 (5.1)	556 (4.3)	155 (4.9)	459 (3.5)	252 (8.5)
		Inactive	1193 (8.8)	352 (13.5)	1138 (8.8)	406 (13)	1079 (8.2)	465 (15.7)
	Long-term illness (32), N (%)	Not having	11123 (82.3)	1814 (69.5)	10725 (82.6)	2212 (70.6)	11013 (83.7)	1923 (64.8)
		Having	2388 (17.7)	797 (30.5)	2266 (17.4)	919 (29.4)	2138 (16.3)	1047 (35.2)
	Self-rated general health (32), N (%)	Good	12348 (91.4)	2213 (84.7)	11894 (91.6)	2667 (85.2)	12230 (93)	2331 (78.5)
		Poor	1163 (8.6)	398 (15.3)	1097 (8.4)	464 (14.8)	922 (7)	639 (21.5)
	Mental health (32), N (%)	Good	10792 (79.9)	1710 (65.5)	10477 (80.6)	2026 (64.7)	10811 (82.2)	1691 (56.9)
		Poor	2719 (20.1)	901 (34.5)	2514 (19.4)	1105 (35.3)	2341 (17.8)	1279 (43.1)
	Mother's education (13), N (%)	Not having a degree	12298 (91)	2305 (88.3)	11875 (91.4)	2727 (87.1)	11925 (90.7)	2677 (90.1)
		Having a degree or above	1213 (9)	306 (11.7)	1116 (8.6)	404 (12.9)	1226 (9.3)	293 (9.9)
		Not having a degree	12007 (88.9)	2233 (85.5)	11576 (89.1)	2664 (85.1)	11626 (88.4)	2614 (88)

			Childhood		Adolescence		Early adulthood	
			No health problem	Having health problem	No health problem	Having health problem	No health problem	Having health problem
	Father's education (13), N (%)	Having a degree or above	1504 (11.1)	378 (14.5)	1415 (10.9)	467 (14.9)	1526 (11.6)	356 (12)
	Mother's occupation level (13), N (%)	Not working	2086 (15.4)	374 (14.3)	1989 (15.3)	472 (15.1)	2032 (15.4)	429 (14.4)
		Routine/semi-routine	4302 (31.8)	781 (29.9)	4198 (32.3)	885 (28.3)	4140 (31.5)	943 (31.7)
		Middle	3594 (26.6)	726 (27.8)	3465 (26.7)	856 (27.3)	3519 (26.8)	801 (27)
		High	3529 (26.1)	729 (27.9)	3340 (25.7)	918 (29.3)	3460 (26.3)	797 (26.8)
	Father's occupation level (13), N (%)	Not working	705 (5.2)	124 (4.7)	683 (5.3)	146 (4.7)	678 (5.2)	151 (5.1)
		Routine/semi-routine	3262 (24.1)	612 (23.4)	3187 (24.5)	688 (22)	3105 (23.6)	770 (25.9)
		Middle	5057 (37.4)	907 (34.7)	4882 (37.6)	1082 (34.6)	4926 (37.5)	1038 (34.9)
		High	4487 (33.2)	968 (37.1)	4240 (32.6)	1215 (38.8)	4443 (33.8)	1012 (34.1)
	Total n, N (%)		13511 (83.8)	2611 (16.2)	12991 (80.6)	3131 (19.4)	13141(81.5)	2970 (18.4)

Table A3a. Full multinomial logistic regressions predicting economic activity (at age 32) by the timing of health problems for all participants

		Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
Long-term illness	**(Intercept)**	0.03** [0.02, 0.03]	0.07** [0.07, 0.08]	0.05** [0.03, 0.08]	0.08** [0.05, 0.11]	0.03** [0.02, 0.03]	0.08** [0.07, 0.08]	0.05** [0.03, 0.09]	0.09** [0.06, 0.13]	0.02** [0.02, 0.03]	0.07** [0.06, 0.07]	0.04** [0.03, 0.08]	0.08** [0.05, 0.11]	0.05** [0.03, 0.08]	0.07** [0.05, 0.11]	0.04** [0.02, 0.07]	0.07** [0.05, 0.10]
	Childhood	1.64** [1.22, 2.20]	2.14** [1.82, 2.51]	1.75** [1.29, 2.35]	2.39** [2.01, 2.83]									1.64** [1.20, 2.25]	2.08** [1.72, 2.51]	1.39 [1.00, 1.94]	1.70** [1.40, 2.06]
	Adolescence					1.63* [1.04, 2.54]	2.42** [1.95, 3.02]	1.68* [1.07, 2.63]	2.52** [2.00, 3.17]					1.33 [0.83, 2.15]	1.78** [1.38, 2.29]	1.08 [0.67, 1.76]	1.41** [1.09, 1.82]
	Early Adulthood									2.52** [1.86, 3.41]	3.24** [2.72, 3.87]	2.68** [1.97, 3.66]	3.35** [2.77, 4.05]			2.45** [1.77, 3.40]	2.78** [2.28, 3.38]
	Gender (ref: male): female			1.35** [1.07, 1.69]	2.72** [2.28, 3.24]			1.32* [1.06, 1.66]	2.64** [2.22, 3.14]			1.28* [1.02, 1.61]	2.52** [2.12, 3.01]	1.35* [1.07, 1.69]	2.72** [2.28, 3.24]	1.30* [1.03, 1.63]	2.60** [2.18, 3.10]
	Ethnicity (ref: White): Mixed			1.38 [0.85, 2.23]	0.92 [0.63, 1.33]			1.37 [0.85, 2.22]	0.92 [0.63, 1.33]			1.36 [0.84, 2.21]	0.90 [0.62, 1.32]	1.38 [0.85, 2.24]	0.92 [0.63, 1.34]	1.37 [0.84, 2.22]	0.91 [0.63, 1.33]
	Ethnicity: Indian			0.70 [0.40, 1.23]	0.59** [0.41, 0.86]			0.68 [0.39, 1.19]	0.56** [0.39, 0.82]			0.70 [0.40, 1.24]	0.58** [0.40, 0.85]	0.71 [0.40, 1.24]	0.60** [0.42, 0.88]	0.73 [0.42, 1.28]	0.63* [0.43, 0.91]
	Ethnicity: Pakistani/Bangladeshi			1.12 [0.70, 1.79]	1.24 [0.93, 1.65]			1.08 [0.68, 1.72]	1.17 [0.87, 1.56]			1.16 [0.73, 1.85]	1.28 [0.95, 1.72]	1.12 [0.71, 1.79]	1.25 [0.93, 1.67]	1.19 [0.75, 1.91]	1.34 [1.00, 1.81]
	Ethnicity: Black			1.00 [0.65, 1.56]	0.89 [0.68, 1.18]			0.97 [0.63, 1.52]	0.86 [0.65, 1.14]			1.03 [0.66, 1.61]	0.91 [0.68, 1.21]	1.01 [0.65, 1.57]	0.91 [0.69, 1.20]	1.06 [0.68, 1.65]	0.96 [0.72, 1.28]
	Ethnicity: Other			1.17 [0.58, 2.33]	1.09 [0.69, 1.70]			1.11 [0.56, 2.22]	1.02 [0.65, 1.60]			1.18 [0.59, 2.35]	1.08 [0.68, 1.69]	1.17 [0.59, 2.34]	1.10 [0.70, 1.72]	1.22 [0.61, 2.44]	1.15 [0.73, 1.81]
	Mother's education (13) (ref: not having a degree): Having a degree			1.14 [0.67, 1.94]	0.88 [0.63, 1.22]			1.14 [0.67, 1.93]	0.87 [0.63, 1.21]			1.13 [0.66, 1.92]	0.88 [0.64, 1.22]	1.13 [0.66, 1.93]	0.87 [0.63, 1.21]	1.12 [0.66, 1.91]	0.87 [0.63, 1.21]
	Father's education (13) (ref: not having a degree): Having a degree			0.68 [0.37, 1.26]	1.03 [0.75, 1.42]			0.68 [0.37, 1.25]	1.02 [0.74, 1.40]			0.68 [0.37, 1.25]	1.03 [0.75, 1.43]	0.68 [0.37, 1.26]	1.03 [0.75, 1.41]	0.68 [0.37, 1.26]	1.03 [0.75, 1.43]
	Mother's occupation level (13) (ref: not working): routine/semi-routine			0.74 [0.50, 1.08]	0.79 [0.61, 1.02]			0.74 [0.50, 1.09]	0.79 [0.62, 1.02]			0.74 [0.50, 1.09]	0.79 [0.61, 1.02]	0.74 [0.50, 1.08]	0.78 [0.61, 1.01]	0.73 [0.50, 1.08]	0.78 [0.60, 1.01]
	Mother's occupation level (13): middle level			0.58* [0.37, 0.89]	0.55** [0.42, 0.73]			0.58* [0.38, 0.90]	0.56** [0.43, 0.74]			0.58* [0.37, 0.89]	0.56** [0.42, 0.74]	0.58* [0.37, 0.89]	0.55** [0.42, 0.73]	0.58* [0.37, 0.89]	0.55** [0.42, 0.73]
	Mother's occupation level (13): high			0.44** [0.27, 0.73]	0.50** [0.37, 0.68]			0.45** [0.27, 0.74]	0.50** [0.37, 0.69]			0.43** [0.26, 0.72]	0.48** [0.35, 0.66]	0.44** [0.27, 0.73]	0.50** [0.36, 0.68]	0.43** [0.26, 0.72]	0.48** [0.35, 0.65]
	Father's occupation level (13) (ref: not working): routine/semi-routine			0.93 [0.55, 1.58]	0.96 [0.69, 1.35]			0.94 [0.55, 1.58]	0.97 [0.69, 1.36]			0.92 [0.55, 1.55]	0.95 [0.68, 1.33]	0.93 [0.55, 1.58]	0.96 [0.69, 1.35]	0.92 [0.54, 1.55]	0.95 [0.68, 1.33]
	Father's occupation level (13): middle level			0.76 [0.45, 1.28]	0.76 [0.54, 1.06]			0.76 [0.45, 1.28]	0.75 [0.54, 1.05]			0.76 [0.45, 1.28]	0.75 [0.54, 1.05]	0.76 [0.45, 1.29]	0.76 [0.54, 1.06]	0.76 [0.45, 1.28]	0.76 [0.54, 1.06]
	Father's occupation level (13): high			0.55* [0.32, 0.95]	0.58** [0.39, 0.85]			0.55* [0.32, 0.95]	0.58** [0.39, 0.85]			0.54* [0.31, 0.93]	0.56** [0.38, 0.83]	0.55* [0.32, 0.95]	0.58** [0.39, 0.85]	0.54* [0.31, 0.94]	0.56** [0.38, 0.83]
	Log Likelihood		-308112.0969		-294124.6769		-309102.4979		-294124.6769		-303613.8194		-290204.2604		-288364.6518		-288364.6518
	McFadden_R2		0.009428543		0.054397693		0.006244433		0.054397693		0.023890375		0.067001718		0.072916006		0.072916006
Self-rated general health	**(Intercept)**	0.03** [0.02, 0.03]	0.08** [0.07, 0.08]	0.05** [0.03, 0.08]	0.09** [0.06, 0.13]	0.03** [0.03, 0.03]	0.08** [0.07, 0.09]	0.05** [0.03, 0.09]	0.09** [0.06, 0.13]	0.03** [0.02, 0.03]	0.07** [0.06, 0.08]	0.04** [0.03, 0.08]	0.08** [0.05, 0.12]	0.05** [0.03, 0.08]	0.08** [0.06, 0.13]	0.04** [0.02, 0.08]	0.07** [0.05, 0.11]
	Childhood	2.38** [1.71, 3.33]	2.90** [2.37, 3.55]	2.32** [1.65, 3.25]	2.71** [2.19, 3.35]									2.33** [1.66, 3.29]	2.56** [2.06, 3.18]	1.84** [1.28, 2.63]	1.94** [1.54, 2.44]
	Adolescence					1.11 [0.68, 1.84]	1.89** [1.49, 2.41]	1.10 [0.66, 1.82]	1.74** [1.36, 2.22]					0.94 [0.56, 1.57]	1.44** [1.11, 1.85]	0.83 [0.50, 1.39]	1.25 [0.96, 1.64]
	Early Adulthood									3.97** [2.90, 5.43]	4.95** [4.03, 6.09]	3.91** [2.84, 5.36]	4.84** [3.90, 6.02]			3.55** [2.55, 4.93]	4.19** [3.35, 5.24]
	Gender (ref: male): female			1.30* [1.03, 1.63]	2.56** [2.15, 3.05]			1.32* [1.05, 1.66]	2.58** [2.17, 3.07]			1.31* [1.05, 1.65]	2.61** [2.19, 3.11]	1.30* [1.03, 1.63]	2.53** [2.13, 3.01]	1.30* [1.04, 1.64]	2.55** [2.13, 3.04]

		Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
Mental health	Ethnicity (ref: White): Mixed			1.38 [0.85, 2.23]	0.92 [0.63, 1.33]			1.37 [0.85, 2.22]	0.92 [0.63, 1.33]			1.38 [0.85, 2.23]	0.91 [0.63, 1.33]	1.37 [0.85, 2.23]	0.92 [0.64, 1.34]	1.38 [0.85, 2.23]	0.92 [0.63, 1.34]
	Ethnicity: Indian			0.66 [0.38, 1.16]	0.54** [0.37, 0.78]			0.66 [0.38, 1.16]	0.54** [0.37, 0.78]			0.70 [0.40, 1.23]	0.58** [0.40, 0.84]	0.66 [0.38, 1.16]	0.54** [0.37, 0.79]	0.70 [0.40, 1.23]	0.58** [0.40, 0.85]
	Ethnicity: Pakistani/Bangladeshi			1.07 [0.67, 1.70]	1.15 [0.86, 1.52]			1.06 [0.67, 1.69]	1.13 [0.85, 1.51]			1.10 [0.69, 1.76]	1.19 [0.88, 1.59]	1.07 [0.67, 1.70]	1.15 [0.86, 1.53]	1.10 [0.69, 1.76]	1.20 [0.89, 1.61]
	Ethnicity: Black			0.98 [0.63, 1.52]	0.85 [0.64, 1.13]			0.96 [0.62, 1.49]	0.83 [0.63, 1.10]			1.00 [0.64, 1.55]	0.87 [0.65, 1.15]	0.98 [0.63, 1.52]	0.86 [0.65, 1.13]	1.01 [0.65, 1.57]	0.89 [0.67, 1.18]
	Ethnicity: Other			1.12 [0.56, 2.22]	1.02 [0.65, 1.60]			1.10 [0.55, 2.18]	0.96 [0.61, 1.51]			1.13 [0.56, 2.26]	1.04 [0.66, 1.63]	1.12 [0.56, 2.23]	1.01 [0.64, 1.58]	1.14 [0.57, 2.29]	1.05 [0.67, 1.65]
	Mother's education (13) (ref: not having a degree): Having a degree			1.14 [0.67, 1.95]	0.88 [0.64, 1.22]			1.14 [0.67, 1.94]	0.88 [0.63, 1.21]			1.12 [0.66, 1.91]	0.87 [0.63, 1.21]	1.15 [0.67, 1.95]	0.88 [0.63, 1.22]	1.12 [0.66, 1.91]	0.86 [0.62, 1.19]
	Father's education (13) (ref: not having a degree): Having a degree			0.69 [0.37, 1.27]	1.04 [0.76, 1.43]			0.68 [0.37, 1.25]	1.03 [0.75, 1.41]			0.70 [0.38, 1.29]	1.06 [0.77, 1.47]	0.69 [0.37, 1.27]	1.04 [0.76, 1.43]	0.71 [0.38, 1.30]	1.07 [0.78, 1.49]
	Mother's occupation level (13) (ref: not working): routine/semi-routine			0.73 [0.50, 1.08]	0.79 [0.61, 1.01]			0.74 [0.51, 1.09]	0.81 [0.63, 1.04]			0.74 [0.50, 1.10]	0.80 [0.62, 1.03]	0.73 [0.50, 1.08]	0.79 [0.62, 1.02]	0.73 [0.50, 1.09]	0.79 [0.61, 1.02]
	Mother's occupation level (13): middle level			0.58* [0.37, 0.89]	0.56** [0.43, 0.74]			0.58* [0.38, 0.90]	0.57** [0.43, 0.74]			0.59* [0.38, 0.91]	0.57** [0.43, 0.75]	0.58* [0.37, 0.89]	0.56** [0.43, 0.74]	0.58* [0.37, 0.90]	0.56** [0.43, 0.75]
	Mother's occupation level (13): high			0.44** [0.27, 0.74]	0.50** [0.37, 0.68]			0.45** [0.27, 0.74]	0.51** [0.37, 0.69]			0.45** [0.27, 0.74]	0.50** [0.37, 0.68]	0.44** [0.27, 0.74]	0.50** [0.37, 0.69]	0.44** [0.27, 0.73]	0.50** [0.37, 0.68]
	Father's occupation level (13) (ref: not working): routine/semi-routine			0.94 [0.56, 1.59]	0.98 [0.70, 1.36]			0.94 [0.55, 1.59]	0.97 [0.70, 1.36]			0.91 [0.54, 1.55]	0.94 [0.67, 1.32]	0.94 [0.56, 1.59]	0.97 [0.70, 1.36]	0.91 [0.54, 1.56]	0.94 [0.67, 1.32]
	Father's occupation level (13): middle level			0.77 [0.46, 1.29]	0.76 [0.54, 1.06]			0.76 [0.45, 1.28]	0.75 [0.54, 1.05]			0.77 [0.45, 1.29]	0.76 [0.55, 1.07]	0.77 [0.46, 1.29]	0.75 [0.54, 1.06]	0.77 [0.46, 1.30]	0.76 [0.54, 1.07]
	Father's occupation level (13): high			0.55* [0.32, 0.96]	0.58** [0.39, 0.85]			0.55* [0.32, 0.95]	0.57** [0.39, 0.84]			0.55* [0.32, 0.96]	0.58** [0.39, 0.85]	0.55* [0.32, 0.96]	0.58** [0.39, 0.85]	0.56* [0.32, 0.97]	0.58** [0.39, 0.86]
	Log Likelihood		-307462.9811		-294601.1901		-310204.2252		-297053.3347		-301532.8749		-288819.1813		-294321.1588		-287257.4513
	McFadden_R3		0.01151542		0.05286571		0.00270241		0.04498214		0.03058055		0.07145470		0.05376600		0.07647562
	(Intercept)	0.03** [0.02, 0.03]	0.08** [0.07, 0.08]	0.05** [0.03, 0.09]	0.09** [0.06, 0.13]	0.03** [0.02, 0.03]	0.08** [0.07, 0.08]	0.05** [0.03, 0.09]	0.09** [0.06, 0.13]	0.02** [0.02, 0.03]	0.07** [0.06, 0.08]	0.04** [0.02, 0.08]	0.08** [0.06, 0.12]	0.05** [0.03, 0.08]	0.09** [0.06, 0.13]	0.04** [0.02, 0.07]	0.08** [0.05, 0.12]
	Childhood	1.48** [1.11, 1.95]	1.54** [1.29, 1.84]	1.45* [1.09, 1.94]	1.34** [1.12, 1.61]									1.37* [1.01, 1.85]	1.25* [1.03, 1.51]	1.23 [0.91, 1.67]	1.16 [0.96, 1.41]
	Adolescence					1.33* [1.01, 1.74]	1.48** [1.24, 1.76]	1.34* [1.01, 1.77]	1.34** [1.12, 1.60]					1.23 [0.92, 1.65]	1.26* [1.04, 1.52]	1.04 [0.76, 1.40]	1.12 [0.92, 1.37]
	Early Adulthood									2.50** [1.93, 3.24]	2.07** [1.75, 2.45]	2.49** [1.92, 3.24]	1.95** [1.65, 2.31]			2.40** [1.84, 3.14]	1.86** [1.56, 2.22]
	Gender (ref: male): female			1.26* [1.00, 1.59]	2.54** [2.13, 3.02]			1.28* [1.01, 1.61]	2.54** [2.13, 3.02]			1.25 [0.99, 1.58]	2.53** [2.13, 3.01]	1.24 [0.98, 1.57]	2.49** [2.08, 2.97]	1.22 [0.96, 1.54]	2.46** [2.06, 2.93]
	Ethnicity (ref: White): Mixed			1.34 [0.83, 2.18]	0.90 [0.62, 1.30]			1.35 [0.84, 2.19]	0.90 [0.62, 1.31]			1.36 [0.84, 2.20]	0.91 [0.63, 1.31]	1.34 [0.83, 2.17]	0.89 [0.62, 1.29]	1.35 [0.83, 2.18]	0.90 [0.62, 1.30]
	Ethnicity: Indian			0.67 [0.38, 1.17]	0.54** [0.37, 0.78]			0.66 [0.38, 1.16]	0.53** [0.37, 0.77]			0.69 [0.39, 1.20]	0.55** [0.38, 0.80]	0.67 [0.38, 1.17]	0.54** [0.37, 0.78]	0.69 [0.39, 1.21]	0.55** [0.38, 0.80]
	Ethnicity: Pakistani/Bangladeshi			1.06 [0.67, 1.69]	1.13 [0.85, 1.50]			1.06 [0.66, 1.68]	1.13 [0.85, 1.50]			1.08 [0.67, 1.72]	1.14 [0.85, 1.52]	1.06 [0.66, 1.68]	1.13 [0.85, 1.50]	1.08 [0.67, 1.72]	1.14 [0.85, 1.52]
	Ethnicity: Black			0.96 [0.62, 1.49]	0.83 [0.63, 1.10]			0.96 [0.62, 1.49]	0.82 [0.62, 1.09]			0.97 [0.63, 1.52]	0.83 [0.63, 1.10]	0.96 [0.62, 1.49]	0.83 [0.63, 1.09]	0.98 [0.63, 1.52]	0.83 [0.63, 1.10]
	Ethnicity: Other			1.08 [0.54, 2.15]	0.97 [0.62, 1.51]			1.07 [0.54, 2.14]	0.96 [0.61, 1.50]			1.08 [0.54, 2.17]	0.97 [0.62, 1.52]	1.06 [0.53, 2.12]	0.95 [0.61, 1.49]	1.07 [0.53, 2.14]	0.95 [0.61, 1.49]
	Mother's education (13) (ref: not having a degree): Having a degree			1.13 [0.66, 1.92]	0.88 [0.64, 1.22]			1.12 [0.66, 1.91]	0.87 [0.63, 1.20]			1.13 [0.67, 1.93]	0.88 [0.64, 1.22]	1.12 [0.66, 1.90]	0.87 [0.63, 1.20]	1.12 [0.66, 1.91]	0.87 [0.63, 1.21]
	Father's education (13) (ref: not having a degree): Having a degree			0.67 [0.36, 1.24]	1.02 [0.74, 1.39]			0.67 [0.37, 1.24]	1.02 [0.75, 1.40]			0.67 [0.37, 1.24]	1.02 [0.74, 1.40]	0.67 [0.36, 1.23]	1.01 [0.74, 1.39]	0.67 [0.36, 1.23]	1.01 [0.74, 1.39]

Activity (ref: employment)	Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
Mother's occupation level (13) (ref: not working): routine/semi-routine			0.74 [0.51, 1.09]	0.80 [0.63, 1.03]			0.75 [0.51, 1.10]	0.81 [0.63, 1.04]			0.74 [0.50, 1.09]	0.80 [0.62, 1.02]	0.74 [0.51, 1.09]	0.81 [0.63, 1.04]	0.74 [0.50, 1.08]	0.80 [0.62, 1.03]
Mother's occupation level (13): middle level			0.58* [0.38, 0.89]	0.56** [0.43, 0.74]			0.58* [0.38, 0.90]	0.56** [0.43, 0.74]			0.57* [0.37, 0.88]	0.56** [0.42, 0.73]	0.58* [0.38, 0.89]	0.56** [0.43, 0.74]	0.57* [0.37, 0.88]	0.56** [0.42, 0.73]
Mother's occupation level (13): high			0.45** [0.27, 0.74]	0.50** [0.37, 0.68]			0.45** [0.27, 0.74]	0.51** [0.37, 0.69]			0.44** [0.27, 0.73]	0.50** [0.37, 0.68]	0.45** [0.27, 0.74]	0.50** [0.37, 0.68]	0.44** [0.27, 0.73]	0.50** [0.37, 0.68]
Father's occupation level (13) (ref: not working): routine/semi-routine			0.93 [0.55, 1.58]	0.97 [0.70, 1.36]			0.94 [0.55, 1.58]	0.97 [0.70, 1.36]			0.92 [0.54, 1.56]	0.96 [0.69, 1.35]	0.93 [0.55, 1.58]	0.97 [0.69, 1.36]	0.92 [0.54, 1.56]	0.96 [0.69, 1.34]
Father's occupation level (13): middle level			0.76 [0.45, 1.28]	0.75 [0.54, 1.05]			0.76 [0.45, 1.27]	0.75 [0.54, 1.04]			0.77 [0.45, 1.29]	0.76 [0.54, 1.06]	0.76 [0.45, 1.27]	0.75 [0.54, 1.04]	0.76 [0.45, 1.29]	0.75 [0.54, 1.05]
Father's occupation level (13): high			0.55* [0.31, 0.95]	0.57** [0.39, 0.84]			0.54* [0.31, 0.94]	0.57** [0.39, 0.83]			0.55* [0.32, 0.95]	0.57** [0.39, 0.85]	0.54* [0.31, 0.94]	0.57** [0.39, 0.83]	0.54* [0.31, 0.94]	0.57** [0.39, 0.84]
Log Likelihood		-309996.7835		-297098.0426		-310150.9885		-297128.4597		-306803.7942		-293982.6893		-296787.0847		-293671.6943
McFadden_R4		0.003369331		0.044838408		0.002873566		0.044740618		0.013634698		0.054854179		0.045838127		0.055854019

***p ≤ .001, **p ≤ .01, *p ≤ .05

Table A3b. Full multinomial logistic regressions predicting economic activity (at age 32) by the timing of health problems for females

	Activity (ref: employment)	Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
		Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
Long-term illness	(Intercept)	0.03** [0.03, 0.03]	0.11** [0.11, 0.11]	0.09** [0.08, 0.10]	0.22** [0.21, 0.23]	0.03** [0.03, 0.03]	0.12** [0.12, 0.12]	0.09** [0.09, 0.10]	0.24** [0.23, 0.25]	0.03** [0.03, 0.03]	0.11** [0.11, 0.11]	0.08** [0.08, 0.09]	0.21** [0.20, 0.22]	0.09** [0.08, 0.09]	0.22** [0.21, 0.23]	0.08** [0.07, 0.09]	0.20** [0.19, 0.21]
	Childhood	1.47** [1.40, 1.55]	1.94** [1.89, 1.99]	1.61** [1.53, 1.70]	2.09** [2.04, 2.15]									1.51** [1.43, 1.59]	1.89** [1.84, 1.95]	1.31** [1.24, 1.38]	1.60** [1.55, 1.64]
	Adolescence					1.55** [1.45, 1.66]	2.03** [1.96, 2.10]	1.62** [1.51, 1.74]	2.07** [1.99, 2.14]					1.35** [1.25, 1.45]	1.53** [1.48, 1.59]	1.16** [1.07, 1.25]	1.28** [1.23, 1.34]
	Early Adulthood									1.84** [1.76, 1.93]	2.25** [2.20, 2.30]	2.11** [2.01, 2.21]	2.52** [2.45, 2.58]			1.93** [1.84, 2.03]	2.15** [2.09, 2.21]
	Ethnicity (ref: White): Mixed			1.56** [1.45, 1.68]	0.99 [0.95, 1.04]			1.57** [1.46, 1.69]	1.01 [0.96, 1.06]			1.55** [1.44, 1.67]	0.99 [0.94, 1.04]	1.56** [1.45, 1.68]	1.00 [0.95, 1.05]	1.55** [1.44, 1.67]	0.99 [0.95, 1.04]
	Ethnicity: Indian			0.84** [0.77, 0.91]	0.65** [0.62, 0.69]			0.82** [0.75, 0.90]	0.63** [0.60, 0.66]			0.85** [0.78, 0.92]	0.65** [0.62, 0.68]	0.85** [0.78, 0.92]	0.67** [0.63, 0.70]	0.87** [0.80, 0.95]	0.69** [0.65, 0.72]
	Ethnicity: Pakistani/Bangladeshi			1.15** [1.08, 1.23]	1.36** [1.31, 1.41]			1.12** [1.05, 1.19]	1.29** [1.24, 1.34]			1.18** [1.11, 1.26]	1.39** [1.34, 1.44]	1.15** [1.08, 1.23]	1.36** [1.31, 1.41]	1.20** [1.13, 1.29]	1.44** [1.38, 1.49]
	Ethnicity: Black			0.96 [0.89, 1.02]	0.94** [0.91, 0.98]			0.94 [0.88, 1.00]	0.91** [0.88, 0.95]			0.97 [0.91, 1.04]	0.95** [0.92, 0.99]	0.96 [0.90, 1.03]	0.96* [0.92, 0.99]	0.99 [0.93, 1.06]	0.99 [0.96, 1.03]
	Ethnicity: Other			1.08 [0.96, 1.21]	0.95 [0.89, 1.02]			1.06 [0.94, 1.18]	0.92* [0.86, 0.99]			1.09 [0.97, 1.22]	0.95 [0.89, 1.02]	1.09 [0.97, 1.22]	0.97 [0.90, 1.03]	1.11 [0.99, 1.25]	0.99 [0.93, 1.06]
	Mother's education (13) (ref: not			1.28** [1.17, 1.39]	0.87** [0.83, 0.92]			1.28** [1.17, 1.39]	0.87** [0.83, 0.91]			1.28** [1.18, 1.40]	0.89** [0.85, 0.93]	1.27** [1.17, 1.39]	0.87** [0.83, 0.91]	1.27** [1.17, 1.39]	0.88** [0.84, 0.92]

		Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
	having a degree): Having a degree																
	Father's education (13) (ref: not having a degree): Having a degree			0.52** [0.47, 0.58]	1.07** [1.02, 1.11]			0.52** [0.47, 0.57]	1.06** [1.02, 1.11]			0.53** [0.48, 0.58]	1.07** [1.03, 1.12]	0.52** [0.47, 0.58]	1.07** [1.02, 1.11]	0.53** [0.48, 0.58]	1.07** [1.03, 1.12]
	Mother's occupation level (13) (ref: not working): routine/semi-routine			0.48** [0.45, 0.51]	0.75** [0.72, 0.77]			0.48** [0.46, 0.51]	0.75** [0.73, 0.78]			0.48** [0.45, 0.51]	0.74** [0.72, 0.77]	0.48** [0.45, 0.51]	0.75** [0.72, 0.77]	0.47** [0.45, 0.50]	0.74** [0.71, 0.76]
	Mother's occupation level (13): middle level			0.48** [0.45, 0.51]	0.53** [0.51, 0.55]			0.48** [0.45, 0.52]	0.54** [0.52, 0.56]			0.48** [0.45, 0.51]	0.53** [0.51, 0.55]	0.48** [0.45, 0.51]	0.53** [0.51, 0.55]	0.47** [0.44, 0.51]	0.53** [0.51, 0.55]
	Mother's occupation level (13): high			0.36** [0.33, 0.38]	0.43** [0.41, 0.45]			0.36** [0.33, 0.39]	0.44** [0.42, 0.46]			0.35** [0.32, 0.37]	0.42** [0.40, 0.44]	0.36** [0.33, 0.38]	0.43** [0.41, 0.45]	0.35** [0.32, 0.37]	0.42** [0.40, 0.44]
	Father's occupation level (13) (ref: not working): routine/semi-routine			0.80** [0.75, 0.86]	0.93** [0.89, 0.97]			0.80** [0.75, 0.86]	0.94** [0.90, 0.97]			0.80** [0.75, 0.86]	0.92** [0.89, 0.96]	0.80** [0.75, 0.86]	0.93** [0.89, 0.97]	0.80** [0.74, 0.85]	0.92** [0.88, 0.96]
	Father's occupation level (13): middle level			0.70** [0.66, 0.75]	0.78** [0.74, 0.81]			0.70** [0.65, 0.75]	0.77** [0.74, 0.80]			0.71** [0.66, 0.76]	0.78** [0.75, 0.81]	0.70** [0.66, 0.75]	0.78** [0.74, 0.81]	0.71** [0.66, 0.76]	0.78** [0.75, 0.81]
	Father's occupation level (13): high			0.45** [0.42, 0.49]	0.57** [0.55, 0.60]			0.45** [0.42, 0.49]	0.57** [0.55, 0.60]			0.44** [0.41, 0.48]	0.56** [0.54, 0.59]	0.45** [0.42, 0.49]	0.57** [0.55, 0.60]	0.45** [0.41, 0.48]	0.56** [0.54, 0.59]
	Log Likelihood		-9198156.607		-8899767.704		-9225545.879		-8938270.218		-9151898.337		-8839783.404		-8887666.676		-8801066.952
	McFadden_R2		0.0069052 2		0.0391212 91		0.0039480 9		0.0349643 01		0.0118995 74		0.0455975 99		0.0404277 99		0.0497776 87
Self-rated general health	(Intercept)	0.03** [0.03, 0.03]	0.11** [0.11, 0.12]	0.09** [0.08, 0.10]	0.23** [0.22, 0.24]	0.03** [0.03, 0.03]	0.12** [0.12, 0.12]	0.09** [0.09, 0.10]	0.24** [0.23, 0.25]	0.03** [0.03, 0.03]	0.11** [0.11, 0.11]	0.08** [0.08, 0.09]	0.22** [0.21, 0.23]	0.09** [0.08, 0.10]	0.23** [0.22, 0.24]	0.08** [0.07, 0.09]	0.20** [0.19, 0.21]
	Childhood	2.07** [1.96, 2.19]	2.29** [2.22, 2.36]	2.10** [1.99, 2.22]	2.28** [2.21, 2.35]									2.13** [2.01, 2.25]	2.16** [2.09, 2.23]	1.71** [1.61, 1.82]	1.72** [1.66, 1.78]
	Adolescence					1.05 [0.98, 1.13]	1.54** [1.49, 1.59]	1.07 [0.99, 1.15]	1.58** [1.53, 1.64]					0.92* [0.85, 0.99]	1.33** [1.29, 1.38]	0.84** [0.77, 0.90]	1.21** [1.16, 1.25]
	Early Adulthood									3.42** [3.25, 3.60]	3.78** [3.67, 3.89]	3.46** [3.29, 3.65]	3.80** [3.69, 3.91]			3.17** [3.00, 3.34]	3.35** [3.25, 3.45]
	Ethnicity (ref: White): Mixed			1.58** [1.47, 1.70]	1.01 [0.96, 1.06]			1.57** [1.46, 1.69]	1.01 [0.96, 1.06]			1.55** [1.43, 1.66]	0.99 [0.95, 1.04]	1.58** [1.46, 1.70]	1.02 [0.97, 1.06]	1.55** [1.44, 1.67]	1.01 [0.96, 1.06]
	Ethnicity: Indian			0.82** [0.75, 0.89]	0.62** [0.59, 0.65]			0.80** [0.74, 0.87]	0.61** [0.58, 0.64]			0.85** [0.78, 0.92]	0.64** [0.61, 0.68]	0.82** [0.75, 0.89]	0.62** [0.59, 0.65]	0.85** [0.78, 0.93]	0.66** [0.62, 0.69]
	Ethnicity: Pakistani/Bangladeshi			1.13** [1.06, 1.21]	1.30** [1.25, 1.34]			1.11** [1.04, 1.18]	1.27** [1.23, 1.32]			1.15** [1.07, 1.22]	1.32** [1.27, 1.37]	1.13** [1.06, 1.21]	1.30** [1.25, 1.35]	1.16** [1.09, 1.24]	1.34** [1.29, 1.39]
	Ethnicity: Black			0.94 [0.88, 1.01]	0.91** [0.88, 0.94]			0.92* [0.86, 0.99]	0.89** [0.86, 0.93]			0.96 [0.90, 1.03]	0.92** [0.89, 0.96]	0.94 [0.88, 1.01]	0.92** [0.88, 0.95]	0.97 [0.91, 1.04]	0.95** [0.91, 0.98]
	Ethnicity: Other			1.09 [0.97, 1.22]	0.95 [0.89, 1.01]			1.03 [0.92, 1.16]	0.87** [0.81, 0.93]			1.12 [1.00, 1.25]	0.97 [0.91, 1.04]	1.09 [0.98, 1.23]	0.93* [0.87, 1.00]	1.17** [1.04, 1.31]	1.00 [0.93, 1.07]
	Mother's education (13) (ref: not having a degree): Having a degree			1.28** [1.17, 1.40]	0.88** [0.84, 0.92]			1.29** [1.18, 1.40]	0.88** [0.84, 0.92]			1.28** [1.17, 1.40]	0.88** [0.84, 0.93]	1.28** [1.17, 1.40]	0.87** [0.83, 0.92]	1.27** [1.17, 1.39]	0.87** [0.83, 0.91]
	Father's education (13) (ref: not having a degree): Having a degree			0.53** [0.48, 0.58]	1.07** [1.03, 1.12]			0.52** [0.47, 0.57]	1.06** [1.02, 1.11]			0.53** [0.48, 0.59]	1.09** [1.04, 1.13]	0.53** [0.48, 0.58]	1.07** [1.03, 1.12]	0.54** [0.49, 0.59]	1.10** [1.05, 1.14]
	Mother's occupation level (13) (ref: not working):			0.48** [0.45, 0.51]	0.75** [0.72, 0.78]			0.49** [0.46, 0.52]	0.77** [0.74, 0.79]			0.48** [0.45, 0.51]	0.75** [0.73, 0.78]	0.48** [0.45, 0.51]	0.75** [0.73, 0.78]	0.48** [0.45, 0.51]	0.75** [0.72, 0.77]

		Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
	routine/semi-routine				0.55**				0.55**				0.55**		0.55**		0.55**
	Mother's occupation level (13): middle level			0.49**	[0.52, 0.57]			0.49**	[0.53, 0.57]			0.49**	[0.52, 0.57]	0.49**	[0.53, 0.57]	0.49**	[0.52, 0.57]
	Mother's occupation level (13): high			0.36**	0.44** [0.42, 0.46]			0.36**	0.44** [0.42, 0.46]			0.35**	0.43** [0.42, 0.45]	0.36**	0.44** [0.42, 0.46]	0.36**	0.43** [0.42, 0.45]
	Father's occupation level (13) (ref: not working):				0.93**				0.94**				0.91**		0.93**		0.91**
	routine/semi-routine			0.80**	[0.89, 0.97]			0.81**	[0.90, 0.98]			0.78**	[0.87, 0.95]	0.80**	[0.89, 0.97]	0.78**	[0.87, 0.95]
	Father's occupation level (13): middle level			0.70**	0.77** [0.74, 0.80]			0.70**	0.77** [0.74, 0.80]			0.71**	0.78** [0.75, 0.81]	0.70**	0.77** [0.74, 0.80]	0.71**	0.78** [0.75, 0.81]
	Father's occupation level (13): high			0.45**	0.57** [0.55, 0.60]			0.45**	0.57** [0.55, 0.60]			0.45**	0.58** [0.55, 0.60]	0.45**	0.57** [0.55, 0.60]	0.45**	0.57** [0.55, 0.60]
	Log Likelihood		-9189327.137		-8905822.842		-9248328.149		-8960725.629		-9057720.964		-8777937.407		-8899728.318		-8742727.737
	McFadden_R3		0.0078585 09		0.0384675 37		0.0014883 64		0.0325398 64		0.0220675 96		0.0522749 08		0.0391255 43		0.0560763 81
			0.12**		0.24**		0.12**		0.24**		0.11**		0.22**		0.24**		0.22**
	(Intercept)	0.03** [0.03, 0.03]	[0.12, 0.12]	0.09** [0.08, 0.10]	[0.23, 0.25]	0.03** [0.03, 0.03]	[0.12, 0.12]	0.09** [0.08, 0.10]	[0.23, 0.25]	0.03** [0.03, 0.03]	[0.11, 0.11]	0.08** [0.07, 0.08]	[0.21, 0.24]	0.09** [0.08, 0.10]	[0.22, 0.25]	0.08** [0.07, 0.08]	[0.21, 0.23]
	Childhood	1.19** [1.14, 1.25]	1.17** [1.14, 1.19]	1.26** [1.21, 1.32]	1.22** [1.19, 1.25]									1.21** [1.15, 1.26]	1.16** [1.13, 1.19]	1.08** [1.03, 1.13]	1.09** [1.07, 1.12]
	Adolescence					1.14** [1.10, 1.19]	1.14** [1.12, 1.17]	1.21** [1.16, 1.26]	1.22** [1.19, 1.25]					1.15** [1.10, 1.20]	1.16** [1.14, 1.19]	0.97 [0.93, 1.02]	1.06** [1.04, 1.09]
	Early Adulthood									2.31** [2.22, 2.40]	1.68** [1.64, 1.72]	2.40** [2.31, 2.50]	1.72** [1.68, 1.76]			2.39** [2.29, 2.49]	1.67** [1.63, 1.71]
	Ethnicity (ref: White):				0.99				0.99				1.00		0.99		0.99
	Mixed			1.55**	[0.94, 1.04]			1.56**	[0.95, 1.04]			1.56**	[0.95, 1.05]	1.55**	[0.94, 1.04]	1.56**	[0.95, 1.04]
	Ethnicity: Indian			0.81**	0.61** [0.58, 0.64]			0.80**	0.60** [0.57, 0.63]			0.82**	0.61** [0.58, 0.64]	0.81**	0.60** [0.57, 0.63]	0.83**	0.61** [0.58, 0.65]
	Ethnicity: Pakistani/Bangladeshi			1.11**	1.27** [1.22, 1.32]			1.11**	1.27** [1.22, 1.32]			1.11**	1.27** [1.22, 1.32]	1.11**	1.27** [1.22, 1.32]	1.11**	1.27** [1.22, 1.32]
Mental health	**Ethnicity: Black**			0.93*	0.89** [0.86, 0.92]			0.92*	0.88** [0.85, 0.92]			0.92*	0.89** [0.85, 0.92]	0.93*	0.89** [0.86, 0.92]	0.93*	0.89** [0.86, 0.92]
	Ethnicity: Other			1.02	0.88** [0.82, 0.94]			1.01	0.87** [0.81, 0.93]			1.01	0.88** [0.82, 0.94]	1.00	0.88** [0.81, 0.92]	1.01	0.87** [0.81, 0.93]
	Mother's education (13) (ref: not having a degree):				0.88**				0.88**				0.88**		0.88**		0.88**
	Having a degree			1.28**	[0.84, 0.93]			1.27**	[0.83, 0.92]			1.28**	[0.84, 0.93]	1.27**	[0.83, 0.92]	1.28**	[0.84, 0.92]
	Father's education (13) (ref: not having a degree):				1.05*				1.06**				1.05*		1.05*		1.04*
	Having a degree			0.52**	[1.01, 1.10]			0.52**	[1.01, 1.10]			0.51**	[1.01, 1.09]	0.52**	[1.01, 1.10]	0.51**	[1.00, 1.09]
	Mother's occupation level (13) (ref: not working):				0.76**				0.77**				0.75**		0.76**		0.75**
	routine/semi-routine			0.49**	[0.73, 0.79]			0.49**	[0.74, 0.79]			0.47**	[0.72, 0.78]	0.49**	[0.74, 0.79]	0.47**	[0.73, 0.78]
	Mother's occupation level (13): middle level			0.49**	0.54** [0.52, 0.56]			0.49**	0.55** [0.53, 0.57]			0.47**	0.54** [0.52, 0.56]	0.49**	0.54** [0.52, 0.57]	0.47**	0.54** [0.52, 0.56]
	Mother's occupation level (13): high			0.36**	0.44** [0.42, 0.46]			0.36**	0.44** [0.42, 0.46]			0.35**	0.43** [0.41, 0.45]	0.36**	0.44** [0.42, 0.46]	0.35**	0.43** [0.41, 0.45]

	Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
Father's occupation level (13) (ref: not working): routine/semi-routine			0.80** [0.75, 0.86]	0.94** [0.90, 0.98]			0.80** [0.75, 0.86]	0.94** [0.90, 0.98]			0.78** [0.73, 0.84]	0.92** [0.89, 0.96]	0.80** [0.75, 0.86]	0.93** [0.90, 0.97]	0.78** [0.73, 0.84]	0.92** [0.88, 0.96]
Father's occupation level (13): middle level			0.70** [0.65, 0.75]	0.77** [0.74, 0.80]			0.70** [0.65, 0.75]	0.77** [0.74, 0.80]			0.70** [0.66, 0.75]	0.77** [0.74, 0.81]	0.70** [0.65, 0.75]	0.77** [0.74, 0.80]	0.70** [0.66, 0.75]	0.77** [0.74, 0.80]
Father's occupation level (13): high			0.45** [0.42, 0.49]	0.57** [0.55, 0.60]			0.45** [0.41, 0.48]	0.57** [0.54, 0.59]			0.45** [0.42, 0.49]	0.57** [0.55, 0.60]	0.45** [0.41, 0.48]	0.57** [0.54, 0.59]	0.45** [0.41, 0.49]	0.57** [0.54, 0.59]
Log Likelihood		-9256892.079		-8967284.518		-9258055.655		-8967511.521		-9179223.045		-8888579.809		-8962860.589		-8885970.603
McFadden_R4		0.0005637 44		0.0318317 22		0.0004381 17		0.0318072 13		0.0089494 15		0.0403292 11		0.0323093 59		0.0406109 19

*****p ≤ .001, **p ≤ .01, *p ≤ .05**

Table A3c. Full multinomial logistic regressions predicting economic activity (at age 32) by the timing of health problems for males.

		Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
Long-term illness	**(Intercept)**	0.02** [0.02, 0.02]	0.04** [0.04, 0.04]	0.03** [0.02, 0.03]	0.07** [0.06, 0.07]	0.02** [0.02, 0.02]	0.04** [0.04, 0.04]	0.03** [0.03, 0.03]	0.08** [0.07, 0.08]	0.02** [0.02, 0.02]	0.03** [0.03, 0.03]	0.02** [0.02, 0.03]	0.06** [0.06, 0.07]	0.03** [0.02, 0.03]	0.07** [0.06, 0.07]	0.02** [0.02, 0.02]	0.05** [0.05, 0.06]
	Childhood	1.88** [1.80, 1.97]	2.97** [2.87, 3.06]	1.87** [1.78, 1.96]	2.95** [2.85, 3.05]									1.77** [1.68, 1.86]	2.43** [2.35, 2.52]	1.48** [1.40, 1.55]	1.89** [1.82, 1.96]
	Adolescence					1.75** [1.63, 1.87]	3.46** [3.32, 3.61]	1.72** [1.60, 1.85]	3.41** [3.27, 3.56]					1.31** [1.22, 1.41]	2.22** [2.12, 2.33]	0.99 [0.92, 1.07]	1.55** [1.48, 1.63]
	Early Adulthood									3.52** [3.36, 3.69]	5.71** [5.53, 5.90]	3.64** [3.47, 3.81]	5.84** [5.66, 6.04]			3.34** [3.18, 3.50]	4.63** [4.47, 4.79]
	Ethnicity (ref: White): Mixed			1.23** [1.12, 1.34]	0.79** [0.73, 0.86]			1.20** [1.10, 1.31]	0.76** [0.71, 0.83]			1.21** [1.10, 1.32]	0.77** [0.71, 0.83]	1.22** [1.12, 1.34]	0.79** [0.73, 0.86]	1.22** [1.12, 1.34]	0.79** [0.73, 0.86]
	Ethnicity: Indian			0.58** [0.52, 0.64]	0.47** [0.43, 0.51]			0.55** [0.49, 0.61]	0.44** [0.40, 0.48]			0.57** [0.51, 0.63]	0.45** [0.42, 0.49]	0.58** [0.52, 0.64]	0.48** [0.44, 0.52]	0.59** [0.53, 0.65]	0.49** [0.45, 0.54]
	Ethnicity: Pakistani/Bangladeshi			1.06 [0.98, 1.15]	0.99 [0.93, 1.05]			1.01 [0.93, 1.09]	0.91** [0.86, 0.97]			1.11* [1.02, 1.20]	1.02 [0.96, 1.09]	1.07 [0.98, 1.16]	1.00 [0.94, 1.06]	1.15** [1.06, 1.25]	1.11** [1.05, 1.18]
	Ethnicity: Black			1.09* [1.02, 1.17]	0.80** [0.75, 0.84]			1.05 [0.98, 1.13]	0.74** [0.70, 0.79]			1.15** [1.07, 1.23]	0.84** [0.80, 0.89]	1.10* [1.02, 1.18]	0.81** [0.76, 0.85]	1.18** [1.10, 1.27]	0.89** [0.84, 0.95]
	Ethnicity: Other			1.32** [1.18, 1.49]	1.41** [1.30, 1.54]			1.23** [1.09, 1.38]	1.22** [1.12, 1.33]			1.35** [1.20, 1.52]	1.41** [1.30, 1.54]	1.32** [1.17, 1.48]	1.40** [1.28, 1.52]	1.42** [1.26, 1.59]	1.56** [1.43, 1.70]
	Mother's education (13) (ref: not having a degree): Having a degree			1.00 [0.91, 1.10]	0.88** [0.82, 0.94]			1.01 [0.92, 1.10]	0.88** [0.83, 0.95]			0.98 [0.89, 1.07]	0.84** [0.79, 0.90]	1.00 [0.91, 1.10]	0.88** [0.83, 0.95]	0.98 [0.89, 1.07]	0.86** [0.80, 0.92]
	Father's education (13) (ref: not having a degree): Having a degree			0.90* [0.83, 0.98]	0.97 [0.91, 1.03]			0.89** [0.81, 0.97]	0.93* [0.87, 0.99]			0.88** [0.80, 0.96]	0.93* [0.87, 0.99]	0.90* [0.82, 0.98]	0.94 [0.89, 1.00]	0.88** [0.81, 0.96]	0.92* [0.87, 0.98]

		Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
	Mother's occupation level (13) (ref: not working): routine/semi-routine			1.24** [1.16, 1.33]	0.87** [0.83, 0.92]			1.24** [1.16, 1.33]	0.87** [0.82, 0.91]			1.27** [1.19, 1.37]	0.91** [0.86, 0.96]	1.24** [1.15, 1.33]	0.86** [0.81, 0.90]	1.27** [1.18, 1.36]	0.89** [0.84, 0.94]
	Mother's occupation level (13): middle level			0.77** [0.71, 0.84]	0.61** [0.57, 0.64]			0.78** [0.72, 0.84]	0.61** [0.58, 0.65]			0.79** [0.73, 0.86]	0.63** [0.60, 0.67]	0.77** [0.72, 0.84]	0.61** [0.58, 0.65]	0.79** [0.73, 0.86]	0.63** [0.60, 0.67]
	Mother's occupation level (13): high			0.62** [0.57, 0.68]	0.66** [0.62, 0.70]			0.63** [0.57, 0.68]	0.66** [0.62, 0.70]			0.62** [0.57, 0.68]	0.66** [0.62, 0.70]	0.62** [0.57, 0.68]	0.65** [0.61, 0.69]	0.62** [0.57, 0.68]	0.65** [0.61, 0.69]
	Father's occupation level (13) (ref: not working): routine/semi-routine			1.19** [1.08, 1.31]	1.03 [0.96, 1.10]			1.20** [1.09, 1.32]	1.04 [0.98, 1.11]			1.16** [1.06, 1.28]	0.98 [0.92, 1.05]	1.19** [1.08, 1.31]	1.03 [0.96, 1.10]	1.16** [1.05, 1.27]	0.98 [0.92, 1.05]
	Father's occupation level (13): middle level			0.90* [0.82, 0.99]	0.72** [0.67, 0.77]			0.90* [0.82, 0.99]	0.72** [0.68, 0.77]			0.90* [0.82, 0.99]	0.70** [0.66, 0.75]	0.90* [0.82, 0.99]	0.72** [0.68, 0.77]	0.89* [0.81, 0.98]	0.71** [0.67, 0.76]
	Father's occupation level (13): high			0.74** [0.67, 0.81]	0.59** [0.55, 0.63]			0.74** [0.67, 0.81]	0.59** [0.55, 0.63]			0.73** [0.66, 0.80]	0.57** [0.53, 0.61]	0.74** [0.67, 0.82]	0.59** [0.55, 0.64]	0.73** [0.66, 0.80]	0.58** [0.54, 0.62]
	Log Likelihood		-5877358.8		-5780351.861		-5917029.116		-5818375.967		-5704487.284		-5602154.655		-5753588.804		-5549597.643
	McFadden_R2		0.018527832		0.034727219		0.011903205		0.028377496		0.047396		0.064484735		0.039196437		0.073261338
	(Intercept)	0.02** [0.02, 0.02]	0.04** [0.04, 0.04]	0.03** [0.03, 0.03]	0.08** [0.07, 0.08]	0.03** [0.02, 0.03]	0.05** [0.04, 0.05]	0.03** [0.03, 0.03]	0.09** [0.08, 0.09]	0.02** [0.02, 0.02]	0.04** [0.04, 0.04]	0.03** [0.02, 0.03]	0.07** [0.06, 0.07]	0.03** [0.03, 0.03]	0.08** [0.07, 0.08]	0.02** [0.02, 0.03]	0.06** [0.06, 0.07]
	Childhood	2.75** [2.59, 2.93]	3.97** [3.81, 4.14]	2.75** [2.58, 2.93]	3.96** [3.80, 4.13]									2.74** [2.57, 2.92]	3.73** [3.58, 3.90]	2.13** [1.99, 2.27]	2.59** [2.48, 2.71]
	Adolescence					1.14** [1.04, 1.26]	2.26** [2.14, 2.39]	1.17** [1.06, 1.29]	2.29** [2.17, 2.42]					1.03 [0.94, 1.14]	1.90** [1.80, 2.01]	0.87** [0.79, 0.96]	1.49** [1.41, 1.58]
	Early Adulthood									4.66** [4.41, 4.91]	7.67** [7.40, 7.96]	4.52** [4.28, 4.78]	7.35** [7.09, 7.63]			4.06** [3.84, 4.29]	6.06** [5.83, 6.30]
	Ethnicity (ref: White): Mixed			1.20** [1.09, 1.31]	0.76** [0.70, 0.82]			1.20** [1.10, 1.31]	0.77** [0.71, 0.83]			1.23** [1.12, 1.34]	0.79** [0.73, 0.85]	1.20** [1.09, 1.31]	0.77** [0.71, 0.83]	1.22** [1.12, 1.34]	0.79** [0.73, 0.86]
	Ethnicity: Indian			0.52** [0.47, 0.58]	0.39** [0.36, 0.43]			0.54** [0.48, 0.60]	0.41** [0.38, 0.45]			0.57** [0.51, 0.64]	0.46** [0.42, 0.50]	0.52** [0.47, 0.58]	0.39** [0.36, 0.42]	0.56** [0.50, 0.62]	0.44** [0.40, 0.48]
	Ethnicity: Pakistani/Bangladeshi			0.97 [0.90, 1.06]	0.83** [0.79, 0.88]			0.99 [0.91, 1.07]	0.85** [0.80, 0.90]			1.02 [0.94, 1.10]	0.90** [0.85, 0.95]	0.97 [0.90, 1.06]	0.84** [0.79, 0.89]	1.00 [0.92, 1.09]	0.89** [0.84, 0.94]
Self-rated general health	**Ethnicity: Black**			1.06 [0.98, 1.13]	0.74** [0.70, 0.78]			1.04 [0.97, 1.11]	0.72** [0.68, 0.76]			1.07* [1.00, 1.15]	0.76** [0.71, 0.80]	1.06 [0.99, 1.13]	0.74** [0.70, 0.79]	1.09* [1.01, 1.17]	0.78** [0.73, 0.82]
	Ethnicity: Other			1.18** [1.05, 1.33]	1.14** [1.05, 1.24]			1.21** [1.08, 1.36]	1.17** [1.08, 1.27]			1.18** [1.05, 1.33]	1.13** [1.04, 1.23]	1.18** [1.05, 1.32]	1.13** [1.04, 1.23]	1.15* [1.02, 1.29]	1.08 [0.99, 1.18]
	Mother's education (13) (ref: not having a degree): Having a degree			1.02 [0.93, 1.12]	0.90** [0.84, 0.96]			1.00 [0.91, 1.10]	0.87** [0.81, 0.93]			0.97 [0.88, 1.07]	0.83** [0.77, 0.89]	1.02 [0.93, 1.12]	0.88** [0.82, 0.94]	0.98 [0.90, 1.08]	0.83** [0.78, 0.89]
	Father's education (13) (ref: not having a degree): Having a degree			0.91* [0.83, 0.99]	0.99 [0.93, 1.05]			0.90* [0.82, 0.98]	0.96 [0.90, 1.02]			0.93 [0.85, 1.01]	1.02 [0.96, 1.09]	0.91* [0.83, 0.99]	0.99 [0.93, 1.05]	0.93 [0.86, 1.02]	1.04 [0.98, 1.11]
	Mother's occupation level (13) (ref: not working): routine/semi-routine			1.23** [1.15, 1.32]	0.86** [0.81, 0.90]			1.25** [1.17, 1.34]	0.89** [0.84, 0.94]			1.27** [1.18, 1.36]	0.90** [0.86, 0.95]	1.23** [1.14, 1.32]	0.87** [0.82, 0.91]	1.25** [1.16, 1.34]	0.89** [0.84, 0.94]
	Mother's occupation level (13): middle level			0.76** [0.70, 0.82]	0.59** [0.55, 0.62]			0.77** [0.72, 0.84]	0.60** [0.57, 0.64]			0.78** [0.72, 0.84]	0.62** [0.58, 0.66]	0.76** [0.70, 0.82]	0.59** [0.55, 0.62]	0.77** [0.71, 0.83]	0.60** [0.57, 0.64]

		Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
	Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
	Mother's occupation level (13): high			0.62** [0.57, 0.67]	0.65** [0.61, 0.69]			0.63** [0.58, 0.69]	0.68** [0.64, 0.72]			0.63** [0.58, 0.69]	0.68** [0.64, 0.72]	0.62** [0.57, 0.67]	0.65** [0.62, 0.70]	0.62** [0.57, 0.68]	0.67** [0.63, 0.71]
	Father's occupation level (13) (ref: not working): routine/semi-routine			1.23** [1.12, 1.35]	1.07* [1.00, 1.14]			1.20** [1.09, 1.32]	1.03 [0.97, 1.10]			1.17** [1.07, 1.29]	1.00 [0.93, 1.07]	1.22** [1.11, 1.34]	1.06 [0.99, 1.13]	1.19** [1.09, 1.31]	1.02 [0.95, 1.09]
	Father's occupation level (13): middle level			0.92 [0.84, 1.01]	0.74** [0.69, 0.79]			0.90* [0.82, 0.99]	0.71** [0.67, 0.76]			0.91 [0.83, 1.00]	0.73** [0.68, 0.78]	0.92 [0.84, 1.01]	0.73** [0.69, 0.78]	0.93 [0.85, 1.02]	0.74** [0.69, 0.79]
	Father's occupation level (13): high			0.75** [0.68, 0.83]	0.60** [0.56, 0.64]			0.73** [0.66, 0.81]	0.57** [0.53, 0.61]			0.74** [0.67, 0.82]	0.59** [0.55, 0.63]	0.75** [0.68, 0.83]	0.60** [0.56, 0.64]	0.76** [0.69, 0.84]	0.60** [0.56, 0.65]
	Log Likelihood		-5890378.608		-5790975.806		-5970218.589		-5868536.028		-5710399.027		-5623263.539		-5779938.581		-5572450.809
	McFadden_R3		0.016353628		0.032953105		0.003020986		0.020001165		0.046408786		0.060959719		0.034796234		0.069445041
	(Intercept)	0.02** [0.02, 0.02]	0.04** [0.04, 0.04]	0.03** [0.03, 0.03]	0.08** [0.08, 0.09]	0.02** [0.02, 0.02]	0.04** [0.04, 0.04]	0.03** [0.03, 0.03]	0.08** [0.08, 0.09]	0.02** [0.02, 0.02]	0.04** [0.04, 0.04]	0.02** [0.02, 0.03]	0.07** [0.07, 0.08]	0.03** [0.02, 0.03]	0.08** [0.07, 0.09]	0.02** [0.02, 0.03]	0.07** [0.06, 0.07]
	Childhood	1.87** [1.78, 1.98]	1.81** [1.74, 1.89]	1.91** [1.81, 2.01]	1.86** [1.78, 1.93]									1.75** [1.66, 1.85]	1.63** [1.57, 1.70]	1.59** [1.51, 1.69]	1.49** [1.43, 1.56]
	Adolescence					1.50** [1.42, 1.58]	1.71** [1.64, 1.77]	1.59** [1.50, 1.67]	1.81** [1.74, 1.88]					1.40** [1.32, 1.48]	1.62** [1.56, 1.68]	1.17** [1.10, 1.23]	1.37** [1.31, 1.42]
	Early Adulthood									2.66** [2.54, 2.78]	2.63** [2.54, 2.72]	2.65** [2.54, 2.77]	2.61** [2.52, 2.70]			2.46** [2.35, 2.57]	2.37** [2.29, 2.45]
	Ethnicity (ref: White): Mixed			1.16** [1.06, 1.27]	0.74** [0.68, 0.80]			1.17** [1.07, 1.28]	0.73** [0.68, 0.79]			1.18** [1.08, 1.29]	0.75** [0.69, 0.81]	1.15** [1.05, 1.26]	0.72** [0.67, 0.78]	1.15** [1.05, 1.26]	0.72** [0.67, 0.78]
	Ethnicity: Indian			0.54** [0.49, 0.60]	0.42** [0.38, 0.46]			0.54** [0.48, 0.59]	0.41** [0.38, 0.45]			0.56** [0.51, 0.63]	0.43** [0.40, 0.47]	0.54** [0.48, 0.60]	0.41** [0.38, 0.45]	0.56** [0.51, 0.63]	0.43** [0.40, 0.47]
	Ethnicity: Pakistani/Bangladeshi			0.98 [0.90, 1.06]	0.85** [0.80, 0.90]			0.97 [0.89, 1.05]	0.83** [0.78, 0.88]			1.02 [0.94, 1.11]	0.88** [0.83, 0.93]	0.97 [0.89, 1.05]	0.83** [0.78, 0.88]	1.00 [0.93, 1.09]	0.86** [0.81, 0.91]
	Ethnicity: Black			1.03 [0.96, 1.11]	0.71** [0.67, 0.76]			1.03 [0.96, 1.11]	0.71** [0.67, 0.75]			1.07 [1.00, 1.15]	0.74** [0.70, 0.78]	1.03 [0.96, 1.11]	0.71** [0.67, 0.75]	1.06 [0.99, 1.14]	0.73** [0.69, 0.77]
	Ethnicity: Other			1.20** [1.07, 1.35]	1.17** [1.08, 1.27]			1.21** [1.07, 1.36]	1.18** [1.08, 1.28]			1.22** [1.09, 1.37]	1.19** [1.09, 1.29]	1.20** [1.06, 1.34]	1.16** [1.07, 1.26]	1.20** [1.07, 1.35]	1.16** [1.07, 1.26]
Mental health	**Mother's education (13) (ref: not having a degree): Having a degree**			0.97 [0.89, 1.07]	0.86** [0.80, 0.92]			0.98 [0.89, 1.07]	0.85** [0.79, 0.91]			0.99 [0.90, 1.09]	0.87** [0.81, 0.93]	0.96 [0.87, 1.05]	0.84** [0.78, 0.89]	0.96 [0.87, 1.05]	0.84** [0.78, 0.90]
	Father's education (13) (ref: not having a degree): Having a degree			0.88** [0.81, 0.96]	0.94 [0.89, 1.00]			0.88** [0.81, 0.96]	0.94* [0.88, 1.00]			0.90* [0.83, 0.98]	0.97 [0.91, 1.03]	0.87** [0.80, 0.95]	0.93* [0.87, 0.99]	0.88** [0.81, 0.96]	0.94 [0.88, 1.00]
	Mother's occupation level (13) (ref: not working): routine/semi-routine			1.26** [1.17, 1.35]	0.89** [0.84, 0.94]			1.25** [1.17, 1.34]	0.88** [0.84, 0.93]			1.27** [1.18, 1.36]	0.89** [0.85, 0.94]	1.26** [1.17, 1.35]	0.89** [0.84, 0.94]	1.27** [1.19, 1.37]	0.90** [0.85, 0.94]
	Mother's occupation level (13): middle level			0.77** [0.71, 0.83]	0.60** [0.57, 0.64]			0.77** [0.71, 0.83]	0.60** [0.57, 0.64]			0.78** [0.72, 0.84]	0.61** [0.57, 0.64]	0.77** [0.71, 0.83]	0.60** [0.57, 0.64]	0.77** [0.72, 0.84]	0.61** [0.57, 0.64]
	Mother's occupation level (13): high			0.64** [0.59, 0.70]	0.68** [0.64, 0.72]			0.63** [0.58, 0.68]	0.67** [0.63, 0.71]			0.64** [0.58, 0.69]	0.68** [0.64, 0.72]	0.64** [0.59, 0.69]	0.68** [0.64, 0.72]	0.65** [0.59, 0.70]	0.69** [0.65, 0.73]
	Father's occupation level (13) (ref: not working): routine/semi-routine			1.19** [1.08, 1.31]	1.03 [0.97, 1.10]			1.20** [1.09, 1.32]	1.04 [0.97, 1.11]			1.20** [1.09, 1.32]	1.04 [0.97, 1.11]	1.19** [1.08, 1.31]	1.03 [0.96, 1.10]	1.19** [1.08, 1.31]	1.03 [0.97, 1.10]

	Childhood only		Childhood only adjusted		Adolescence only		Adolescence only adjusted		Early adulthood only		Early adulthood only adjusted		Childhood + Adolescence adjusted		Three stage adjusted	
Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
Father's occupation level (13): middle level			0.90* [0.82, 0.99]	0.71** [0.67, 0.76]			0.90* [0.82, 0.99]	0.71** [0.67, 0.76]			0.92 [0.84, 1.01]	0.73** [0.68, 0.77]	0.90* [0.82, 0.99]	0.71** [0.66, 0.76]	0.92 [0.83, 1.01]	0.72** [0.68, 0.77]
Father's occupation level (13): high			0.72** [0.65, 0.80]	0.57** [0.53, 0.61]			0.72** [0.66, 0.80]	0.57** [0.53, 0.61]			0.74** [0.67, 0.82]	0.58** [0.54, 0.62]	0.72** [0.65, 0.79]	0.56** [0.52, 0.60]	0.73** [0.66, 0.80]	0.57** [0.53, 0.61]
Log Likelihood		-5959245.867		-5856315.024		-5965561.267		-5859652.119		-5877662.129		-5778893.127		-5839901.147		-5754701.626
McFadden_R4		0.004853343		0.022041975		0.003798722		0.021484707		0.018477179		0.034970816		0.024782962		0.039010604

*****p ≤ .001, **p ≤ .01, *p ≤ .05**

Table A4a. Multinomial logistic regressions predicting economic activity (at age 32) by accumulated health problems for all participants.

Independent variable:	**Long-term illness**				**Self-rated general health**				**Mental health**			
	Unadjusted		**Three stage adjusted**		**Unadjusted**		**Three stage adjusted**		**Unadjusted**		**Three stage adjusted**	
Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
(Intercept)	0.02** [0.02, 0.03]	0.06** [0.06, 0.07]	0.04** [0.02, 0.07]	0.07** [0.05, 0.10]	0.02** [0.02, 0.03]	0.07** [0.06, 0.07]	0.04** [0.03, 0.08]	0.08** [0.05, 0.11]	0.02** [0.02, 0.03]	0.07** [0.06, 0.07]	0.04** [0.03, 0.08]	0.08** [0.06, 0.12]
Accumulation	1.56** [1.34, 1.81]	1.85** [1.71, 2.02]	1.62** [1.39, 1.89]	1.94** [1.77, 2.12]	1.97** [1.65, 2.35]	2.39** [2.14, 2.66]	1.95** [1.63, 2.33]	2.29** [2.04, 2.57]	1.45** [1.28, 1.65]	1.43** [1.32, 1.55]	1.46** [1.28, 1.67]	1.34** [1.24, 1.46]
Gender (ref: male): female			1.33* [1.06, 1.67]	2.66** [2.23, 3.17]			1.27* [1.01, 1.59]	2.48** [2.08, 2.96]			1.17 [0.93, 1.49]	2.40** [2.01, 2.87]
Ethnicity (ref: White): Mixed			1.38 [0.85, 2.24]	0.92 [0.63, 1.34]			1.40 [0.86, 2.26]	0.94 [0.64, 1.36]			1.32 [0.82, 2.14]	0.89 [0.61, 1.28]
Ethnicity: Indian			0.74 [0.42, 1.29]	0.63* [0.44, 0.92]			0.69 [0.39, 1.20]	0.57** [0.39, 0.83]			0.68 [0.39, 1.18]	0.54** [0.37, 0.79]
Ethnicity: Pakistani/Bangladeshi			1.18 [0.74, 1.88]	1.33 [0.99, 1.79]			1.09 [0.69, 1.74]	1.18 [0.88, 1.58]			1.06 [0.67, 1.69]	1.13 [0.85, 1.51]
Ethnicity: Black			1.05 [0.68, 1.64]	0.96 [0.72, 1.27]			1.01 [0.65, 1.56]	0.89 [0.67, 1.18]			0.97 [0.62, 1.50]	0.83 [0.63, 1.10]
Ethnicity: Other			1.22 [0.61, 2.43]	1.15 [0.73, 1.81]			1.10 [0.55, 2.20]	1.01 [0.64, 1.59]			1.04 [0.52, 2.07]	0.93 [0.60, 1.46]
Mother's education (13) (ref: not having a degree): Having a degree			1.12 [0.66, 1.91]	0.87 [0.63, 1.21]			1.11 [0.65, 1.89]	0.85 [0.61, 1.19]			1.10 [0.65, 1.86]	0.86 [0.62, 1.19]
Father's education (13) (ref: not having a degree): Having a degree			0.68 [0.37, 1.26]	1.03 [0.74, 1.42]			0.70 [0.38, 1.28]	1.06 [0.77, 1.46]			0.66 [0.36, 1.22]	1.00 [0.73, 1.38]
Mother's occupation level (13) (ref: not working): routine/semi-routine			0.73 [0.49, 1.08]	0.78 [0.60, 1.01]			0.74 [0.50, 1.09]	0.80 [0.62, 1.03]			0.74 [0.51, 1.10]	0.80 [0.62, 1.03]
Mother's occupation level (13): middle level			0.57* [0.37, 0.89]	0.55** [0.41, 0.73]			0.58* [0.38, 0.90]	0.56** [0.43, 0.74]			0.57* [0.37, 0.89]	0.56** [0.42, 0.74]
Mother's occupation level (13): high			0.44** [0.26, 0.72]	0.48** [0.35, 0.66]			0.45** [0.27, 0.74]	0.50** [0.37, 0.68]			0.44** [0.27, 0.73]	0.50** [0.37, 0.68]
Father's occupation level (13) (ref: not working): routine/semi-routine			0.92 [0.55, 1.56]	0.95 [0.68, 1.34]			0.92 [0.55, 1.56]	0.95 [0.68, 1.34]			0.92 [0.54, 1.56]	0.96 [0.69, 1.35]
Father's occupation level (13): middle level			0.76 [0.45, 1.29]	0.76 [0.54, 1.06]			0.76 [0.45, 1.28]	0.75 [0.54, 1.06]			0.75 [0.45, 1.27]	0.75 [0.54, 1.04]
Father's occupation level (13): high			0.55* [0.32, 0.95]	0.57** [0.39, 0.84]			0.55* [0.32, 0.96]	0.58** [0.39, 0.85]			0.53* [0.31, 0.92]	0.56** [0.38, 0.83]
Log Likelihood		-303382.8224		-289426.743		-301991.2749		-289714.6434		-307349.1683		-294950.5942
McFadden_R2		0.024633024		0.069501414		0.029106808		0.068575823		0.011881337		0.051742393

Table A4b. Multinomial logistic regressions predicting economic activity (at age 32) by accumulated health problems for females.

Independent variable:	Long-term illness				Self-rated general health				Mental health			
	Unadjusted		Three stage adjusted		Unadjusted		Three stage adjusted		Unadjusted		Three stage adjusted	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
	0.03**	0.10**	0.08**	0.20**	0.03**	0.10**	0.08**	0.21**	0.03**	0.11**	0.08**	0.22**
(Intercept)	[0.03, 0.03]	[0.10, 0.10]	[0.08, 0.09]	[0.19, 0.21]	[0.03, 0.03]	[0.10, 0.10]	[0.08, 0.09]	[0.20, 0.22]	[0.03, 0.03]	[0.11, 0.11]	[0.07, 0.08]	[0.21, 0.23]
	1.38**	1.61**	1.48**	1.70**	1.73**	1.93**	1.76**	1.95**	1.30**	1.20**	1.35**	1.24**
Accumulation	[1.35, 1.42]	[1.59, 1.63]	[1.45, 1.52]	[1.67, 1.72]	[1.68, 1.77]	[1.91, 1.96]	[1.71, 1.81]	[1.92, 1.98]	[1.28, 1.33]	[1.19, 1.21]	[1.32, 1.38]	[1.22, 1.25]
Ethnicity (ref: White):			1.56**	1.00			1.58**	1.02			1.53**	0.98
Mixed			[1.45, 1.68]	[0.95, 1.05]			[1.47, 1.70]	[0.97, 1.07]			[1.42, 1.65]	[0.94, 1.03]
			0.88**	0.69**			0.85**	0.65**			0.82**	0.61**
Ethnicity: Indian			[0.81, 0.96]	[0.66, 0.73]			[0.78, 0.92]	[0.62, 0.68]			[0.75, 0.89]	[0.58, 0.64]
Ethnicity:			1.19**	1.42**			1.15**	1.33**			1.11**	1.27**
Pakistani/Bangladeshi			[1.12, 1.28]	[1.37, 1.48]			[1.07, 1.22]	[1.28, 1.38]			[1.04, 1.19]	[1.22, 1.32]
			0.99	0.99			0.97	0.94**			0.93*	0.89**
Ethnicity: Black			[0.93, 1.06]	[0.96, 1.03]			[0.91, 1.04]	[0.91, 0.98]			[0.87, 0.99]	[0.86, 0.92]
			1.12	1.00			1.08	0.95			0.97	0.85**
Ethnicity: Other			[1.00, 1.25]	[0.93, 1.07]			[0.96, 1.21]	[0.89, 1.01]			[0.86, 1.08]	[0.79, 0.91]
Mother's education (13) (ref: not having a degree): Having a degree			1.26**	0.87**			1.26**	0.86**			1.25**	0.87**
			[1.16, 1.38]	[0.83, 0.91]			[1.15, 1.37]	[0.82, 0.90]			[1.14, 1.36]	[0.83, 0.92]
Father's education (13) (ref: not having a degree): Having a degree			0.52**	1.07**			0.53**	1.08**			0.51**	1.04
			[0.48, 0.58]	[1.03, 1.12]			[0.48, 0.58]	[1.03, 1.13]			[0.46, 0.56]	[1.00, 1.09]
Mother's occupation level (13) (ref: not working): routine/semi-routine			0.48**	0.74**			0.48**	0.75**			0.48**	0.76**
			[0.45, 0.51]	[0.71, 0.76]			[0.46, 0.51]	[0.73, 0.78]			[0.46, 0.51]	[0.73, 0.79]
Mother's occupation level (13): middle level			0.47**	0.52**			0.49**	0.55**			0.48**	0.54**
			[0.45, 0.51]	[0.50, 0.55]			[0.46, 0.52]	[0.53, 0.57]			[0.45, 0.51]	[0.52, 0.56]
Mother's occupation level (13): high			0.35**	0.42**			0.36**	0.44**			0.35**	0.43**
			[0.33, 0.38]	[0.41, 0.44]			[0.33, 0.39]	[0.42, 0.46]			[0.33, 0.38]	[0.42, 0.45]
Father's occupation level (13) (ref: not working): routine/semi-routine			0.80**	0.92**			0.79**	0.92**			0.79**	0.93**
			[0.74, 0.85]	[0.89, 0.96]			[0.74, 0.85]	[0.88, 0.96]			[0.74, 0.85]	[0.89, 0.97]
Father's occupation level (13): middle level			0.70**	0.78**			0.70**	0.77**			0.69**	0.77**
			[0.66, 0.75]	[0.75, 0.81]			[0.65, 0.75]	[0.74, 0.80]			[0.65, 0.74]	[0.74, 0.80]
Father's occupation level (13): high			0.45**	0.57**			0.45**	0.57**			0.44**	0.56**
			[0.41, 0.48]	[0.54, 0.59]			[0.42, 0.49]	[0.55, 0.60]			[0.41, 0.48]	[0.54, 0.59]
Log Likelihood		-9126456.915		-8815246.1		-9085251.938		-8800720.643		-9221716.675		-8924164.729
McFadden_R2		0.014646401		0.04824681		0.019095167		0.049815077		0.004361517		0.036487224

***p ≤ .001, **p ≤ .01, *p ≤ .05

Table A4c. Multinomial logistic regressions predicting economic activity (at age 32) by accumulated health problems for males.

Independent variable:	Long-term illness				Self-rated general health				Mental health			
	Unadjusted		Three stage adjusted		Unadjusted		Three stage adjusted		Unadjusted		Three stage adjusted	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
	0.02**	0.03**	0.02**	0.05**	0.02**	0.03**	0.02**	0.06**	0.02**	0.04**	0.02**	0.07**
(Intercept)	[0.02, 0.02]	[0.03, 0.03]	[0.02, 0.03]	[0.05, 0.06]	[0.02, 0.02]	[0.03, 0.03]	[0.02, 0.03]	[0.06, 0.07]	[0.02, 0.02]	[0.04, 0.04]	[0.02, 0.03]	[0.06, 0.07]
	1.77**	2.42**	1.79**	2.44**	2.32**	3.27**	2.31**	3.24**	1.66**	1.69**	1.68**	1.72**
Accumulation	[1.73, 1.82]	[2.38, 2.46]	[1.74, 1.83]	[2.40, 2.48]	[2.24, 2.39]	[3.20, 3.35]	[2.23, 2.39]	[3.17, 3.31]	[1.62, 1.70]	[1.66, 1.72]	[1.64, 1.73]	[1.69, 1.75]
Ethnicity (ref: White):			1.23**	0.80**			1.23**	0.80**			1.13**	0.71**
Mixed			[1.13, 1.35]	[0.74, 0.87]			[1.13, 1.35]	[0.74, 0.87]			[1.03, 1.24]	[0.66, 0.77]
			0.60**	0.51**			0.53**	0.41**			0.55**	0.42**
Ethnicity: Indian			[0.54, 0.66]	[0.47, 0.55]			[0.48, 0.59]	[0.38, 0.45]			[0.49, 0.61]	[0.39, 0.46]
			1.14**	1.10**			0.99	0.87**			0.97	0.84**
Ethnicity: Pakistani/Bangladeshi			[1.05, 1.24]	[1.04, 1.17]			[0.92, 1.08]	[0.82, 0.93]			[0.90, 1.05]	[0.79, 0.89]

Independent variable:	Long-term illness				Self-rated general health				Mental health			
	Unadjusted		Three stage adjusted		Unadjusted		Three stage adjusted		Unadjusted		Three stage adjusted	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
Ethnicity: Black			1.16**	0.87**			1.08*	0.77**			1.05	0.72**
			[1.08, 1.24]	[0.82, 0.93]			[1.01, 1.16]	[0.73, 0.82]			[0.97, 1.12]	[0.68, 0.76]
Ethnicity: Other			1.40**	1.54**			1.15*	1.08			1.19**	1.15**
			[1.24, 1.57]	[1.42, 1.68]			[1.02, 1.30]	[0.99, 1.17]			[1.06, 1.34]	[1.06, 1.25]
Mother's education (13) (ref: not having a degree): Having a degree			0.99	0.87**			0.98	0.83**			0.94	0.82**
			[0.90, 1.09]	[0.82, 0.94]			[0.89, 1.08]	[0.78, 0.89]			[0.85, 1.03]	[0.77, 0.88]
Father's education (13) (ref: not having a degree): Having a degree			0.88**	0.92*			0.93	1.03			0.86**	0.92*
			[0.81, 0.96]	[0.87, 0.98]			[0.85, 1.01]	[0.97, 1.10]			[0.79, 0.94]	[0.87, 0.98]
Mother's occupation level (13) (ref: not working): routine/semi-routine			1.24**	0.86**			1.25**	0.89**			1.27**	0.90**
			[1.16, 1.33]	[0.82, 0.91]			[1.17, 1.34]	[0.84, 0.94]			[1.18, 1.36]	[0.85, 0.94]
Mother's occupation level (13): middle level			0.78**	0.62**			0.76**	0.59**			0.77**	0.60**
			[0.73, 0.85]	[0.59, 0.66]			[0.70, 0.82]	[0.56, 0.62]			[0.71, 0.83]	[0.57, 0.64]
Mother's occupation level (13): high			0.62**	0.64**			0.63**	0.67**			0.64**	0.69**
			[0.57, 0.67]	[0.60, 0.68]			[0.57, 0.68]	[0.63, 0.71]			[0.59, 0.70]	[0.65, 0.73]
Father's occupation level (13) (ref: not working): routine/semi-routine			1.17**	1.00			1.20**	1.03			1.19**	1.03
			[1.07, 1.29]	[0.94, 1.07]			[1.09, 1.32]	[0.96, 1.10]			[1.08, 1.30]	[0.96, 1.10]
Father's occupation level (13): middle level			0.91*	0.72**			0.93	0.74**			0.91*	0.71**
			[0.82, 0.99]	[0.68, 0.77]			[0.84, 1.02]	[0.69, 0.79]			[0.82, 0.99]	[0.67, 0.76]
Father's occupation level (13): high			0.74**	0.59**			0.75**	0.60**			0.72**	0.56**
			[0.67, 0.82]	[0.55, 0.63]			[0.68, 0.83]	[0.56, 0.64]			[0.65, 0.79]	[0.52, 0.60]
Log Likelihood		-5702258.026		-5605222.072		-5720427.049		-5627289.851		-5880658.732		-5774305.187
McFadden R2		0.047768268		0.063972501		0.044734186		0.060287357		0.01797677		0.035736966

***p ≤ .001, **p ≤ .01, *p ≤ .05

Additional covariates for the sensitivity analysis

Economic activity at age 25: The cohort members were asked about their current main employment activity at age 25. Using this question, we were able to derive their economic activity, categorising respondents into three groups: employed, unemployed, and inactive. This same question was asked at age 32, and the same method was applied.

Long-term illness at age 32: The cohort members were asked if they had any long-term physical or mental health conditions lasting or expected to last 12 months (1 = yes, 0 = no) at age 32.

Self-rated general health at age 32: At age 32, the cohort members were asked to rate their current general health on a scale from 1 (Excellent) to 5 (Poor). We also dichotomised the answer into good (0, those who reported 'good', 'very good', or 'excellent') and bad (1, those who reported 'fair' or 'poor').

Mental health at age 32: Mental health is also measured by GHQ and dichotomised into good (0) and poor (1) using the same method as mental health at other life stages (see main text).

Highest achieved qualification: The participants were asked to report their highest achieved educational qualification, which was categorised as 1 = having a degree or higher or 0 = not having a degree.

Table A5. Descriptive results of the additional covariates.

		All	Economic Activity (32)		
			Employed	Unemployed	Inactive
Having a degree (32), N(%)	**Not having a degree**	9238(57.3)	8008(55.3)	323(76.5)	906(74.8)
	Having a degree or above	6884 (42.7)	6480(44.7)	99(23.5)	305(25.2)
Economic activity at 25, N(%)	**Employed**	13867 (86)	12965 (89.5)	237(56.1)	665(54.9)
	Unemployed	711(4.4)	506(3.5)	142(33.5)	63(5.2)
	Inactive	1544(9.6)	1017(7)	44(10.4)	483(39.9)
Long-term illness (32), N(%)	**No**	12937(80.2)	12026(83)	240(56.7)	671(55.4)
	Long-term illness	3185(19.8)	2462(17)	183(43.3)	540(44.6)
Self-rated general health (32), N(%)	**Good**	14560(90.3)	13394(92.4)	301(71.2)	865(71.4)
	Poor	1562(9.7)	1094(7.6)	122(28.8)	346(28.6)
Mental health (32), N(%)	**Good**	12502(77.5)	11512(79.5)	239(56.5)	751(62)
	Poor	3620(22.5)	2976(20.5)	184(43.5)	460(38)
Total N(%)		16122(100)	14488(90)	423(2.5)	1211(7.5)

Table A6. Correlation between earlier health and age 32 health.

Long-term illness				
	Childhood	**Adolescence**	**Early adulthood**	**Adulthood**
Childhood	1	0.62***	0.43***	0.37***
Adolescence		1	0.47***	0.37***
Early adulthood			1	0.69***
Adulthood				1
Self-rated general health				
	Childhood	**Adolescence**	**Early adulthood**	**Adulthood**
Childhood	1	0.38***	0.43***	0.45***
Adolescence		1	0.28***	0.21***
Early adulthood			1	0.67***
Adulthood				1
Mental health				
	Childhood	**Adolescence**	**Early adulthood**	**Adulthood**
Childhood	1	0.51***	0.30***	0.24***
Adolescence		1	0.37***	0.28***
Early adulthood			1	0.41***
Adulthood				1

*****p = .001, **p = .01, *p = .05**

Table A7a. Sensitivity analysis: Multinomial logistic regressions predicting economic activity (at age 32) by the timing of health problems for all participants.

Independent variable:	Long-term illness		Self-rated general health		Mental health	
	Adjusted (sensitivity test)		Adjusted (sensitivity test)		Adjusted (sensitivity test)	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
(Intercept)	0.03** [0.01, 0.05]	0.05** [0.03, 0.07]	0.03** [0.02, 0.05]	0.05** [0.03, 0.08]	0.03** [0.01, 0.05]	0.05** [0.04, 0.08]
Childhood	1.15 [0.81, 1.64]	1.39** [1.12, 1.71]	1.29 [0.87, 1.91]	1.44** [1.12, 1.87]	1.15 [0.84, 1.59]	1.09 [0.89, 1.33]
Adolescence	0.83 [0.50, 1.37]	1.20 [0.91, 1.58]	0.83 [0.49, 1.42]	1.14 [0.85, 1.53]	1.00 [0.72, 1.38]	1.06 [0.86, 1.30]
Early Adulthood	1.20 [0.82, 1.76]	1.43** [1.13, 1.81]	1.51* [1.01, 2.26]	2.00** [1.51, 2.66]	1.47* [1.09, 1.97]	1.33** [1.09, 1.64]
Gender (ref: male): female	1.27* [1.00, 1.60]	2.20** [1.82, 2.67]	1.33* [1.05, 1.68]	2.25** [1.86, 2.72]	1.23 [0.97, 1.57]	2.11** [1.75, 2.55]
Ethnicity (ref: White): Mixed	1.32 [0.79, 2.22]	0.94 [0.63, 1.41]	1.31 [0.78, 2.21]	0.93 [0.62, 1.39]	1.28 [0.77, 2.14]	0.90 [0.60, 1.34]
Ethnicity: Indian	1.00 [0.55, 1.80]	0.98 [0.66, 1.46]	0.89 [0.50, 1.61]	0.87 [0.58, 1.29]	0.90 [0.50, 1.62]	0.85 [0.58, 1.26]
Ethnicity: Pakistani/Bangladeshi	1.38 [0.84, 2.27]	1.61** [1.17, 2.23]	1.20 [0.73, 1.98]	1.39* [1.01, 1.92]	1.24 [0.75, 2.03]	1.38 [1.00, 1.89]
Ethnicity: Black	1.16 [0.73, 1.84]	1.14 [0.83, 1.57]	1.06 [0.67, 1.67]	1.02 [0.75, 1.40]	1.05 [0.66, 1.66]	0.99 [0.73, 1.34]
Ethnicity: Other	1.41 [0.68, 2.95]	1.34 [0.83, 2.17]	1.24 [0.60, 2.58]	1.15 [0.71, 1.85]	1.17 [0.56, 2.44]	1.09 [0.68, 1.75]
Education (ref: not having a degree): Having a degree	0.47** [0.34, 0.64]	0.46** [0.37, 0.56]	0.49** [0.36, 0.68]	0.48** [0.39, 0.59]	0.46** [0.33, 0.63]	0.43** [0.35, 0.53]
Economic activity (25) (ref: employed): Unemployed	11.51** [7.82, 16.96]	1.73** [1.18, 2.54]	11.21** [7.66, 16.39]	1.69** [1.16, 2.47]	11.80** [8.11, 17.16]	1.89** [1.29, 2.76]
Economic activity (25): Inactive	1.80* [1.12, 2.87]	6.31** [4.90, 8.13]	1.83* [1.13, 2.97]	6.44** [4.98, 8.32]	1.91** [1.19, 3.06]	7.24** [5.66, 9.26]
Long-term illness (32) (ref: no long-term illness): long-term illness	3.11** [2.36, 4.11]	2.57** [2.13, 3.11]	3.17** [2.31, 4.36]	2.65** [2.13, 3.29]	2.51** [1.94, 3.25]	1.87** [1.57, 2.21]

Independent variable:	Long-term illness		Self-rated general health		Mental health	
	Adjusted (sensitivity test)		Adjusted (sensitivity test)		Adjusted (sensitivity test)	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
Mother's education (13) (ref: not having a degree): Having a degree	1.25 [0.72, 2.17]	1.02 [0.73, 1.44]	1.29 [0.74, 2.27]	1.03 [0.73, 1.46]	1.25 [0.72, 2.18]	1.04 [0.74, 1.46]
Father's education (13) (ref: not having a degree): Having a degree	0.82 [0.43, 1.55]	1.15 [0.81, 1.64]	0.82 [0.43, 1.56]	1.17 [0.83, 1.67]	0.79 [0.42, 1.51]	1.16 [0.82, 1.64]
Mother's occupation level (13) (ref: not working): routine/semi-routine	0.74 [0.49, 1.12]	0.79 [0.60, 1.04]	0.77 [0.51, 1.16]	0.81 [0.61, 1.08]	0.74 [0.49, 1.12]	0.81 [0.61, 1.07]
Mother's occupation level (13): middle level	0.69 [0.44, 1.09]	0.63** [0.46, 0.85]	0.70 [0.44, 1.12]	0.65** [0.48, 0.88]	0.69 [0.43, 1.10]	0.65** [0.48, 0.87]
Mother's occupation level (13): high	0.51* [0.30, 0.87]	0.55** [0.39, 0.76]	0.52* [0.30, 0.89]	0.57** [0.41, 0.80]	0.53* [0.31, 0.92]	0.58** [0.41, 0.81]
Father's occupation level (13) (ref: not working): routine/semi-routine	0.83 [0.47, 1.44]	0.96 [0.67, 1.39]	0.83 [0.47, 1.46]	0.96 [0.66, 1.38]	0.84 [0.48, 1.48]	0.98 [0.68, 1.42]
Father's occupation level (13): middle level	0.76 [0.43, 1.32]	0.82 [0.57, 1.19]	0.75 [0.43, 1.31]	0.82 [0.57, 1.18]	0.77 [0.44, 1.33]	0.82 [0.57, 1.18]
Father's occupation level (13): high	0.64 [0.36, 1.16]	0.73 [0.47, 1.11]	0.65 [0.36, 1.18]	0.75 [0.49, 1.14]	0.66 [0.37, 1.18]	0.74 [0.48, 1.14]
Log Likelihood		-254462.9449		-255333.7245		-259600.6051
McFadden_R2		0.181909011		0.17910948		0.165391583

***p = .001, **p = .01, *p = .05

Table A7b. Sensitivity analysis: Multinomial logistic regressions predicting economic activity (at age 32) by the timing of health problems stratified by gender.

	Female						Male					
Independent variable:	**Long-term illness Adjusted (sensitivity test)**		**Self-rated general health Adjusted (sensitivity test)**		**Mental health Adjusted (sensitivity test)**		**Long-term illness Adjusted (sensitivity test)**		**Self-rated general health Adjusted (sensitivity test)**		**Mental health Adjusted (sensitivity test)**	
Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
(Intercept)	0.05** [0.04, 0.05]	0.12** [0.11, 0.12]	0.06** [0.05, 0.06]	0.13** [0.12, 0.13]	0.05** [0.05, 0.06]	0.13** [0.12, 0.14]	0.01** [0.01, 0.02]	0.04** [0.03, 0.04]	0.02** [0.01, 0.02]	0.05** [0.04, 0.05]	0.01** [0.01, 0.01]	0.04** [0.04, 0.05]
Childhood	1.13** [1.07, 1.20]	1.32** [1.28, 1.36]	1.29** [1.21, 1.37]	1.34** [1.30, 1.39]	1.01 [0.96, 1.06]	1.04** [1.01, 1.07]	1.16** [1.10, 1.22]	1.49** [1.43, 1.55]	1.37** [1.27, 1.47]	1.72** [1.64, 1.81]	1.46** [1.37, 1.54]	1.32** [1.26, 1.38]
Adolescence	0.98 [0.91, 1.07]	1.12** [1.08, 1.17]	0.90** [0.83, 0.97]	1.13** [1.09, 1.18]	0.97 [0.93, 1.02]	1.02 [0.99, 1.05]	0.67** [0.62, 0.73]	1.28** [1.21, 1.34]	0.74** [0.67, 0.82]	1.21** [1.14, 1.29]	1.08** [1.02, 1.15]	1.22** [1.17, 1.27]
Early Adulthood	0.89** [0.84, 0.94]	1.27** [1.23, 1.31]	1.56** [1.46, 1.65]	1.72** [1.66, 1.78]	1.62** [1.55, 1.69]	1.25** [1.22, 1.28]	1.72** [1.62, 1.82]	1.77** [1.69, 1.84]	1.48** [1.38, 1.58]	2.47** [2.36, 2.59]	1.32** [1.26, 1.39]	1.51** [1.45, 1.56]
Ethnicity (ref: White): Mixed	1.64** [1.51, 1.77]	1.02 [0.97, 1.07]	1.57** [1.45, 1.69]	1.01 [0.96, 1.06]	1.58** [1.46, 1.70]	1.00 [0.95, 1.05]	1.09 [0.99, 1.20]	0.83** [0.77, 0.90]	1.08 [0.98, 1.19]	0.81** [0.75, 0.88]	1.04 [0.94, 1.14]	0.73** [0.67, 0.79]
Ethnicity: Indian	1.31** [1.20, 1.44]	1.12** [1.06, 1.18]	1.14** [1.04, 1.24]	1.04 [0.98, 1.09]	1.12* [1.02, 1.22]	1.00 [0.95, 1.05]	0.76** [0.68, 0.85]	0.73** [0.66, 0.79]	0.66** [0.59, 0.74]	0.57** [0.52, 0.62]	0.69** [0.62, 0.77]	0.60** [0.55, 0.66]
Ethnicity: Pakistani/Bangladeshi	1.47** [1.37, 1.58]	1.72** [1.65, 1.79]	1.27** [1.19, 1.36]	1.58** [1.51, 1.64]	1.28** [1.19, 1.37]	1.54** [1.47, 1.60]	1.29** [1.18, 1.40]	1.39** [1.31, 1.48]	1.10* [1.01, 1.19]	1.02 [0.96, 1.09]	1.15** [1.06, 1.25]	1.07* [1.01, 1.14]
Ethnicity: Black	1.13** [1.05, 1.21]	1.20** [1.15, 1.24]	0.98 [0.91, 1.05]	1.10** [1.06, 1.14]	0.97 [0.91, 1.05]	1.07** [1.03, 1.11]	1.26** [1.17, 1.36]	1.05 [0.99, 1.12]	1.20** [1.11, 1.29]	0.89** [0.84, 0.95]	1.16** [1.08, 1.25]	0.84** [0.79, 0.89]
Ethnicity: Other	1.40** [1.24, 1.58]	1.25** [1.16, 1.34]	1.27** [1.13, 1.43]	1.17** [1.09, 1.26]	1.12 [1.00, 1.27]	1.10** [1.02, 1.18]	1.48** [1.31, 1.67]	1.55** [1.41, 1.70]	1.21** [1.07, 1.37]	1.04 [0.95, 1.14]	1.26** [1.12, 1.43]	1.05 [0.96, 1.15]
Education (ref: not having a degree): Having a degree	0.49** [0.46, 0.51]	0.46** [0.45, 0.47]	0.51** [0.48, 0.53]	0.47** [0.46, 0.49]	0.47** [0.45, 0.50]	0.44** [0.43, 0.45]	0.44** [0.41, 0.46]	0.46** [0.44, 0.48]	0.47** [0.45, 0.50]	0.49** [0.47, 0.51]	0.43** [0.41, 0.46]	0.41** [0.40, 0.43]
Economic activity (25) (ref: employed): Unemployed	10.72** [10.23, 11.24]	1.76** [1.67, 1.85]	10.06** [9.60, 10.55]	1.67** [1.59, 1.76]	10.62** [10.13, 11.13]	1.83** [1.74, 1.92]	12.56** [11.96, 13.18]	1.54** [1.44, 1.65]	12.52** [11.92, 13.14]	1.66** [1.55, 1.77]	13.05** [12.43, 13.70]	1.94** [1.82, 2.07]
Economic activity (25): Inactive	1.40** [1.31, 1.49]	5.96** [5.82, 6.11]	1.42** [1.34, 1.51]	5.96** [5.81, 6.10]	1.46** [1.37, 1.56]	6.47** [6.32, 6.63]	2.59** [2.40, 2.79]	6.47** [6.22, 6.73]	2.74** [2.55, 2.95]	7.31** [7.03, 7.60]	2.90** [2.69, 3.12]	9.00** [8.67, 9.33]
Long-term illness (32) (ref: no long-term illness): long-term illness	3.71** [3.55, 3.88]	2.14** [2.08, 2.19]	2.79** [2.66, 2.94]	2.32** [2.25, 2.39]	2.32** [2.23, 2.42]	1.66** [1.62, 1.70]	2.55** [2.42, 2.68]	3.84** [3.70, 3.98]	3.73** [3.53, 3.94]	3.36** [3.23, 3.50]	2.78** [2.65, 2.91]	2.32** [2.24, 2.40]

	Female						Male					
Independent variable:	**Long-term illness Adjusted (sensitivity test)**		**Self-rated general health Adjusted (sensitivity test)**		**Mental health Adjusted (sensitivity test)**		**Long-term illness Adjusted (sensitivity test)**		**Self-rated general health Adjusted (sensitivity test)**		**Mental health Adjusted (sensitivity test)**	
Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
Mother's education (13) (ref: not having a degree): Having a degree	1.39** [1.27, 1.52]	1.05 [1.00, 1.10]	1.50** [1.37, 1.64]	1.06* [1.01, 1.12]	1.42** [1.29, 1.55]	1.07** [1.02, 1.13]	1.11* [1.01, 1.22]	0.98 [0.92, 1.06]	1.08 [0.98, 1.19]	0.96 [0.90, 1.03]	1.04 [0.95, 1.15]	0.97 [0.90, 1.04]
Father's education (13) (ref: not having a degree): Having a degree	0.63** [0.57, 0.69]	1.21** [1.16, 1.27]	0.62** [0.56, 0.69]	1.23** [1.18, 1.29]	0.62** [0.56, 0.68]	1.23** [1.18, 1.28]	1.04 [0.95, 1.14]	0.99 [0.93, 1.06]	1.08 [0.99, 1.18]	1.05 [0.98, 1.12]	1.01 [0.93, 1.11]	1.01 [0.94, 1.07]
Mother's occupation level (13) (ref: not working): routine/semi-routine	0.48** [0.45, 0.51]	0.75** [0.72, 0.77]	0.49** [0.46, 0.52]	0.77** [0.74, 0.80]	0.47** [0.44, 0.50]	0.76** [0.74, 0.79]	1.31** [1.21, 1.40]	0.89** [0.85, 0.94]	1.34** [1.24, 1.44]	0.91** [0.86, 0.96]	1.29** [1.20, 1.39]	0.92** [0.87, 0.97]
Mother's occupation level (13): middle level	0.58** [0.54, 0.62]	0.60** [0.58, 0.63]	0.60** [0.56, 0.64]	0.63** [0.61, 0.66]	0.58** [0.54, 0.62]	0.63** [0.60, 0.65]	0.94 [0.87, 1.02]	0.72** [0.68, 0.76]	0.93 [0.86, 1.01]	0.70** [0.66, 0.75]	0.91* [0.84, 0.99]	0.70** [0.66, 0.75]
Mother's occupation level (13): high	0.40** [0.37, 0.43]	0.48** [0.46, 0.50]	0.41** [0.38, 0.44]	0.50** [0.48, 0.52]	0.42** [0.39, 0.46]	0.50** [0.48, 0.52]	0.75** [0.69, 0.82]	0.73** [0.69, 0.78]	0.76** [0.69, 0.83]	0.75** [0.71, 0.80]	0.77** [0.70, 0.84]	0.78** [0.73, 0.83]
Father's occupation level (13) (ref: not working): routine/semi-routine	0.71** [0.66, 0.76]	0.96 [0.91, 1.00]	0.71** [0.66, 0.76]	0.95* [0.91, 0.99]	0.71** [0.66, 0.76]	0.96 [0.92, 1.01]	1.08 [0.98, 1.19]	0.92* [0.85, 0.98]	1.09 [0.99, 1.21]	0.94 [0.87, 1.01]	1.12* [1.02, 1.24]	0.98 [0.92, 1.05]
Father's occupation level (13): middle level	0.68** [0.63, 0.73]	0.85** [0.81, 0.89]	0.68** [0.63, 0.73]	0.85** [0.81, 0.89]	0.68** [0.64, 0.73]	0.85** [0.81, 0.89]	0.94 [0.85, 1.03]	0.75** [0.70, 0.80]	0.94 [0.85, 1.03]	0.76** [0.71, 0.82]	0.97 [0.88, 1.07]	0.77** [0.72, 0.82]
Father's occupation level (13): high	0.52** [0.48, 0.56]	0.75** [0.71, 0.78]	0.52** [0.48, 0.57]	0.76** [0.73, 0.80]	0.52** [0.48, 0.57]	0.76** [0.72, 0.79]	0.90* [0.81, 1.00]	0.68** [0.63, 0.73]	0.92 [0.83, 1.02]	0.70** [0.65, 0.76]	0.92 [0.83, 1.02]	0.70** [0.65, 0.75]
Log Likelihood		-7759793.918		-7784570.775		-7877844.425		-4903851.158		-4945135.31		-5063405.998
McFadden_R2		0.162200519		0.159525444		0.149454993		0.181095864		0.174201744		0.154451475

*****p = .001, **p = .01, *p = .05**

Table A8a. Sensitivity analysis: Multinomial logistic regressions predicting economic activity (at age 32) by the accumulation of health problems for all participants.

Independent variable:	Long-term illness		Self-rated general health		Mental health	
	Adjusted (sensitivity test)		Adjusted (sensitivity test)		Adjusted (sensitivity test)	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
(Intercept)	0.03** [0.01, 0.05]	0.05** [0.03, 0.07]	0.03** [0.02, 0.05]	0.05** [0.03, 0.08]	0.03** [0.01, 0.05]	0.05** [0.04, 0.08]
Accumulation	1.08 [0.90, 1.30]	1.35** [1.21, 1.50]	1.22 [0.98, 1.53]	1.51** [1.31, 1.74]	1.19* [1.03, 1.38]	1.15** [1.04, 1.27]
Gender (ref: male): female	1.27* [1.00, 1.61]	2.20** [1.82, 2.67]	1.32* [1.04, 1.66]	2.22** [1.84, 2.68]	1.21 [0.95, 1.55]	2.09** [1.73, 2.52]
Ethnicity (ref: White): Mixed	1.33 [0.79, 2.22]	0.94 [0.63, 1.41]	1.31 [0.78, 2.21]	0.93 [0.62, 1.39]	1.27 [0.76, 2.12]	0.89 [0.60, 1.33]
Ethnicity: Indian	1.00 [0.55, 1.81]	0.98 [0.66, 1.46]	0.89 [0.50, 1.61]	0.86 [0.58, 1.28]	0.89 [0.50, 1.61]	0.85 [0.58, 1.26]
Ethnicity: Pakistani/Bangladeshi	1.37 [0.84, 2.25]	1.61** [1.16, 2.22]	1.20 [0.73, 1.97]	1.38* [1.00, 1.90]	1.22 [0.74, 2.01]	1.37 [1.00, 1.88]
Ethnicity: Black	1.16 [0.73, 1.84]	1.14 [0.83, 1.57]	1.05 [0.67, 1.67]	1.02 [0.74, 1.39]	1.04 [0.66, 1.65]	0.99 [0.73, 1.34]
Ethnicity: Other	1.41 [0.68, 2.95]	1.34 [0.83, 2.17]	1.23 [0.59, 2.54]	1.13 [0.70, 1.83]	1.16 [0.55, 2.41]	1.09 [0.68, 1.74]
Education (ref: not having a degree): Having a degree	0.47** [0.34, 0.64]	0.46** [0.37, 0.56]	0.49** [0.36, 0.68]	0.48** [0.39, 0.59]	0.45** [0.33, 0.62]	0.43** [0.35, 0.53]
Economic activity (25) (ref: employed): Unemployed	11.48** [7.79, 16.92]	1.73** [1.18, 2.54]	11.43** [7.82, 16.72]	1.74** [1.19, 2.53]	12.18** [8.42, 17.63]	1.93** [1.32, 2.82]
Economic activity (25): Inactive	1.80* [1.13, 2.88]	6.33** [4.92, 8.14]	1.85* [1.15, 2.99]	6.54** [5.07, 8.43]	1.94** [1.21, 3.10]	7.31** [5.72, 9.33]

Independent variable:	Long-term illness		Self-rated general health		Mental health	
	Adjusted (sensitivity test)		Adjusted (sensitivity test)		Adjusted (sensitivity test)	
Activity (ref: employment)	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**	**Unemployment**	**Inactivity**
Long-term illness (32) (ref: no long-term illness): long-term illness	3.20** [2.46, 4.16]	2.61** [2.18, 3.14]	3.36** [2.48, 4.56]	2.84** [2.31, 3.49]	2.57** [1.98, 3.32]	1.90** [1.60, 2.24]
Mother's education (13) (ref: not having a degree): Having a degree	1.26 [0.73, 2.18]	1.02 [0.72, 1.44]	1.30 [0.74, 2.27]	1.03 [0.73, 1.46]	1.24 [0.71, 2.15]	1.03 [0.73, 1.45]
Father's education (13) (ref: not having a degree): Having a degree	0.82 [0.43, 1.55]	1.15 [0.81, 1.64]	0.82 [0.43, 1.54]	1.16 [0.82, 1.66]	0.80 [0.42, 1.52]	1.16 [0.82, 1.64]
Mother's occupation level (13) (ref: not working): routine/semi-routine	0.74 [0.49, 1.11]	0.79 [0.60, 1.04]	0.77 [0.51, 1.16]	0.82 [0.62, 1.08]	0.75 [0.49, 1.13]	0.81 [0.62, 1.07]
Mother's occupation level (13): middle level	0.69 [0.44, 1.09]	0.63** [0.46, 0.85]	0.70 [0.44, 1.12]	0.65** [0.48, 0.88]	0.70 [0.44, 1.11]	0.65** [0.48, 0.87]
Mother's occupation level (13): high	0.51* [0.30, 0.87]	0.55** [0.39, 0.76]	0.52* [0.31, 0.90]	0.57** [0.41, 0.80]	0.54* [0.31, 0.92]	0.58** [0.42, 0.81]
Father's occupation level (13) (ref: not working): routine/semi-routine	0.83 [0.47, 1.45]	0.96 [0.67, 1.39]	0.83 [0.48, 1.46]	0.96 [0.67, 1.39]	0.84 [0.48, 1.48]	0.98 [0.68, 1.42]
Father's occupation level (13): middle level	0.76 [0.43, 1.32]	0.82 [0.57, 1.18]	0.75 [0.43, 1.30]	0.82 [0.57, 1.18]	0.76 [0.44, 1.33]	0.82 [0.57, 1.18]
Father's occupation level (13): high	0.65 [0.36, 1.16]	0.73 [0.47, 1.11]	0.65 [0.36, 1.18]	0.75 [0.49, 1.14]	0.65 [0.36, 1.17]	0.74 [0.48, 1.13]

Independent variable:	Long-term illness		Self-rated general health		Mental health	
	Adjusted (sensitivity test)		Adjusted (sensitivity test)		Adjusted (sensitivity test)	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
Log Likelihood		-254593.7787		-255763.6905		-259862.242
McFadden_R2		0.181488384		0.177727152		0.164550427

***p = .001, **p = .01, *p = .05

Table A8b. Sensitivity analysis: Multinomial logistic regressions predicting economic activity (at age 32) by the accumulation of health problems for all participants.

Female only	Female						Male					
Independent variable:	Long-term illness Adjusted (sensitivity test)		Self-rated general health Adjusted (sensitivity test)		Mental health Adjusted (sensitivity test)		Long-term illness Adjusted (sensitivity test)		Self-rated general health Adjusted (sensitivity test)		Mental health Adjusted (sensitivity test)	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
(Intercept)	0.05** [0.04, 0.05]	0.12** [0.11, 0.12]	0.06** [0.05, 0.06]	0.13** [0.12, 0.13]	0.05** [0.05, 0.05]	0.13** [0.12, 0.13]	0.01** [0.01, 0.02]	0.04** [0.03, 0.04]	0.02** [0.01, 0.02]	0.05** [0.04, 0.05]	0.01** [0.01, 0.01]	0.05** [0.04, 0.05]
Accumulation	1.00 [0.97, 1.03]	1.25** [1.23, 1.27]	1.24** [1.20, 1.28]	1.38** [1.36, 1.41]	1.16** [1.14, 1.19]	1.09** [1.08, 1.10]	1.15** [1.12, 1.18]	1.51** [1.48, 1.54]	1.23** [1.18, 1.28]	1.81** [1.77, 1.86]	1.27** [1.24, 1.31]	1.35** [1.32, 1.37]
Ethnicity (ref: White):												
Mixed	1.64** [1.51, 1.77]	1.02 [0.97, 1.08]	1.57** [1.46, 1.70]	1.01 [0.96, 1.07]	1.55** [1.43, 1.67]	0.99 [0.95, 1.05]	1.08 [0.98, 1.18]	0.83** [0.76, 0.90]	1.09 [0.99, 1.19]	0.81** [0.75, 0.88]	1.02 [0.93, 1.12]	0.72** [0.67, 0.79]
Ethnicity: Indian	1.31** [1.20, 1.43]	1.12** [1.06, 1.18]	1.14** [1.04, 1.25]	1.04 [0.98, 1.09]	1.13** [1.03, 1.24]	1.00 [0.95, 1.06]	0.75** [0.67, 0.84]	0.73** [0.67, 0.80]	0.66** [0.59, 0.74]	0.56** [0.51, 0.61]	0.68** [0.61, 0.76]	0.60** [0.55, 0.65]
Ethnicity: Pakistani/Bangladeshi	1.47** [1.37, 1.58]	1.71** [1.64, 1.78]	1.27** [1.18, 1.36]	1.57** [1.51, 1.64]	1.28** [1.19, 1.37]	1.54** [1.48, 1.60]	1.25** [1.15, 1.36]	1.39** [1.30, 1.48]	1.09* [1.00, 1.19]	1.01 [0.95, 1.07]	1.14** [1.05, 1.24]	1.06 [1.00, 1.13]
Ethnicity: Black	1.13** [1.05, 1.21]	1.20** [1.15, 1.24]	0.98 [0.91, 1.05]	1.10** [1.05, 1.14]	0.98 [0.91, 1.05]	1.07** [1.03, 1.12]	1.25** [1.16, 1.34]	1.05 [0.99, 1.12]	1.19** [1.11, 1.28]	0.89** [0.84, 0.94]	1.15** [1.07, 1.24]	0.83** [0.79, 0.89]
Ethnicity: Other	1.40** [1.24, 1.58]	1.25** [1.16, 1.34]	1.23** [1.09, 1.39]	1.15** [1.07, 1.23]	1.10 [0.97, 1.24]	1.09* [1.01, 1.17]	1.47** [1.30, 1.66]	1.55** [1.41, 1.69]	1.23** [1.09, 1.39]	1.05 [0.96, 1.15]	1.26** [1.12, 1.42]	1.05 [0.96, 1.15]
Education (ref: not having a degree):												
Having a degree	0.49** [0.46, 0.51]	0.46** [0.45, 0.47]	0.51** [0.48, 0.53]	0.47** [0.46, 0.49]	0.47** [0.45, 0.49]	0.44** [0.43, 0.45]	0.44** [0.41, 0.46]	0.46** [0.44, 0.48]	0.47** [0.45, 0.50]	0.48** [0.46, 0.50]	0.43** [0.41, 0.45]	0.41** [0.40, 0.43]
Economic activity (25) (ref:	10.62** [10.13, 11.13]	1.76** [1.67, 1.85]	10.31** [9.83, 10.80]	1.70** [1.62, 1.79]	11.12** [10.61, 11.65]	1.86** [1.77, 1.95]	12.47** [11.87, 13.09]	1.54** [1.44, 1.65]	12.69** [12.08, 13.32]	1.70** [1.59, 1.82]	13.16** [12.54, 13.81]	1.98** [1.85, 2.11]

Female only	Female						Male					
Independent variable:	Long-term illness Adjusted (sensitivity test)		Self-rated general health Adjusted (sensitivity test)		Mental health Adjusted (sensitivity test)		Long-term illness Adjusted (sensitivity test)		Self-rated general health Adjusted (sensitivity test)		Mental health Adjusted (sensitivity test)	
Activity (ref: employment)	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity	Unemployment	Inactivity
Unemployed	1.39** [1.31, 1.48]	5.96** [5.82, 6.11]	1.44** [1.35, 1.53]	6.02** [5.87, 6.16]	1.50** [1.41, 1.60]	6.52** [6.37, 6.68]	2.71** [2.52, 2.92]	6.59** [6.33, 6.85]	2.76** [2.57, 2.98]	7.47** [7.19, 7.76]	2.91** [2.71, 3.13]	9.09** [8.76, 9.43]
Economic activity (25): Inactive												
Long-term illness (32) (ref: no long-term illness): long-term illness	3.62** [3.47, 3.78]	2.15** [2.10, 2.20]	2.97** [2.83, 3.12]	2.45** [2.38, 2.52]	2.40** [2.30, 2.50]	1.69** [1.65, 1.73]	2.80** [2.67, 2.94]	3.99** [3.85, 4.13]	3.95** [3.74, 4.16]	3.63** [3.49, 3.78]	2.77** [2.65, 2.90]	2.35** [2.27, 2.43]
Mother's education (13) (ref: not having a degree): Having a degree	1.39** [1.27, 1.52]	1.05 [1.00, 1.10]	1.50** [1.37, 1.64]	1.06* [1.01, 1.12]	1.41** [1.28, 1.54]	1.07* [1.01, 1.12]	1.12* [1.02, 1.23]	0.98 [0.92, 1.06]	1.08 [0.98, 1.20]	0.96 [0.90, 1.03]	1.04 [0.94, 1.15]	0.96 [0.90, 1.03]
Father's education (13) (ref: not having a degree): Having a degree	0.63** [0.57, 0.69]	1.21** [1.16, 1.27]	0.62** [0.56, 0.68]	1.22** [1.17, 1.28]	0.62** [0.56, 0.68]	1.23** [1.17, 1.28]	1.05 [0.96, 1.15]	0.99 [0.93, 1.06]	1.07 [0.98, 1.17]	1.04 [0.98, 1.11]	1.01 [0.93, 1.11]	1.00 [0.94, 1.07]
Mother's occupation level (13) (ref: not working): routine/semi-routine	0.48** [0.45, 0.51]	0.75** [0.72, 0.77]	0.49** [0.46, 0.52]	0.77** [0.75, 0.80]	0.48** [0.45, 0.51]	0.77** [0.74, 0.80]	1.26** [1.17, 1.36]	0.89** [0.84, 0.94]	1.34** [1.24, 1.44]	0.90** [0.85, 0.95]	1.29** [1.20, 1.39]	0.91** [0.87, 0.96]
Mother's occupation level (13): middle level	0.58** [0.54, 0.62]	0.60** [0.58, 0.63]	0.60** [0.56, 0.64]	0.63** [0.61, 0.66]	0.59** [0.55, 0.64]	0.63** [0.60, 0.65]	0.92* [0.85, 0.99]	0.72** [0.67, 0.76]	0.93 [0.85, 1.00]	0.69** [0.65, 0.74]	0.91* [0.84, 0.99]	0.70** [0.66, 0.75]
Mother's occupation level (13): high	0.40** [0.37, 0.43]	0.48** [0.46, 0.50]	0.41** [0.38, 0.45]	0.50** [0.48, 0.52]	0.43** [0.40, 0.46]	0.50** [0.48, 0.53]	0.74** [0.68, 0.81]	0.73** [0.69, 0.78]	0.76** [0.70, 0.83]	0.75** [0.71, 0.80]	0.77** [0.70, 0.84]	0.78** [0.74, 0.83]
Father's occupation level (13) (ref: not working): routine/semi-routine	0.71** [0.66, 0.76]	0.96 [0.92, 1.00]	0.71** [0.66, 0.77]	0.95* [0.91, 1.00]	0.71** [0.66, 0.76]	0.96 [0.92, 1.01]	1.08 [0.98, 1.19]	0.92* [0.85, 0.98]	1.08 [0.98, 1.20]	0.94 [0.88, 1.01]	1.12* [1.02, 1.24]	0.98 [0.91, 1.05]
Father's occupation level (13): middle level	0.68** [0.63, 0.73]	0.85** [0.81, 0.89]	0.67** [0.63, 0.72]	0.84** [0.81, 0.88]	0.68** [0.63, 0.73]	0.85** [0.81, 0.88]	0.95 [0.86, 1.04]	0.75** [0.70, 0.80]	0.93 [0.85, 1.03]	0.76** [0.71, 0.81]	0.97 [0.88, 1.07]	0.77** [0.72, 0.82]
Father's occupation level (13): high	0.52** [0.48, 0.56]	0.75** [0.71, 0.78]	0.53** [0.48, 0.57]	0.76** [0.73, 0.80]	0.52** [0.48, 0.56]	0.75** [0.72, 0.79]	0.91 [0.82, 1.01]	0.68** [0.63, 0.73]	0.91 [0.82, 1.01]	0.70** [0.65, 0.75]	0.92 [0.83, 1.02]	0.69** [0.64, 0.75]
Log Likelihood		-7761258.059		-7792165.229		-7887157.969		-4912967.063		-4955299.381		-5065635.099
McFadden_R2		0.16204244		0.158705496		0.14844944		0.179573581		0.17250442		0.154079233

***p = .001, **p = .01, *p = .05