Estimating the Impact of Relative Financial Circumstances in Childhood on Adult Mental Wellbeing: a Mediation Analysis

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Abstract
Previous research has indicated that the role of childhood circumstances on adult mental health is primarily mediated through adult socioeconomic circumstances. Using linear regression models and mediation analysis this paper examines whether childhood financial circumstances is associated with adult mental wellbeing and to what extent any association is explained by adult financial circumstances. Adjusting for age and highest education attainment, we found that childhood financial circumstances predict wellbeing in adulthood. However, stratifying by age (respondents aged 18–40, 41–65 and 66 years plus), a more complicated pattern of associations emerged with potential cohort and age effects emerging. Only adult financial circumstances significantly impact adult wellbeing in our youngest group, while neither childhood nor adult financial circumstances are significantly associated with wellbeing in the oldest age group (66 years plus). However, both childhood and adult financial circumstances were significantly associated with wellbeing in middle age, and this effect was mostly direct (OR-1.09: CI 95%: -1.63, -0.17) rather than indirect (OR-0.08: CI 95%: -0.17, -0.01). This research adds to the evidence base that childhood is a critical period for wellbeing in middle age (41–65 years). Previous research has found that subjective wellbeing plays an important role in physical and mental health outcomes in adulthood. The impact of financial hardship in childhood on wellbeing in adulthood found in this study is particularly concerning as levels of child poverty increase in the UK.

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Introduction

Evidence on the important role childhood material circumstances on various physical and mental health outcomes in adulthood has increased considerably over the last two decades (Carr, 2019; Morrissey & Kinderman, 2020). However, despite research indicating that both objective and subjective financial circumstances are key contributors to individual overall wellbeing in adulthood (Stafford et al., 2015; Wood et al., 2017; Downward et al., 2020; Marshall et al., 2020), the relationship between childhood circumstances and adult mental wellbeing remains far less developed (Carr, 2019). Conceptually, an increased understanding of the impact of material circumstances in childhood on adult mental wellbeing outcomes is important for two interlinked reasons. First, from a health care perspective, research has found that good mental wellbeing lowers the risk of the onset of several chronic diseases including cardiovascular diseases (Feller et al., 2013) increases life expectancy (Steptoe et al., 2014) and is associated with healthy aging more broadly (Kuh et al., 2014). Thus, there is an important rationale for public authorities and health care practitioners to incorporate positive wellbeing as substantive policy aims, particularly economic and health policies aimed at older age groups (Steptoe et al., 2014).

Second, although widely assumed that later-born cohorts on average are healthier than earlier-born cohorts, reflecting a multidimensional process of improvement in medical care and increasing living standards (Wetzel & Vanhoutte, 2020), there is no living generation that has ‘escaped’ from some form of economic and turbulence in the UK (Wood et al., 2017). Although the latter half of the twentieth century presented large gains in the material standard of living in the UK, each decade has been marked by large social, political, and economic changes, including the large scale industrial restructuring of the 1970s, the growth in inequality in the 1980 and 1990s and the great recession in the 2000s (Wood et al., 2017). Whilst for the current generation of children, childhood poverty is once again increasing in the UK (Wickham et al., 2016). As such, childhood material circumstances, and the pathways in which it impacts health and wellbeing throughout the lifecourse remains a core public health concern (Wickham et al., 2016) across all age groups. However, the ‘directness’ and pathways in which childhood circumstances impact health and wellbeing in later life remains unclear. Specifically, research remains unclear whether childhood circumstances have a direct impact on adult health and wellbeing outcomes, or whether the role of childhood circumstances on adult health outcomes are mediated through adult socioeconomic status (Pudrovskas & Anikputa, 2013).

Lifecourse epidemiology seeks to explain how childhood circumstances influence adult disease risk and socioeconomic position (Kuh et al., 2002). Initial research by Barker (1995, 1998) in the 1990s suggested that the last trimester of life in-utero was a “critical period” for development, which directly influenced health outcomes in later life. According to Barker (1995, 1998),
time in-utero exerted a long-lasting effect on health via a biological imprinting mechanism that affected adult health independently of intervening experiences. Overtime, the concept of a critical period has expanded from its initial focus on in-utero as a critical period, to define early childhood as a sensitive period. Like critical periods, sensitive periods are also times of rapid individual change but there is more scope to modify or even reverse those changes outside the time window (Kuh et al., 2002). As interest in this area increased, research began to indicate that the role of childhood circumstances on adult health outcomes were fully or partially mediated through adult socioeconomic status (Flèche et al., 2021; Wood et al., 2017). Referred to as the chains of risk hypothesis, this pathway posits childhood circumstances influence later life health indirectly, via the role of early life SES plays on determining an individual’s SES in later life. Here it is argued that the social and economic resources available in childhood influences access to adult financial circumstances which in turn affects health and wellbeing outcomes in adulthood by influencing health related behaviour, access to health care and/or causing elevated stress levels (Pudrovska & Anikputa, 2013).

Using a life course modelling approach, we hypothesis that childhood financial circumstances will have a significant association with adult wellbeing. Consistent with the critical period hypothesis, we hypothesize that the effect of poor financial circumstances will extend directly into adulthood at a population level. We further hypothesize that this association will be direct rather than indirect and therefore consistent with the chains of risk hypothesis. Following evidence that there may be both biological sex based (Morrissey & Kinderman, 2020; Pudrovska & Anikputa, 2013) and generational or cohort differences in the role that childhood circumstances play on adult wellbeing (Wood et al., 2017; Flèche et al., 2021; Layard et al., 2014; Stafford et al., 2015; Blane et al., 2004) our analysis is further stratified by biological sex and three age group. The age groups were defined based on three widely recognised generational age cohorts in the UK (Searle, 2019) with the 18–40 year old age group representing Millennials, the 41–65 year old age group representing Generation X and the age group comprising people over 66 years of age representing the generational cohort referred to as the Baby Boomers. Although Millennials are often depicted as being less resilient compared to members of Generation X and Baby Boomers, as noted above, each of these 3 generational cohorts will have experienced significant economic and social changes in their early life. Such stratification adds an important methodological and conceptual perspective contribution to the current life-course literature. Regarding the role of biological sex, we do not have an a priori hypothesis that childhood circumstances will disproportionately impact one sex compared to the other. We hypothesis that childhood circumstances will have a significant association across all age groups; however, the direct effect of childhood SES will be greatest for the youngest group, while the effect of childhood circumstances will be largely indirect for the middle and oldest age group as the role of adult SES becomes stronger. It is crucial to note that as this analysis uses cross sectional data the effect of age or cohort effects cannot be disentangled.
Data

Smartline National Survey (SNS)

The Smartline National Survey (SNS) was developed using largely existing validated scales and was pretested using focus groups. The survey was implemented in the UK using an existing online household panel provided by YouGov. Participants were selected via quota sampling to obtain representative samples in terms of age, biological sex, social grade and home ownership. In total, we have received 3668 questionnaires from respondents over 18-year-old and 3511 of them contains enough information for this study. Descriptive statistics comparing the Smartline National Survey sample to the UK census is presented in Table 1. From Table 1, one can see that our sample has similar age, biological sex, socioeconomic and home ownership profile compared to national averages in the 2011 Census. Regarding the timeframe, data collection was primarily conducted in late February and completed by mid-March, just before COVID-19 began to become a widespread public health emergency in the UK. A pilot study was collected in January 2020, and no noticeable differences were observed in the key outcomes of relevance to this paper, mainly wellbeing. As such, we believe that this data represents an accurate depiction of wellbeing pre-COVID-19 for the UK.

Measures

Outcome Measure

Mental wellbeing was assessed using the validated and widely used Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS). SWEMWBS was developed to enable the monitoring of mental wellbeing in the general population and the

| Table 1  | Descriptive statistics comparing the Smartline National Survey sample to the UK census 2011 |
|-----------------|---------------------------------------------------------------|
|                | Sample | UK census^a                |
| Mean of age of the population 18+ (year-old) | 50  | 49 |
| Biological sex (female) | 52% | 51% |
| Home ownership | 61% | 63% |
| Social grade | Sample | UK census^b |
| AB (Higher & intermediate managerial, administrative, professional occupations) | 30% | 27% |
| C1 (Supervisory, clerical & junior managerial, administrative, professional occupations) | 30% | 28% |
| C2 (Skilled manual occupations) | 20% | 20% |
| DE (Semi-skilled & unskilled manual occupations, Unemployed and lowest grade occupations) | 21% | 25% |
| Number of respondents | 3688 |

a: ONS National Population Projections, 2018

b: National Relationship Survey (NRS), 2016
evaluation of projects, programmes and policies which aim to improve mental wellbeing (Tennant et al., 2007). SWEMWBS mental wellbeing was defined as the ‘positive aspect of mental health’, using the World Health Organization of mental health ‘a state of well-being in which an individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and is able to contribute to his or her community’ (Ng Fat et al., 2017). The SWEMWBS has been validated for the general UK population (Ng Fat et al., 2017).

**Predicator: Financial Circumstances in Childhood and Adulthood**

There is an increasing evidence base that both objective and subjective financial circumstances is a key contributor to individual overall well-being throughout their lifecourse (Downward et al., 2020; Marshall et al., 2020). However, access to the appropriate longitudinal data to test this relationship, particularly data on childhood circumstances, has been limited to date. An established solution to this problem has been to collect data about people’s earlier life, retrospectively by asking them to recall their fertility, health, work, partnership, and residential history as well as other information about their circumstances in childhood (Morrissey & Kinderman, 2020). To test the robustness of this approach, a recent study by Jivraj et al. (2020) found a high degree of similarity between childhood exposures at age 14 that have been prospectively collected in a cohort study, the National Child Development Study and retrospectively collected in the English Longitudinal Survey of Aging (ELSA) and wellbeing outcomes in mid-life. Jivraj et al. (2020) concluded that retrospective data does not produce biased estimates with respect to the direction of association between life course exposures and mid-life wellbeing when compared with similar prospective data. Following the validation of the ELSA recall question, as an English based study, age 14 was chosen as the recall age for parental income in the SNS. Specifically, this question asked respondents to compare their parental income to the rest of the population across four categories, ‘much lower than others, bottom 25% of the population’ to ‘much higher than others, highest 25% of the population’. This question was used to form a dichotomous variable for childhood subjective financial hardship, with participants responding that their parental income was ‘much lower than others, bottom 25% of the population’ denoted as having financial hardship in childhood.

Containing data on respondent’s occupation, education, and personal income, it was possible to derive a composite continuous variable for wider adult socio-economic status from the SNS. However, following work by (Morrissey & Kinderman, 2020) using the BBC Stress Test (Kinderman et al., 2011) which used a similar question on childhood circumstances, adult financial circumstances was also based on a single data point, respondent’s current income, to prevent data on adult circumstances being over-represented compared to data on childhood circumstances. The question on current annual adult income was divided into seventeen categories in the Stress Test; starting with earnings” under £5,000 per year” and with each category increasing by increments £5,000 up to £60,000, with the remaining categories defined as £60,000 to £69,999 per year”, “£70,000 to £99,999 per year”, “£100,000 to £149,999 per year” and “£150,000 and over”. Medium
UK income was £30,800 in 2020 (Office of National Statistics, 2021). Based on the UKs definition of low-income households (households earning less than is less than 60% of the UK’s median income), this means that respondents living on less than £18,500 could be considered low income. As our data is categorical rather than continuous, to reflect households living below 60% of the medium income, respondents earning in the lowest 2 income categories (less than £20,000) were denoted as experiencing financial hardship (0 – income greater than £20,000; 1 – income less than £20,000 per annum).

Finally, it is important to note that the use of personal income may be problematic for certain groups, particularly respondents that are still in education and individuals that are retired. Only 3% and 4% of the SNS respondents recorded that they were retired or still in education, respectively. Given these low percentages we retained these respondents in the sample and believe that adult income is a relevant indicator of financial circumstances for the wider sample.

**Covariates**

Age as a continuous variable and highest education level achieved were included in all models. The ‘highest education level achieved’ variable was defined as a categorical variable across seven categories (No formal education, Vocational Education, GCSEs, A levels, post-secondary school diploma, undergraduate degree, and post graduate degree). No formal education was used as the reference variable in all models. The variable ‘highest education level achieved’ was included in all models as it has been found to be an important factor attenuating the effects of childhood socioeconomic status (Schaan, 2014).

**Missing Data**

Missing data were deleted listwise, yielding complete data on 3,013 participants (retention of 82% of the original sample). 18% of participants did not respond to the adult income question (n = 655); however, analysis revealed no significant differences between those with and without missing data on demographic variables and the measured variables.

**Methods**

The dependent variable of interest, mental wellbeing score as defined by SWEMWBS was tested for normality. The distribution was confirmed as normal and linear regression models were used to investigate the associations stratifying by biological sex and the three age categories (respondents aged 18–40 (millennials), 41–65 (Generation X) and 66 years plus (baby boomers)). Following previous research on the role of childhood on adult health outcomes (Pudrovska & Anikputa, 2013) (Morrissey & Kinderman, 2020), the critical period hypothesis was tested by including both financial hardship in childhood and adulthood as two separate, binary variables in the same regression model.
The chain of risk hypothesis, which posits that adult financial circumstances mediate the association between childhood financial circumstances and wellbeing in adulthood requires the estimation of both direct and indirect effects via mediation analysis. The first step involves testing if adult financial circumstances fulfilled the criteria of a mediator. To test if adult financial circumstances fulfilled the criteria of a mediator two regression models were initially run. A logistic model to test if lower childhood financial circumstances was significantly associated with lower adult circumstances and a linear regression model to test if adult financial circumstances was significantly associated with adult wellbeing score. Adult financial circumstances fulfilled the criteria for a mediator as lower childhood adult financial circumstances were significantly associated with lower adult financial circumstances (OR 1.77, CI95% 1.47, 2.12), and adult financial circumstances was significantly associated with adult wellbeing score (-0.870, CI95%: -1.22, -0.517). On confirming that adult financial circumstances acted as a mediator, mediation analysis was performed. The approach used calculates the average mediation and direct effects through simulation of predicted values of the mediator or outcome, and calculating the average causal mediation, direct effects, and total effects (Hicks & Tingley, 2011). All analysis were calculated in Stata 16.0 using the –medeff- package (Hicks & Tingley, 2011). Stata 16.0 contains several mediation packages; the ‘medeff’ package was chosen as it allows model specification with a binary mediator (adult financial circumstances) and continuous outcome variable (wellbeing score) (Imai et al., 2010). As with the linear regression analysis, models were run for the full population, by biological sex and by age category.

Results

Overall wellbeing as defined by SWEMWBS is 21.28 for this sample. Regarding our sub-populations of interest, average wellbeing is 21.52 for men and 21.07 for women, 20.53 for participants aged 18–40, 20.95 for participants aged 41–65 and 22.79 for participants aged 66 years plus. This is slightly lower than previous analysis (Ng Fat et al., 2017) who recorded an average wellbeing score of 23.7 for men and 23.6 for women. Respondents that noted they experienced financial hardship in childhood had an average SWEMWBS of 20.78 compared to 21.42 (no financial hardship in childhood); while respondents that noted they experienced financial hardship in adulthood had an average SWEMWBS of 20.7 compared to 21.4 (no financial hardship in adulthood). The finding that the oldest age group has the highest mental wellbeing score is in line with previous research that indicates that life expectations change over age, and with this change subjective appreciation of quality of life become more positive, even if objectively speaking circumstances might be worse (Vanhoutte & Nazroo, 2015).

Table 3 presents descriptive statistics of the financial circumstances of respondents to the SNS at two points in their life, childhood, and adulthood. 21% of respondents reported that they had experienced what we define as financial hardship in childhood, as measured by their perception that their parent’s income was in the lowest quarter during their childhood. This percentage is higher than the 14% of
respondents who were recorded as having financial hardship in their childhood than previous research using the BBC Stress Test on which this question was modelled (Morrissey & Kinderman, 2020). 20% of respondents reported financial hardship in adulthood (defined as having a current income less than £20,000 per annum). Looking at the accumulation of financial hardship, 65% of respondents indicated that they never experienced financial hardship, 6% of respondents indicated that they always experienced financial hardship, 15% of respondents reported that they experienced financial hardship in childhood but not in adulthood, while 14.5% of respondents noted that they experienced financial hardship in adulthood but not in childhood. Table 2 also presents the financial circumstances of respondents to the SNS by biological sex and age group (respondents 18–40, 41–65 and 60 years plus). We see that a higher percentage of women experience financial hardship (23%) in adult life compared to men (18%). The oldest age group, respondents aged 66 years plus that the highest levels of childhood and adult financial hardship and reported much lower rates, 56% of ‘never experiencing financial hardship’, than respondents in the youngest (70%) and middle aged (65%) categories.

Total Population: Early Life Financial Hardship, Critical Period, and Chains of Risk

Using linear regression models Model 1 and Model 2 in Table 4 presents the association between childhood financial circumstances and adult mental wellbeing and adult financial circumstances and adult mental wellbeing, respectively. Model 3 includes both childhood financial circumstances and adult financial circumstances on adult mental wellbeing, adjusted for age, biological sex and highest level of education achieved and represents the critical period hypothesis. Model 4 in Table 3 explores the chains of risk hypothesis using mediation analysis to estimate both the direct and indirect effects of childhood financial circumstances on wellbeing in adulthood. All 4 models are adjusted for age, biological sex and highest level of education achieved.

| Table 2 | Comparison of distribution of biological sex, age and childhood circumstances between the full sample and post removal of missing income observations |
|---------|--------------------------------------------------------------------------------------------------|
|          | Full sample (n = 3,668) | Missing adult income responses deleted (n = 3,013) |
| Biological Sex | | |
| Men | 46.56 | 47.73 |
| Women | 53.44 | 52.27 |
| Age | | |
| Age 18–40 | 33.48 | 35.01 |
| Age 41–65 | 41.17 | 40.86 |
| Age 66 + | 25.35 | 24.13 |
| Childhood Circumstances | | |
| No Financial hardship | 79.06 | 78.86 |
| Financial hardship | 20.94 | 21.14 |
Table 3 Financial hardship in childhood and adulthood by total sample, biological sex and age categories. Total (n = 3,013). Smartline National Survey. Sample Population: Residents of the UK.

| Financial circumstances                  | Total      | Men         | Women        | Age 18–40 | Age 41–65 | Age 66 + |
|------------------------------------------|------------|-------------|--------------|-----------|-----------|----------|
| Financial hardship in childhood (age 14)| 21% (768)  | 22% (374)   | 20% (394)    | 19% (232) | 21% (318) | 23% (218) |
| Financial hardship in adulthood          | 20% (752)  | 18% (306)   | 23% (446)    | 15% (185) | 20% (305) | 28% (262) |
| Always experienced financial hardship    | 6% (219)   | 6% (100)    | 6% (119)     | 4% (48)   | 6% (95)   | 8% (76)  |
| Never experienced financial hardship     | 65% (2367) | 66% (1128)  | 63% (1239)   | 70% (859) | 65% (982) | 56% (526) |
| One period of hardship                   | 29%        | 28%         | 31%          | 26%       | 29%       | 46%      |

Table 4 Total Estimates (biological sex, age and education adjusted) of effects of financial hardship in mean wellbeing scores (SWEMWBS) in (i) Childhood, (ii) adulthood and (iii) according to the critical period and (iv) chains of risk hypotheses (95% CI)

| Model | Circumstances                  | B  | SE  | Stand. Coeff | p-value | CI Lower | CI Upper |
|-------|--------------------------------|----|-----|--------------|---------|----------|----------|
| Model 1 | Childhood financial circumstances | -0.65 | 0.17 | -0.06 | 0.000 | -1 | -0.31 |
| Model 2 | Adult financial circumstances | -0.89 | 0.18 | -0.08 | 0.000 | -1.24 | -0.54 |
| Model 3 | Childhood critical period | -0.59 | 0.17 | -0.06 | 0.000 | -0.93 | -0.25 |
| Model 4 | Adulthood critical period | -0.84 | 0.18 | -0.08 | 0.000 | -1.2 | -0.49 |
| Model 4 | Chains of risk | -0.04 | 0.08 | -0.02 | 0.007 | 0.04 | 0.14 |
|        | Total effect of childhood circumstances | -0.64 | 0.07 | -0.3 | 0.000 | -1 | -0.3 |
|        | % Total effect mediated | 0.07 | 0.07 | 0.14 | 0.000 | 0.04 | 0.14 |

Total (n = 3013). The Smartline National Survey 2020. Sample Population: Residents of the UK

Table 4 shows a significant negative association between childhood financial hardship and adult wellbeing (Model 1: -0.65, CI: -1.00, -0.31), however the association between adult financial hardship and wellbeing was greater (Model 2: -0.89, CI: -1.24, -0.54). Model 3 tests includes both childhood and adult financial circumstances and represents the critical period hypothesis. Here we see that the association for both childhood and adulthood remain significant, albeit slightly attenuated, and the coefficient for adult financial circumstances (-0.84, CI: -1.20, -0.49) is larger than that for childhood circumstances (-0.59, CI: -0.93, -0.25). Exploring the role of childhood circumstances further on adult mental wellbeing, performing a mediation analysis (Table 3) indicates that the association between childhood financial circumstances and adult wellbeing is mostly direct (-0.64, CI: -1.00, -0.30), thus supporting the critical period, rather than the chains of risk hypothesis.
Sex Stratification

Early Life Financial Hardship, Critical Period, and Chains of Risk

The same pattern emerged on stratifying by biological sex for model 1, 2 and 3 (Table 5). No significant difference observed between men and women. Regarding the mediation analysis, the total effect of childhood financial hardship for men (-0.695, CI: -1.205, -0.185) and women (-0.60, CI: -1.066, -0.141) was mostly direct (indirect men: -0.06, CI: -0.128, -0.012, indirect women: -0.07, CI: -1.29, -0.39), with no significant difference observed between men and women. As with the population model these results supporting the critical period, rather than the chains of risk hypothesis for both men and women.

Age Stratification

Early Life Financial Hardship, Critical Period and Chains of Risk

Further analysis examined the relationship between childhood financial circumstances, adult financial circumstances and wellbeing stratifying by three age categories that correspond with the three widely recognised generational age cohorts in the UK (Searle, 2019); Millennials, Generation X and the Baby Boomers. Controlling for highest level of education achieved and biological sex, Table 6 indicates that neither the critical period or the chains of risk hypothesis were confirmed for the age groups representing Millennials nor Baby Boomers. Only adult financial circumstances were significantly associated with wellbeing for Millennials, while neither childhood nor adult circumstances were significantly associated with the wellbeing of Baby Boomers. Examining the 41–65 age group or Generation X further, the effect of childhood financial hardship for this group was mostly direct (OR-1.09: CI 95%: -1.63, -0.17) rather than indirect (OR-0.08: CI 95%: -0.17, -0.01). As with the population and the sex stratified models these results supporting the critical period, rather than the chains of risk hypothesis for this age group.

Discussion

There is increasing evidence that good mental wellbeing plays an important role in overall health. As such, the need to understand what factors and their associated mechanisms promote good mental wellbeing throughout an individual’s lifecourse is growing in importance (Steptoe et al., 2014). This research found that the effect of childhood financial hardship for this sample was mostly direct rather than indirect. That is, the role of childhood circumstances extends directly into adulthood at a population level and when stratifying by biological sex. Although, results for the overall sample population confirmed the critical period hypothesis, rather than the chains of risk hypothesis, on stratifying by age a more complicated
Table 5  Sex stratified estimates (age and education adjusted) of effects of financial hardship on mean wellbeing scores (SWEMWBS) according to the critical period, chains of risk and accumulation hypotheses (95% CI)

|                | B       | SE    | Stand. Coeff | p-value | CI Lower | CI Upper |
|----------------|---------|-------|--------------|---------|----------|----------|
| **Men**        |         |       |              |         |          |          |
| Model 1        | Childhood financial circumstances | -0.69 | 0.26 | -0.07 | -1.21 | -0.19 |
| Model 2        | Adult financial circumstances    | -0.91 | 0.29 | -0.08 | 0.002 | -1.48 | -0.35 |
| Model 3        | Childhood critical period        | -0.62 | 0.26 | -0.06 | 0.017 | -1.14 | -0.11 |
|                | Adulthood critical period        | -0.85 | 0.29 | -0.07 | 0.003 | -1.42 | -0.28 |
| Model 4        | Chains of risk                   | -0.06 | 0.23 | -0.09 | 0.003 | -1.33 | -0.43 |
|                | % Total effect mediated          | -0.69 | 0.24 | -0.06 | 0.000 | -1.07 | 0.14  |
| **Women**      |         |       |              |         |          |          |
| Model 1        | Childhood financial circumstances | -0.60 | 0.24 | -0.06 | 0.000 | -1.07 | 0.14  |
| Model 2        | Adult financial circumstances    | -0.87 | 0.23 | -0.09 | 0.002 | -1.33 | -0.43 |
| Model 3        | Childhood critical period        | -0.54 | 0.24 | -0.05 | 0.02  | -1    | -0.08 |
|                | Adulthood critical period        | -0.84 | 0.23 | -0.09 | 0.000 | -1.29 | -0.39 |
| Model 4        | Chains of risk                   | -0.07 | 0.23 | -0.09 | 0.000 | -1.29 | -0.39 |
|                | % Total effect mediated          | -0.61 | 0.24 | -0.06 | 0.000 | -1.05 | -0.13 |

Total (men n = 1438, women n = 1575). The Smartline National Survey 2020. Sample Population: Residents of the UK.
Table 6: Age stratified Estimates (biological sex, age and education adjusted) of effects of financial hardship on mean wellbeing scores (SWEMWBS) according to the critical period and chains of risk accumulation hypotheses (95% CI)

| Age | Model 1 | Childhood financial circumstances | B   | SE  | Stand. Coeff | p-value | CI Lower | CI Upper |
|-----|---------|-----------------------------------|-----|-----|--------------|---------|----------|----------|
| 1   | Model 1 | Childhood financial circumstances| -0.27 | 0.33 | -0.02 | 0.412 | -0.91 | 0.37 |
|     | Model 2 | Adult financial circumstances     | -0.92 | 0.36 | -0.08 | 0.01 | -1.63 | -0.21 |
|     | Model 3 | Childhood critical period         | -0.15 | 0.33 | -0.02 | 0.512 | -0.79 | 0.5 |
|     |         | Adulthood critical period         | -0.94 | 0.36 | -0.07 | 0.013 | -1.66 | -0.23 |
|     | Model 4 | Chains of risk                    | -0.03 | 0.36 | -0.07 | 0.013 | -1.66 | -0.23 |
|     |         | Total effect of childhood financial circumstances | -0.19 | 0.36 | -0.07 | 0.013 | -1.66 | -0.23 |
|     |         | % Total effect mediated           | 0.06 | 0.36 | 0.07 | 0.013 | -1.66 | -0.23 |
| 2   | Model 1 | Childhood financial circumstances| -1.09 | 0.26 | -0.11 | 0.000 | -1.61 | -0.57 |
|     | Model 2 | Adult financial circumstances     | -1.3 | 0.27 | -0.13 | 0.000 | -1.83 | -0.76 |
|     | Model 3 | Childhood critical period         | -0.98 | 0.26 | -0.1 | 0.000 | -1.5 | -0.46 |
|     |         | Adulthood critical period         | -1.2 | 0.28 | -0.12 | 0.000 | -1.82 | -0.75 |
|     | Model 4 | Chains of risk                    | -0.08 | 0.36 | -0.07 | 0.013 | -1.66 | -0.23 |
|     |         | Total effect of childhood financial circumstances | -1.07 | 0.36 | -0.07 | 0.013 | -1.66 | -0.23 |
|     |         | % Total effect mediated           | 0.07 | 0.36 | 0.07 | 0.013 | -1.66 | -0.23 |

Total (18–40 n = 1055, 41–65 n = 1231, 66 years plus n = 727). The Smartline National Survey 2020. Sample Population: Residents of the UK.
pattern of associations emerged. Counter to our initial hypothesis, which posited that childhood circumstances would have a direct significant effect on all three age groups, childhood financial circumstances were only significantly associated with adult wellbeing for Generation X (defined as respondents aged 41–65 years old). Regarding the Millennial’s, only adult financial circumstances are significantly associated with adult wellbeing for respondents in this age group. This result is surprising as one may have expected that childhood financial circumstances would have had a greater effect on the younger aged group as childhood would be more proximal. Whilst, despite the higher percentage of respondents reporting that they had experience financial hardship in childhood among the baby-boomers (23% experience financial hardship), no statistical evidence of the role of childhood was found for this age group. Indeed, the descriptive statistics indicate that average mental wellbeing is highest for this age group (SWEMWBS: 22.79) and is higher than average wellbeing for the overall sample (SWEMWBS: 21.28).

A possible age related (rather than cohort effects) explanation for the results observed for the Millennials age group is that younger age groups focus on their immediate circumstances; and as such their current financial circumstances have a more proximate impact on their mental wellbeing. Regarding the emergence of childhood circumstances as a significant predictor of adult mental wellbeing for Generation X a possible explanation may be offered by the accumulation hypothesis within lifecourse epidemiology (Kuh et al., 2002). The accumulation hypothesis proposes that the longer the duration of exposure to financial hardship the greater the impact on the health outcome. For Generation X, the impact of financial hardship in both childhood and adulthood may begin to have an additive effect on adult mental wellbeing. Viewed together the results for the Millenial and Generation X age groups may indicate that while current financial circumstances may have a more proximate impact on mental wellbeing in early adulthood, if financial circumstances do not improve as people move into middle age, the impact of childhood and adult financial circumstances begin to compound to have a negative impact mental wellbeing. Regarding the insignificant association between childhood circumstances and wellbeing in the oldest age group, a possible explanation for this result is that factors other than socioeconomic circumstances, such as physical health become more important for mental wellbeing as people age (Steptoe et al., 2014).

A further possible explanation for our results may be due to cohort effects. A cohort is any group that shares common historical or social experiences, like their year of birth. To begin to explore the potential cohort effects within our cross-sectional data, we stratified our age groups into on three widely recognised generational age cohorts in the UK (Searle, 2019); Millennials (18–40-year-olds), Generation X (41–65-year-olds) and baby boomers (over 66 years of age). Much focus has been placed on the financial and wider socioeconomic circumstances of Millennials, particularly regarding home ownership (Abelson, 2021), their perceived failure to plan for future financial events (Cwynar, 2020) and a wider cultural anxiety that young people are taking longer to ‘grow up’ than in the past, and that they are struggling to cope with the demands and responsibilities of adulthood (Bristow, 2019). This analysis potentially provides new evidence demonstrating the difficulties of Millennials moving into adulthood. However, it is again important to stress that as this analysis
uses cross sectional data the effect of age or cohort effects cannot be disentangled. Thus, we encourage future work using longitudinal data to begin to unpack these results more.

A third reason for our results may be due to the methodological limitations of our research. To fully understand the mechanisms that underpin the impact of financial hardship in childhood and mental health outcomes, a longitudinal research design is necessary. Although using slightly different definitions of wellbeing, the recent work on childhood socioeconomic circumstances and adult wellbeing cited here by Wood et al. (2017) and Flèche et al. (2021) both use objective childhood and adult socioeconomic data from longitudinal datasets. In contrast this paper uses a cross sectional design with childhood financial circumstances measured subjectively and as a recall variable. Given that childhood circumstances are based on individual recall, respondents may have systematically misremembered their childhood situation considering their old age health conditions, thus introducing measurement error to our analysis (Jivraj et al., 2020). A further limitation is that our study consists of references to only two observation points in time. The investigation of the effects of lifecourse social and economic conditions on health is stated to require at least three points of observation in time. Future work will focus on exploring these results using available longitudinal datasets, such as the British Birth Cohorts. However, while there are limitations with the financial hardship variable that was used in this study and the number of time periods that were used, information concerning financial circumstances in childhood is scarce, so the presence of this variable in the data is a clear strength of the SNS dataset.

**Conclusion**

Seeking to explore the role of financial hardship in childhood on adult mental wellbeing and using a representative sample of the British population, this paper found that one-fifth (21%) of respondents reported that they had experienced what we define as financial hardship in childhood. Our results indicate that childhood and adult financial hardship are independently important predictors of mental wellbeing in adulthood. Specifically, we find that financial hardship in childhood have a direct association with mental wellbeing in middle age. We hypothesise that as per the accumulation hypothesis in life course epidemiology that the effects of childhood and adult financial hardship accumulate and combine over time to significantly affect adult mental wellbeing in middle age. This hypothesis requires further research. Interestingly, although the baby-boomers age-group recorded the highest percentage of respondents noting that they had experienced financial hardship at some point in their life (56%), this group had the highest level of mental wellbeing. Here we look to work which has found that factors other than socioeconomic circumstances, such as physical health become more important for mental wellbeing as people enter older age groups (Steptoe et al., 2014). In conclusion, we believe that the age stratification included in this study adds an important conceptual and methodological contribution to the evidence base on the changing role that childhood plays in adult health and wellbeing over time.
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Declarations

Ethics Statement This study complies with the guidelines of the 1964 Declaration of Helsinki. Ethical approval was obtained by the University of Exeter Research Ethics Committee, reference no. eUEBS002996 v2.0.

Competing Interests None.

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