

Out-of-home care in childhood and socio-
economic functioning in adulthood: ONS
Longitudinal Study 1971-2011

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Abstract

Background

Children who spent time in non-parental care report poor outcomes in many aspects of their later lives on average, but less is known about differences by type of care. We examined whether socioeconomic, family, and living arrangements of adults who had been in non-parental care across the first three decades of adult life varied by type of care (residential, non-relative and relative).

Methods

We used longitudinal data from the Office for National Statistics Longitudinal Study (LS). Participants were aged <18 years and had never been married at baseline of each census year from 1971-2001 (n=242,843). Separately for each adult follow-up age (20 to 29; 30 to 39; 40 to 49), multi-level logistic regression models were used to compare socioeconomic, family, and living arrangements by different out-of-home care (OHC) experiences.

Results

Any OHC increased the likelihood of poorer functioning in the three domains of socioeconomic circumstances, family formation and relationships, and living arrangements. This was evident in their 20s, 30s and 40s; the most adverse outcomes were observed for those with a history of residential care, followed by non-relative OHC, and the least adverse outcomes for relative OHC. Moderation by childhood census year, age in OHC, and gender altered the relationship between OHC and some, but not all, adult outcomes. The strongest, most consistent, evidence was for widening of inequalities in age 20-29 outcomes across childhood census years and weakest evidence for any moderation of age 40-49 outcomes by age when in OHC.

Conclusion

Enduring inequalities in social and economic functioning for OHC-experienced adults were found. The evidence overwhelmingly supports the policy to place children in relative care whenever possible, with residential care the least favoured option.

Keywords: child; foster; care; longitudinal; socioeconomic; follow-up studies; censuses

1. Introduction

Children in out-of-home care (OHC) are at higher risk of adverse outcomes later in life [1-18]. This includes outcomes such as poorer mental and physical health [1, 4, 5, 7, 9, 11], premature mortality [10, 15, 19-23], less education and lower qualifications [3, 4, 11, 13], unemployment and a more disadvantaged socioeconomic position [3, 4, 11, 24], unstable relationships and earlier family formation [2, 3, 6] and poorer living conditions [4, 14, 18].

1.1. Gaps in the literature

Less well known is whether disadvantage continues throughout adulthood since most prospective research examines outcomes at one stage in adulthood [4, 8, 11, 25, 26], with the immediate post care period [4, 27] or at best early adulthood [8, 11, 20, 25-27] predominating. Rare exceptions extend the follow-up period to mid adulthood [13, 24], but only cover a limited range of outcomes. Added to this limitation, three other themes emerge about gaps in the literature. First, sample sizes can be small [4, 28, 29] and nonprobability samples occasionally used [30], as are designs without a comparator group [4, 25, 30-32], or that rely on retrospective data [2, 3, 12, 33, 34]. The extent to which these sampling and design issues may bias conclusions is unknown. Second, covariates for even basic sociodemographic data in childhood are not always measured [4, 8, 20, 29, 31], prohibiting the ability to control for other factors associated with poorer adult outcomes. Third, type of OHC is not always considered and previous work suggests very different risks for adverse outcomes associated with disaggregated care types [7, 9, 10, 35, 36].

This analysis will address all three concerns. It uses the ONS Longitudinal Study (LS), the largest longitudinal data resource in England and Wales, which is broadly representative of the entire population. It is based on data collected in the England and Wales censuses, starting from the 1971 census. Holding information on approximately 1 million people over the 40 years of the study, the LS allows for robust research into subgroups of the population such as children in OHC using prospectively collected data. The design of the LS makes it possible to estimate models that include the basic social and demographic data that have been missing to date. With up to 40 years follow-up data on children in the LS, we are able to chart, amongst other factors, key markers of adult functioning such as acquiring qualifications, getting on in work, finding a partner, establishing a family and providing a secure home.

1.2. Type of out-of-home care

Outcomes are consistently worse for children in OHC compared to general population children [37, 38]. Possible explanations include residential care putting children, particularly young children, at

risk of attachment disorder and developmental delays. A few studies have shown that children in residential care have more problems in adulthood than those fostered in private households [7, 35, 39], while those in relative households have fewer problems than those in non-relative foster care [27]. Various theories explaining these findings include minimisation of trauma through residing with kin [40] and more regular contact with a parent [41]. Since much of relative care ‘goes under the wire’ and is not known to social services [42], we separate OHC into i) residential care; ii) relative care (both formal and informal placements); and iii) non-relative care (both formal and more rarely informal fostering) and hypothesise that adult outcomes will differ systematically across the OHC types, with outcomes likely to be poorest for those who were in residential care.

1.3. Moderation effects

The size of the LS also makes it possible to examine hypotheses about moderation, which have hitherto been hampered by a lack of power and the inherent difficulty that small sample sizes increase the probability of making a Type II error and rejecting a “true” moderating effect. We address three moderation questions suggested by the literature: i) have things improved more recently - consistent with changes in recommendations for placements in different types of OHC? ii) Are there differences in outcome depending on the age that a child is placed in OHC? and iii) are there gendered responses in adulthood to a history of OHC? Moderation by ethnicity or migration history is a complex issue which will be reported on separately [Sacker et al, in preparation].

1.3.1. Moderation by census year

We first observe children in OHC in April 1971. Prior to the Seebohm Report in 1968 [43], local government social services for children were spread between different departments, predominantly welfare, health and housing. Following publication of the report, social work services and social care provision for children were unified into Children’s Departments. The establishment of these departments started in April 1971, making it unlikely that any will have been incorporated by the census date. However, the tragic death of Maria Cowell at the hands of her stepfather highlighted a serious lack of coordination within child protection services. The report from the subsequent inquiry led to the setting up of area child protection committees to coordinate decisions by agencies responsible for children’s safety when at risk. This may have affected children observed in 1981. Following this, the United Kingdom’s (UK’s) 1989 Children Act recommended that placement priority be given to a child’s extended relatives and friends. The Act came into effect in 1991, too early to have had an impact on OHC observed in the 1991 census. But since then new placements into residential care have decreased and placements into relative household care increased [44, 45], and outcomes for children in OHC in the 2001 census might be more beneficial for their long-term well-

being. Therefore, it is important to gain some understanding of the potential long-term impact of changes in child protection legislation. This leads to the hypothesis that children will have more positive outcomes in adulthood if they are observed in OHC in more recent census years.

1.3.2. Moderation by age when in care

It has been reported that children entering care at different ages do so for different reasons, with parental abuse and developmental issues being more common for entry at younger ages and behavioural issues/delinquency more common at older ages [46]. Also longer placements and multiple placements, which have been associated with more extensive difficulties in adulthood [47], may be reflected by being in care later in childhood. It is possible for both these reasons that OHC later in childhood and adolescence may be associated with less positive functioning across a range of social domains in adulthood. This is our second moderation hypothesis.

1.3.3. Moderation by gender

Some studies have shown gendered associations between care status and adolescent and adult outcomes [11, 41]. Others suggest that gendered adult functioning applies across the whole population and is not specific to those with a history of OHC [24]. One possible explanation for moderation by gender concerns gender differences in resilience, with girls more likely to be resilient to stressful circumstances than boys [18, 48-50]. Another explanation is that the nature and timing of transitions to adulthood differ for men and women and the risks associated with OHC may affect adult social functioning differentially via different transition patterns [51]. Overall, it seems that gender has not been the focus of most studies and reviews, possibly because of study limitations such as insufficient statistical power. Therefore, with our larger sample size, we propose the third moderation hypothesis – that there will be different patterns of functioning across a range of social outcomes for men and women.

1.4. The current study

The current study examines the impact of OHC on adult functioning in the domains of socioeconomic position, family formation and relationships, and living arrangements. Given the reliable data on the impact of OHC on multiple health outcomes, we hypothesised that OHC would increase the likelihood of poorer functioning in all three domains. Moreover, we expect outcomes to differ across placement type with the most adverse outcomes for those with a history of residential care and the least adverse outcomes for those with a history of relative OHC. Finally, we explore moderation by childhood census year, age in OHC and gender, with the expectation that each will be shown to alter the relationship between OHC and adult outcomes.

2. Materials and methods

2.1. Data

The Office for National Statistics Longitudinal Study (LS) is a 1% representative sample of the population of England and Wales, drawn initially from respondents to the 1971 census who were born on one of four dates in the calendar year [52]. New members – newly born or immigrants - are added to the LS if they have the same four birth dates. Similar 1% samples have also been drawn from the 1981, 1991, 2001 and 2011 censuses. The LS has linked records for each census after LS members were first sampled to create a longitudinal dataset. Census data are also collected on the LS members' co-residents, but these are not linked and are cross-sectional only. LS members' data from birth, death and cancer registers have been added to the LS since 1971.

2.2. Inclusion and exclusion criteria

2.3. Main exposures

The main exposure was experience of non-parental care in childhood, taken from the 1971 to 2001 censuses.

2.3.1. Care type

For each census from 1971 to 2001, household grid and residential type data was used to classify dependent children as either: (1) living with a parent, (2) living with a relative > 18, (3) living with a non-relative family, or (4) living in residential care (a children's home or place of detention) on the respective census day. Those living in other types of communal establishment (e.g. hotel, hostel, hospital) at the time of the census were excluded from the sample. For the interaction analyses, non-parental care (types 2-4) were combined into an 'any care' category.

2.4. Outcomes

Social outcomes are taken from the 1981 to 2011 censuses. Hence, LS members from the 1971 have outcomes at 10-, 20-, 30- and 40-year follow-up whereas LS members from the 2001 census have outcomes at 10-year follow-up only. The outcome variables cover the domains of socioeconomic circumstances, family formation and relationships, and living arrangements.

2.4.1. Socioeconomic circumstances

There are four indicators of adult socioeconomic circumstances: qualifications; social class; current employment status; and long-term non-employed.

Highest qualification level was derived by ONS based on census questions on professional, vocational and academic qualifications. To harmonise across census years, we collapsed highest qualification level into the categories 0: ≥ 18 years qualifications (A levels and equivalent or higher); and 1: < 18 years qualifications.

Social class is measured using the 3-category version of the National Statistics Socioeconomic Classification (NS-SEC): Managerial/professional; Intermediate occupations; Routine occupations [53], plus a not known category if the LS member did not give sufficient details of their current or last held job to assign them to a social class.

Those who were ≥ 16 years old were asked if they were currently working and if not the number of years since last worked (census year 1991) or if they had no paid work in the last 10 years (2001-2002). From these responses, we derived the employment status and long-term non-employed variables.

Current employment status is a 4-category variable indicating whether the LS member was i) employed, ii) unemployed, iii) in education or iv) other (out of the labour force for reasons other than education) at the time of the census. *Long-term non-employed* (i.e. ≥ 10 years or not) was a binary variable taking the value 1 if long-term non-employed.

2.4.2. *Living arrangements*

Housing tenure indicates whether the home is owner occupied, rented, or other. *Overcrowding* was defined as a ratio > 1.5 of the number of persons in the household to the number of rooms. *Living alone* is a binary indicator derived from questions on household composition.

2.4.3. *Family formation and relationships*

Legal marital status is defined as i) married, ii) divorced/widowed, iii) single. For women only, the LS is linked to the Births Registration form, from which *number of children* and *age at first child* was derived. The 1971-1991 censuses instructed separated respondents to choose married or re-married categories; information on cohabiting is only available from 2001.

2.4. Covariates

2.4.1. *Demographic variables*

Age, in years, and *gender* (0 male; 1 female) were taken from the census in which the LS child was identified. Childhood census year identifies which census the LS member was observed (0: 1971; 1: 1981; 2: 1991; and 4: 2001).

Ethnicity was grouped into 0 White; 1 Black; 2 South Asian; and 4 Other. Information on ethnicity is only available from 1991, so for LS children in the 1971 and 1981 censuses, ethnicity was extrapolated from their responses in later censuses. A 5th category (not known) was added where this could not be defined due to loss to follow-up, or no ethnicity information being provided.

2.4.2. *Country of birth*

Information from a census question on *country of birth* was dichotomised to create a variable indicating whether LS children were born in the UK or elsewhere.

2.4.3. *Childhood socioeconomic variables*

Data on the socioeconomic environment in childhood was only available for children observed in a private household. If children were observed in residential care, an extra category indicated that data were missing.

Head of household (HoH) social class was measured using the 3-category version of the NS-SEC described above. *Educational level* identified whether the HoH had 18+ years qualifications or not, as above. *HoH employment* indicated if they were currently in work or not. *HoH marital status* was collapsed into 2 categories: legally married or not.

2.5. *Analysis*

Data from census years 1971 to 2001 were pooled and linked to follow-up records from 1981 to 2011. The distribution of LS members' childhood characteristics in the analytical sample was compared with i) all available data, ii) all complete childhood data; iii) incomplete childhood data, and iv) data for those with missing follow-up data. Details are shown in online Supplementary table S1. The distribution of the variables in the complete case sample are very similar to that in the full data sample, apart from childhood census, HoH marital status and HoH employment status. The majority of the childhood census differences can be explained by missing follow-up data due to linkage failures and by study design, neither of which are associated with attributes of the LS child or their family. There were more LS members in the analysis sample where the HoH was married and in employment than in the full sample.

The sociodemographic characteristics of children in parental care, relative care, non-relative care and residential care were compared using chi-square tests or ANOVA, as appropriate. Multiple exposure models were fitted as parallel regression models that allowed for 1 or two census records in childhood with outcomes measured when they were aged 20-29 years, 30-39 years and 40-49 years old. Models estimated the main effect of care type with outcomes separately for each adult

age-group. All models controlled for child gender, age at childhood census, ethnicity, and HoH qualifications, marital status, social class and employment status.

We then repeated the models combining care-type into a binary 'any care' (vs not) variable before estimating 3 interaction models: i) care by gender; ii) care by age in childhood; and iii) care by childhood census. The coefficients from the interaction models were used to estimate adjusted predictions for each outcome. For non-linear outcomes, individual predicted probabilities of the outcome are calculated for each LS member assuming all covariate values are at the mean. For age at first birth, a linear outcome (predicted age) is reported. The difference between the adjusted predictions associated with being in care and the adjusted predictions associated with not being in care are known as marginal effects at the means (MEM).

3. Results

In total, there were 348,924 observations from 242,843 individuals (table 1). Around 1.45% of children in the sample were in care for one or more observations. In table 2, the observations are divided up by type of care and follow-up at different ages in adulthood. On average, care type observations split into 99.0% in parental care, 0.47% in relative care, 0.34% in non-relative care and 0.19% in residential care.

Table 3 shows the distribution of children's sociodemographic characteristics when first observed by care type (distributions for the second observation are presented in Supplementary table S2). All characteristics varied across care types, except for gender. However, note that childhood census counts cannot be interpreted simply because they are affected by follow-ups missing by design, non-response, and linkage problems. The main findings are that children in non-parental care were older on average than children in parental care; more often born outside the UK; Black ethnic groups were more commonly in non-parental care and South Asian ethnic groups in relative care than other ethnic groups; and the HoH for children in non-parental care was more socially disadvantaged (characterised by being single, divorced or widowed, in a less privileged social class, without age 18+ qualifications and non-employed).

The relationship between care type at the first observation in childhood and social outcomes for the first observed census year when over 20 years old is presented in table 4. All the outcomes varied across care type, with those who had not been in OHC having the best outcomes and those who had been in residential care the poorest outcomes. In the next section, these differences are examined more systematically by modelling the relationship between OHC and adult outcomes after controlling for their childhood sociodemographic characteristics observed.

3.1. Age 20-29 outcomes

Findings at 20-29 years' follow-up are detailed in table 5. Overall, the results show a graded impact of non-parental care such that residential care was associated with the poorest social outcomes and relative care the least poor outcomes compared with those who had been with their parent(s) in childhood. Key socioeconomic findings are that those who had been in residential care were four times as likely to have less than 18-year qualifications in early adulthood; had nearly six times the risk of unemployment and 5 times the risk of being out of the labour market for reasons other than education; a 400% increased chance of long-term unemployment; and a 5-fold increased risk of being in a routine social class.

Non-parental care-experienced adults in their 20s had less stable living arrangements: they had a 40% increased risk of renting than being owner occupiers if in relative care, rising to a 341% increased risk if in residential care compared with being in parental care. Those who had been in residential care were particularly at risk of having "other" living arrangements, such as "sofa-surfing", or in communal establishments such as hostels, hospitals and prison. The odds of living in overcrowded accommodation or alone were also higher for those who had been in non-parental care, rising from a 30% excess for relative care experiences to a 200% excess for residential care experiences.

Family formation and relationships in the 20s were also found to be affected by a history of non-parental care: those who had been in relative care were less likely to be single, while those in other types of care were more likely to have married and then divorced (residential OR 2.15; non-relative care 1.97). Women who had been in non-relative care had more children in their 20s whereas women in relative care had fewer children. A trend in age at first birth was evident: an experience of relative care was associated with being 0.44 years younger on average, non-relative care with being 1.16 years younger and residential care with being 2.32 years younger.

3.2. Age 30-39 outcomes

Table 6 covers the age 30-39 year follow-up results. Across the board, the main finding is the remarkable stability of the estimates when comparing them with the age 20-29 estimates in table 5. There was no change in the associations between care experiences in living arrangements, and little change for most of the socioeconomic outcomes and adult family formation and relationships.

The one exception in the socioeconomic domain was that in their 30s, adults who had been in non-parental care in childhood were more likely to be out of the labour force than when in their 20s. In their 30s, adults who had been in residential care were twelve times as likely to be in education and

nine times as likely to be economically inactive for other reasons than those who had been in non-parental care in childhood. Being more likely to be in education in their 30s was replicated for those in non-relative and relative care, albeit at lower levels than estimated for residential care (residential OR 12.15; non-relative care OR 4.62, relative care OR 1.90).

In the family domain, a similar trend across OHC groups was seen for the relative risk of no longer being married. But a trend across OHC groups from residential to relative care was now established for the chances of being single.

3.2. Age 40-49 outcomes

The age 40-49 follow-up relationships between care experiences in childhood and adult social outcomes are shown in table 7. Again, the overall picture was one of stability rather than a change for the better or worse. There was little difference in the strength of the associations between care experiences in childhood and housing tenure nor for adult family formation and functioning between the 30s and 40s. Differences in associations between care experiences in childhood and socioeconomic functioning in their 40s, when they occurred, indicated more positive outcomes than earlier in life.

For those who were followed-up into their 40s, there was a trend towards greater odds of having 18-year level qualifications or higher associated with care type than the odds for those followed-up into their 20s. The reduction in odds of low qualifications was most marked for those who had been in non-relative or relative care (from an odds ratio of 2.78 in their 20s to 1.44 in their 40s and from 1.47 to 1.18, respectively), with only a suggestion of lower odds for those who had been in residential care (3.77 to 2.86).

The raised odds of being out of the labour force associated with non-parental care for educational or other reasons, noted for the age 30-39 follow-up, was still evident for the age 40-49 follow-up although the point estimates were somewhat smaller in magnitude and no longer different from the age 20-29 follow-up in the case of relative care.

The final change was a reduction in the odds of being in a routine social class position in their 40s compared with their 20s. Although there was a general downward trend in the odds ratios across care types, a quantifiable difference between the odds of a routine social class position in early- and mid-adulthood was only observed for those who had been in non-relative care.

3.3. Moderation by childhood census, gender, and age in childhood

To reliably test for moderation by childhood census, gender and age in childhood, we combined the care types into one 'any care' category. Supplementary table S3 shows the models in tables 5-7

repeated for this new dichotomous care variable. Table S4 provides results of the Wald tests for statistical interactions between any care experience and childhood census, age in childhood, and gender. The test results in these tables indicate that there is evidence of moderation by childhood census, gender and age in childhood (23 of 84 Wald tests below a 5% alpha value), although not necessarily in a consistent manner over the follow-up stages or across follow-up outcomes in adulthood. We then applied the Holm-Bonferroni correction for multiple testing [54] and found only 12 were of interest after the correction had been applied (threshold $p \approx 0.0007$). Tables S5-S7 give the estimates for the care by childhood census, age in childhood and gender models, respectively. Summarising the findings, 9 of the 12 models relate to care by childhood census interactions, with some consistency in the findings for the employment status, living alone and number of children outcomes at different stages of adulthood. Of the remaining 3 interaction models of interest, all relate to care by age in childhood interactions, with 2 models applying to age 30-39 and 1 to age 20-29. We report MEMs which give the difference in the probability of an outcome for an 'average' person who has been in care compared to the probability for an 'average' person who has not. A positive MEM implies that the probability if care-experienced was higher than if not (negative MEM the probability if care-experienced was lower).

3.3.1 Moderation by childhood census

We selected employment status, living alone and number of children to graphically display the interactions in the three domains of socioeconomic functioning, living arrangements and family formation and relationships across adulthood. There was moderation of the employment status with non-parental care relationship at the age 20-29 and 30-39 follow-ups by childhood census, although the results are somewhat inconsistent.

Compared to people in their 20s who had not been in care (see figure 1, panel a), people had a lower probability of being in work if they had been in care, but mean differences varied across census years with non-overlapping confidence intervals for 1981 and 1991 compared with 1971 ($MEM_{1971} = -0.008$; $MEM_{1981} = -0.021$; $MEM_{1991} = -0.048$; $MEM_{2001} = -0.038$). They had a higher probability of being unemployed (figure 1, panel b) if they had been in care in 1971 to 1991 than in care in 2001 ($MEM_{1971} = 0.042$; $MEM_{1981} = 0.043$; $MEM_{1991} = 0.049$; $MEM_{2001} = 0.012$). Absolute differences in the chances of being in education were greatest if in care in 1971 or 2001 (figure 1, panel c), but the direction of effect switched from a lower probability in 1971 and 1981 to a higher probability in 1991 and 2001 ($MEM_{1971} = -0.033$; $MEM_{1981} = -0.017$; $MEM_{1991} = 0.010$; $MEM_{2001} = 0.044$). Differences in the probability of being out of the labour force or economically inactive in their 20s (figure 1, panel d) were found after being in OHC in 1971 to 1981, but not after OHC in 2001 ($MEM_{1971} = -0.002$; $MEM_{1981} = -0.005$; $MEM_{1991} = -0.048$; $MEM_{2001} = -0.038$).

Similar patterns were observed for the age 30-39 year follow-up but with the suggestion that differences in the probability of being in education or out of the labour force by childhood census for care experienced individuals versus not were more likely to be due to the increase in educational and work opportunities in more recent periods than an age in care effect.

Adults who had been in OHC in 1981 and 1991 had a higher probability of living alone in their 20s than other adults ($MEM = 0.03$ for both childhood censuses) but not if they had been in care in 1971 or 2001, albeit at a low predicted probability of 5.3%-6.5% compared with 2.6%-3.9% (see figure 2, panel a). These differences were replicated at ages 30-39 years, but at lower levels in terms of predicted probability (1.4%-1.6% versus 0.2-0.3% and marginal effects ($MEM_{1981} = 0.010$; $MEM_{1991} = 0.014$).

Figure 2, panel b shows how differences in the number of children born to women who had been in care or not varied across childhood census years. It reveals that if we only look at early fertility (i.e. age 20-29) then OHC in 1971 was associated with having fewer children. But by 2001, OHC was associated with having more children than non-care experienced women ($MEM_{1971} = -0.38$; $MEM_{2001} = 0.17$). Looking at the 30-39 year and 40-49 year follow-ups, we no longer have data for the more recent childhood census years. Nevertheless, in their 30s when many women will have completed their families, the mean number of children born to women in care in 1971 was predicted to be 1.21 lower than the number born to women in parental care at that time. A smaller difference was predicted for those who had been in care in 1981 and a difference was no longer evident for OHC in 1991. Finally, at the 40-49 year follow-up, the smaller mean number of children born to women with OHC experience in 1971 and 1981 was confirmed ($MEM_{1971} = -1.47$; $MEM_{1981} = -0.29$).

3.3.2 Moderation by age in childhood

Moderation of the OHC association with qualifications by age in childhood when in care was supported at the age 30-39 follow-up (figure 3, panel a), as was moderation of the OHC association with living alone (figure 3, panel b).

Although having fewer qualifications was more likely with a history of OHC, figure 3a shows that this was moderated by the age that they were observed in care. The probability of not obtaining 18-year or higher qualifications by the age of 30-39 ranged between 48% and 60% if they were observed at the age of 0-3, with no difference between the OHC group and the parental care group (e.g. MEM at age 0-1 = 0.01). However, the gap in qualifications grew with age in childhood. There was a 90%

probability of not obtaining 18-year or higher qualifications by the age of 30-39 if they left care at 18 compared with 80% for the average person reaching the age of majority without a history of OHC (MEM at 17 years = 0.10).

There was an estimated zero probability of living alone at age 30-39 for those observed soon after birth in a parental home with only a slightly higher probability if in OHC in infancy (MEM at age 0-1 = 0.01). But unlike the association with qualifications, the gap in living alone narrowed with age in childhood. By the age of 18, even though the probability of living alone grew to 3%, the difference in probability between those with and without a history of care converged on zero.

Women observed in care earlier in childhood also had fewer children in their 20s than women observed in care later in childhood. For example, the mean number of children was predicted to be 0.39 fewer than for an average non-care experienced individual observed in the first year of life (mean 0.75 vs. 1.14). By contrast, the difference in the mean number of children was predicted to grown if individuals had been observed aging out of care (MEM -0.68).

3.3.3 Moderation by gender

Despite there being no moderation of the relationship between OHC and adult outcomes after the Holm-Bonferroni correction had been applied, there were several gender interactions beforehand. Interaction estimates are given in table S7 and suggest that where gender differences are seen they are most often such that men who had been in care did less well in adulthood than women who had been in care when compared with non-care experienced adults of the same gender.

4. Discussion

4.1. Summary of principal findings

Consistent with our first hypothesis, OHC increased the likelihood of poorer functioning in the three domains of socioeconomic circumstances, family formation and relationships, and living arrangements in adulthood. This was evident in OHC-experienced adults in their 20s, 30s and 40s. Our second hypothesis was also fully supported: outcomes differed across placement type, with the most adverse outcomes observed for those with a history of residential care, followed by outcomes for non-relative OHC, and the least adverse outcomes for those with a history of relative OHC. The moderation hypotheses were partially supported. Childhood census year, age in OHC and gender, in order of importance, altered the relationship between OHC and some, but not all, adult outcomes. The strongest and most consistent evidence was for moderation of outcomes by childhood census year and the weakest evidence for moderation of outcomes by gender.

4.2. Strengths and limitations

The main strength of this paper was the repeated prospective collection of care type, social outcomes and covariates across four decades. Coupled with the data being nationally representative, this allowed us to investigate whether adults who had a history of OHC had different social outcomes up to 30 years later from individuals without any experience of OHC. We could estimate differences throughout early to mid-adulthood when LS members were in their 20s, 30s and 40s. This would have been impossible using a dataset with shorter follow-up. The use of the large LS dataset also allowed us to disaggregate types of care, something impossible with smaller sample sizes. Using longitudinally linked census data reduced loss to follow-up and the availability of covariate data improved the precision of, and reduced potential confounding in, our results.

However, some limitations must be acknowledged. A major disadvantage of using the LS dataset is a lack of data on reason(s) for OHC and family characteristics prior to OHC, which are both likely to correlate with adult functioning and selection into OHC. Selection into different types of OHC must also be acknowledged. For the most part, children will have only been placed in residential care if they were unable to have been placed elsewhere, either because their health or behaviour precluded placement in a family setting. Placement in relative care may have been excluded as an option due to parental and wider family circumstances. Selection into relative care suggests children might already have had a better environment for positive social development. In this context, finding graded differences in adult outcomes between types of OHC is perhaps unsurprising, but the magnitude, range and persistence of the differences is noteworthy.

Another disadvantage of using census data is that they are only available every 10 years. Therefore, we were not able to identify the exact timings of when children were in OHC and for how long, or whether they moved between care settings in the intervening 10 years. Moreover, we were unable to identify children with and without local authority care orders. Extrapolating from national care statistics, children in non-relative care without a care order would account for only a handful of LS children in non-relative care. Our relative care group though comprises children with care orders and those with informal kinship arrangements. Care orders into relative care were less common in 1971 to 1991 than in 2001 [44, 45], but how this might have influenced the findings is unknown. As in any longitudinal study, sample attrition occurred, albeit at lower levels than reported elsewhere [11, 55]. There were indications in our data that loss to follow-up was greater in the non-parental care groups, particularly for residential care, suggesting that differential associations of outcomes by care type may be even larger than estimated.

We had to combine the care types in a binary any care variable for the moderation analyses due to small cell sizes contributing to estimation difficulties otherwise. Neither were we able to model the interaction terms jointly. Future studies may be able to combine the censuses from around the UK to increase sample sizes and make finer grained moderation analyses feasible. We took a conservative approach to adjustment for multiple comparisons. If we had used the FDR adjustment [56], 91% of the 23 Wald tests would have been considered of interest. Finally, as in any study using routine self-reported data, we cannot rule out the possibility of measurement error.

4.3. Results in relation to other studies

4.3.1. Socioeconomic circumstances

Our finding that adults with a history of care had lower qualification levels is consistent with previous work in the US [3], Australia [4], Sweden [13] and the UK [11]. Viner and Taylor [11] reported poorer educational outcomes for men but not women whereas we found no gender effects. Forsman [13] commented that differences were more modest in their study compared to findings from more recent Swedish cohorts while the latest evidence from Scotland [57] reported improvements in educational attainment since the 2011 census and that looked-after school leavers who were in foster care or with relatives had higher attainment than other placement types. Our study found no evidence for differences in educational attainment up to 2011 and more differentiated placement types once population trends in qualifications had been accounted for. However, we were only able to follow-up children in care into their 20s in 2011. Returning to education at older ages was seen though and highlights the need to take a life course perspective.

Our findings are also consistent with the evidence on employment with an increased odds of poorer quality work, unemployment – both current and long-term – and of being out of the labour force [3, 4, 11, 24]. We found similar rates of employment among care-experienced young adults as Cashmore and Paxman [4] if they were in family placements but with the addition of finding much lower rates if young adults had a history of residential care. Like Brannstrom et al [58] and Viner and Taylor [11], we found men more likely to be unemployed than women. However, inequalities in rates of employment for care-experienced LS adults increased over the childhood census years whereas they narrowed in Scotland after 2010 before increasing again since 2016 [57].

Viner and Taylor [11] also found social class differences at age 30 for those who had been in care sometime between 1970 and 1988 with around 27.5% in managerial or professional occupations

compared with 38.5% of non-care leavers. We found much lower rates of membership of the managerial and professional social class, 12% of care leavers versus 24% of the rest of the general population in their 20s and 30s (see Supplementary table S13). However, it is not clear from Viner and Taylor's paper whether the same social class outcome measure was used, although the adjustment for childhood social class was different.

4.3.2 Living arrangements

The most consistent finding in the literature was for an increased risk of homelessness and unstable or inadequate accommodation [3, 4, 14]. We were not able to investigate these issues with our study design but the excess of 'other' types of living arrangements does suggest a risk of unstable and inadequate housing. Buehler et al [3] reported that 40% of care leavers were owner-occupiers compared with 64% of their random sample control group. This is very similar to our estimate of 31% to 47% owner occupation among care-experienced adults depending on care type compared with 60% in the general population. We also found higher rates of overcrowding and living alone, both suggestive of poorer quality accommodation. Overcrowding might indicate a greater propensity to be in shared accommodation or a hostel, consistent with the findings of Cashmore and Paxman [4]. Alternatively, living alone might suggest that care-experienced adults were more likely to be housed in a bedsit, which is known to be associated with isolation and poor wellbeing [59]; Barratt, 2015 #274}.

4.3.3. Family formation and relationships

Previous research has highlighted the increased risk for teenage pregnancies among OHC young women [4, 6], and larger families [2]. Earlier marriages and a greater divorce rate have also been found [3]. Our findings are only partially consistent with the evidence on marital status: We found care-experienced individuals at the first observation in adulthood were more likely to be married (table 4), but not if they had been with a non-relative carer in childhood. Intriguingly, the combined OHC group were more likely to have been divorced in the adult censuses (none were widowed, data not shown), whereas the finer-grained analyses showed no excess risk for those in relative care until they reached their 40s. Why those previously in residential or non-relative care were less likely to be single in their 20s but more likely to be single in their 30s and 40s is unclear. It may be that some individuals self-report their marital status as single rather than divorced. Our findings do not totally agree with the previous evidence on childbearing either. All types of OHC were associated with

having fewer children on average than parental care, but if they did have children, then the OHC mothers were younger at the birth of their first child.

4.4 Implications and future research

Inequalities between OHC groups and the general population are widespread and long-lasting. This should be monitored and acted on as a priority. More work is needed on the trends in inequalities, especially in the areas of employment and family planning. Our results suggest that monitoring the immediate outcomes of OHC in terms of school qualifications and initial destinations is insufficient to quantify what could potentially be permanent damage to life chances and well-being for this vulnerable group. Unfortunately, the Staying Put programme [60, 61], a formal extended care scheme for former fostered children which is currently being implemented, does not extend to residential care. The newer Staying Close arrangements [62], aimed at enabling young people leaving residential care to live near their former care home so that they are able to continue to be supported by professionals with whom they have established relationships, are not yet implemented. Among the catalysts to implementation of extended care cited by van Breda et al [63] is research highlighting that care-leavers are at greater risk of poor outcomes. One can only hope that our evidence of the enduring negative legacy of OHC experiences, going well beyond the transition to adulthood phase, will add impetus to speedily implementing these programmes nationwide. The European Convention on Human Rights 1998 and UK's Children Act 1989 underpin the legal framework that when OHC is required, priority be given to non-residential care, especially the child's extended relatives and friends [64, 65]. Our findings also provide evidence supporting this policy.

The moderation results could be particularly useful for policy and practice as they suggest areas for improvement of intervention. Nevertheless, replication of these findings is recommended to confirm the results and to clarify if and why we found some inconsistent results across age in adulthood. We found scant evidence for moderation of differences between the OHC groups and the reference group by gender or age in childhood but stronger evidence for moderation by childhood census year. If replicated, it is a worrying finding that the trends we have found suggest decline rather than improvements for OHC children grown up. Long-term follow-ups of hard-to-reach populations are notoriously difficult. Greater access to routine data, exemplified in the Nordic countries, could help move research forward.

5. Conclusions

Enduring inequalities for OHC-experienced adults in social and economic functioning add to the evidence on health inequalities. The findings overwhelmingly support the policy to place children in relative care whenever possible and when not achievable, to place children in foster care as a 2nd choice. We recommend residential care should only be used in exceptional circumstances for hard-to-place children with special needs.

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This work contains statistical data from ONS which is Crown Copyright. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

The derivation of 1971 and 1981 NSSEC & Goldthorpe classes is provided in Bukodi and Neuburger (2009) "Data Note. Job and occupational histories for the NSHD 1946 Birth Cohort" as part of the ESRC Gender Network Grant, Project 1 'Changing occupational careers of men and women', Reference: RES-225-25-2001. The code was kindly provided by Erzsebet Bukodi and adapted for use in the LS by Buscha and Sturgis as part of the ESRC grant 'Inter-cohort Trends in Intergenerational Mobility in England and Wales: income, status, and class (InTIME)', Reference: ES/K003259/1.

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Table 1. Distribution of care status by number of observations in childhood, ONS Longitudinal Study

Number of observations	Care status	N	%
One	Y	1,877	0.54
	N	134,885	38.66
Two	Y Y	126	0.07
	Y N	447	0.26
	N Y	1027	0.59
	N N	104,481	59.89
Total		348,924	100
N		242,843	

Y in care; N not in care

Table 2. Number (%) of observations by care type for age 20-29, 30-39 and 40-49 year follow-up models, ONS Longitudinal Study

	Age 20-29	Age 30-39	Age 40-49
Care type			
Parental	321,122 (99.03)	225,559 (98.99)	146,869 (98.94)
Relative care	1,543 (0.48)	1,024 (0.45)	747 (0.50)
Non-relative care	1,093 (0.34)	810 (0.36)	472 (0.32)
Residential	521 (0.16)	462 (0.20)	358 (0.24)
Total	324,279 (100.00)	227,855 (100.00)	148,446 (100.00)

Table 3. Number (%) of children with different sociodemographic characteristics at first observation by care type, ONS Longitudinal Study

	Parental care	Relative care	Non-relative care	Residential	p
Gender					0.125
Male	120914 (50.30)	573 (52.04)	429 (49.31)	263 (54.91)	
Female	119479 (49.70)	528 (47.96)	441 (50.69)	216 (45.09)	
Childhood census year					<0.0005
1971	117023 (48.68)	410 (37.24)	345 (39.66)	333 (69.52)	
1981	57604 (23.96)	371 (33.70)	235 (27.01)	76 (15.87)	
1991	55618 (23.14)	126 (11.44)	230 (26.44)	70 (14.61)	
2001	10148 (4.22)	194 (17.62)	60 (6.90)	0 (0.00)	
Country of birth					<0.0005
UK	232858 (96.87)	925 (84.01)	800 (91.95)	456 (95.20)	
Non-UK	7535 (3.13)	176 (15.99)	70 (8.05)	23 (4.80)	
Ethnicity ¹					<0.0005
White	212411 (88.36)	787 (71.48)	646 (74.25)	348 (>71.60)	
Black	4580 (1.91)	71 (6.45)	84 (9.66)	36 (>7.41)	
South Asian	8605 (3.58)	169 (15.35)	53 (6.09)	≤ 10 (≤ 2.06)	
Other	875 (0.36)	16 (1.45)	≤ 10 (≤ 1.15)	≤ 10 (≤ 2.06)	
Not known	13922 (5.79)	58 (5.27)	> 77 (> 8.85)	82 (>16.87)	
HOH marital status					<0.0005
Married	223058 (92.79)	777 (70.57)	690 (79.31)	n/a	
Widowed/divorced/single	17335 (7.21)	324 (17.08)	180 (20.69)	n/a	
HOH social class					<0.0005
Manager/professional	69189 (28.78)	215 (19.53)	207 (23.79)	n/a	
Intermediate	81791 (34.02)	327 (29.70)	276 (31.72)	n/a	
Routine	89413 (37.19)	559 (50.77)	387 (44.48)	n/a	
HOH education					<0.0005
18+ qualifications	34981 (14.55)	104 (9.45)	119 (13.68)	n/a	
<18 qualifications	205412 (85.45)	997 (90.55)	751 (86.32)	n/a	
HOH employment status					<0.0005
Employed	219278 (91.22)	842 (76.48)	753 (86.55)	n/a	
Unemployed	12571 (5.23)	68 (6.18)	58 (6.67)	n/a	
OLF	8544 (3.55)	191 (17.35)	59 (6.78)	n/a	
Age, mean (s.e.)	7.55 (0.01)	10.49 (0.15)	8.77 (0.18)	11.06 (0.21)	<0.0005

HOH: Head of household; OLF: out of the labour force; s.e.: standard error; n/a: not applicable

¹ Cell counts < 10 suppressed. Percentages based on cell count of suppressed cell=10

Table 4. Distribution of outcomes by care type¹, ONS Longitudinal Study

	Parental care	Residential care	Non-relative care	Relative care	p
< 18-year qualifications (%)	73.93	92.07	86.09	80.56	<0.0005
Employment status (%)					<0.0005
Employed	69.94	45.30	51.15	59.95	
Unemployed	9.28	20.67	15.75	14.90	
In education	5.21	4.38	6.90	4.54	
OLF	15.36	29.65	26.21	20.62	
Long-term nonemployed (%)	2.75	12.59	5.72	3.46	<0.0005
Social class (%)					<0.0005
Managerial/professional	23.84	11.51	11.06	16.33	
Intermediate/technical	28.63	18.83	21.20	25.55	
Routine occupations	30.94	38.28	42.28	35.68	
Not known	16.60	31.38	25.46	22.45	
Housing tenure (%)					<0.0005
Owner occupier	60.02	31.37	39.42	47.31	
Renting	36.17	57.73	54.88	47.95	
Other	3.80	10.89	5.70	4.75	
Overcrowding (%)	3.74	6.75	7.00	9.02	<0.0005
Lives alone (%)	4.18	11.48	5.63	5.09	<0.0005
Marital status (%)					<0.0005
Currently married	24.98	34.24	24.60	31.70	
Previously married	2.07	5.85	3.56	3.09	
Single	72.95	59.92	71.84	65.21	
Number of children (women only)	0.51	0.21	0.43	0.26	<0.0005
Age at first child (parous women only)	22.44	21.16	21.01	21.67	<0.0005

¹ Based on relationship between first observation in childhood and outcomes in first observed census year when over 20 years of age

Table 5. Estimates (95% confidence intervals) for social outcomes at 20-29 years regressed on care type (reference parental care), ONS Longitudinal Study

	RE	Residential	Non-relative carer	Related carer
< 18-year qualifications ¹	OR	3.77 (2.73, 5.20)	2.78 (2.29, 3.38)	1.47 (1.28, 1.68)
Employment status ³	RRR			
Employed		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Unemployed		5.71 (4.55, 7.17)	2.19 (1.84, 2.60)	1.31 (1.13, 1.52)
In education		1.16 (0.75, 1.79)	1.30 (0.98, 1.73)	0.97 (0.75, 1.25)
OLF		5.29 (4.27, 6.54)	2.24 (1.94, 2.60)	1.20 (1.05, 1.38)
Long-term nonemployed ¹	OR	5.04 (3.51, 7.23)	2.03 (1.49, 2.78)	1.23 (0.89, 1.69)
Social class ³	RRR			
Managerial/professional		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Intermediate/technical		1.61 (1.16, 2.24)	1.57 (1.26, 1.96)	1.21 (1.03, 1.42)
Routine occupations		5.17 (3.84, 6.95)	2.80 (2.29, 3.43)	1.38 (1.19, 1.61)
Not known		7.04 (5.20, 9.54)	2.87 (2.30, 3.57)	1.38 (1.16, 1.63)
Housing tenure ³	RRR			
Owner occupier		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Renting		4.41 (3.61, 5.37)	2.05 (1.81, 2.33)	1.43 (1.29, 1.59)
Other		7.63 (5.66, 10.29)	1.87 (1.40, 2.49)	1.34 (1.03, 1.74)
Overcrowding ¹	OR	3.15 (2.17, 4.55)	1.62 (1.25, 2.10)	1.30 (1.05, 1.62)
Lives alone ¹	OR	2.60 (2.01, 3.35)	1.49 (1.15, 1.91)	1.26 (1.00, 1.58)
Marital status ³	RRR			
Currently married		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Previously married		2.15 (1.35, 3.41)	1.97 (1.38, 2.82)	1.07 (0.73, 1.58)
Single		0.82 (0.67, 1.00)	0.84 (0.72, 0.98)	0.77 (0.67, 0.87)
Number of children (women only) ⁴	IRR	0.92 (0.74, 1.16)	1.14 (1.02, 1.27)	0.75 (0.67, 0.84)
Age at first child (parous women only) ⁵	B	-2.32 (-3.19, -1.46)	-1.16 (-1.54, -0.78)	-0.44 (-0.82, -0.06)
N (minimum, maximum)		33232, 225133		
Observations (minimum, maximum)		45235, 324279		

¹ Binary logistic regression; ² Ordinal logistic regression; ³ Multinomial logistic regression; ⁴ Poisson regression; ⁵ Linear regression

Models adjust for gender, age, childhood census year, ethnicity, and Head of household qualifications, marital status, social class and employment status in childhood

OLF: out of the labour force; RE: regression estimate; OR: odds ratio; RRR: relative risk ratio; IRR: incidence rate ratio; B: unstandardized coefficient

Table 6. Estimates (95% confidence intervals) for social outcomes at 30-39 years regressed on care type (reference parental care), ONS Longitudinal Study

	RE	Residential	Non-relative carer	Related carer
< 18-year qualifications ¹	OR	3.94 (3.01, 5.15)	1.92 (1.60, 2.29)	1.48 (1.27, 1.73)
Employment status ³	RRR			
Employed		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Unemployed		6.31 (4.70, 8.47)	1.94 (1.49, 2.52)	1.53 (1.21, 1.95)
In education		12.15 (8.29, 17.81)	4.62 (3.49, 6.11)	1.90 (1.33, 2.72)
OLF		8.82 (6.07, 12.80)	4.19 (3.18, 5.53)	1.85 (1.29, 2.64)
Long-term nonemployed ¹	OR	4.39 (3.19, 6.04)	2.24 (1.73, 2.90)	1.32 (1.00, 1.74)
Social class ³	RRR			
Managerial/professional		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Intermediate/technical		1.91 (1.40, 2.61)	1.62 (1.32, 1.98)	1.31 (1.10, 1.55)
Routine occupations		6.40 (4.86, 8.43)	2.40 (1.98, 2.92)	1.64 (1.39, 1.94)
Not known		19.88 (14.74, 26.81)	4.03 (3.16, 5.14)	2.11 (1.67, 2.66)
Housing tenure ³	RRR			
Owner occupier		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Renting		5.68 (4.66, 6.92)	2.36 (2.04, 2.74)	1.53 (1.33, 1.75)
Other		7.27 (5.13, 10.30)	3.17 (2.27, 4.41)	1.72 (1.22, 2.43)
Overcrowding ¹	OR	2.93 (1.92, 4.47)	1.93 (1.43, 2.60)	1.40 (1.07, 1.85)
Lives alone ¹	OR	2.63 (1.87, 3.71)	2.59 (1.82, 3.68)	1.18 (0.79, 1.75)
Marital status ³	RRR			
Currently married		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Previously married		2.17 (1.59, 2.96)	1.62 (1.28, 2.05)	1.21 (0.96, 1.51)
Single		2.48 (2.02, 3.04)	1.31 (1.13, 1.53)	1.11 (0.97, 1.28)
Number of children (women only) ⁴	IRR	0.47 (0.39, 0.56)	0.68 (0.62, 0.75)	0.52 (0.47, 0.57)
Age at first child (parous women only) ⁵	B	-4.19 (-5.52, -2.86)	-1.99 (-2.64, -1.35)	-1.10 (-1.74, -0.46)
N (minimum, maximum)		57651, 163616		
Observations (minimum, maximum)		79665, 227855		

¹ Binary logistic regression; ² Ordinal logistic regression; ³ Multinomial logistic regression; ⁴ Poisson regression; ⁵ Linear regression

Models adjust for gender, age, childhood census year, ethnicity, and Head of household in childhood's qualifications, marital status, social class and employment status

OLF: out of the labour force; RE: regression estimate; OR: odds ratio; RRR: relative risk ratio; IRR: incidence rate ratio; B: unstandardized coefficient

Table 7. Estimates (95% confidence intervals) for social outcomes at 40-49 years regressed on care type (reference parental care), ONS Longitudinal Study

	RE	Residential	Non-relative carer	Related carer
< 18-year qualifications ¹	OR	2.86 (2.23, 3.67)	1.44 (1.17, 1.78)	1.18 (1.01, 1.39)
Employment status ³	RRR			
Employed		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Unemployed		4.81 (3.27, 7.09)	1.32 (0.84, 2.08)	1.59 (1.18, 2.16)
In education		9.17 (6.50, 12.94)	3.27 (2.41, 4.45)	1.25 (0.89, 1.76)
OLF		7.23 (5.17, 10.12)	2.94 (2.17, 3.98)	1.22 (0.87, 1.71)
Long-term nonemployed ¹	OR	3.24 (2.30, 4.56)	2.30 (1.72, 3.06)	1.06 (0.78, 1.45)
Social class ³	RRR			
Managerial/professional		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Intermediate/technical		1.42 (1.03, 1.97)	1.33 (1.04, 1.71)	1.22 (1.01, 1.47)
Routine occupations		4.84 (3.68, 6.37)	1.68 (1.32, 2.13)	1.31 (1.09, 1.58)
Not known		14.38 (10.23, 20.21)	2.46 (1.71, 3.56)	1.70 (1.25, 2.32)
Housing tenure ³	RRR			
Owner occupier		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Renting		6.06 (4.86, 7.55)	2.77 (2.29, 3.35)	1.39 (1.18, 1.64)
Other		8.24 (5.32, 12.77)	2.61 (1.46, 4.69)	1.17 (0.64, 2.15)
Overcrowding ¹	OR	0.94 (0.35, 2.53)	0.92 (0.47, 1.79)	1.79 (1.25, 2.56)
Lives alone ¹	OR	13.17 (7.69, 22.56)	3.68 (1.72, 7.88)	1.42 (0.53, 3.85)
Marital status ³	RRR			
Currently married		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Previously married		1.66 (1.24, 2.22)	1.60 (1.26, 2.03)	1.26 (1.03, 1.54)
Single		2.26 (1.77, 2.88)	1.33 (1.06, 1.66)	1.05 (0.87, 1.26)
Number of children (women only) ⁴	IRR	0.33 (0.27, 0.41)	0.59 (0.53, 0.67)	0.46 (0.41, 0.51)
Age at first child (parous women only) ⁵	B	-4.30 (-6.19, -2.42)	-2.89 (-3.89, -1.88)	-1.40 (-2.32, -0.49)
N (minimum, maximum)		45174, 110551		
Observations (minimum, maximum)		60749, 148446		

¹ Binary logistic regression; ² Ordinal logistic regression; ³ Multinomial logistic regression; ⁴ Poisson regression; ⁵ Linear regression

Models adjust for gender, age, childhood census year, ethnicity, and Head of household in childhood's qualifications, marital status, social class and employment status

OLF: out of the labour force; RE: regression estimate; OR: odds ratio; RRR: relative risk ratio; IRR: incidence rate ratio; B: unstandardized coefficient

Table S1. Childhood characteristics of LS dependent children in the final sample compared with all available data, complete and incomplete childhood data, and ≥ 1 follow-up censuses missing: ONS Longitudinal Study

	Full data ¹		Complete data ²		Incomplete data ³		Missing follow-up ⁴		Final sample ⁵	
	N	%	N	%	N	%	N	%	N	%
Gender										
Male	251,049	51.07	223,015	50.94	28,034	52.19	58,075	54.58	122,179	50.31
Female	240,485	48.93	214,802	49.06	25,683	47.81	48,337	45.42	120,664	49.69
Childhood census year										
1971	135,820	27.63	127,308	29.08	8,512	15.85	10,005	9.40	118,111	48.64
1981	126,359	25.71	101,432	23.17	24,927	46.40	10,966	10.31	58,286	24.00
1991	115,344	23.47	102,525	23.42	12,819	23.86	17,872	16.80	56,044	23.08
2001	114,011	23.19	106,552	24.34	7,459	13.89	67,569	63.50	10,402	4.28
Country of birth										
UK	474,269	96.51	424,838	97.04	49,431	92.25	100,454	94.47	235,039	96.79
Non-UK	17,131	3.49	12,979	2.96	4,152	7.75	5,876	5.53	7,804	3.21
Ethnicity										
White	415,677	87.38	385,621	88.08	30,056	79.27	100,454	94.47	214,192	88.20
Black	12,411	2.61	9,844	2.25	2,567	6.77	5,876	5.53	4,771	1.96
South Asian	20,467	4.30	17,416	3.98	3,051	8.05	100,454	94.47	8,833	3.64
Other	2,003	0.42	1,717	0.39	286	0.75	5,876	5.53	907	0.37
Not known	25,173	5.29	23,219	5.30	1,954	5.15	100,454	94.47	14,140	5.82

	Full data ¹		Complete data ²		Incomplete data ³		Missing follow-up ⁴		Final sample ⁵	
	N	%	N	%	N	%	N	%	N	%
HOH marital status										
Married	418,817	85.23	385,606	88.07	33,211	61.99	79,515	74.77	224,525	92.46
Widowed/divorced/single	71,666	14.59	51,472	11.76	20,194	37.7	26,623	25.04	17,839	7.35
N/A	912	0.19	739	0.17	173	0.32	207	0.19	479	0.20
HOH social class										
Manager/professional	143,542	31.78	138,784	31.70	4,758	34.47	34,673	36.00	69,611	28.67
Intermediate	151,492	33.54	147,473	33.68	4,019	29.11	30,926	32.11	82,394	33.93
Routine	155,675	34.47	150,821	34.45	4,854	35.16	30,514	31.68	90,359	37.21
N/A	912	0.20	739	0.17	173	1.25	207	0.21	479	0.20
HOH education										
18+ qualifications	82,733	16.84	78,373	17.90	4,360	8.16	23,633	22.24	35,204	14.50
<18 qualifications	407,579	82.97	358,705	81.93	48,874	91.51	82,408	77.56	207,160	85.31
N/A	912	0.19	739	0.17	173	0.32	207	0.19	479	0.20
HOH employment status										
Employed	407,669	82.99	391,594	89.44	16,075	30.11	81,280	76.5	220,873	90.95
Non-employed	82,622	16.82	45,484	10.39	37,138	69.57	24,755	23.3	21,491	8.85
N/A	912	0.19	739	0.17	173	0.32	207	0.19	479	0.20
Mean age	491,534	8.94	437,817	7.40	53,717	9.53	106,412	6.78	242,843	7.53

¹ All available data; ² Complete within childhood census data; ³ Item non-response within childhood census data; ⁴ Missing follow-up censuses by design, non-response or linkage problems; ⁵ Analysis sample

Table S2. Sociodemographic characteristics of children at second observation by care type, ONS Longitudinal Study

	Parental care	Relative care	Non-relative care	Residential	p
Gender					0.001
Male	52,287 (49.83)	302 (47.78)	167 (44.18)	90 (62.94)	
Female	52,641 (50.17)	330 (52.22)	211 (55.82)	53 (37.06)	
Census year					<0.0005
1971	n/a	n/a	n/a	n/a	
1981	39,781 (37.91)	280 (44.30)	168 (44.44)	78 (54.55)	
1991	31,807 (30.31)	79 (12.50)	143 (37.83)	65 (45.45)	
2001	33,340 (31.77)	273 (43.20)	67 (17.72)	0 (0.00)	
Country of birth					0.007
UK	103,538 (98.68)	>622 (>98.42)	366 (96.83)	>133 (>93.01)	
Non-UK	1,390 (1.32)	≤ 10 (≤1.58)	12 (3.17)	≤ 10 (≤6.99)	
Ethnicity					<0.0005
White	99,477 (94.81)	572 (90.51)	344 (91.01)	132 (>81.48)	
Black	1,657 (1.58)	30 (4.75)	14 (3.70)	≤ 10 (≤ 6.17)	
South Asian	3,419 (3.26)	30 (4.75)	> 10 (> 2.65)	≤ 10 (≤ 6.17)	
Other	375 (0.36)	0 (0.00)	≤ 10 (≤ 2.65)	≤ 10 (≤ 6.17)	
HOH marital status					<0.0005
Married	92,321 (87.99)	392 (62.03)	241 (63.76)	n/a	
Widowed/divorced/single	12,607 (12.01)	240 (37.97)	137 (36.24)	n/a	
HOH social class					<0.0005
Manager/professional	36,882 (35.15)	150 (23.73)	102 (26.98)	n/a	
Intermediate	36,001 (34.31)	201 (31.80)	126 (33.33)	n/a	
Routine	32,045 (30.54)	281 (44.46)	150 (39.68)	n/a	
HOH education					<0.0005
18+ qualifications	21,612 (20.60)	71 (11.23)	46 (12.17)	n/a	
<18 qualifications	83,316 (79.40)	561 (88.71)	332 (87.83)	n/a	
HOH employment status					<0.0005
Employed	95,498 (91.01)	457 (72.31)	302 (79.89)	n/a	
Non-employed	9,430 (8.99)	175 (27.69)	76 (20.11)	n/a	
Mean age (s.e.)	13.82 (0.01)	14.17 (0.08)	14.93 (0.11)	14.45 (0.16)	

HOH: head of household; OLF: out of the labour force; s.e.: standard error; n/a: not applicable

¹ Cell counts < 10 suppressed. Percentages based on cell count of suppressed cell=10

Table S3. Estimates (95% confidence intervals) for social outcomes regressed on any care experience (reference parental care) by age at follow-up, ONS Longitudinal Study

	RE	20-29 years	30-39 years	40-49 years
< 18-year qualifications ¹	OR	1.86 (1.67, 2.08)	1.66 (1.48, 1.87)	1.28 (1.13, 1.45)
Employment status ³	RRR			
Employed		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Unemployed		1.62 (1.44, 1.81)	1.70 (1.42, 2.03)	1.50 (1.60, 1.93)
In education		1.09 (0.90, 1.32)	3.05 (2.44, 3.81)	1.95 (1.55, 2.46)
OLF		1.58 (1.43, 1.74)	2.88 (2.31, 3.59)	1.56 (1.31, 1.85)
Social class ³	RRR			
Managerial/professional		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Intermediate/technical		1.33 (1.17, 1.51)	1.43 (1.25, 1.63)	1.26 (1.08, 1.46)
Routine occupations		1.83 (1.62, 2.06)	1.93 (1.70, 2.20)	1.44 (1.24, 1.67)
Not known		1.85 (1.62, 2.11)	2.83 (2.39, 3.35)	1.97 (1.55, 2.50)
Long-term nonemployed ¹	OR	1.55 (1.24, 1.94)	1.71 (1.41, 2.06)	1.52 (1.23, 1.88)
Housing tenure ³	RRR			
Owner occupier		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Renting		1.66 (1.53, 1.81)	1.86 (1.68, 2.05)	1.85 (1.63, 2.09)
Other		1.54 (1.27, 1.87)	2.28 (1.79, 2.89)	1.65 (1.08, 2.51)
Overcrowding ¹	OR	1.42 (1.20, 1.68)	1.61 (1.31, 1.97)	1.50 (1.09, 2.06)
Lives alone ¹	OR	1.35 (1.14, 1.61)	1.72 (1.32, 2.24)	2.34 (1.27, 4.31)
Marital status ³	RRR			
Currently married		1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Previously married		1.44 (1.11, 1.87)	1.37 (1.17, 1.62)	1.39 (1.19, 1.62)
Single		0.79 (0.72, 0.88)	1.20 (1.08, 1.33)	1.15 (1.00, 1.33)
Number of children (women only) ⁴	IRR	0.92 (0.85, 0.99)	0.59 (0.55, 0.64)	0.51 (0.47, 0.56)
Age at first child (parous women only) ⁵	B	-0.80 (-1.07, -0.53)	-1.55 (-2.00, -1.09)	-2.08 (-2.76, -1.40)
N (minimum, maximum)		33232, 225133	57651, 163616	45174, 110551
Observations (minimum, maximum)		45235, 324279	79665, 227855	60749, 148446

¹ Binary logistic regression; ² Ordinal logistic regression; ³ Multinomial logistic regression; ⁴ Poisson regression; ⁵ Linear regression

Models adjust for gender, age, childhood census year, ethnicity, and head of household qualifications, marital status, social class and employment status in childhood

RE: regression estimate; OR: odds ratio; RRR: relative risk ratio; IRR: incidence rate ratio; B: unstandardized coefficient

Table S4. Wald tests of significance for interaction effects, ONS Longitudinal Study¹

	20-29 years	30-39 years	40-49 years
Childhood census by any care			
< 18-year qualifications	0.099	0.0016	0.25
Employment status	<0.0001	0.0001	0.013
Social class	0.0002	0.0068	0.011
Long term non-employed	0.31	0.20	0.41
Housing tenure	0.039	0.0004	0.29
Overcrowding	0.75	0.43	0.78
Lives alone	0.0002	<0.0001	0.28
Marital status	0.10	0.47	0.66
Number of children (women only)	<0.0001	<0.0001	<0.0001
Age at first child (parous women only)	0.034	0.090	0.46
Age in childhood by any care			
< 18-year qualifications	0.92	<0.0001	0.084
Employment status	0.0044	0.18	0.33
Social class	0.73	0.019	0.12
Long term non-employed	0.40	0.39	0.59
Housing tenure	0.17	0.039	0.084
Overcrowding	0.98	0.21	0.63
Lives alone	0.62	<0.0001	0.36
Marital status	0.0077	0.38	0.36
Number of children (women only)	0.0001	0.21	0.15
Age at first child (parous women only)	0.83	0.046	0.15
Gender by any care			
< 18-year qualifications	0.17	0.55	0.74
Employment status	0.22	0.017	0.016
Social class	0.018	0.24	0.14
Long term non-employed	0.28	0.0006	0.015
Housing tenure	0.0027	0.066	0.93
Overcrowding	0.087	0.085	0.26
Lives alone	0.0049	0.66	0.91
Marital status	0.22	0.48	0.26

¹figures in bold are significant after Holm-Bonferroni correction for multiple testing applied

Table S5. Estimates (95% confidence intervals) for social outcomes regressed on childhood census year by any care interaction, ONS Longitudinal Study

	RE	Child census	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
< 18-year qualifications ¹	OR	1971	1.00 (Reference)	1.59 (1.25, 1.92)	1.00 (Reference)	1.48 (1.26, 1.71)	1.00 (Reference)	1.36 (1.14, 1.58)
		1981	0.63 (0.62, 0.65)	0.86 (0.43, 1.29)	0.39 (0.38, 0.40)	0.56 (0.36, 0.76)	0.57 (0.56, 0.59)	0.89 (0.57, 1.21)
		1991	0.20 (0.20, 0.21)	0.39 (0.23, 0.55)	0.13 (0.13, 0.14)	0.31 (0.20, 0.41)		
		2001	0.10 (0.10, 0.11)	0.16 (0.09, 0.22)				
Employment status ³	RRR							
Employed (Reference)								
Unemployed		1971	1.00 (Reference)	1.78 (1.44, 2.13)	1.00 (Reference)	1.47 (1.08, 1.86)	1.00 (Reference)	1.77 (1.24, 2.30)
		1981	0.79 (0.76, 0.82)	1.56 (0.09, 1.98)	0.91 (0.87, 0.96)	1.06 (0.47, 1.64)	1.43 (1.29, 1.57)	3.83 (1.38, 6.27)
		1991	0.83(0.80, 0.86)	2.02 (1.32, 2.72)	1.06 (0.98, 1.14)	1.58 (0.80 2.36)		
		2001	1.94 (1.86, 2.02)	2.56 (1.67, 3.45)				
In education		1971	1.00 (Reference)	0.82 (0.57, 1.07)	1.00 (Reference)	2.70 (1.92, 3.49)	1.00 (Reference)	2.24 (1.66,2.82)
		1981	1.06 (1.01, 1.10)	1.74 (0.45, 3.12)	3.35 (3.03, 3.67)	20.81 (2.26, 38.36)	2.85 (2.57, 3.14)	10.01 (4.32, 15.71)
		1991	0.75 (0.71, 0.78)	2.51 (0.92, 4.10)	6.70 (5.91, 7.49)	76.23 (14.30, 138.16)		
		2001	0.24 (0.22, 0.26)	2.11 (0.73, 3.51)				
OLF		1971	1.00 (Reference)	1.65 (0.52, 0.97)	1.00 (Reference)	1.68 (1.40, 1.96)	1.00 (Reference)	1.64 (1.19, 2.09)
		1981	1.09 (1.05, 1.12)	1.77 (1.12, 2.42)	0.65 (0.63, 0.68)	1.52 (0.96, 2.07)	0.64 (0.60, 0.68)	1.66 (0.71, 2.62)
		1991	1.46 (1.42, 1.50)	3.01 (2.10, 3.93)	0.41 (0.39, 0.43)	1.00 (0.61, 1.38)		
		2001	2.31 (2.23, 2.40)	2.58 (1.76, 3.39)				

	RE	Child census	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
Long-term nonemployed ¹	OR	1971	1.00 (Reference)	1.45 (1.07, 1.84)	1.00 (Reference)	1.63 (1.18, 2.09)	1.00 (Reference)	1.64 (1.19, 2.09)
		1981	0.38 (0.36, 0.41)	0.51 (0.21, 0.81)	0.52 (0.49, 0.54)	0.86 (0.36, 1.37)	0.87 (0.82, 0.92)	1.66 (0.71, 2.62)
		1991	0.02 (0.02, 0.03)	0.04 (0.00, 0.07)	0.33 (0.31, 0.36)	0.83 (0.38, 1.28)		
		2001	0.01 (0.01, 0.01)	0.04 (0.00, 0.08)				
Social class ³	RRR							
Man/prof (Reference)								
Intermediate/technical		1971	1.00 (Reference)	1.34 (1.07, 1.61)	1.00 (Reference)	1.36 (1.13, 1.60)	1.00 (Reference)	1.11 (0.88, 1.34)
		1981	0.79 (0.77, 0.81)	1.02 (0.55, 1.49)	0.71 (0.70, 0.73)	0.87 (0.53, 1.21)	0.86 (0.83, 0.89)	0.74 (0.41, 1.07)
		1991	0.56 (0.54, 0.57)	0.80 (0.47, 1.12)	0.52 (0.50, 0.54)	0.67 (0.39, 0.95)		
		2001	0.61 (0.59, 0.63)	0.74 (0.43, 1.05)				
Routine occupations		1971	1.00 (Reference)	1.93 (1.55, 2.30)	1.00 (Reference)	1.69 (1.41, 1.98)	1.00 (Reference)	1.28 (1.03, 1.52)
		1981	2.48 (2.42, 2.55)	10.83 (6.07, 15.59)	2.32 (2.27, 2.38)	8.40 (5.19, 11.61)	3.06 (2.96, 3.16)	8.26 (4.84, 11.69)
		1991	0.85 (0.82, 0.87)	1.36 (0.84, 1.89)	0.82 (0.79, 0.85)	1.53 (0.95, 2.11)		
		2001	1.65 (1.59, 1.71)	1.69 (1.03, 2.35)				
Not known		1971	1.00 (Reference)	1.88 (1.45, 2.32)	1.00 (Reference)	2.68 (2.07, 3.28)	1.00 (Reference)	2.18 (1.57, 2.79)
		1981	0.64 (0.61, 0.66)	0.90 (0.45, 1.36)	0.66 (0.63, 0.69)	1.92 (0.98, 2.86)	1.46 (1.36, 1.57)	4.28 (1.77, 6.78)
		1991	0.95 (0.92, 0.97)	1.56 (0.91, 2.21)	0.63 (0.59, 0.67)	3.05 (1.65, 4.46)		
		2001	2.14 (2.05, 2.22)	1.69 (1.03, 2.35)				

	RE	Child census	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
Housing tenure ³	RRR							
Owner (Reference)								
Renting		1971	1.00 (Reference)	1.66 (1.44, 1.89)	1.00 (Reference)	1.80 (1.56, 2.04)	1.00 (Reference)	1.85 (1.55, 2.15)
		1981	0.79 (0.77, 0.80)	1.31 (0.92, 1.71)	1.37 (1.34, 1.41)	2.34 (1.64, 3.04)	1.51 (1.46, 1.56)	2.78 (1.83, 3.74)
		1991	1.10 (1.08, 1.12)	1.67 (1.24, 2.11)	2.24 (2.17, 2.31)	4.20 (2.97, 5.42)		
		2001	1.42 (1.38, 1.46)	2.61 (1.92, 3.30)				
Other		1971	1.00 (Reference)	1.01 (0.66, 1.36)	1.00 (Reference)	2.35 (1.60, 3.09)	1.00 (Reference)	2.18 (1.02, 3.34)
		1981	1.40 (1.33, 1.48)	0.77 (0.21, 1.34)	0.85 (0.79, 0.90)	2.97 (0.97, 4.98)	0.58 (0.51, 0.65)	2.07 (0.00, 4.18)
		1991	1.84 (1.74, 1.93)	1.94 (0.90, 2.97)	0.56 (0.50, 0.62)	4.59 (1.73, 7.45)		
		2001	2.05 (1.91, 2.19)	1.93 (0.77, 3.09)				
Overcrowding ¹	OR	1971	1.00 (Reference)	1.58 (1.14, 2.02)	1.00 (Reference)	1.39 (0.96, 1.82)	1.00 (Reference)	1.44 (0.79, 2.08)
		1981	0.58 (0.55, 0.61)	1.02 (0.42, 1.62)	0.75 (0.70, 0.79)	0.80 (0.28, 1.32)	1.02 (0.91, 1.13)	1.34 (0.05, 2.64)
		1991	0.45 (0.43, 0.48)	0.63 (0.28, 0.98)	0.66 (0.61, 0.72)	0.84 (0.31, 1.36)		
		2001	0.45 (0.42, 0.49)	0.63 (0.28, 0.98)				
Lives alone ¹	OR	1971	1.00 (Reference)	1.71 (1.28, 2.14)	1.00 (Reference)	4.21 (2.45, 5.97)	1.00 (Reference)	2.90 (0.86, 4.94)
		1981	0.71 (0.68, 0.74)	2.05 (0.97, 3.13)	0.11 (0.10, 0.12)	1.92 (0.33, 3.51)	0.99 (0.77, 1.21)	4.48 (0.00, 10.19)
		1991	0.47 (0.44, 0.49)	1.65 (0.89, 2.41)	0.07 (0.06, 0.09)	2.30 (0.74, 3.85)		
		2001	0.56 (0.52, 0.59)	0.81 (0.33, 1.28)				
Marital status ³	RRR							
Married (Reference)								

	RE	Child census	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
Previously married		1971	1.00 (Reference)	1.48 (0.89, 2.06)	1.00 (Reference)	1.55 (1.21, 1.89)	1.00 (Reference)	1.47 (1.17, 1.78)
		1981	1.15 (1.06, 1.23)	1.92 (0.33, 3.51)	0.93 (0.90, 0.97)	1.92 (1.00, 2.84)	1.01 (0.97, 1.05)	1.67 (0.94, 2.41)
		1991	0.85 (0.76, 0.94)	1.07 (0.03, 2.11)	0.71 (0.67, 0.76)	1.45 (0.69, 2.21)		
		2001	0.75 (0.60, 0.90)	2.32 (0.22, 4.41)				
Single		1971	1.00 (Reference)	0.82 (0.69, 0.95)	1.00 (Reference)	1.22 (1.05, 1.39)	1.00 (Reference)	1.14 (0.94, 1.35)
		1981	2.73 (2.67, 2.80)	2.19 (1.46, 2.92)	1.99 (1.95, 2.03)	2.51 (1.73, 3.29)	1.99 (1.92, 2.06)	2.24 (1.37, 3.10)
		1991	5.79 (5.63, 5.96)	4.74 (3.25, 6.23)	4.08 (3.96, 4.20)	5.09 (3.55, 6.62)		
		2001	15.97 (15.25, 16.70)	9.53 (6.26, 12.81)				
Number of children (women only) ⁴	IRR	1971	1.00 (Reference)	1.11 (0.98, 1.24)	1.00 (Reference)	0.79 (0.72, 0.85)	1.00 (Reference)	0.83 (0.76, 0.90)
		1981	0.96 (0.94, 0.98)	6.15 (4.01, 8.29)	0.94 (0.93, 0.95)	3.43 (2.60, 4.26)	0.97 (0.94, 0.99)	3.83 (2.90, 4.77)
		1991	0.86 (0.84, 0.88)	5.41 (3.66, 7.16)	0.82 (0.80, 0.84)	3.76 (2.88, 4.65)		
		2001	0.71 (0.69, 0.73)	0.19 (0.13, 0.25)				
Age at first birth (parous women only) ⁵	B	1971	22.0 (21.9, 22.1)	21.9 (20.9, 22.9)	26.6 (26.5, 26.7)	26.1 (24.9, 27.3)	28.8 (28.7, 29.0)	27.2 (25.7, 28.6)
		1981	21.8 (21.7, 21.9)	21.0 (20.6, 21.4)	27.3 (27.2, 27.4)	25.7 (25.2, 26.3)	29.6 (29.3, 29.8)	27.3 (26.6, 28.1)
		1991	21.8 (21.7, 21.9)	20.4 (19.8, 20.9)	27.3 (27.1, 27.4)	25.1 (24.2, 26.0)		
		2001	21.1 (21.0, 21.2)	20.6 (20.1, 21.0)				

¹ Binary logistic regression; ² Ordinal logistic regression; ³ Multinomial logistic regression; ⁴ Poisson regression; ⁵ Linear regression

Models adjust for gender, age, childhood census year, ethnicity, and Head of household in childhood's qualifications, marital status, social class and employment status

RE: regression estimate; OR: odds ratio; RRR: relative risk ratio; IRR: incidence rate ratio; B: unstandardized coefficient

Table S6. Estimates (95% confidence intervals) for social outcomes regressed on age in childhood by any care interaction, ONS Longitudinal Study

	RE	Age	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
< 18-year qualifications ¹	OR	< 1	1.00 (Reference)	1.84 (1.35, 2.33)	1.00 (Reference)	1.03 (0.77, 1.29)	1.00 (Reference)	0.97 (0.64, 1.30)
		≥ 17	2.00 (1.94, 2.07)	3.75 (3.13, 4.38)	3.95 (3.81, 4.10)	8.82 (7.15, 10.48)	2.44 (2.33, 2.55)	3.48 (2.85, 4.11)
Employment status ³	RRR							
Employed (Reference)								
Unemployed		< 1	1.00 (Reference)	2.04 (1.25, 2.83)	1.00 (Reference)	1.40 (0.77, 2.03)	1.00 (Reference)	0.98 (0.27, 1.68)
		≥ 17	0.44 (0.41, 0.47)	0.23 (0.12, 0.34)	1.80 (1.63, 1.96)	3.53 (2.46, 4.59)	0.54 (0.47, 0.61)	0.97 (0.54, 1.40)
In education		< 1	1.00 (Reference)	2.04 (1.25, 2.83)	1.00 (Reference)	2.44 (1.19, 3.70)	1.00 (Reference)	2.15 (0.94, 3.35)
		≥ 17	0.44 (0.41, 0.47)	0.23 (0.12, 0.34)	0.64 (0.53, 0.75)	2.17 (1.15, 3.20)	0.10 (0.09, 0.12)	0.20 (0.09, 0.30)
OLF		< 1	1.00 (Reference)	1.66 (1.26, 2.05)	1.00 (Reference)	2.18 (1.14, 3.21)	1.00 (Reference)	1.01 (0.47, 1.55)
		≥ 17	0.72 (0.69, 0.752)	1.13 (0.91, 1.35)	0.27 (0.24, 0.31)	0.93 (0.62, 1.23)	2.36 (2.18, 2.53)	3.83 (2.81, 4.85)
Long-term nonemployed ¹	OR	< 1	1.00 (Reference)	1.30 (0.69, 1.92)	1.00 (Reference)	2.07 (1.10, 3.04)	1.00 (Reference)	1.31 (0.54, 2.08)
		≥ 17	3.33 (2.95, 3.71)	5.75 (3.79, 7.71)	3.19 (2.92, 3.46)	5.06 (3.74, 6.38)	1.24 (1.12, 1.36)	1.99 (1.42, 2.57)
Social class ³	RRR							
Man/prof (Reference)								
Intermediate/technical		< 1	1.00 (Reference)	1.39 (0.94, 1.84)	1.00 (Reference)	0.93 (0.64, 1.22)	1.00 (Reference)	0.95 (0.55, 1.35)
		≥ 17	0.88 (0.85, 0.91)	1.15 (0.93, 1.36)	1.64 (1.57, 1.70)	2.93 (2.35, 3.52)	1.35 (1.28, 1.42)	1.89 (1.49, 2.29)
Routine occupations		< 1	1.00 (Reference)	1.76 (1.22, 2.29)	1.00 (Reference)	1.41 (1.00, 1.81)	1.00 (Reference)	0.99 (0.60, 1.39)
		≥ 17	0.52 (0.50, 0.54)	0.97 (0.79, 1.14)	1.28 (1.23, 1.33)	2.96 (2.39, 3.53)	0.84 (0.80, 0.89)	1.40 (1.11, 1.69)
Not known		< 1	1.00 (Reference)	2.00 (1.36, 2.64)	1.00 (Reference)	2.32 (1.44, 3.19)	1.00 (Reference)	1.11 (0.44, 1.79)

	RE	Age	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
		≥ 17	0.39 (0.37, 0.40)	0.68 (0.55, 0.82)	1.74 (1.62, 1.87)	5.57 (4.20, 6.94)	0.44 (0.39, 0.49)	1.08 (0.73, 1.43)
Housing tenure ³	RRR							
Owner (Reference)								
Renting		< 1	1.00 (Reference)	1.40 (1.13, 1.68)	1.00 (Reference)	1.61 (1.23, 1.99)	1.00 (Reference)	1.44 (0.96, 1.93)
		≥ 17	0.90 (0.88, 0.93)	1.64 (1.44, 1.84)	0.51 (0.49, 0.53)	1.03 (0.88, 1.18)	0.46 (0.44, 0.49)	0.94 (0.77, 1.10)
Other		< 1	1.00 (Reference)	1.35 (0.80, 1.89)	1.00 (Reference)	3.40 (1.77, 5.04)	1.00 (Reference)	2.91 (0.26, 5.57)
		≥ 17	0.57 (0.53, 0.61)	0.94 (0.67, 1.21)	0.87 (0.78, 0.96)	1.56 (1.00, 2.13)	1.97 (1.61, 2.32)	2.64 (1.19, 4.09)
Overcrowding ¹	OR	< 1	1.00 (Reference)	1.41 (0.83, 1.99)	1.00 (Reference)	1.17 (0.53, 1.81)	1.00 (Reference)	1.19 (0.00, 2.39)
		≥ 17	1.53 (1.41, 1.64)	2.17 (1.64, 2.69)	1.60 (1.44, 1.75)	2.91 (2.08, 3.73)	0.86 (0.71, 1.01)	1.38 (0.77, 2.00)
Lives alone ¹	OR	< 1	1.00 (Reference)	1.24 (0.77, 1.71)	1.00 (Reference)	7.37 (2.91, 11.84)	1.00 (Reference)	3.70 (0.00, 7.87)
		≥ 17	0.90 (0.85, 0.96)	1.28 (0.96, 1.59)	14.86 (12.98, 16.73)	16.19 (10.44, 21.95)	0.69 (0.46, 0.93)	1.31 (0.24, 2.39)
Marital status ³	RRR							
Married (Reference)								
Previously married		< 1	1.00 (Reference)	1.12 (0.23, 2.02)	1.00 (Reference)	1.11 (0.63, 1.59)	1.00 (Reference)	1.10 (0.60, 1.60)
		≥ 17	0.78 (0.69, 0.87)	1.22 (0.79, 1.65)	1.12 (1.06, 1.19)	1.68 (1.30, 2.06)	0.94 (0.89, 1.00)	1.42 (1.12, 1.72)
Single		< 1	1.00 (Reference)	1.14 (0.82, 1.46)	1.00 (Reference)	1.28 (0.97, 1.58)	1.00 (Reference)	1.27 (0.81, 1.74)
		≥ 17	0.11 (0.11, 0.11)	0.07 (0.06, 0.09)	0.24 (0.23, 0.25)	0.27 (0.23, 0.32)	0.30 (0.28, 0.31)	0.33 (0.26, 0.39)
Number of children	IRR	< 1	1.00 (Reference)	0.60 (0.46, 0.74)	1.00 (Reference)	0.66 (0.55, 0.76)	1.00 (Reference)	0.44 (0.33, 0.54)
(women only) ⁴		≥ 17	2.02 (1.96, 2.07)	2.14 (1.91, 2.36)	1.34 (1.32, 1.37)	0.76 (0.69, 0.84)	1.08 (1.05, 1.10)	0.59 (0.52, 0.65)
Age at first birth	B	< 1	21.8 (21.7, 21.9)	20.9 (20.2, 21.7)	27.3 (27.2, 27.4)	26.6 (25.6, 27.6)	29.8 (29.6, 30.0)	28.2 (26.4, 30.0)
(parous women only) ⁵		≥ 17	22.9 (22.8, 23.0)	22.2 (21.8, 22.5)	27.3 (27.2, 27.4)	25.3 (24.6, 25.9)	28.3 (28.1, 28.4)	26.0 (25.1, 26.9)

¹ Binary logistic regression; ² Ordinal logistic regression; ³ Multinomial logistic regression; ⁴ Poisson regression; ⁵ Linear regression

Models adjust for gender, age, childhood census year, ethnicity, and Head of household in childhood's qualifications, marital status, social class and employment status

RE: regression estimate; OR: odds ratio; RRR: relative risk ratio; IRR: incidence rate ratio; B: unstandardized coefficient

Figures in bold are significant after Holm-Bonferroni correction for multiple testing applied

Table S7. Estimates (95% confidence intervals) for social outcomes regressed on gender by any care interaction, ONS Longitudinal Study

	RE	Gender	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
< 18-year qualifications ¹	OR	Male	1.00 (Reference)	2.03 (1.72, 2.39)	1.00 (Reference)	1.72 (1.46, 2.03)	1.00 (Reference)	1.31 (1.10, 1.55)
		Female	0.84 (0.82, 0.85)	1.46 (1.25, 1.67)	1.00 (0.98, 1.02)	1.62 (1.37, 1.87)	1.06 (1.03, 1.08)	1.33 (1.10, 1.55)
Employment status ³	RRR							
Employed (Reference)								
Unemployed		Male	1.00 (Reference)	1.61 (1.34, 1.89)	1.00 (Reference)	1.84 (1.40, 2.28)	1.00 (Reference)	1.85 (1.17, 2.53)
		Female	0.75 (0.73, 0.77)	1.28 (1.01, 1.55)	0.75 (0.71, 0.78)	1.15 (0.79, 1.51)	0.92 (0.86, 0.98)	0.91 (0.46, 1.36)
In education		Male	1.00 (Reference)	0.94 (0.65, 1.24)	1.00 (Reference)	2.89 (1.83, 3.95)	1.00 (Reference)	2.04 (1.19, 2.89)
		Female	1.09 (1.05, 1.14)	1.38 (0.96, 1.81)	1.35 (1.24, 1.46)	3.93 (2.56, 5.30)	1.21 (1.13, 1.29)	2.49 (1.52, 3.45)
OLF		Male	1.00 (Reference)	1.43 (1.14, 1.73)	1.00 (Reference)	3.03 (2.25, 4.09)	1.00 (Reference)	1.95 (1.39, 2.51)
		Female	3.65 (3.55, 3.75)	6.49 (5.53, 7.45)	1.10 (1.03, 1.17)	2.23 (1.86, 2.60)	3.18 (3.04, 3.32)	4.00 (3.03, 4.98)
Long-term nonemployed ¹	OR	Male	1.00 (Reference)	1.31 (0.89, 1.93)	1.00 (Reference)	2.81 (2.06, 3.83)	1.00 (Reference)	2.04 (1.50, 2.78)
		Female	2.45 (2.32, 2.59)	4.06 (3.03, 5.08)	5.49 (5.17, 5.84)	5.76 (4.57, 6.95)	2.60 (2.47, 2.74)	3.39 (2.53, 4.26)
Social class ³	RRR							
Man/prof (Reference)								
Intermediate/technical		Male	1.00 (Reference)	1.26 (1.05, 1.50)	1.00 (Reference)	1.62 (1.35, 1.93)	1.00 (Reference)	1.45 (1.17, 1.78)
		Female	1.08 (1.06, 1.11)	1.53 (1.25, 1.80)	1.12 (1.10, 1.14)	1.41 (1.16, 1.66)	1.33 (1.29, 1.36)	1.47 (1.18, 1.76)
Routine occupations		Male	1.00 (Reference)	1.76 (1.49, 2.06)	1.00 (Reference)	2.08 (1.75, 2.47)	1.00 (Reference)	1.58 (1.29, 1.93)
		Female	0.91 (0.89, 0.92)	1.73 (1.43, 2.02)	1.24 (1.21, 1.26)	1.57 (1.04, 2.11)	1.18 (1.15, 1.22)	1.56 (1.26, 1.86)
Not known		Male	1.00 (Reference)	1.52 (1.26, 1.84)	1.00 (Reference)	3.10 (2.44, 3.94)	1.00 (Reference)	2.40 (1.76, 3.26)

	RE	Gender	20-29 years		30-39 years		40-49 years	
			No care	Care	No care	Care	No care	Care
		Female	1.45 (1.42, 1.49)	3.12 (2.57, 3.68)	2.21 (2.12, 2.30)	1.41 (1.16, 1.66)	1.48 (1.40, 1.56)	2.42 (1.68, 3.15)
Housing tenure ³	RRR							
Owner (Reference)								
Renting		Male	1.00 (Reference)	1.53 (1.37, 1.72)	1.00 (Reference)	1.99 (1.73, 2.28)	1.00 (Reference)	1.80 (1.52, 2.14)
		Female	1.25 (1.23, 1.27)	2.23 (1.99, 2.48)	1.16 (1.13, 1.18)	2.02 (1.76, 2.29)	1.13 (1.10, 1.15)	2.12 (1.78, 2.46)
Other		Male	1.00 (Reference)	1.81 (1.43, 2.29)	1.00 (Reference)	2.76 (2.06, 3.69)	1.00 (Reference)	1.63 (0.99, 2.69)
		Female	0.96 (0.93, 1.00)	1.19 (0.86, 1.53)	0.88 (0.83, 0.93)	1.57 (1.04, 2.11)	0.74 (0.68, 0.81)	1.24 (0.56, 1.91)
Overcrowding ¹	OR	Male	1.00 (Reference)	1.24 (0.98, 1.56)	1.00 (Reference)	1.87 (1.44, 2.42)	1.00 (Reference)	1.72 (1.17, 2.52)
		Female	0.93 (0.90, 0.97)	1.51 (1.18, 1.84)	1.11 (1.05, 1.17)	1.50 (1.06, 1.93)	0.87 (0.80, 0.94)	1.03 (0.49, 1.58)
Lives alone ¹	OR	Male	1.00 (Reference)	1.61 (1.31, 1.97)	1.00 (Reference)	1.66 (1.22, 2.27)	1.00 (Reference)	2.30 (1.16, 4.56)
		Female	0.73 (0.70, 0.76)	1.61 (1.28, 1.93)	0.48 (0.45, 0.51)	0.87 (0.55, 1.19)	0.48 (0.40, 0.57)	1.16 (0.23, 2.09)
Marital status ³	RRR							
Married (Reference)								
Previously married		Male	1.00 (Reference)	1.03 (0.63, 1.69)	1.00 (Reference)	1.23 (0.95, 1.59)	1.00 (Reference)	1.23 (0.97, 1.55)
		Female	1.49 (1.39, 1.59)	2.39 (1.69, 3.09)	1.45 (1.40, 1.50)	2.12 (1.71, 2.53)	1.39 (1.34, 1.43)	2.07 (1.68, 2.46)
Single		Male	1.00 (Reference)	0.81 (0.70, 0.93)	1.00 (Reference)	1.16 (1.01, 1.33)	1.00 (Reference)	1.18 (0.98, 1.42)
		Female	0.47 (0.46, 0.48)	0.37 (0.32, 0.41)	0.63 (0.62, 0.64)	0.78 (0.67, 0.89)	0.70 (0.68, 0.72)	0.78 (0.62, 0.93)

¹ Binary logistic regression; ² Ordinal logistic regression; ³ Multinomial logistic regression; ⁴ Poisson regression; ⁵ Linear regression

Models adjust for gender, age, childhood census year, ethnicity, and Head of household in childhood's qualifications, marital status, social class and employment status

RE: regression estimate; OR: odds ratio; RRR: relative risk ratio; IRR: incidence rate ratio; B: unstandardized coefficient

Figures in bold are significant after Holm-Bonferroni correction for multiple testing applied

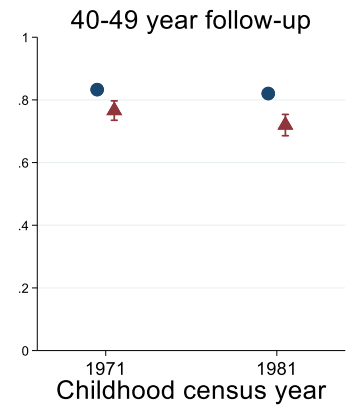
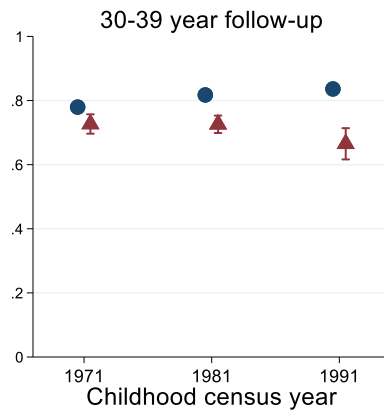
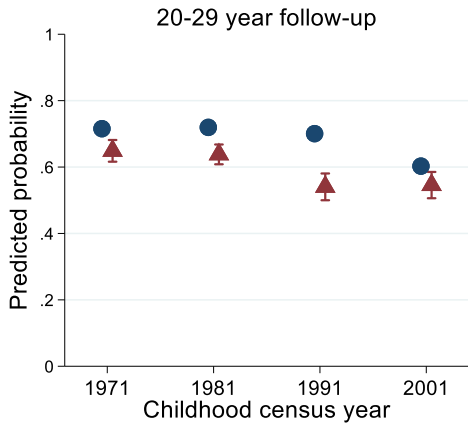
Figure legends

Figure 1. Moderation of out-of-home care on employment status in adulthood by childhood census year, ONS Longitudinal Study

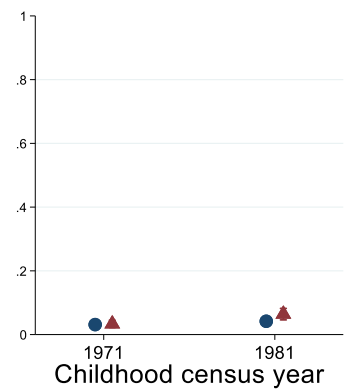
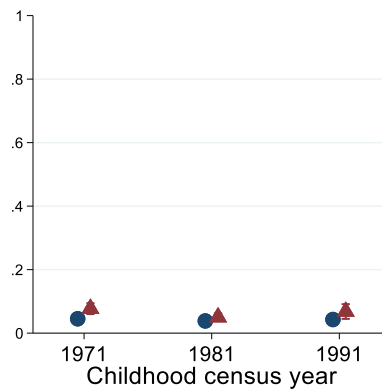
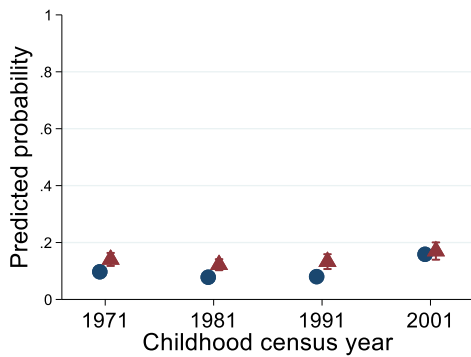
Figure 2. Moderation of out-of-home care on a) living alone and b) number of children in adulthood by childhood census year, ONS Longitudinal Study

Figure 3. Moderation of out-of-home care on a) qualifications and b) living alone in adulthood by age in childhood, ONS Longitudinal Study

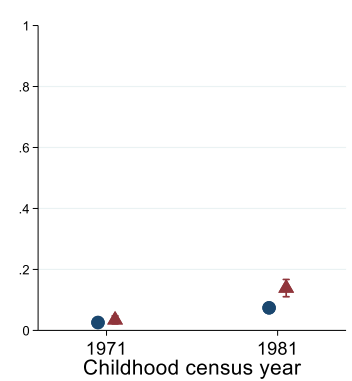
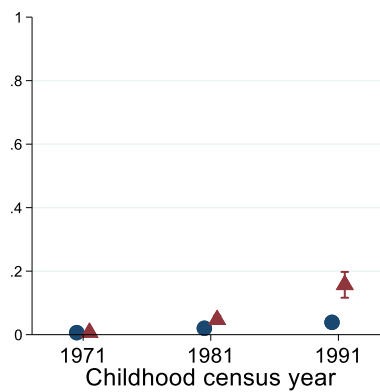
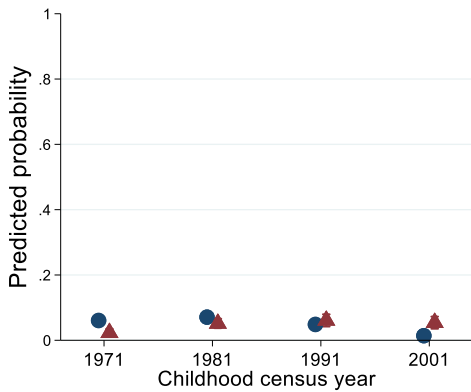
a) Employed



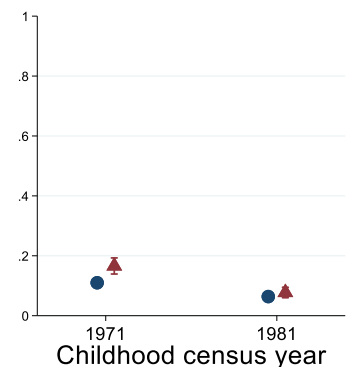
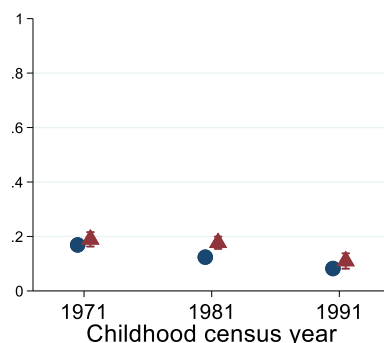
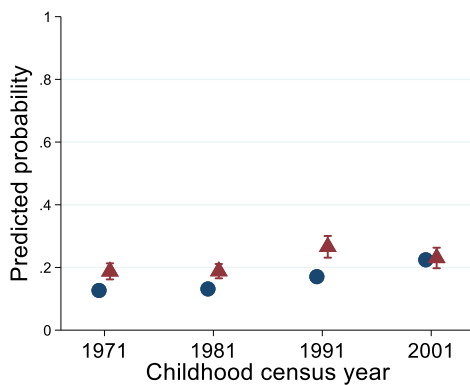
b) Unemployed



c) In education

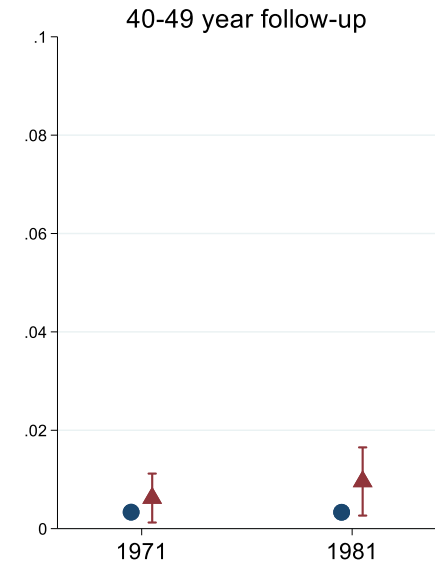
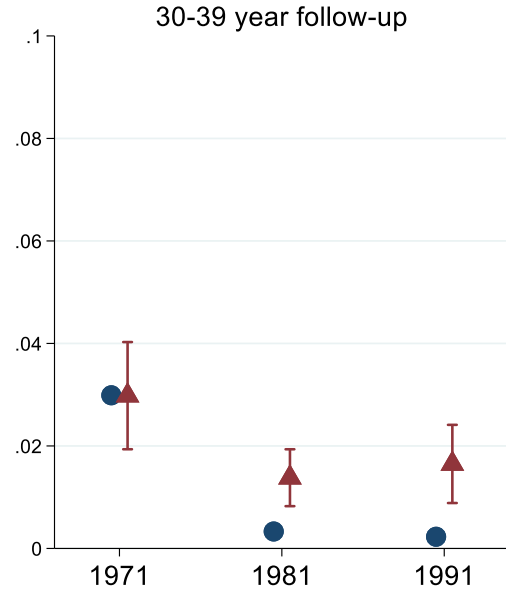
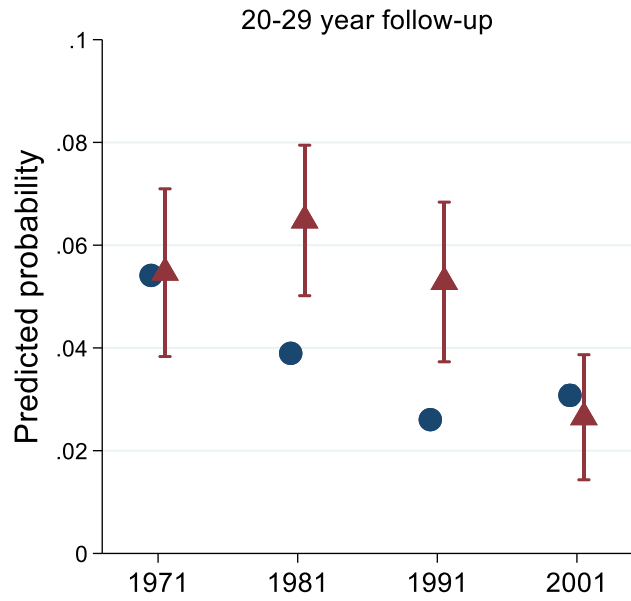


l) Out of the labour force

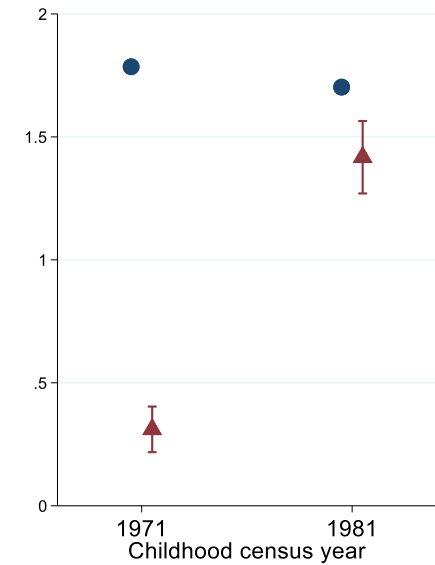
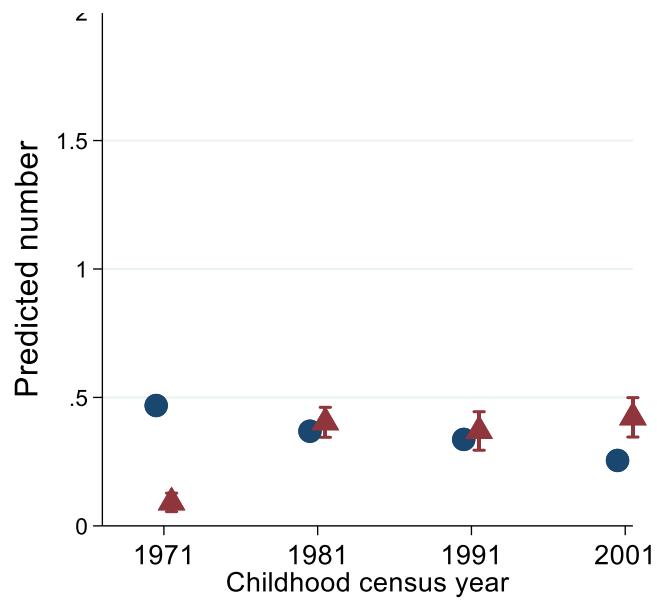


— In care — Not in care

a) Living alone

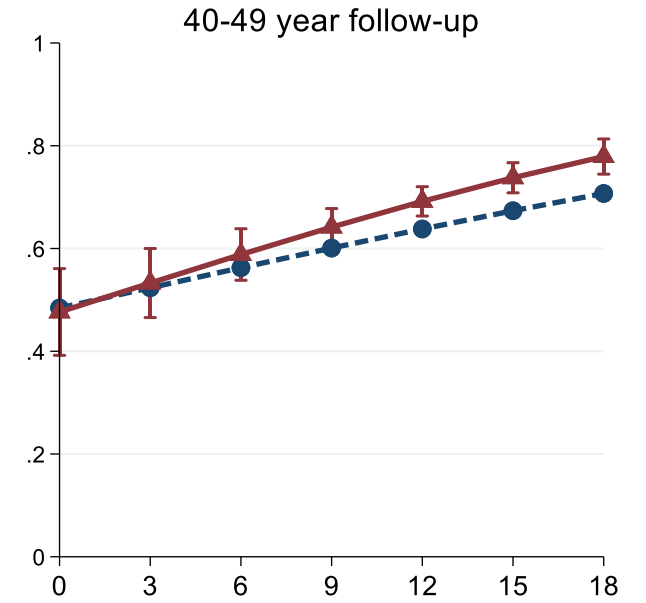
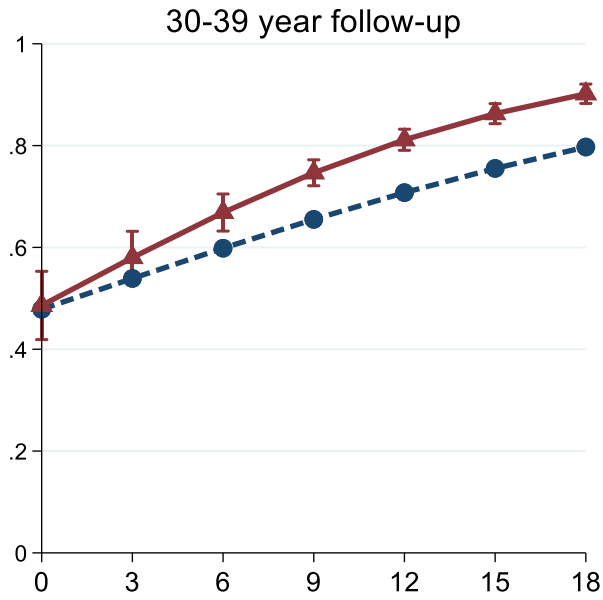
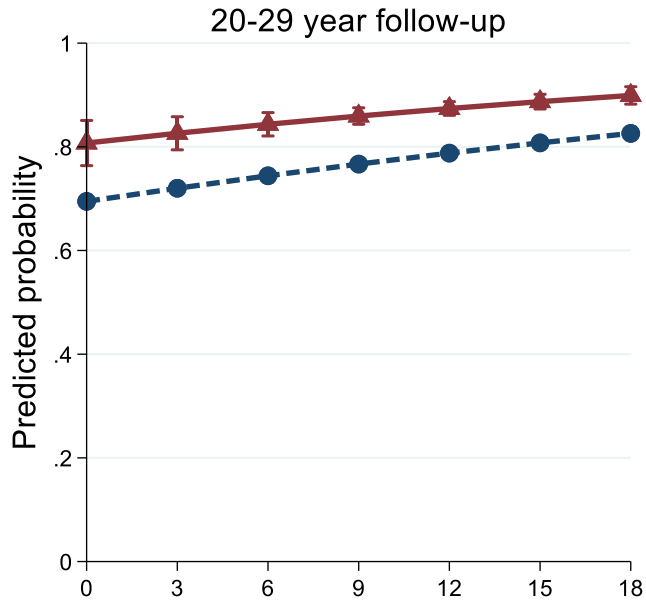


b) Number of children

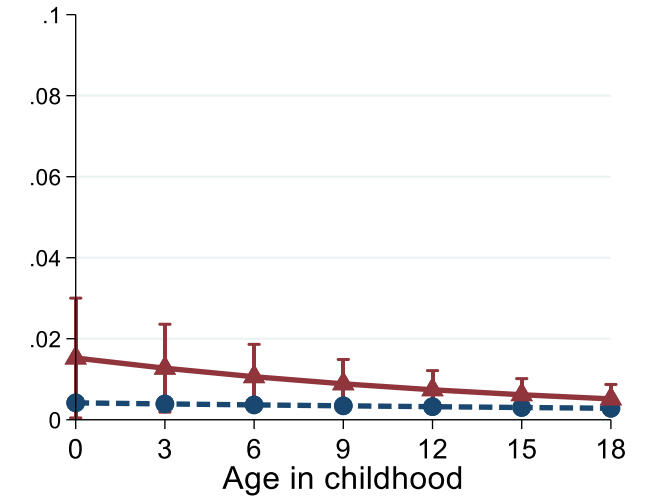
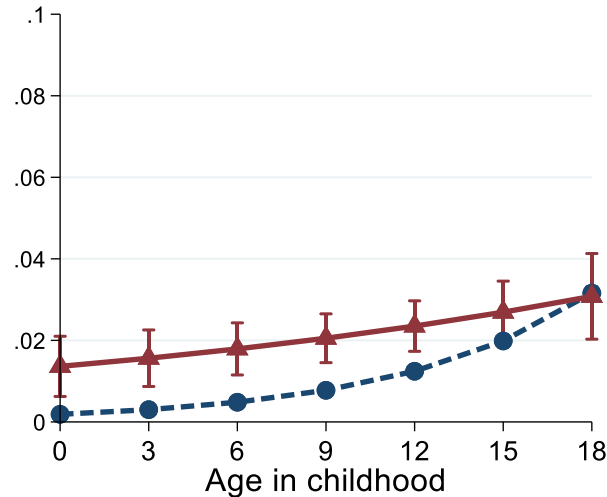
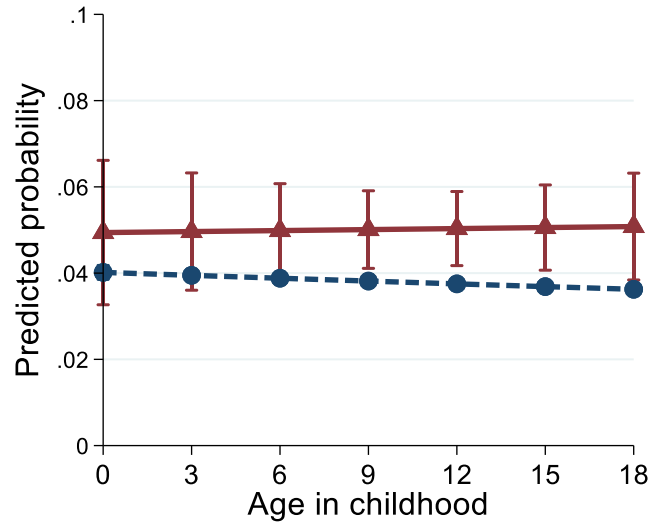


— In care — Not in care

a) < age 18 qualifications



b) Living alone



—▲— In care - - -●- - - Not in care