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Children of the 2020s: second survey of families at age 2 years

Research report

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Glossary of terms

Use of language: Throughout the report we have used ‘caregiver’ or ‘parent/carer’ to reflect the variation of adult-child connections within families participating in the study.

Attainment: Refers to the measure of a child’s achievement in school which compares every child to a standardised expectation for their age level, regardless of individual starting points.

Birth cohort: A cohort is a selected group of people with a shared characteristic, which in the case of a birth cohort is when they were born.

Children of the 2020s (COT20s): Children of the 2020s is a national research study following the lives of children born in the 2020s over the course of their first five years, commissioned by the Department for Education (DfE) and led by University College London (UCL).

COVID-19 pandemic: Refers to the global pandemic outbreak of coronavirus, an infectious respiratory disease, which started in late 2019.

Early childhood education and care (ECEC): This consists of any arrangement that provides education and care for children from birth to compulsory primary school age.

Formal ECEC in this report includes the following categories: Individual - Childminder, Professional nanny; Group-based – Day nursery, Nursery school, Pre-school or playgroup, Special day school or nursery or unit for children with special educational needs. Except for professional nannies, these settings are regulated by the government and Ofsted, provide funded childcare from age 2, and deliver the early years curriculum.

Informal ECEC in this report includes care provided on a regular basis by a relative, friend or neighbour in a domestic setting on an individual basis. It includes arrangements with an au pair but does not include care provided by the child’s other parent (regardless of whether they are cohabiting with the child’s primary caregiver).

Home learning environment: Activities and interactions that offer learning opportunities to the child in the home.

Longitudinal research: Refers to research in which data are collected from the same individuals multiple times over a period of time to study change. Wave 1 refers to the first data collection point in this study at age 9 months and Wave 2 refers to the second data collection point in this study at age 2 years.

Millennium Cohort Study (MCS): MCS is a longitudinal study following the lives of around 19,000 young people born across England, Scotland, Wales and Northern Ireland in 2002-02.

Multivariate analysis: Refers to analyses that involve evaluating multiple variables (more than two) to identify any possible association among them, for example multiple regression.

Primary caregiver: This person was defined at Wave 1 as the parental figure who spent the most time caring for the child.

Screen time: Screen time refers to activities that are undertaken on devices with screens such as smartphones, tablets, laptops and televisions, and the amount of time spent on them.

Watching: Watching television, videos or watch other digital content on a screen.

Playing computer games: Playing games on a digital device including educational games.

Standard deviation (SD): A measure that shows how much individual values in a set of data differ from the average (mean) value. A low standard deviation means the values are close to the mean, while a high standard deviation means they are spread out over a wider range. It helps understand the variability within a dataset.

Statistically significant: A research finding is statistically significant if the results in the data are unlikely to have occurred by chance alone. More precisely, in social science, if the p-value (probability value) is less than a certain percentage, then the results are unlikely to be explained by chance. For this Wave 2 report, this percentage was 1%, meaning 1% of statistically significant results will be due to chance and not because of a true difference.

Study of Early Education and Development (SEED): The Study of Early Education and Development (SEED) is a major longitudinal study following nearly 6,000 children from across England from age two. It started in 2013, and it is funded by the Department for Education (DfE).

Executive summary

Key findings of Children of the 2020s (COT20s) Wave 2

Overview

- The second primary caregiver survey (Wave 2) of the longitudinal Children of the 2020s Study took place online between October 2023 and February 2024.
- The cohort children were between 24 and 28 months old (average of 24.8 months).
- A total of 4,758 surveys were completed with the cohort children's primary caregivers (92% of whom were the biological mother), representing a response rate of 55% of the issued sample.

The current report provides a description of the age 2 data via a focused exploration of the following three research topics.

Topic 1: The economic circumstances of families of 2-year-olds in England and the relationship between family finances and early childhood education and care (ECEC) choices and usage.

- Average family income rose by 4% (£27,523 to £28,713) from 9 months (Wave 1) to 2 years (Wave 2), but inflation also rose by 4.6% over a similar period.
- Over one-third of families (35%) experienced significant financial strain – up 5 percentage points from the 9-month survey.
- About 6 in 10 (60%) reported that they had taken any parental leave with the cohort child.
- When their child was 2 years old, 67% of primary caregivers were employed; 33% were not, most commonly because of a preference to care for their child themselves (16%) and/or due to concerns regarding childcare costs (12%). Note the COT20s Wave 2 survey was conducted prior to the expansion of childcare entitlements in April 2024.
- At 2 years, 52% of families had used formal ECEC (such as nursery or childminder), up from 13% at 9 months, and 52% had used informal ECEC (such as relatives), compared to 37% at 9 months.
- Overall, 79% had used any ECEC for their child by age 2 years.
- Almost half (48%) of families had not used any type of *formal* ECEC between 9 months and 2 years. The most common reasons were: personal choice (25% of the total sample prefer to look after their child themselves) and financial constraints (18% of the total sample said it was too expensive and/or unaffordable).
- Half of formal ECEC users reported difficulty affording formal ECEC.

Topic 2: The mental health and wellbeing of primary caregivers of 2-year-olds in England and the connections between caregiver mental health, the home learning environment and parenting.

- Around 1 in 10 primary caregivers reported symptoms of depression (10%) or anxiety (12%) at the age 2 survey – similar to rates reported at the 9-month survey. Both anxiety and depression symptoms were more common in primary caregivers with lower family income, whereas anxiety symptoms were also associated with ethnicity (specifically symptoms were less common in primary caregivers of Asian/Asian British ethnicity compared to White ethnicity) and depression symptoms were also more common in primary caregivers with lower education levels.
- Home learning activities at age 2 (such as reading, singing, drawing, and playing with numbers or letters) were reported at similar rates to those observed a decade ago in the Study of Early Education and Development (SEED).
- Lower income, lower education, and minority ethnic backgrounds (specifically those of Black or Black British and Asian or Asian British ethnic backgrounds compared to those of White ethnicity) were linked to less frequent and/or less varied home learning activities.
- Parental depression and anxiety were not associated with home learning activity levels.
- At age 2, nearly all children (98%) watched TV, videos or other digital content on a screen daily, averaging 127 minutes per day. Around a third (34%) met the World Health Organisation (WHO) guidance of less than 1 hour per day of sedentary screen time for children aged 2 to 4, a decline from 46% when measured in 2013-14.
- Children’s screen time was higher in families with lower income, lower education, and among children of primary caregivers with Black, Asian or Mixed/Other ethnic backgrounds (compared to White ethnic backgrounds). Screen time was also higher among children whose primary caregiver reported symptoms of depression compared to those who did not.
- Primary caregivers with higher income, higher education levels, and those who were single parents were more likely to report overreactive parenting (such as displaying anger or irritability in response to their child’s challenging behaviour). Primary caregiver mental health was also linked with overreactive parenting – for example, 25% of those with depression or anxiety symptoms reported yelling at their child, compared to 17% of those without symptoms.

Topic 3: Children’s language, emotional and behavioural outcomes at age 2 years and how these vary according to family circumstances.

- At 2 years, children could say an average of 21 out of 34 common words. Our analysis found a preliminary indication that children’s spoken vocabulary was not significantly different from earlier cohorts of 2-year-olds between 2017 and 2020.
- Children from the lowest family income quintile could say fewer words on average than those from the highest: 53% of the 34 test words, compared to 68%.

- Higher levels of parental symptoms of depression were independently associated with lower spoken vocabulary: children whose primary caregiver had symptoms indicative of depression could say on average 56% of the test words, compared to 62% by those whose primary caregiver did not have symptoms.
- Engagement in less frequent and/or less varied home learning activities was linked to lower spoken vocabulary scores: children in the lowest Home Learning Environment (HLE)-Index quintile could say 44% of the 34 test words, compared to 74% of test words for those in highest HLE-Index quintile.
- Higher screen time was independently associated with lower spoken vocabulary, notably for children who had more than 1.5 hours of screen time a day on average. Children in the highest screen time quintile (an average of 5+ hours per day) could say 53% of the 34 test words compared to 65% by children in the lowest screen time quintile (with an average of 44 minutes of screen time per day).
- A quarter of children (25%) scored above the threshold for possible emotional or behavioural problems on a standardised questionnaire, which is consistent with previous norms.
- Increased rates of possible behavioural or emotional problems were linked to lower family income, lower primary caregiver education, single-parent households, and ethnicity. For example, 41% of children in the lowest family income quintile had scores indicative of possible problems, compared to 12% in the highest family income quintile. Similarly, 48% of children of primary caregivers with the lowest education levels had scores indicative of possible problems, compared to 15% with the highest. Children from single-parent households (39%) and those with primary caregivers of Asian or Asian British ethnicity (38%) were also more likely to have scores indicative of possible emotional and behavioural problems compared to children with coupled parents (21%) and White primary caregivers (21%), respectively.
- Primary caregiver depression and anxiety were each independently linked to children's possible behavioural or emotional problems. For example, 41% of children with primary caregivers with depression symptoms scored at a level indicative of possible problems compared to 23% of those without. For anxiety, 46% of children with primary caregivers with anxiety symptoms scored at a level indicative of possible problems compared to 22% of those without.
- Higher screen time was linked to higher rates of emotional and behavioural problems: 39% of children with an average of 5+ hours per day of screen time had possible behavioural or emotional problems compared to 17% with an average of less than 1 hour per day.
- Overreactive parenting was also linked to children's emotional and behavioural problems: 43% of children whose primary caregivers were in the highest quintile for overreactive parenting had scores indicative of possible problems, compared to 20% of those whose primary caregivers were in the lowest quintile.

Introduction

The Children of the 2020s (COT20s) study is the first nationally representative birth cohort study in England in two decades. The study is measuring the circumstances and outcomes of children, and their families, longitudinally, with annual data collections over the first 5 years of life. COT20s is creating a rich source of data for researchers and policy makers to conduct research and inform policy relating to early learning and development, early childhood education and care (ECEC) and family services.

The current report provides a description of key findings from the primary caregiver survey of the second wave of data collection from the COT20s longitudinal study, conducted when the cohort children were 2 years old. This report provides a focused exploration of three key policy-relevant research topics:

1. The economic circumstances of families of 2-year-olds in England and the relationship between family finances and early childhood education and care (ECEC) choices and usage.
2. The mental health and wellbeing of primary caregivers of 2-year-olds in England and the connections between caregiver mental health, the home learning environment and parenting.
3. Children's language, emotional and behavioural outcomes at age 2 years and how these vary according to family circumstances.

Methodology

The Wave 2 survey invited the primary caregiver identified at Wave 1 (defined as the parental figure who provided most of the care for the cohort child at the time) to complete an online survey when their child was around 2 years old. Fieldwork took place between October 2023 to February 2024. The cohort children were between 24 and 28 months old (average of 24.8 months). A total of 4,758 surveys were completed by the cohort children's primary caregivers (92% of whom were the biological mother), representing a response rate of 55% of the issued sample.

Results

Topic 1: The economic circumstances of families of 2-year-olds in England and the relationship between family finances and early childhood education and care (ECEC) choices and usage.

Context

Children of the 2020s has studied parents and children during a challenging time in England, as families and wider society came out of the COVID-19 pandemic to then face

a difficult economic landscape marked by rapidly increasing inflation and a rising cost of living. The COT20s study provides important longitudinal data on the economic circumstances of families with young children and the interactions between employment and childcare during this period.

Changes in average income and rates of financial strain

Overall, families had a 4% higher income (adjusted for household size) when their child was 2 years (mean = £28,713) compared to the previous round of data collection when the children were 9 months (mean = £27,523). This is consistent with the fact that although a similar number of primary caregivers were in paid work both when their child was 9 months and 2 years (around 67%), the most common change to their main job, reported by 28% of primary caregivers at age 2 years, was higher pay. The small increase in average income needs to be interpreted in the context of inflation during this period, which peaked in October 2022 at 11.1%, around the time the cohort children turned 1, but then declined to around 4.6% in October 2023 when the children turned 2. Reflecting this rising cost of living, over a third of families reported experiencing significant financial strain (35%), as indicated by one or more of the following indicators: not keeping up with bills and debts; finding it very difficult to manage financially; having to skip meals; or not being able to afford essential baby items. This figure was up 5 percentage points from when they were surveyed at 9 months. The data suggest that small rises in income did not keep pace with rising living costs for many families with 2-year-olds and underlines the economic challenges faced by young families in England at the time of the survey.

Patterns of employment

Although at the age 2 survey the majority of primary caregivers were in paid work, a total of 33% of primary caregivers were not working. Seventeen percent reported their main activity was looking after family and 5% said they were not in paid work because of a reason other than poor health. These caregivers reported that the most common reasons for not being in paid work primarily revolved around personal choice (such as the 16% who 'prefer to look after the child themselves') and financial constraints (such as the 7% whose 'income would not be enough after childcare costs to be worthwhile', the 5% who 'cannot afford childcare').

Childcare usage, choices and affordability

Typical reasons given for not being in paid work mirrored the reasons for not using formal early childhood education and care (ECEC) provision, underlining the interdependence between childcare use and employment. Although as a whole, more families were regularly using ECEC at 2 years (74%) compared to when their child was 9 months (43%) – possibly corresponding, in part, to the end of parental leave (60% reported that they had taken parental leave for the cohort child at some point since the child was born)

– 48% had not used any type of formal childcare since their child was 9 months old. The two most common reasons for this were personal choice (indicated by 25% of the total sample) and financial constraints or unaffordability (indicated by 18% of the total sample). The perception of unaffordability of formal childcare was also shared by half of formal ECEC users, who reported that it was very difficult or difficult to afford, with those with lower incomes more likely to report finding it difficult. Note that the age 2 survey took place before the April 2024 introduction of 15 hours of government-funded childcare per week for eligible working parents of 2-year-olds.

Topic 2: The mental health and wellbeing of primary caregivers of 2-year-olds in England and the connections between caregiver mental health, the home learning environment and parenting.

Context

Parental mental health and wellbeing are important factors that can affect parenting and the home learning environment and are important to consider when seeking to understand how family circumstances contribute to disparities in children's outcomes.

Rates of parental mental health problems

Overall, 10% of primary caregivers reported symptoms indicative of depression and 12% reported symptoms indicative of anxiety. This was similar to rates reported when the children were 9 months of age (9% and 13%, respectively). When children were 2 years, parental depression was more prevalent in the lowest income quintile (17%) than in the highest income quintile (5%) and was more prevalent in the lowest education group (18%) than in the highest education group (4%). These patterns were similar to those found at 9 months, though single parent status was also linked to depression during infancy but not at 2 years. Anxiety was more prevalent in the lowest income quintile (16%), compared the highest income quintile (7%). Fewer primary caregivers of Asian or Asian British ethnicity had symptoms indicative of anxiety (9%), compared to those of White ethnicity (12%). These findings were similar to those at 9 months. However, Black/Black British primary caregivers had shown higher anxiety rates than White primary caregivers at 9 months, while by age 2 rates were similar to those of White primary caregivers.

Children's screen time

A particular focus of the study is early-life exposure to rapidly evolving digital media. At 2 years, the vast majority (98%) of children watched television, videos or other digital content on a screen (such as computers, tablets, smartphones) on a typical day. Only one-third of 2-year-olds met the World Health Organization's guideline of no more than one hour of sedentary screen time per day for children aged 2-4 years. In COT20s, fewer 2-year-olds met this WHO recommended threshold than children in a comparable study

10 years ago (34% in COT20s, compared to 46% in 2013-14). Given how widespread screen use is in the early years, understanding its impact on development is an important priority.

Parental mental health, the home learning environment, children's screen time and parenting

The frequency or variety of home learning activities (such as reading, singing, drawing, and playing with numbers or letters) (reading, singing, drawing, and playing with numbers or letters) were reported at similar rates to those observed a decade ago in the Study of Early Education and Development (SEED). The frequency and/or variety of home learning activities at age 2 was not associated with parental anxiety and depression. Instead, socio-economic and demographic factors, particularly lower income, lower parental education, and a minority ethnic background, appeared to play a potentially more important role, in each case being associated with a lower frequency and variety of home learning activities. For example, 32% of primary caregivers in the lowest income quintile reported someone at home read daily with their child, compared to 77% of those in the highest; 29% of primary caregivers with the lowest education level reported someone at home read daily, compared to 73% of those with the highest; 33% of Asian primary caregivers and 25% of Black primary caregivers reported someone at home read daily to the child, compared to 62% of White primary caregivers.

Primary caregiver mental health was linked to children's screen time. Children of primary caregivers with symptoms indicative of depression spent more time on screens in a typical day (182 minutes) than those without (135 minutes). In addition, children from lower-income families or whose primary caregivers had lower education levels, tended to have higher screen time. For example, children in the lowest income quintile had nearly double the amount of daily screen time as those in the highest (179 compared to 97 minutes). Similarly, children of primary caregivers with the lowest education level had nearly twice as much daily screen time (186 compared to 98 minutes) as those with the highest education level. Additionally, primary caregivers of Black or Black British ethnicity, Asian or Asian British ethnicity or Other/Mixed ethnicity reported their children to have more screen time (on average for 213 minutes, 156 minutes and 174 minutes per day, respectively) compared to children of primary caregivers of White ethnicity (average of 131 minutes).

Overreactive parenting, broadly defined as displaying anger or irritability in response to a child's behaviour, was more common among primary caregivers who reported difficulties with anxiety and depression. A quarter (25%) of primary caregivers with symptoms of depression reported responding by yelling or raising their voice when their child misbehaves, compared to 17% of those without depression symptoms. Similar differences were seen among primary caregivers with symptoms of anxiety. Overreactive parenting was also more common among caregivers with higher education levels and higher income, and among coupled parents. Nineteen percent of those in the highest

income quintile said they were more likely to respond by yelling or raising their voice when their child misbehaves, compared to 15% in the lowest quintile; 21% of those in the highest education group said they responded by yelling or raising their voice when their child misbehaves, compared to 13% in the lowest education group; 18% of coupled parent/carers said they responded by yelling or raising their voice when their child misbehaves, compared to 16% single parent/carers.

Topic 3: Children’s language, emotional and behavioural outcomes at age 2 years and how these vary according to family circumstances

Context

Children’s early developmental skills and behaviour are important foundations for their later outcomes, including their educational attainment and mental health. Inequalities in developmental skills and wellbeing have been extensively documented by longitudinal research (Cattan et al., 2022), but contemporary nationally representative data on early childhood is limited. This report focused on 2-year-old’s language skills and their emotional and behavioural wellbeing.

Children’s language development

At age 2, primary caregivers reported that children could say an average of 21 out of 34 words commonly used by children of this age¹. Analysis provided a preliminary indication that children’s spoken vocabulary was not significantly different from earlier cohorts of 2-year-olds from 2017 to 2020. Several factors were independently associated with children’s spoken vocabulary, including family income, parental depression, home learning environment and screen time. By age 2, children from the lowest income families were able to say on average 53% of the 34 test words compared to those from the highest income families, who could say 68% of the 34 test words. Primary caregiver depression was associated with lower spoken vocabulary at 2 years. Children whose primary caregiver had symptoms indicative of depression could say 56% of the 34 test words on average, compared to 62% by those without symptoms of depression. The frequency and variety of home learning activities – measured by the Home Learning Environment (HLE)-Index – were also linked to language skills. Children in the lowest HLE-Index quintile, who experienced the least frequent and varied home learning activities, could say on average 44% of the 34 test words, compared to those in the highest HLE-Index quintile, who could say on average 74% of the 34 test words. The largest relative difference occurred between the lowest and second-lowest quintiles, suggesting that even a small increase in HLE activities for the lowest quintile could make a difference for children’s language development. Greater screen time was also

¹ The child uses a different pronunciation of a word (for example, “raffe” instead of “giraffe” or “sketti” for “spaghetti”), or says the word in a different language (e.g. “dwr” or “agua” for “water”), the respondent was asked to select that word anyway.

associated with lower vocabulary scores. Children in the highest screen time quintile (with an average of 5+ hours per day) could say 53% of the 34 words, compared to 65% among those in the lowest quintile of screen time (who had less than an average of 44 minutes per day of screen time). The World Health Organization (WHO) recommends no more than one hour of sedentary screen time a day for children aged 2 to 4 years.

Children's emotional and behavioural problems

One in four children (25%) scored above an established threshold for possible emotional and behavioural problems, aligning with expectations based on standardised norms for the instrument (the Brief Infant-Toddler Social and Emotional Assessment). This threshold identifies children who may benefit from further assessment or support. Possible emotional and behavioural problems were more common among children in lower income families, with primary caregivers with lower education levels, single parents, or with primary caregivers from Asian or Asian British backgrounds. For example, 41% of children in the lowest income quintile were above the threshold for possible problems, compared to 12% in the highest income quintile. Similarly, 48% of children of primary caregivers with the lowest education levels were above threshold, compared to 15% of those with the highest education levels. Children from single-parent households (39%) and those with primary caregivers of Asian or Asian British ethnicity (38%) were also more likely to be above threshold compared to those with coupled parents (21%) and White primary caregivers (21%), respectively.

Primary caregiver anxiety, depression, and overreactive parenting, and children's high daily screen time, were also associated with increased rates of possible emotional and behavioural problems. For instance, 41% of children with primary caregivers showing depression symptoms were above threshold for possible emotional or behavioural problems, compared to 23% without depression symptoms; and 46% with primary caregivers showing anxiety symptoms were above threshold for possible behavioural or emotional problems, compared to 22% without anxiety symptoms. Furthermore, 39% of children in the highest screen time quintile (average 5+ hours/day) were above threshold for possible behavioural and emotional problems, compared to 17% of children in the lowest screen time quintile (average 44 minutes/day). Finally, 43% of children whose primary caregivers were in the highest quintile for overreactive parenting were above the threshold for possible behavioural and emotional problems, compared to 20% of those whose primary caregivers were in the lowest quintile for overreactive parenting.

These findings highlight the complex and interrelated influences of economic circumstances, caregiver wellbeing, and the home environment on early development. They underscore the importance of addressing early disadvantage, supporting parenting and providing guidance on screen use during early childhood.

Conclusion

This report presents findings of Wave 2 of the Children of the 2020s study, focusing primarily on cross-sectional analysis. Results cannot identify causal factors directly but highlight multiple factors worthy of further investigation. As the study progresses, its design will allow for increasingly powerful longitudinal analysis of how family circumstances, early childhood education and care, and the home learning environment shape children's developmental outcomes. Data from Cot20s is being made publicly available on the UK Data Service and ONS Secure Research Service. Additionally, data collected from Cot20s participants monthly via the study app, BabySteps, will be made available in the near future and will add value to the data by tracking children's cognitive, language, motor and socio-emotional development more frequently over time than is possible with just the annual survey data alone. Wave 3, the data collection for age 3 which took place in 2025, includes a rich array of direct assessments of language, reasoning, working memory, inhibition and motor skills, as well as large-scale video recordings of parent-child interaction and will allow a host of new insights about children's development in England.

1. Introduction

Summary

Wave 2 report overview

The Children of the 2020s (COT20s) study is the first nationally representative birth cohort study in England in two decades. The study is measuring the circumstances and outcomes of children and their families longitudinally, with annual data collection over the first 5 years of life. COT20s provides a rich source of data for scientific research and policy-making relating to early learning and development, early childhood education and care (ECEC), and family services.

The current report provides a description of key findings from the primary caregiver survey of the second wave of data collection from the Children of the 2020s longitudinal study, conducted when the cohort children were 2 years old (24.8 months). It focuses on three policy-relevant research topics:

1. The economic circumstances of families of 2-year-olds in England and the relationship between family finances and early childhood education and care (ECEC) choices and usage.
2. The mental health and wellbeing of primary caregivers of 2-year-olds in England and the connections between caregiver mental health, the home learning environment and parenting.
3. Children's language, social-emotional and behavioural outcomes at age 2 years and how these vary according to family circumstances.

The Wave 2 survey invited the primary caregiver identified at Wave 1 (defined as the parental figure who provided most of the care for the cohort child at the time) to complete an online survey when their child reached age 2. Fieldwork took place between October 2023 to February 2024, when the cohort children were between 24 and 28 months old. A total of 4758 surveys with the child's primary caregivers were completed (a response rate of 55%).

Cohort and family profile at 2 years

On the whole, weighted profiles of children and families were unchanged from the 9-month sample, except for the arrival of new babies in 10% of families.

1.1. Children of the 2020s Study

The Children of the 2020s (COT20s) study is the first nationally representative birth cohort study in England in two decades. The study is measuring the circumstances and outcomes of children and their families longitudinally over the first 5 years of life. COT20s will provide a rich source of data for scientific research and policymaking relating to early learning and development, early childhood education and care (ECEC), and family

services. COT20s is the first study in the Department for Education's (DfE) longitudinal research programme collectively referred to as the Education and Outcomes Panel Study (EOPS). These studies will generate evidence on the progress of children through the early years, primary and secondary school, and the post-16 period, with data collection continuing until the end of the decade.

COT20s is a five-wave longitudinal study with annual data collection, including face-to-face interviews at 9 months and 3 years, and online and telephone interviews at 2, 4 and 5 years. The study's main objective is to examine the relationship between children's early life circumstances, their home environments and early learning opportunities, both formal and informal, and their developmental and educational trajectories.

The study measures a range of children's outcomes, including language, cognition and socio-emotional development. Primary data collection is supplemented by linkage of survey data to education and health administrative records. Pseudonymised data are made available to suitably qualified researchers for research and policy purposes. Data from wave 1 (collected at 9 months of age) are available on the Office for National Statistics Secure Researcher Service² and the UK Data Service³. The age 2 data will be deposited in due course so that interested users may apply for access to conduct their own analysis.

A detailed explanation of the rationale, justification and methodological overview of the Children of the 2020s study can be found in the first survey descriptive and technical research reports (<https://www.gov.uk/government/publications/children-of-the-2020s-first-survey-of-families-at-age-9-months>).

1.2. Content of the current report

This report focuses on the cohort at age 2, exploring three policy-relevant research topics:

- 1) [family economic circumstances and early childhood education and care](#)
- 2) [caregiver mental health, the home learning environment and parenting style](#) and
- 3) [early factors associating with child language and emotional and behavioural development at 2 years](#).

² <https://doi.org/10.57906/d6pm-0r78>

³ <https://datacatalogue.ukdataservice.ac.uk/studies/study/9464#details>

1.2.1. Methodology

Full details of the design of the second (Wave 2) mainstage survey of the COT20s study can be found in the accompanying technical report (Ipsos & UCL, 2026).

Briefly, the mainstage fieldwork for the second wave of the study took place predominantly online (with a proportion of non-responders followed up to complete a shorter version of the survey by telephone⁴) between October 2023 to February 2024, when the cohort children were between 24 and 28 months old (average of 24.8 months).

The Wave 2 survey invited the primary caregiver identified at Wave 1 (defined as the parental figure who provided most of the care for the cohort child at the time) to complete the survey. The Wave 2 survey completed by primary caregivers contained questions on a range of topics including key socio-demographics, their child's health and development, their own health and wellbeing, early childhood education and care arrangements, service usage, and the home learning environment.

The issued sample was all 8,611⁵ primary caregiver respondents from the Wave 1 COT20s survey. A total of 4758⁶ primary caregivers completed the Wave 2 survey (a response rate of 55%).

The Wave 2 survey contained questions on a range of topics including key socio-demographics, their child's health and development, their own health and wellbeing, early childhood education and care arrangements, service usage, and the home learning environment.

All statistics reported are weighted based on the probability of being sampled at Wave 1 (initial sampling was from the Child Benefit Register). This means that the frequencies presented in this report provide population estimates of 2-year-old children in England who were registered on the Child Benefit Register (CBR) in infancy, and analyses presented are representative of this target population. Most children in England are registered on the CBR, however, those from higher income families (those earning over £100,000 per annum) are less likely to be on this register and are therefore under-represented in the report's findings.

To address selection biases related to non-response to the Wave 2 survey, all statistics were weighted for non-response at Wave 2⁷ using data from Wave 1. This returned the

⁴ A set of exploratory analysis found no effect of mode (online or telephone completion), indicating that the mode of survey completion did not substantially influence the findings of the report (see Appendix 3).

⁵ This figure includes all Wave 1 primary caregivers minus a small number (17) who had either withdrawn from the study prior to the launch of Wave 2 or who no longer lived in England.

⁶ At Wave 2, a total of 320 interviews were partially completed. The imputed data from these interviews are included in this report.

⁷ Details of the derivation of the non-response weights for Wave 2 can be found in the Technical Report (Ipsos & UCL 2026).

sample to population representativeness based on Wave 1. However, we cannot rule out additional unobserved selection biases affecting the reported statistics, particularly considering the response rate of 55%. Weighted and unweighted bases (denominators) are reported in tables for descriptive purposes.

In addition to selection bias related to survey non-response, partial survey completion or item-level missingness can introduce bias. To mitigate this, and to maximise the use of available data to increase statistical power, multiple imputation was used in this report to address item-level missing data (see Appendix 1 for methodological details).

1.2.2. Aims and objectives of current report

The aim of this report is to address the following research topics:

1. The economic circumstances of families of 2-year-olds in England and the relationship between family finances and early childhood education and care (ECEC) choices and usage.
2. The mental health and wellbeing of primary caregivers of 2-year-olds in England and the connections between caregiver mental health, the home learning environment and parenting.
3. Children's language, emotional and behavioural outcomes at age 2 years and how these vary according to family circumstances.

1.2.3. Current report conventions

The background literature and findings relating to each of the research topics mentioned in section 1.2.2. will be presented independently in chapters 2 to 5 in the style of a relatively standalone research brief.

The analysis has been produced in accordance with the DfE Analytical Quality Assurance Framework⁸.

All percentages have been rounded to the nearest whole number, therefore, sums may not equal 100%.

Where group-wise differences or associations between variables are reported, these were statistically significant. Illustrative findings are provided for these statistically significant findings using unadjusted results (percentages and means of the differences without controlling for other factors in the model). Further details of the statistical modelling used throughout this report can be found in Appendix 2. Between-wave comparisons are descriptive only, unless otherwise specified.

⁸ <https://www.gov.uk/government/publications/analytical-quality-assurance-at-the-department-for-education>

It should also be noted that analyses relating to ethnicity were done using broad ethnic groupings (White, Asian or Asian British, Black or Black British, and Other or Mixed ethnicity) due to small sample sizes in more specific categories. While this approach enables more reliable statistical estimates, these broad categories encompass a wide variety of diverse sub-groups. Additionally, some ethnic groups, particularly Asian or Asian British, Black or Black British and Other or Mixed groups, are relatively small compared to the White ethnicity group, which introduces additional uncertainty in the estimates. Findings relating to ethnicity should therefore be interpreted with caution, recognising that important differences within groups may be obscured and that estimates may be uncertain. Future research with larger samples or alternative data sources will be needed to explore these differences in more detail.

1.3. Cohort profile at age 2

What follows is a brief description of key demographic characteristics of the cohort children, their primary caregiver, and their household when the cohort children were 2 years old (See Appendix 4 for a more detail profile). On the whole, weighted profiles of children and families were unchanged from the 9-month sample, except for the arrival of new babies in 10% of families.

1.3.1. Cohort children

The Wave 2 survey data include information for a total of 4,812 cohort children (1.13% of families had twin cohort members)⁹. As in Wave 1, 49% of cohort children were female and 51% were male. The average age of the children at the time of the Wave 2 survey was 24.8 months. Appendix 4 summarises the proportion of children per month of age at the time of the Wave 2 survey. The cohort children's ethnicity is reported in Appendix 4.

1.3.2. Primary Caregiver

The majority of primary caregivers were the biological mother of the child (91.9%) and 7.7% were the child's biological father¹⁰. At the time of the Wave 2 survey, primary caregivers were between 17 and 62 years of age, with an average age of 33 years. Appendix 4 shows the distribution of the primary caregivers' ages at the time of the Wave 2 survey. Primary caregivers' education and ethnicity are reported in Appendix 4.

⁹ A two-proportion z-test found no significant difference in the proportion of twin families between Wave 1 (1.3%) and Wave 2 (1.13%), $z = 0.85$, $p = .396$. This suggests that attrition of twin families between waves was not meaningfully different.

¹⁰ The remaining 0.4% of primary caregivers consisted of adoptive parents, foster parents, special guardians and full or half siblings.

1.3.3. Family composition

At the time of the Wave 2 survey, the majority (80%) of children lived in households with two caregivers in residence, while 20% lived in single parent¹¹ households – this was not significantly different to the proportion of single parent families at Wave 1¹². Of children living in a single parent household, 75% (15% of the whole cohort) had contact with a parent/carer living elsewhere, 3% (<1% of the whole cohort) had a parent/carer living elsewhere who did not have contact but was involved in some other way (such as financial support), and 22% (4% of the whole cohort) did not have any contact with the parent/carer living elsewhere.

In total, 5% of primary caregivers who reported having a cohabiting partner¹³ at Wave 1 had separated by Wave 2. Of primary caregivers who reported being a single parent/carer at Wave 1, 14% had a cohabiting partner by Wave 2.

In total, 10% of families had had a new baby since the Wave 1 survey. A further 7% of families were expecting a new baby at the time of the Wave 2 survey.

1.3.4. Family income

All primary caregivers reported their net income (from all sources), or, if living with a partner, their own and their cohabiting partner's combined net income (after any deductions, such as income tax or National Insurance).

In order to allow comparisons of the living standards of different family types, income was equivalised using the Modified OECD scale (Department for Work and Pensions, 2021) to take into account variations in the size and composition of the family, including the primary caregiver, their cohabiting partner and their dependent children (see Appendix 5 for details on methodology). This means that households with a different composition or different net incomes, but the same equivalised income can be considered to have a comparable standard of living.

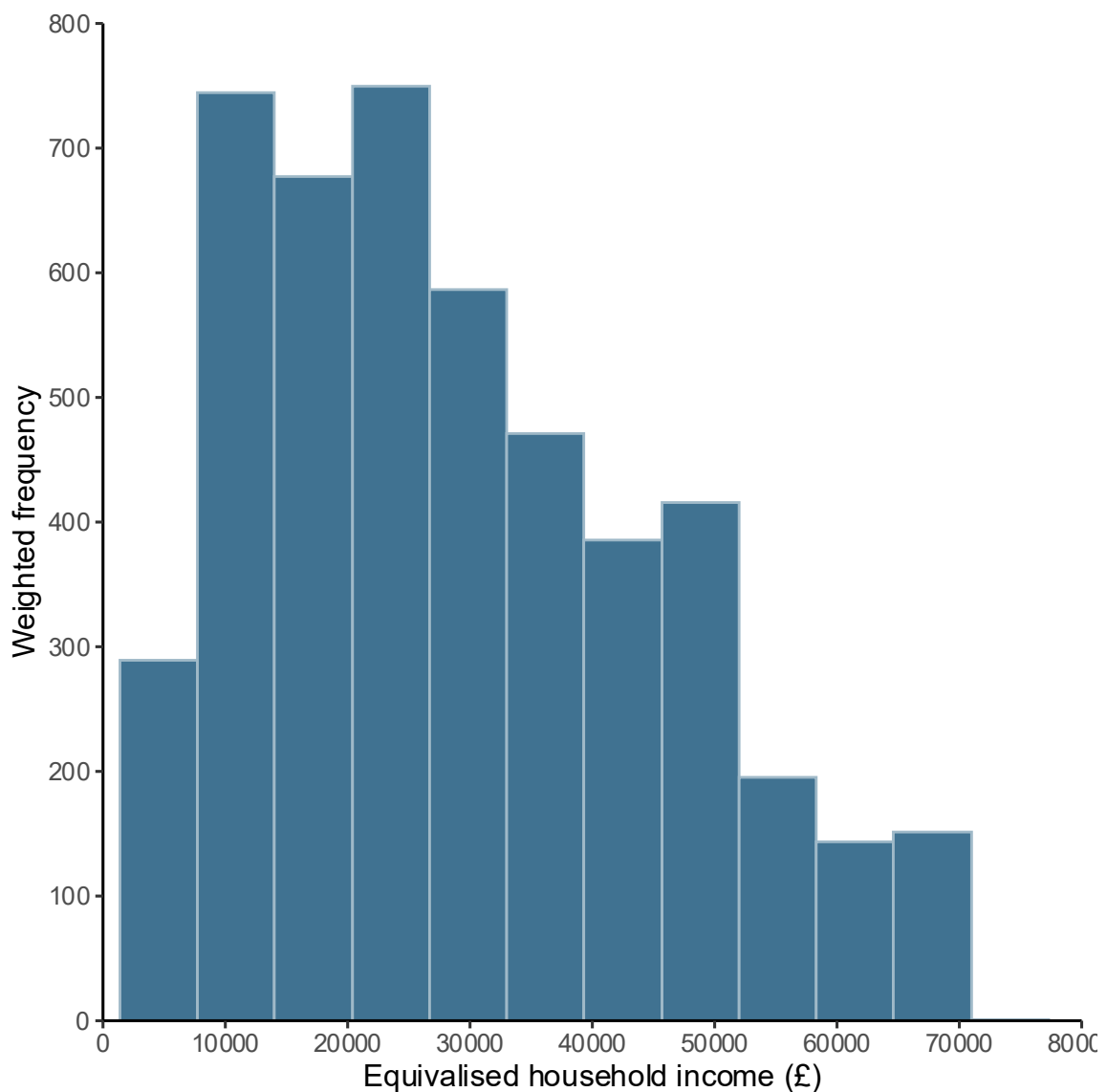
Figure 1 demonstrates the distribution of equivalised income of families when their child was 2 years old.

¹¹ Single parents/carers were defined as those not living with a partner or the cohort child's other parent. However, it includes parents/carers who are the sole carer of their child and those whose child has contact with another parent living elsewhere.

¹² A two-proportion z-test found no significant difference in the proportion of single-parent families between Wave 1 (19%) and Wave 2 (20%), $z = 1.40$, $p = .161$. This suggests that the proportion of single-parent families between waves was not meaningfully different.

¹³ Cohabiting partners included all types of couple partnerships, regardless of marital or civil partnership status.

Figure 1. Distribution of weighted family equivalised income when children were 2 years old



Base: All primary caregivers' households.

Source: COT20s Wave 2

Figure shows weighted frequency. Equivalised family income Intervals are equal to approximately £6,325.

For the analyses in chapters 2 to 4, equivalised income was split into five weighted quintiles (see Appendix 5 for methodology). Table 1 displays the mean income of each weighted quintile. For example, the average annual equivalised income for families in the lowest quintile was £9,076, compared with £26,666 in the middle quintile and £54,323 in the highest quintile. Refer to Chapter 2 (section 2.2) for further analysis of family income.

Table 1. Weighted equivalised income quintiles

Quintile	Percentage of the sample in quintile (%)	Mean income (SD)
Quintile 1 (lowest)	21	£9,076 (£3,352)
Quintile 2	20	£18,014 (£2,435)
Quintile 3 (middle)	20	£26,666 (£2,445)
Quintile 4	20	£36,407 (£3,269)
Quintile 5 (highest)	20	£54,323 (£8,120)

Table shows weighted proportion, mean and standard deviation of the equivalised family income in each weighted income quintile group

As explained in section 1.2.1, the results presented in this report are representative of 2-year-old children in England who were registered on the Child Benefit Register in infancy, and families at the upper end of the income distribution are under-represented.

2. Family economic circumstances and early childhood education and care (ECEC)

Summary

How have the financial circumstances of families with young children in England changed between age 9 months and 2 years?

- On average, families' incomes increased by 4% between 2022 when their child was age 9 months, and 2023/24 when their child was age 2. Over a similar period, inflation rose by 4.6%.
- Despite the average increase, 42% of families experienced a drop in income during this period.
- At the age 2 survey, 35% of families reported financial strain such as not keeping up with bills and debts; finding it very difficult to manage financially; having to skip meals; or not being able to afford essential items for their child. The proportion reporting financial strain was 5 percentage points higher than when the children were 9 months of age.

What are primary caregivers' main activities, and how does this differ from Wave 1 and/or before the child was born?

- Those on parental leave were asked to report their main activity before taking leave; by age 2, 60% of primary caregivers had taken parental leave at some point for the cohort child.
- At the age 2 survey, 67% were in paid work, compared to 71% at 9 months.
- For those in paid work, 45% experienced no change in their employment between the age 9 months and age 2 surveys. When primary caregivers reported changes in their employment, the most common were higher pay (28%) and shorter working hours (16%).

What are the most common reasons for not being in paid work among parents with young children?

- A third (33%) were not in paid work when their child was aged 2. The most common reasons were: personal choice (16% prefer to look after the child themselves) and financial constraints (7% stated their income would not be enough after childcare costs to be worthwhile, and 5% cannot afford childcare).

What early childhood education and care (ECEC) provision do parents of 2-year-olds typically use, and how has it changed since their child was 9 months old?

- Between 9 months and 2 years, 52% of families had used formal ECEC (such as nursery or childminder), up from 13% between birth and 9 months, and 52% had used informal ECEC (such as relatives), compared to 37% between birth and 9 months.
- Formal ECEC was used between 9 months and 2 years by 67% of those in paid work compared with 20% not in paid work, and by 85% in the highest income quintile compared with 22% in the lowest.

What are the most common reasons for not using formal ECEC?

- Almost half (48%) did not use formal childcare between 9 months and 2 years. The most common reasons were: personal choice (53% of those not using formal childcare, 25% of the total sample, prefer to look after their child themselves) and financial constraints (38% of those not using formal childcare, 18% of the total sample, said it was too expensive and/or unaffordable).
- Of the 52% who had used formal childcare between 9 months and 2 years, half (50%) found it difficult or very difficult to afford. Even in the highest income quintile, 37% found it difficult or very difficult to afford formal childcare.

This chapter explores the primary caregiver's occupation and family economic circumstances and how these relate to childcare uptake. At the point of the Wave 2 survey, when the children had turned 2 years old, England was experiencing an acute period of inflation and cost-of-living pressures.

2.1. Background

The economic context of the Children of the 2020s families

Since the COT20s study children were born, in Autumn 2021, the economic landscape in England has undergone rapid change. The children in the cohort were born between 1st September-30th November 2021, when mandated public health restrictions for COVID-19 had been recently lifted, but many public services and the wider economy were still facing significant disruption and challenge. The UK, like many other parts of the world, experienced rapid increases in inflation, which peaked in October 2022 at 11.1%, around the time the cohort children were turning 1. Inflation gradually declined to around 4.6% in October 2023 when the children were turning 2. Economic recovery was gradual, and the economy was technically in recession when the cohort children were turning 2. The period between the Wave 1 and Wave 2 surveys was thus characterised by marked economic challenges and financial pressures on families due to the rising cost of living Francis-Devine (2023). This economic strain is likely to have been particularly pronounced for parents of young children, who were facing increased costs of housing, utilities, food, and childcare, which, in addition, disproportionately affects families with more than two children (Resolution Foundation, 2023). Findings from the Wave 1 COT20s survey indicated that almost a third of families in England experienced significant financial difficulties when their child was 9 months old, such as being unable to afford essential baby items or to keep up with bills and debts, findings it very difficult to manage financially, and/or having to skip meals (Bernardi & Fish, et al., 2023).

The role of economic circumstances in early child development

There is extensive evidence that family economic circumstances have important influences on child development and influence it through a wide range of mechanisms (Bradley & Corwyn, 2002). Financial hardship has been linked to increased parental stress and mental health difficulties, as well as parenting and couple conflict (Bradley & Corwyn, 2002), all of which can negatively affect parent-child interactions and, in turn, children's socio-emotional and cognitive outcomes (Batcheler, 2022). Early childhood inequalities in the UK, driven substantially by socio-economic factors, contribute to significant developmental gaps by school age (Cattan et al., 2022), so understanding the processes that give rise to these inequalities in early life is critical. Findings from the Wave 1 COT20s report align with this evidence (Bernardi & Fish, et al., 2023). Data from the COT20s study showed that disparities are already present in the first year of life, with family economic circumstances being linked to disparities in health, birth weight, and gestational age, which are known predictors of children's long-term outcomes (Johnson & Marlow, 2011). At age 9 months, children from lower-income families also experienced less varied and less frequent home learning activities, such as book reading and structured play, than those from higher-income families. Importantly, a higher variety and greater frequency of these stimulating home learning activities was associated with better early language abilities at 9 months.

Patterns of employment, parental leave and childcare decisions

Workforce participation among working-age women and mothers has been rising steadily since 2004 (Latimer, 2024), and among COT20s families of 9 months olds in 2022, 71% of primary caregivers were in employment, 39% of whom were on parental leave at that time. Employers in the UK are also increasingly offering flexible hours and remote working options, driven by both employee demands and legislative changes. In 2023, 10% of workers in the UK were almost fully remote, and about 30% followed a hybrid model, typically splitting their time between home and office (Johnson, 2023). Understanding the impact of such shifts in parental working patterns on early family life may provide important insights that could shape policy decisions aimed at supporting families in the early years.

Family economic circumstances, parental employment patterns, and use of early childhood education and care (ECEC) are closely interrelated. The Childcare and Early Years Survey of Parents (CEYSP) found that in 2023, 72% of families with children aged 0-4 years used some form of childcare for their children (Department for Education, 2024). Many working mothers in 2023 reported in the CEYSP that childcare provided essential support for them to work (66%), a higher proportion than in 2022 (60%); families with pre-school children are particularly reliant on childcare, compared to families with school-aged children, but costs of formal childcare are highest for younger children (Farquharson & Olorenshaw, 2022). A substantial proportion of families during this time reported having difficulties affording childcare (34%), reflecting an increase from 24% in

2021 (Department for Education, 2024). At the same time, the number of childcare places in England fell between 2020 and 2023 (Ofsted, 2024), and more than a third of families of children aged 0-4 years reported that there were not enough childcare places available to them locally. Understanding how the changing economic landscape and changing patterns of work affect childcare arrangements and choices is important for understanding how policy interventions such as childcare entitlements can support families.

Aims of the current chapter

The economic, occupational and childcare circumstances of families in England currently reflect a complex mix of challenges and opportunities. The COT20s study provides important longitudinal data on the economic circumstances of families with young children and the interactions between employment and childcare during this period of change. Not only do such data allow us to track factors influencing childcare decisions, but they, in turn, also have implications for child development, because both family economic circumstances and childcare experiences influence children's early learning, development and wellbeing.

The current chapter explores these topics by addressing the following research questions:

1. How have the financial circumstances of families with young children in England changed between the ages of 9 months and 2 years?
2. What are primary caregivers' main activities, and how does this differ from Wave 1 and/or before the child was born?
3. What are the most common reasons for not being in paid work among parents with young children?
4. What early childhood education and care (ECEC) provision do parents of 2-year-olds typically use, and how has that changed since their child was 9 months old?
5. What are the most common reasons for not using formal ECEC?

Methodological details of the statistical modelling used throughout this chapter can be found in Appendix 1.

2.2. How have the financial circumstances of families with young children in England changed since Wave 1?

2.2.1. Family income

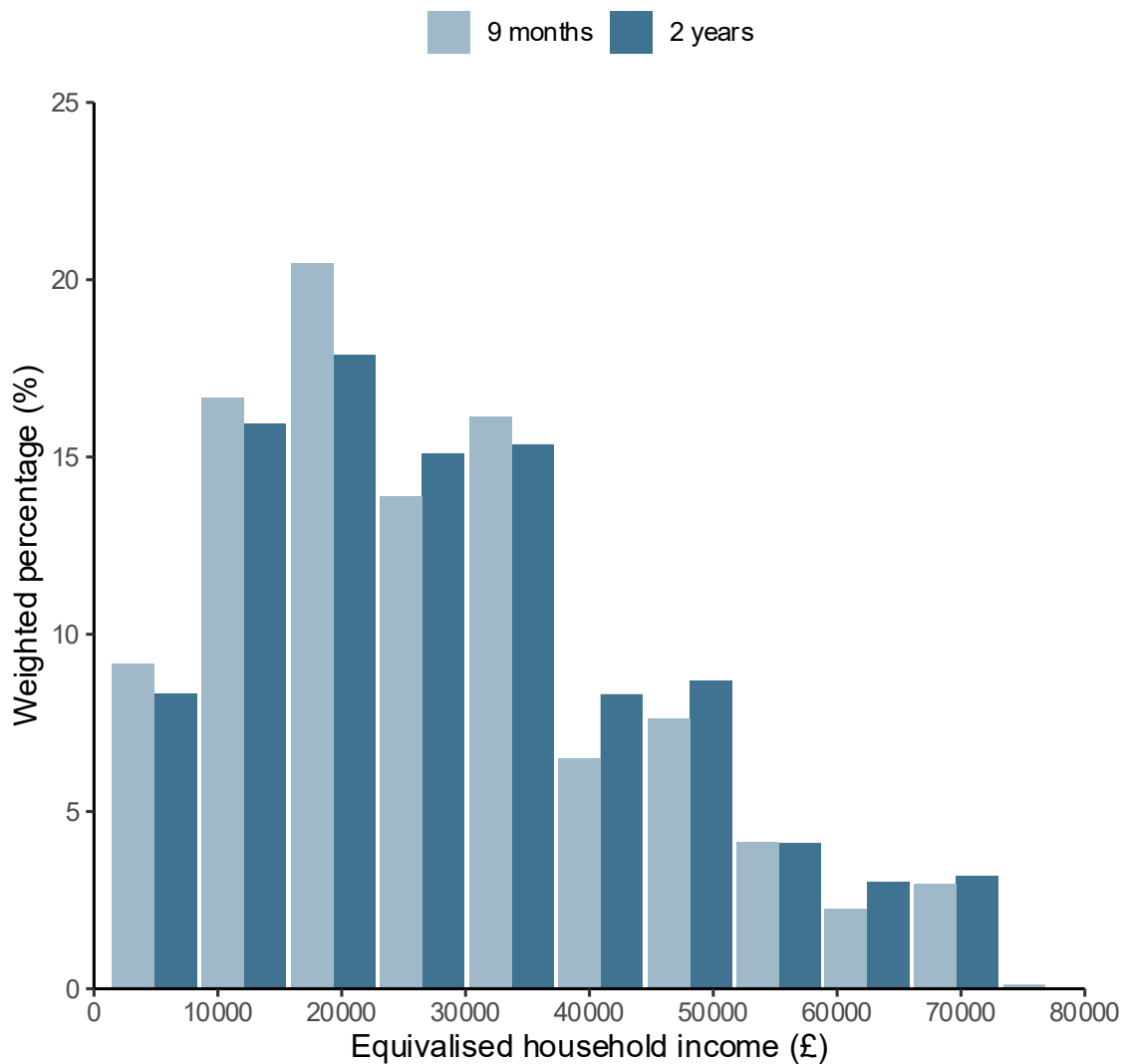
To allow comparisons of the living standards of different family types, income was equivalised to account for variations in the size and composition of the household,

including the primary caregiver, their cohabiting partner and their dependent children (see section 1.3.3.). Households with a different number of family members or different net incomes, but the same equivalised income, can be considered to have a comparable standard of living.

On average, families had a higher equivalised income in 2023/4 when their child was 2 years (mean = £28,713) compared to 2022, when their child was 9 months (mean = £27,523). This change equated to an average increase of 4% (or £1189), over a 15-month period (see Appendix 6 for detailed analysis). This small, but significant, difference in income needs to be interpreted in the context of inflation during this period, which peaked in October 2022 at 11.1%, around the time the cohort children turned 1, but then declined to around 4.6% in October 2023 when the children were turning 2.

Although on average across the cohort there was a slight increase in family income, there was substantial variation. About half (53%) of families had a higher equivalised income when their child was 2 years than when they were 9 months, with an average rise of £9,544. In contrast, about 4 in 10 (42%) families had a lower equivalised income, with an average decrease of £9,172. Overall, 4% had the same equivalised income at both time points. Figure 2 displays the equivalised income at each time point.

Figure 2. Family equivalised income when children were 9 months and 2 years old



Base: All primary caregivers. Figure shows %.

Source: COT20s Wave 1 & Wave 2

Equivalised family income Intervals are equal to approximately £7,272. Weighted bases. Wave 1 (9 months): 8615. Wave 2 (2 years): 4747

Unweighted bases: Wave 1 (9 months): 8628. Wave 2 (2 years): 4758

A quarter (25%) of families in the lowest income quintile at Wave 1 had seen their family income fall between Wave 1 and Wave 2, whereas 62% of those in the highest income quintile at Wave 1 had a fall in their income. While 75% of families in the lowest income quintile at Wave 1 had seen an increase in family income, this was only true for a quarter (26%) of those in the highest income quintile at Wave 1. Further details of increases and decreases to household by income quintile at Wave 1 are shown in Table 2.

Table 2. Percentages of increases and decrease of family income between 9 months and 2 years by income quintile at the Wave 1 survey

Family income quintile Wave 1	Percentage whose income decreased (%)	Percentage whose income increased (%)	Unweighted base	Weighted base
Quintile 1 (lowest)	25	74	782	976
Quintile 3 (middle)	41	56	988	970
Quintile 5 (highest)	62	26	1007	841

Base: Quintile 1, 3, and 5.

Source: COT20s Wave 2

Table shows %, all derived using weights

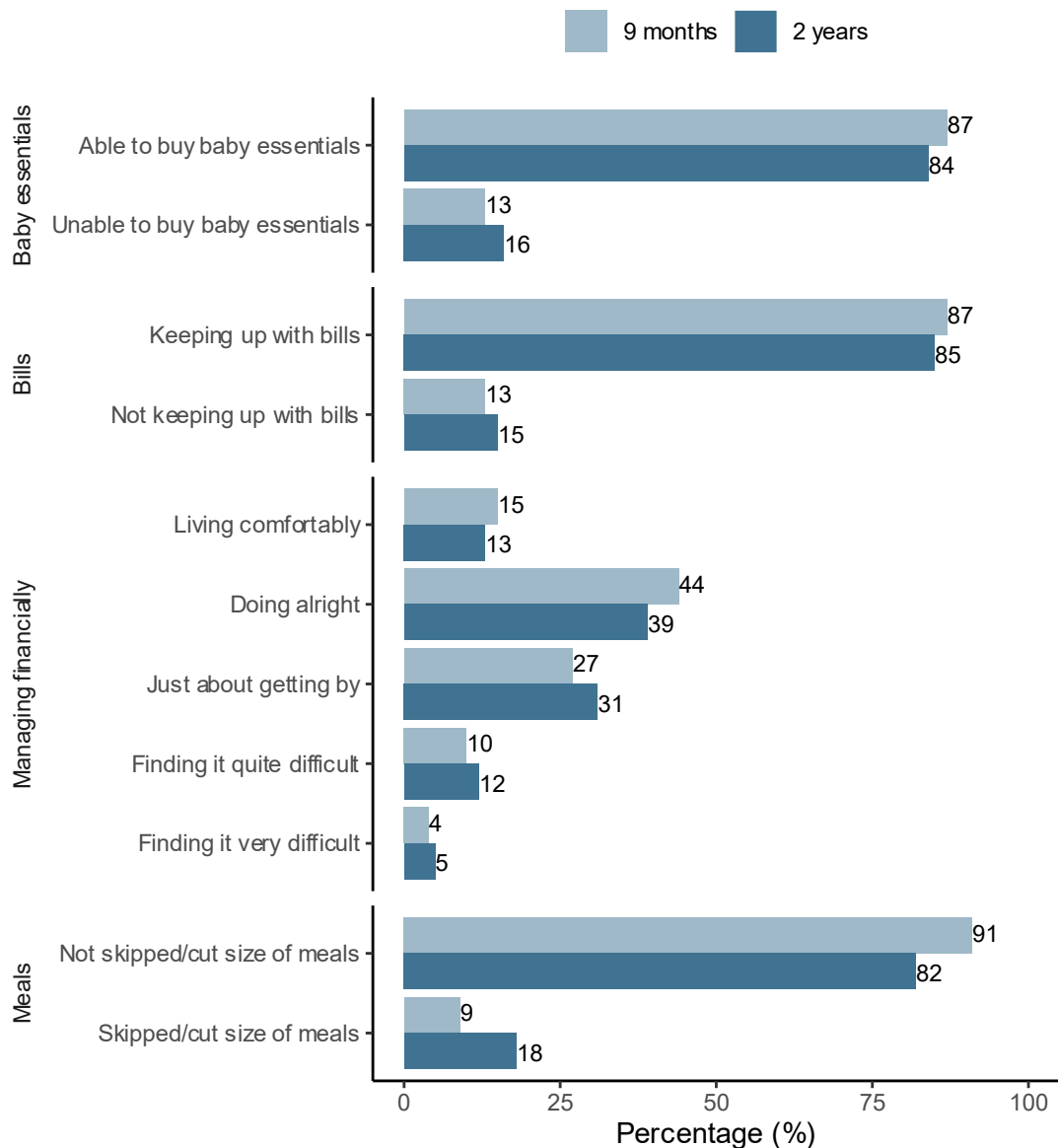
2.2.2. Financial strain

In both the Wave 1 and Wave 2 surveys, primary caregivers were asked about their experience of financial difficulties, such as how well they felt they were managing finances, keeping up with bills and debt repayments, and having the funds to buy food and baby essentials.

More families experienced financial difficulties when their child was aged 2 years compared to when the child was 9 months. Notably, the percentage of people who reported having to skip or cut the size of their meals because they did not have enough money for food doubled from 9% to 18%. Those who said that they found it quite or very difficult to manage financially rose from 14% to 17%. Similarly, the percentage who reported struggling to keep up with bills or debt repayments in the past six months increased from 13% when their child was 9 months old to 15% at age 2, and those who could not afford to buy essential items for their child as often as they would have liked increased from 13% to 16%.

Figure 3 displays families' financial circumstances in winter 2023-24 when their child was 2 years old, alongside family financial circumstances at the time of the Wave 1 survey in summer to autumn 2022 when their child was 9 months old.

Figure 3. Families' experiences of financial strain when children were 9 months and 2 years old



Base: All primary caregivers. Figure shows %.

Source: COT20s Wave 1 & Wave 2

Weighted bases. Wave 1 (9 months): 8615. Wave 2 (2 years): 4758

Unweighted bases: Wave 1 (9 months). 8628 Wave 2 (2 years): 4747

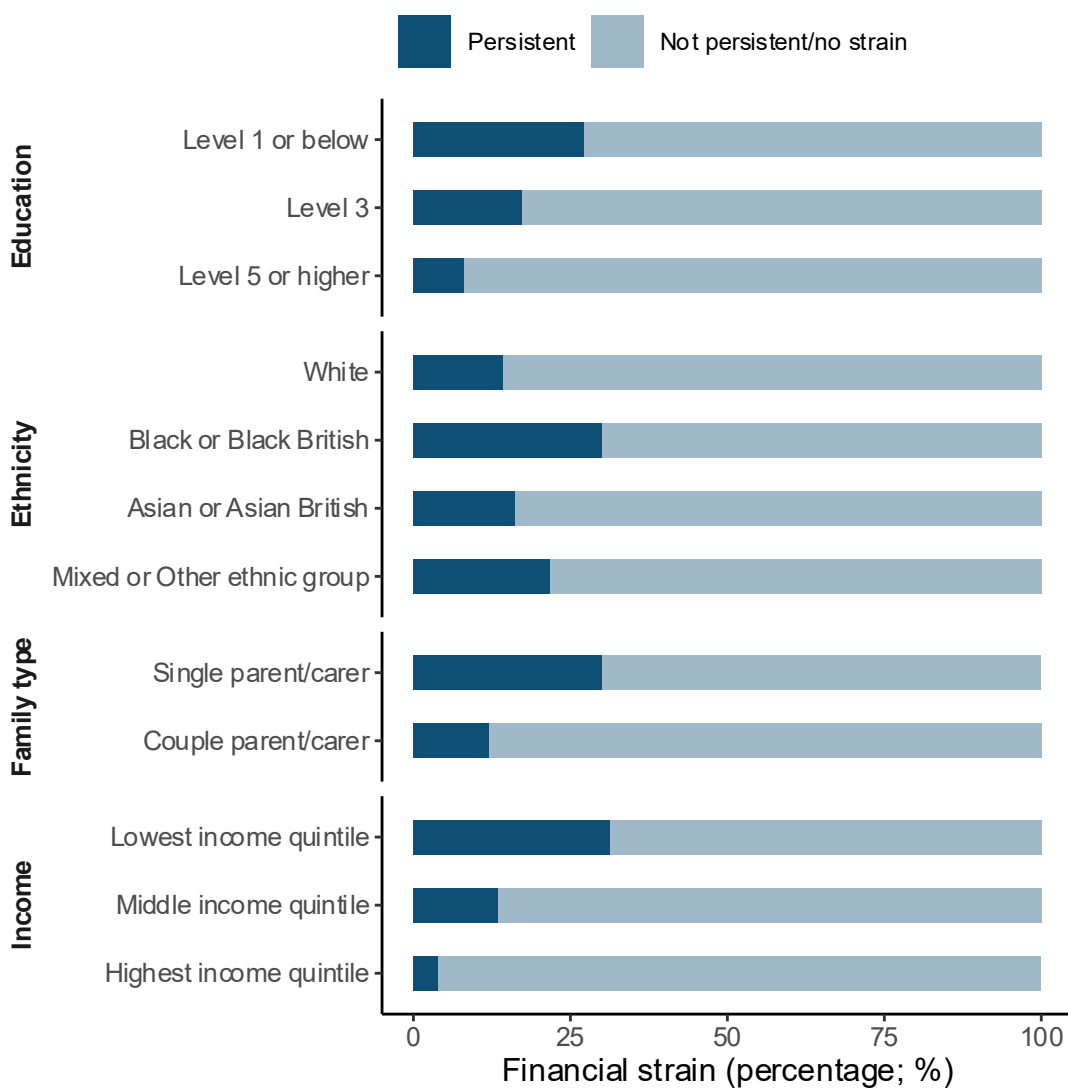
More families experienced at least one of the four financial strain indicators when the child was 2 years (35%) compared to 9 months (30%): not keeping up with bills and debts; finding it very difficult to manage financially; having to skip meals; or not being able to afford essential baby items. Further, the percentage of families experiencing two or more of these financial difficulties rose from 10% at 9 months to 16% at age 2.

When considering persistent financial strain, 16% had at least one financial strain at both 9 months and at 2 years.

2.2.3. Does persistent financial strain vary depending on socio-demographic differences?

The percentage of families who experienced persistent financial strain (defined as reporting at least one financial strain at both 9 months and 2 years) by demographic groups (family income at Wave 2, primary caregiver's education level, primary caregiver's ethnicity and family type) are displayed in Figure 4. See Appendix 2 Table 2 for a breakdown of families experiencing persistent financial strain by demographic groups.

Figure 4. Persistent financial strain by demographic characteristics



Base: All families. Figure shows %.
Unadjusted results are shown (not controlling for other factors)

Source: COT20s Wave 2

2.3.1. Multivariate results: persistent financial strain and demographic characteristics

A multivariate analysis was conducted to assess whether family income, primary caregivers' education level, ethnicity and family type independently associated with persistent financial strain. This analysis tested each demographic factor while controlling for the effect of the other demographic factors in the analysis. Results indicated that family income, family type, and ethnicity associated independently with persistent financial strain (over and above the association of all other demographic factors added to the analysis).

As expected, lower-income families experienced persistent financial strain more often than higher-income families. Illustrating this, 31% of families in the lowest income quintile had persistent financial strain, compared to 4% of those in the highest family income quintile. In other words, the rate of persistent financial strain was nearly 8 times higher in the lowest income quintile compared to the highest income quintile.

Single parents experienced persistent financial strain more often than coupled parents. Illustrating this, 30% of single parents showed persistent financial strain, compared to 12% of coupled parents. In other words, the rate of persistent financial strain was 2.5 times higher for those who were single parents compared to coupled parents.

Primary caregivers of Black or Black British ethnicity experienced persistent financial strain more often than those of White ethnicity. Illustrating this, 30% of Black or Black British ethnicity had persistent financial strain, compared to 14% of those of White ethnicity. In other words, the rate of persistent financial strain was more than 2 times higher for those of Black or Black British ethnicity compared to White ethnicity.

2.3. What are primary caregivers' main activity, and how do these differ from Wave 1 and/or before the child was born?

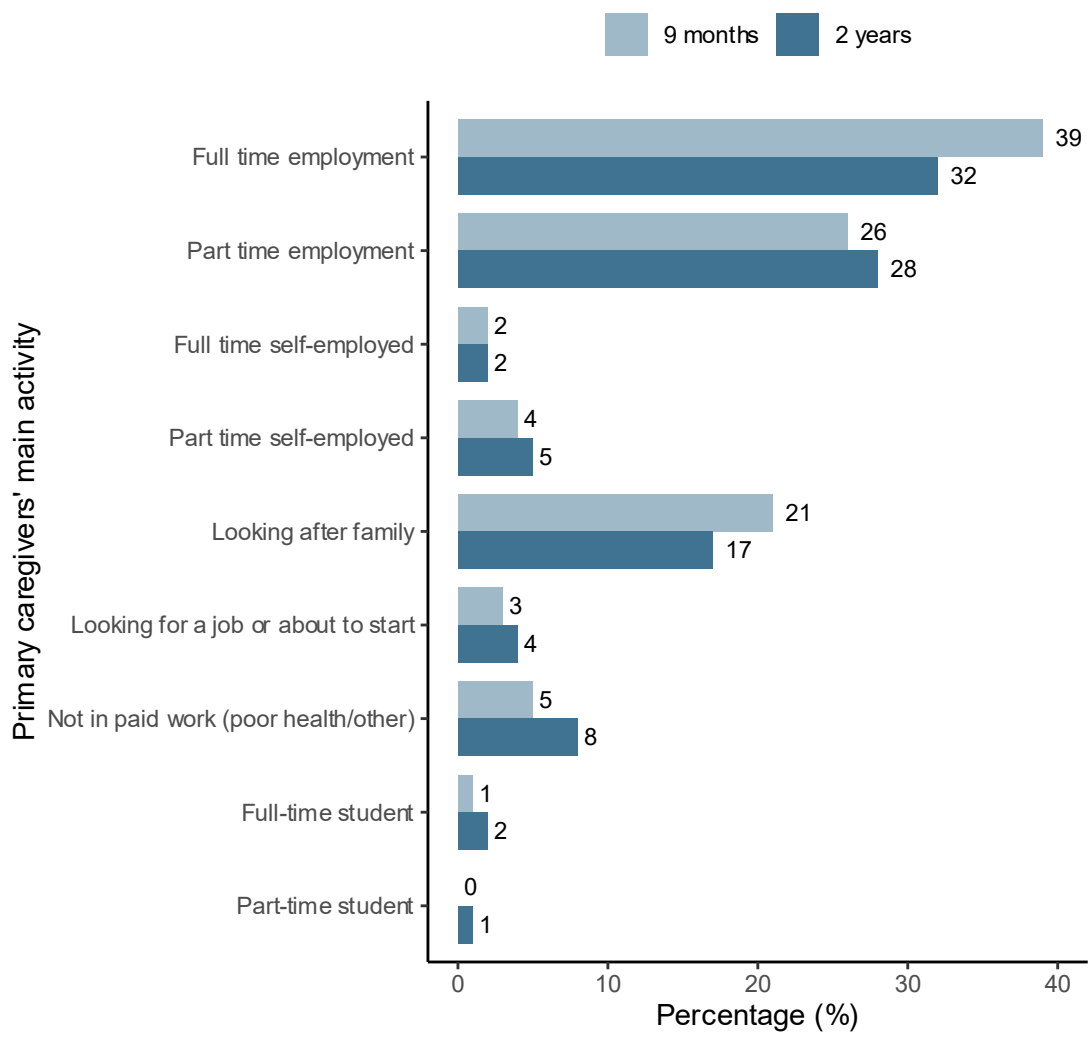
2.3.1. Primary caregivers' main activity

The following analyses explore changes in primary caregivers' main current activities. Note that if they were on parental/maternity/paternity leave at the time of the interview, they were asked to report what they were doing before starting their leave (the position they were currently on leave from).

Although the majority (62%) of primary caregivers indicated that they were in some form of paid work at **both** time points, there was a higher proportion in paid work at 9 months (71%) compared to 2 years (67%). There had also been a shift to more part-time employment/self-employment and less full-time employment/self-employment between the two time points (full-time down from 41% to 34% and part-time up from 30% to 33%).

Almost a quarter (24%) of primary caregivers indicated that paid work was not their main activity at either time point, with the main reason for this differing at the two time points. At 2 years compared to 9 months, fewer indicated looking after the family as their main activity (21% to 17%); more were out of work because of poor health or some other reason (5% to 8%), more were about to start or were looking for a job (3% to 4%), and more were studying (1% to 3%). These patterns of change between 9 months and 2 years are displayed in Figure 5.

Figure 5. Primary caregiver main activity when children were 9 months and 2 years old



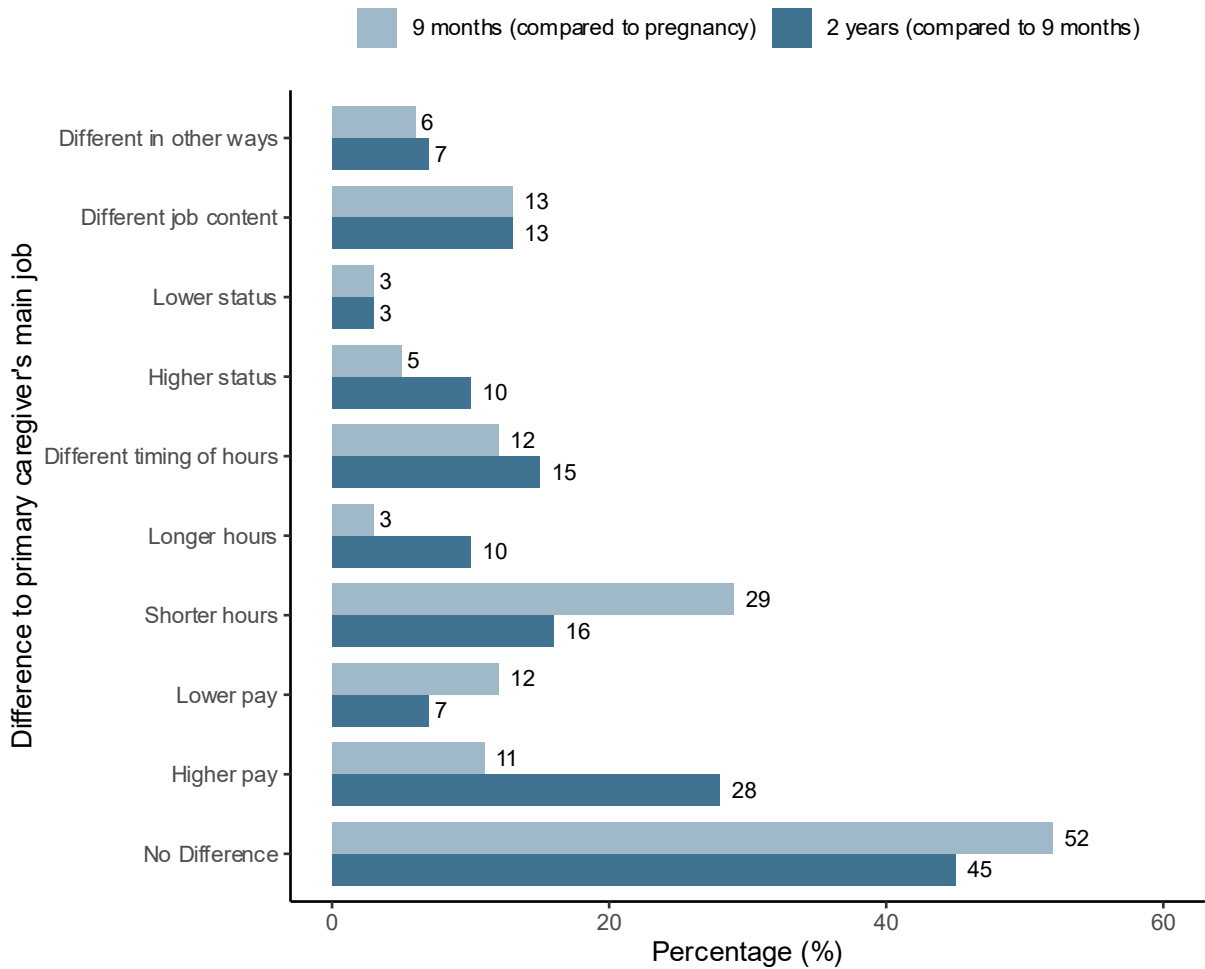
Base: All primary caregivers; Source: COT20s Wave 1 & Wave 2
 Wave 1 (9 months): unweighted base = 8614; weighted base = 8614. Wave 2 (2 years): unweighted base = 4758; weighted base = 4747. Less than 1% of primary caregivers reported unpaid voluntary work, paid apprenticeship, unpaid traineeship/government training scheme, or retire as their main activity.

2.3.2. Changes to primary caregivers' main employment

At both Wave 1 and Wave 2, primary caregivers whose main activity was paid work (either employed or self-employed) reported how their work had changed. At Wave 1, this referred to changes since they (or their partner) became pregnant with the cohort child. At Wave 2, it referred to changes since their interview when the child was 9 months old. Those currently on parental leave were not asked this question.

Forty-five percent of primary caregivers who were employed or self-employed reported that their work had not changed between 9 months and 2 years, compared to 52% reporting no changes between pregnancy and 9 months. At age 2 years, those primary caregivers reporting employment changes most frequently reported higher pay (28%), whereas at 9 months they most frequently reported shorter hours (29%). Figure 6 displays the percentages of primary caregivers indicating if, and how, their main employment changed.

Figure 6. Changes to primary caregiver’s main employment when children were 9 months and 2 years old



Base: All primary caregivers who were in paid work;
 Wave 1 (9 months): unweighted base = 2769 weighted base = 2792. Wave 2 (2 years): unweighted base = 3232;
 weighted base = 3011.

Source: COT20s Wave 1 & Wave 2.

2.3.3. Most common changes to main employment at 2 years by income.

People in the lowest income quintile tended to report no change in their employment more frequently than people in the highest quintile. People in the highest quintile tended to report improvements in their pay more frequently than people in the lowest income quintile. There were no differences between the income quintiles in whether they had changed their working hours to shorter hours.

See Table 3 for a full breakdown of these top three responses by income quintile.

Table 3. Top 3 most common differences to main employment at 2 years by income quintile

Difference	Percentage in lowest income quintile (%)	Percentage in middle income quintile (%)	Percentage in highest income quintile (%)
No difference	46	46	35
Higher pay	8	20	41
Shorter hours	14	17	15
<i>Unweighted Base</i>	<i>250</i>	<i>753</i>	<i>1033</i>
<i>Weighted Base</i>	<i>307</i>	<i>726</i>	<i>879</i>

Base: Primary caregivers in paid work at 2 years in each quintile
Table shows %, all derived using weights

Source: COT20s Wave 2

2.3.4. Primary caregivers' parental leave

In the Wave 2 survey, primary caregivers reported whether they had ever taken parental leave, including statutory maternity leave, statutory paternity leave, shared parental leave, workplace leave agreements and any unpaid leave, from their employment in relation to the cohort child.

About 6 in 10 (60%) reported that they had taken parental leave, 22% reported they had not, and 18% said that they were not in paid work at the time of their child's birth. For the 60% who reported having taken parental leave at some point prior to the Wave 2 survey, the average amount of parental leave taken was 9.46 months.

The most common pay received was statutory maternity/paternity pay plus additional pay from their employer, as indicated by just over half (56%) of those who took parental leave. About 3 in 10 (29%) only received statutory maternity/paternity pay. Out of all of those who had taken parental leave for the cohort child, 3% did not receive any type of pay. Table 4 summarises the percentages of primary caregivers who had taken parental leave and had received each type of pay during their parental leave.

Table 4. Type of pay received during parental leave

Type of pay	Percentage (%)
Statutory maternity/paternity pay plus additional pay from employer	56
Only statutory maternity/paternity pay	29
Maternity Allowance	11
Some other type of pay	2
Statutory shared parental pay	1
No pay at all	3
<i>Unweighted Base</i>	3127
<i>Weighted Base</i>	2863

Base: Primary Caregivers who had taken parental leave

Source: COT20s Wave 2

Table shows %, all derived using weights

2.4. What are the most common reasons for not being in paid work among parents with young children?

2.4.1. Most common reasons for not being in paid work among parents with young children

About one third (33%) of primary caregivers reported they were not in paid employment or self-employment at the time of the Wave 2 survey. This included those who were looking for work (3%) or had found a job and were waiting to start it (1%), or were retired, doing unpaid voluntary work or an unpaid traineeship (<1%). It also included either part-time (1%) or full-time (2%) students, and the 2% of primary caregivers who reported they were not in paid work because of poor health. The remaining 22% of primary caregivers indicated they were not in paid work because they were looking after family (17%) or for reasons other than poor health (5%). This 22% of primary caregivers reported why they were not looking for paid work.

The most common reason for not looking for paid work was personal choice, as indicated by 16% who would 'prefer to look after the child themselves'. The second most common reason was financial constraints, with 7% stating their 'income would not be enough after childcare costs to be worthwhile', 5% saying they 'cannot afford childcare' and 1% who 'would lose benefits'. Other common reasons for not looking for paid work included labour market constraints (4% stated 'no jobs with the right hours' were available and for 1% 'no jobs were in the right place'), and childcare constraints (1% 'could not find

suitable childcare'). A further 3% reported they were caring for someone with a long-term health condition and 2% reported ill health as reason for not looking for paid work.

Table 5 displays the top 10 reasons given by primary caregivers who were not currently working/studying or looking for paid work (see Appendix 7 for full list of reasons).

Table 5. Reasons why primary caregivers were not looking for paid work

Reason	Percentage of primary caregivers not looking for paid work (%)	Percentage of all primary caregivers (%)
I prefer to look after my child myself	70	16
I would not have enough income left after paying for childcare for working to be worthwhile	31	7
I cannot earn enough to pay for childcare	20	5
There are no jobs with the right hours for me	16	4
I am caring (unpaid) for someone with a long-term health condition, illness or disability	12	3
Household income is enough to live on/do not need the money	10	2
I cannot work because of poor health	7	2
There are no jobs in the right place for me	6	1
I cannot find suitable childcare	6	1
My family would lose benefits if I was earning	5	1
<i>Unweighted Base</i>	<i>925</i>	<i>4758</i>
<i>Weighted Base</i>	<i>1067</i>	<i>4747</i>

Base: Primary caregivers not looking for paid work because of family or other reasons & all primary caregivers
Table shows %, all derived using weights

Source: COT20s Wave 2

2.4.2. Most common reasons for not being in paid work among parents with young children by income.

The most common reason for not looking for paid work (“I prefer to look after my child myself”) was similar across income quintiles (71% in the lowest and 70% in the highest quintile; see Table 6). However, the next two top reasons for not looking for paid work showed clear differences. The reason “I would not have enough income left after paying for childcare” was more common among the highest income quintile (39%) than the lowest (22%). Whereas the reason “I cannot earn enough to pay for childcare” was almost twice as common among the lowest income quintile (17%) compared to the highest (9%). See Table 6 for a full breakdown of these top three reasons by income quintile.

Table 6. Top 3 reasons why primary caregivers were not looking for paid work by highest and lowest income quintile

Reason	Percentage in lowest income quintile (%)	Percentage in middle income quintile (%)	Percentage in highest income quintile (%)
I prefer to look after my child myself	71	69	70
I would not have enough income left after paying for childcare for working to be worthwhile	22	34	39
I cannot earn enough to pay for childcare	17	21	9
<i>Unweighted Base</i>	<i>380</i>	<i>153</i>	<i>48</i>
<i>Weighted Base</i>	<i>472</i>	<i>163</i>	<i>43</i>

Base: Primary caregivers not looking for paid work because of family or other reasons & all primary caregivers in each quintile

Source: COT20s wave 2

Table shows %, all derived using weights

2.5. What early childhood education and care (ECEC) provision do parents of 2-year-olds use, and how has it changed since their child was 9 months old?

2.5.1. ECEC use

As the Wave 2 survey took place from October 2023 to February 2024, when the cohort children had just turned 2, most families had not yet taken up any government-funded childcare entitlements. Note that when the COT20s Wave 2 survey took place, a small

proportion of families would have been eligible for free childcare for disadvantaged 2-year-olds (those who took part in 2024 – the term after the children turned 2 – and fulfilled the eligibility criteria). The COT20s Wave 2 survey can provide a baseline of ECEC use for 2-year-old children prior to the April 2024 expansion of government-funded childcare entitlements. See footnote¹⁴ for more details of subsequent changes to childcare entitlements.

The Wave 1 and Wave 2 surveys collected information about the use of Early Childhood Education and Care (ECEC). Wave 1 covered the period between birth and 9 months, and Wave 2 between 9 months and 2 years.

By age 2, the use of both formal¹⁵ and informal¹⁶ ECEC had increased substantially. Over half of families (52%) used formal ECEC between age 9 months and 2 years, up from 13% in the first 9 months. The most common formal childcare provisions used when the children were between 9 months and 2 years were day nurseries (26%), nursery schools (15%), and childminders (11%) (for full details see Appendix 8).

Similarly, over half of families (52%) had been using informal ECEC since the last survey until age 2 years, compared to the period between birth and the previous survey (37%). Around half (51%) of families relied regularly on relatives to care for the cohort child between 9 months and 2 years (36% used relatives regularly for childcare at the 9-month survey; see in Appendix 8 for more details).

Notably, formal (52%) and informal (52%) ECEC provision were equally common in the child's second year, whereas in infancy more families were using informal ECEC provision (37%) than formal ECEC provision (13%). Further, at age 2 years, fewer families had used informal childcare only than at age 9 months, and most were using it in combination with formal ECEC, as displayed in Figure 7.

By age 2, 79% families had regularly used some form of ECEC provision (formal, informal or both) for the cohort child since birth. About 4 in 10 (43%) used ECEC between birth and 9 months (Wave 1 survey; Bernardi & Fish, et al., 2023). Almost three

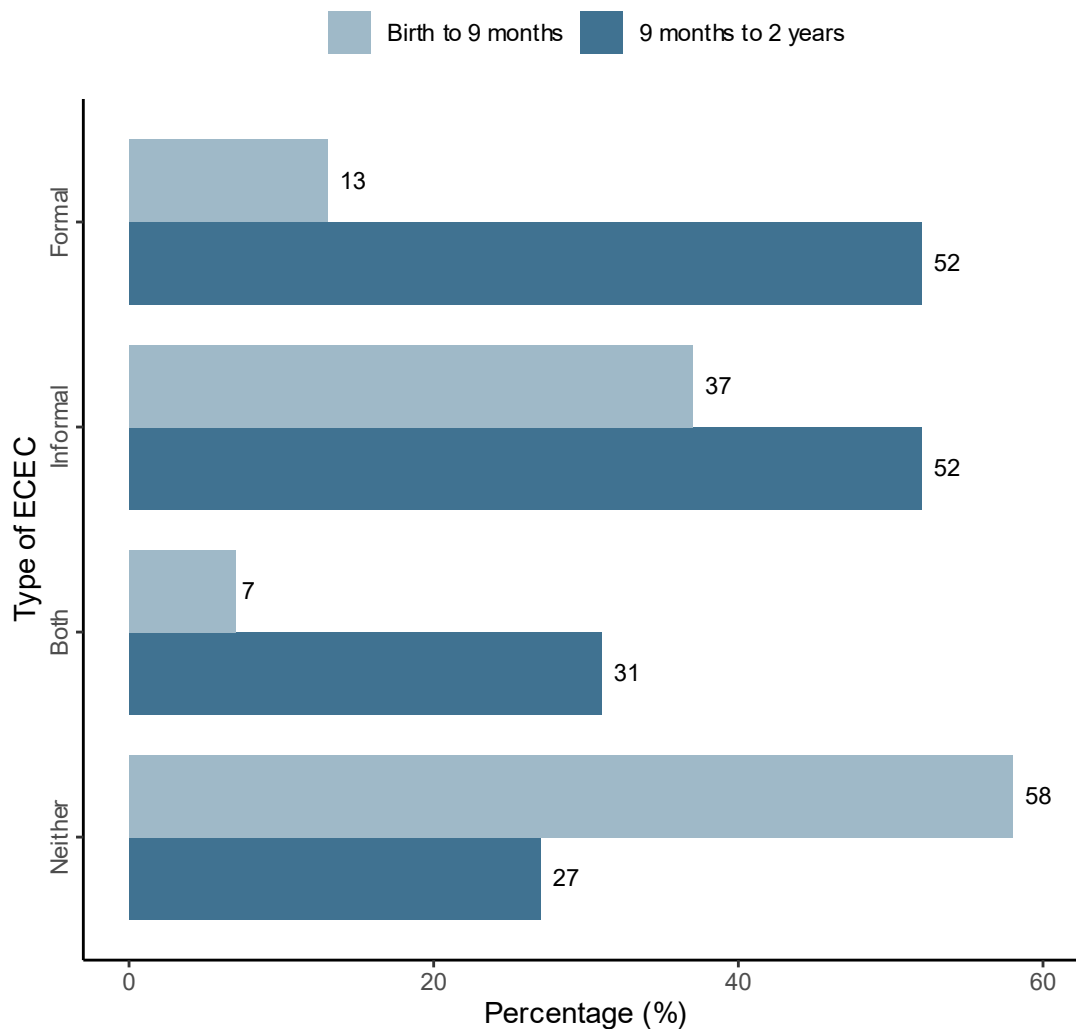
¹⁴ In April 2024, the Department for Education introduced an expanded childcare entitlement for two-year-olds of working parents, aimed at easing financial burdens and improving childcare accessibility. This scheme was in addition to the existing childcare entitlement, which applied only to disadvantaged 2-year-olds whose families are in receipt of certain income-related benefits, as well as to children with additional needs, including those with an Education, Health and Care (EHC) Plan, those receiving Disability Living Allowance or certain income-related benefits. Each entitlement provides access to 15 hours per week of government-funded childcare from the term after the child turns 2. The entitlement for working parents is due to be further expanded to provide 30 hours per week for children aged nine months and older by September 2025.

¹⁵ Formal ECEC included childminder, professional nanny, day nursery, nursery school, pre-school or playgroup, special day school or nursery unit for children with special educational needs

¹⁶ Informal ECEC included regular care by relatives, friends or neighbours in a domestic setting on an individual basis, and arrangements with an au pair. It does not include care provided by the child's other parent (regardless of whether cohabiting with the child's primary caregiver).

quarters (74%) used ECEC between 9 months and 2 years (as reported in the Wave 2 survey).

Figure 7 shows the percentages of those using formal, informal or a combination of both formal and informal ECEC for each period.



Base: All cohort families;

Source: COT20s Wave 1 & Wave 2

Wave 1 (9 months): unweighted base = 8628; weighted base = 8615. Wave 2 (2 years): unweighted base = 4758; weighted base = 4747.

Note. "Formal" includes those who used either childminder, professional nanny, day nursery, nursery school, pre-school or playgroup, special day school or nursery unit for children with special educational needs. "Informal" includes those with regular care by relatives, friends or neighbours in a domestic setting on an individual basis. "Both" includes those who used both informal and formal ECEC. "Neither" was defined as those who had not used any ECEC.

2.5.2. Differences in ECEC type used by employment status

Of the 74% of primary caregivers who had used either type of ECEC between 9 months and 2 years, 83% were in paid work at the time of the Wave 2 survey. Table 7 displays

the percentages of those who were in paid work at the time of the Wave 2 survey and whether they had used formal or informal ECEC or had not used ECEC.

Table 7. Use of formal and informal ECEC use between 9 months and 2 years within primary caregiver’s paid work status at the Wave 2 survey

Paid work status	Percentage using formal ECEC (%)	Percentage using informal ECEC (%)	Percentage not using ECEC (%)	Unweighted base	Weighted base
In paid work	67	63	11	3441	3230
Not in paid work	20	31	58	1315	1517

Base: Families who used formal and informal childcare
Table shows %, all derived using weights

Source: COT20s Wave 2

2.5.3. Differences in ECEC type used by income

Families with higher incomes used ECEC more commonly than those with lower incomes in the period between age 9 months and 2 years. In the lowest income quintile, only a minority of families reported using either formal (22%) or informal (35%) ECEC during this period. In contrast, in the highest income quintile, 85% used formal ECEC and 60% used informal ECEC during this period. A comparison by income quintile is shown in Table 8.

Table 8. Use of formal and informal ECEC use across 9 months and 2 years period by family income quintile at the Wave 2 survey

Family income quintile	Percentage using formal ECEC (%)	Percentage using informal ECEC (%)	Unweighted base	Weighted base
Lowest	22	35	794	979
Middle	51	56	962	950
Highest	85	60	1098	937

Base: Families in lowest, middle and highest quintiles
Table shows %, all derived using weights

Source: COT20s Wave 2

2.6. What are the most common reasons for not using formal ECEC?

The 48% of primary caregivers who had not used any formal childcare since their child was 9 months old reported why.

The most common reason parents gave for not using formal childcare since their child was 9 months was personal choice - with about half (53% of those who were asked, 25% of the total sample) preferring to look after their child themselves, and a quarter (25% of those who were asked, 12% of the total sample) indicating that they felt their child was too young for childcare.

The second most common reason was financial constraints, with 38% (of those who were asked, 18% of the total sample) stating that formal childcare was too expensive and/or unaffordable. Other constraints related to the childcare availability and quality. For 7% (3% of the total sample) the times childcare was available did not fit with their working hours, and 6% (3% of the total sample) had concerns that the quality of childcare was not good enough.

The third most frequently cited reason for not using formal childcare was a lack of need. Just over a quarter (27% of those asked; 13% of the total sample) rarely needed to be away from their child, almost a quarter (24%; 12%) did not need childcare as relatives and friends provided all the childcare they needed, and 1 in 10 (10% of those asked; 5% of the sample) had others in the household available to look after their child. A further 4% (2% of the total sample) did not use formal ECEC because they were on maternity/paternity leave.

Table 9 displays the top 10 most frequent reasons why primary caregivers were not using formal childcare, and the percentages of those who had indicated this as a reason. See Appendix 9 for full list of reasons.

Table 9. Top 10 reasons why primary caregiver did not use formal childcare

Reason	Percentage of those not using formal ECEC (%)
I'd rather look after my child myself	53
I cannot afford childcare/the childcare available is too expensive	38
I rarely need to be away from my child	27
My child is too young	25
Relatives and friends can provide all the childcare I need	24
Not needed as other people in my household can look after my child	10
The times childcare is available doesn't fit with my/our working hours	7
The quality of childcare is not good enough	6
I cannot find a childcare place because local providers are full	5
Not needed as I am/my partner is on maternity/paternity leave	4
<i>Unweighted Base</i>	2075
<i>Weighted Base</i>	2271

Base: families who did not use formal childcare
 Table shows %, all derived using weights

Source: COT20s Wave 2

2.6.1. Most common reasons for not using formal childcare by income.

Parental preference (“I’d rather look after my child myself”) was more likely to be reported in the lowest income quintile (58%) compared to the highest income quintile (44%, see Table 10). However, the next most common response (“I cannot afford childcare/the childcare available is too expensive”) was more likely to be reported in the middle (46%) and highest (39%) income quintiles compared to the lowest (24%). The third most common reason (“I rarely need to be away from my child”) was more frequently reported by the lowest (26%) and middle (26%) income quintiles, compared to the highest income quintile (22%).

See Table 10 for a full breakdown of these top three reasons by income quintile.

Table 10. Top 3 most common reasons not to use formal childcare by income quintile

Reason	Percentage in lowest income quintile (%)	Percentage in middle income quintile (%)	Percentage in highest income quintile (%)
I'd rather look after my child myself	58	47	44
I cannot afford childcare/the childcare available is too expensive	24	46	39
I rarely need to be away from my child	26	26	22
<i>Unweighted Base</i>	<i>624</i>	<i>448</i>	<i>171</i>
<i>Weighted Base</i>	<i>768</i>	<i>459</i>	<i>153</i>

Base: Primary caregivers in paid work in each quintile
Table shows %, all derived using weights

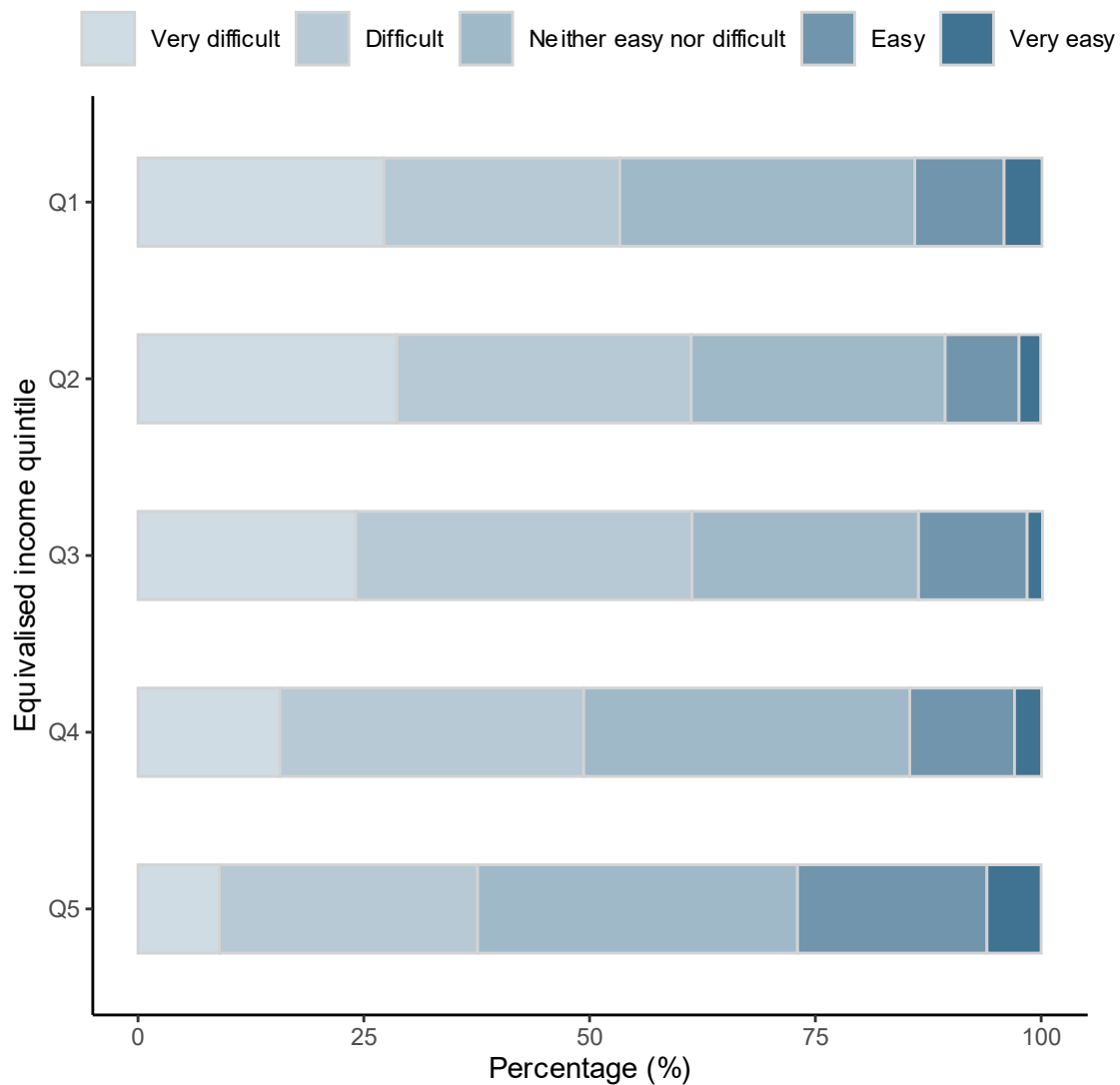
Source: COT20s wave 2

2.7. Affordability of formal childcare

Of the 52% who used formal childcare, a total of half found it either difficult (32%) or very difficult (18%) to afford given their family income. Fourteen percent reported finding it 'easy' and 4% 'very easy' to afford their formal childcare. A third (33%) reported finding it neither difficult nor easy.

Though perceptions of affordability of formal ECEC varied by family income quintile, the proportion of those finding it "difficult" or "very difficult" was still substantial among higher-income families. Over a third (37%) of those in income quintile 5 (highest) found it "very difficult" or "difficult" to afford, and around half of those in family income quintile 1 (lowest; 54%), quintile 2 (61%), quintile 3 (middle; 61%) and quintile 4 (49%) were finding their formal ECEC "very difficult" or "difficult" to afford. The relationship between family income and perception of childcare affordability are displayed Figure 8.

Figure 8. How easy or difficult it is to afford formal ECEC at 2 years by income quintile



Base: Families using formal childcare.

Source: COT20s Wave 2

Q1 = Quintile one (the lowest quintile), Q5 = Quintile five (the highest quintile).

2.8. Discussion

This chapter presented examples of the data collected at Wave 2 of the Children of the 2020s Study on family financial circumstances, patterns of employment and parental leave, and their use of ECEC. The chapter focussed on understanding the financial challenges facing families with young children at this time in England and the potential influence these may have on their employment situation and childcare choices, which, we know from other sources, can be valuable in promoting early learning, particularly among children in disadvantaged circumstances (Crowley et al., 2025; Sylva et al., 2014).

Family income and financial strain

Families in England experienced a 4% increase in income by the time their child was aged 2 (October 2023 to January 2024) compared with age 9 months (June to October 2022), with average equivalised family income rising from £27,523 to £28,713. These changes to family income were taking place against a background of a challenging economic landscape in the wider economy and significant cost-of-living pressures at the time. Inflation in the UK rose steadily throughout 2021 and peaked at 11.1% in October 2022 (shortly after Wave 1 fieldwork) and only began to decline gradually in 2023 (Francis-Devine et al., 2023). Although the inflation rate had dropped to around 4.6% by Wave 2, families were likely still experiencing the financial strain of prolonged economic disruption and rising living costs. The 4% increase in family income over this time would not have kept pace with the larger increases in household costs in the same period (which increased by around 7.1% between 2022 and 2023). Furthermore, families with young children may rely more heavily than the general population on products and services whose prices rose more than inflation, such as domestic energy and heating, and many rely on benefits, which were increased at rates below inflation (Stone & Padley, 2023). Another key example is childcare, which is one of the largest monthly outgoings for families with preschool children (Kuang et al., 2024). While changes to the threshold for receiving financial support for childcare among families on universal credit helped reduce childcare costs for lower income families, this came into effect in June 2023, only a short period before our Age 2 survey. Finally, although on average we observed a small overall increase in incomes across the population, many families did not see an increase in their incomes. In fact, 42% of families experienced a drop in income during this period.

All of these factors may help to explain why more families were experiencing at least one indicator of financial hardship at 2 years (35%) compared to 9 months (30%), with about half of these families (16% of all families) reporting persistent financial strain at both time points. Reports of multiple difficulties also increased: 16% of families reported two or more financial difficulties, up from 10% at 9 months. These indicators, including skipping meals, struggling with bills, and being unable to afford essential items for their child, suggest that average income increases at a national level between 2022 and 2023/4 were not sufficient to ease financial strains for many households with young children.

These findings are important, because financial disadvantage during a child's earliest years is consistently associated with a range of negative outcomes, including poorer parental mental health, lower-quality home environments, and heightened risks to children's physical health and early development (Cooper & Stewart, 2021). Later sections of this report explore how family financial circumstances relate to parental wellbeing, employment patterns, childcare use, and, crucially, to child outcomes at age 2.

Patterns of employment

Most primary caregivers were in paid work at the time of the Wave 2 survey (67%) and indeed most had been in paid work at both 9 months of age and age 2 years (62%). However, there were shifts in caregivers' main activities. Compared to when the children were 9 months old, there was a shift towards part-time working, but nevertheless a higher proportion were working full-time than part-time. These shifts suggest a move toward more flexible work arrangements (such as reduced hours) by the time children turned 2, potentially influenced to some degree by caregiving demands and preferences, the end of parental leave entitlements, and financial pressures.

For those not in paid work, reasons varied between caregiving preferences, financial or structural barriers, and poor health. The most frequently cited reason was a desire to look after the child themselves, followed by financial disincentives such as low income after childcare costs or an inability to afford childcare. Similar reasons were cited by families who chose not to use formal childcare, suggesting strong connections between employment decisions and childcare constraints, as well as personal choices some parents make to prioritise caring for their child over employment. However, it is important to note that the circumstances for subsequent families with children under 3 in England have changed since the age 2 survey due to changes in Universal Credit in 2023 and the 2024 expansion of free childcare entitlements (see below for further discussion).

Early childhood education and care

The use of Early Childhood Education and Care (ECEC) increased substantially between age 9 months and age 2 years. At age 2, 74% of families had used some form of ECEC since the child was 9 months old, compared to around half (43%) at 9 months¹⁷. Use of formal ECEC, such as nurseries, childminders or preschools, increased from 13% to 52%. Informal ECEC use also became more common, increasing from 37% to 52%, indicating that regular care provided by relatives plays a significant role in supporting young families. These findings reflect the rising need for childcare as children grow older. The finding that a substantial proportion of primary caregivers shifted to part-time work during this period likely reflects changes in how families manage childcare in relation to both cost and preference (for example wanting to look after their child for a proportion of the working week).

The high proportion of parents reporting that it was difficult or very difficult to afford childcare, or stating that they were not in paid work/did not use formal ECEC due to

¹⁷ This figure is slightly higher than the rate reported for 2-year-olds in the Childcare and Early Years Survey of Parents (CEYSP) in 2023 (which was 70%). However, these estimates are not exactly comparable because the questions related to different time frames (since the last 9-month survey in COT20s, in the last week in the Early Years Parent Survey). The COT20s sample of 2-year-olds is also more than 4 times larger than the CEYSP and has a different sample design (COT20s includes a low-income neighbourhood boost and does not include an additional high-income sample from the Family Resources Survey, unlike the CEYSP).

affordability constraints, reflects the challenges many families experienced in managing the costs of childcare. Challenges related to affordability are likely to partially account for the large differences in ECEC use between those in the highest and lowest income quintiles (85% versus 22%). Having said that, it is important to also note that the main reason primary caregivers gave for not being in paid work and for not using formal ECEC was not financial but rather a desire to care for their child themselves. A small minority (6%) of parents also expressed concerns about the quality of the childcare environment for their child.

Concerns about the affordability of childcare were widespread and not confined to families on low incomes. The end of the second year likely represented a key pressure point for many families, coinciding with rising financial strain and the need to make difficult decisions about childcare use and participation in paid work, at a time when childcare entitlements for this cohort were still relatively limited. To address affordability and accessibility of childcare, the Department for Education introduced expanded childcare entitlements for two-year-olds of working parents in April 2024, followed by further expansions from September 2025 that will extend free childcare entitlement to eligible nine-month-old children. Most families in the Wave 2 sample would not have yet been eligible for this new entitlement. At the time of Wave 2 data collection (October 2023 to January 2024), only disadvantaged families qualified for the existing entitlement to 15 free hours at age 2, and only a small portion of the cohort (those interviewed in January 2024 at the end of the Wave 2 fieldwork) were the right age to have begun accessing it. As the new policy changes were not yet in effect for the families surveyed in COT20s at the time of Wave 2, the data from Wave 3 (collected from November 2024 onwards) will provide valuable insights into the extent to which COT20s families made use of the expanded entitlements from age 2 onwards and how this varies according to family circumstances.

3. Primary caregiver's mental health, the home learning environment and parenting

Summary

How common are significant symptoms of anxiety and depression among primary caregivers of 2-year-olds in England, and have these changed since the children were 9 months of age?

- When the children were age 2 years, 10% of primary caregivers reported symptoms indicative of depression, compared to 9% at 9 months. At 2 years, 12% reported symptoms indicative of anxiety, compared to 13% at 9 months.
- A total of 3% reported symptoms indicative of depression at both time points, and 4% of anxiety at both time points, indicating chronic mental health difficulties.
- The percentage of primary caregivers using mental health support services was stable at 8% from birth to 9 months, and 8% from 9 months to 2 years.

Which socio-demographic groups are most at risk of depression and anxiety, and how does this compare to when the children were 9 months old?

- When children were 2 years of age, primary caregiver depression was independently associated with lower family income and lower levels of education. Depression was more prevalent in the lowest income quintile (17%), than in the highest income quintile (5%) and was more prevalent in the lowest education group (18%) than in the highest education group (4%). These patterns were similar to those found at 9 months, though single parent status was also linked to depression during infancy.
- When children were age 2 years, primary caregiver anxiety was independently associated with lower family income, and ethnicity. Anxiety was more prevalent in the lowest income quintile (16%), compared to the highest quintile (7%). Fewer primary caregivers of Asian or Asian British ethnicity had symptoms indicative of anxiety (9%), compared to those of White ethnicity (12%).
- The socio-demographic groups at greatest risk of primary caregiver depression and anxiety were somewhat similar both at age 9 months and 2 years, with low incomes consistently associated with depression and anxiety at both time points.

Does the home learning environment vary depending on parental mental health and socio-demographic circumstances?

- The Home Learning Environment Index (HLE-Index) measures how often someone at home engages in five activities with the cohort child: reading or looking at books, playing with letters, playing with numbers or counting, teaching songs or rhymes, and painting or drawing.
- The most frequent home learning activity reported at age 2 was reading or looking at books, with 56% doing this daily and only 2% never doing so.
- Parents of 2-year-olds in 2023-24 were carrying out these home learning environment activities to a similar degree to parents of 2-year-olds 10 years earlier.

- Higher HLE-Index scores reflect more frequent and varied home learning activities. HLE-Index scores were independently associated with family background: families with lower income, lower education, and of Black or Asian ethnicity reported lower HLE-Index scores, indicating their children experienced fewer or less frequent home learning activities. For example, 77% of the highest income families read daily with their child, compared to 32% of the lowest income quintile; 73% of caregivers with the highest education read daily, compared to 29% of those with the lowest; and 62% of White caregivers read daily, compared to 33% of Asian and 25% of Black caregivers.
- The variety and frequency of engagement in home learning activities was unrelated to primary caregiver mental health.

Does children’s screen time vary depending on parental mental health and socio-demographic circumstances?

- The World Health Organisation (WHO) recommends no more than 1 hour a day of sedentary screen time for children between 2 and 4 years. This was defined in the current study as the amount of time watching television, videos or other digital content on a screen on a typical day. Fewer 2-year-olds met this WHO recommendation in 2023-24 than in 2013-14 (34% in COT20s, compared to 46% in the Study of Early Education and Development 10 years ago).
- At 2 years, 98% of children watched television, videos or other digital content on a screen on a typical day. They watched for an average 127 minutes a day (up from an average of 29 minutes when the children were age 9 months).
- Screen time can be a shared activity: 26% of primary caregivers said they mostly watched with their child during screen time, 46% sometimes watched with their child, and another 26% said they mostly did something else.
- In addition, 19% of children played computer games at age 2. The total average time spent either watching screens or playing computer games at age 2 was 140 minutes per day.
- Lower family income, lower primary caregiver education, and Black, Asian or Mixed/Other ethnic backgrounds were independently associated with higher screen time (combined time spent either watching screens or playing computer games) at age 2. For example, children in the lowest income quintile had nearly double the screen time of those in the highest (179 compared to 97 minutes per day). Similarly, children of primary caregivers with the lowest education level had nearly twice the screen time (186 compared to 98 minutes) of those with the highest. Screen time was also higher among children of Black (213 minutes), Asian (156 minutes) and Mixed/Other ethnicity primary caregivers (174 minutes), compared to White primary caregivers (131 minutes).
- Parents’ mental health was also independently associated with children’s screen time. Children of primary caregivers with depression symptoms had more screen time (182 minutes) than those without (135 minutes).

Does parenting style vary depending on parental mental health and socio-demographic circumstances?

- Overreactive parenting scores measure a parent's tendency to get angry or irritable when a child's behaviour is challenging. Higher scores indicate more overreactive parenting.
- Primary caregivers from higher income households, with higher levels of education and those who were in a couple, were more likely to report overreactive parenting. For example, 19% of those in the highest income quintile said they yell or raise their voice when their child misbehaves, compared to 15% in the lowest quintile; 21% of those in the highest education group said they would yell or raise their voice when their child misbehaves, compared to 13% in the lowest education group; and 18% of coupled parent/carers would yell or raise their voice when their child misbehaves, compared to 16% single parent/carers.
- Parental mental health was also independently associated with overreactive parenting. A quarter (25%) of those with symptoms indicative of anxiety or depression reported responding by yelling or raising their voice when their child misbehaves, compared to 17% without symptoms.

This chapter describes some key findings from Wave 2 of the Children of the 2020s Study relating to primary caregivers' mental health and explores associations between caregiver mental health, parenting and the home learning environment.

3.1. Background

Parental mental health problems and child development

Parental mental health is an important influence on family wellbeing and child development. Past research has revealed consistent, typically modest in size, associations between parental mental health problems and child outcomes, including language development, cognitive development and emotional and behavioural problems (see Stein et al., 2014). Large scale meta-analyses and systematic reviews of perinatal mental health show that parental mental health symptoms are quite strongly associated with poorer child social-emotional development (Goodman et al., 2011), and, albeit with smaller effect sizes, lower cognitive and language skills (Rogers et al., 2020). While the majority of research has focused on mothers, there is evidence that paternal depression also impacts children's socio-emotional development, either directly or via family climate and couple functioning (Ramchadani et al., 2005). Although the evidence concerning the association between parental mental health and child outcomes is based on observational studies and is therefore prone to confounding, there is mounting evidence that the associations may be causal and potentially amenable to intervention (Stein et al., 2018; Weissman et al., 2006).

The role of chronicity of parental mental health problems

Evidence also suggests that the greater the severity and chronicity of parental mental health symptoms (that is, the more persistent or stable they are over time) the more likely

it is that poorer child outcomes will be observed (Sutherland et al., 2022). Longitudinal cohort analyses, for example, indicate a dose–response pattern, with persistent/recurrent or severe depression being more strongly associated with adverse child outcomes than transient presentations (for example, higher behavioural difficulties in the preschool years and poorer later academic attainment; Netsi et al., 2018). Thus, in addition to examining the prevalence and impact of parental mental ill-health at a given point in time, it is also important to look at how stable mental health symptoms are over time and to understand the socio-economic or other family factors (such as conflict between parents, financial strains, work stress) that are related to consistently elevated symptoms. Socioeconomic gradients in perinatal mental health are well documented in UK studies and internationally (Ban et al., 2012).

Policy context

Parental mental health is a key area where disparities in early life experiences and outcomes among young children can be effectively addressed by early intervention. In recognition of that, there has been sustained investment in mental health services in recent years, providing enhanced targeted support for parents of very young children (Population Health, Clinical Audit and Specialist Care Team, 2022). In England, the NHS Long Term Plan commits to ensuring that at least 66,000 women per year can access specialist perinatal mental health care, with coverage extended from pre-conception to 24 months postpartum; recent data indicate substantial progress toward that target. The government’s Family Hubs and Start for Life programme prioritises perinatal mental health, parent–infant relationships and early support. Together, these policies make timely, population-representative data on parental mental health - and its impact on children and service use - especially valuable (NHS England, n.d.; Royal College of Psychiatrists, 2025).

Parental mental health in the Children of the 2020s Cohort

Given the context described above, parental mental health and its relationship to child outcomes is a central focus of Children of the 2020s, alongside the socio-economic and family factors that elevate or mediate risk. When the Children of the 2020s cohort were 9 months old, 13% of primary caregivers reported symptoms indicative of anxiety, and 9% reported symptoms indicative of depression; 5% also reported feeling often or always lonely. Consistent with past research, socio-demographic disparities in these indicators were observed, with more primary caregivers on lower incomes reporting symptoms indicative of depression and anxiety. Similarly, loneliness was reported less frequently among higher income families. Loneliness was also reported more frequently by primary caregivers who were of White ethnicity compared to those from other ethnic groups (Bernardi & Fish et al., 2023).

Assessing the prevalence of mental ill-health in the COT20s Wave 2 data will provide important indications regarding the extent to which anxiety and depression symptoms are

increasing or decreasing over time in this cohort and how stable those symptoms are over the first two years of a child's life. Looking beyond Wave 2, repeated measurement of mental health symptoms, child wellbeing and service use across the first five years will allow trajectory analyses (for example, persistent versus transient symptoms) and tests of pathways of impact - providing valuable information to inform strategies for prevention and targeted intervention.

Parental mental health and parenting

A plausible route through which parental mental health influences child outcomes is through parenting and the home learning environment. For example, observational studies of parent-infant and parent-toddler interaction have highlighted the important role played by synchronous, positive and mutually responsive caregiving in promoting children's language, cognitive and socio-emotional outcomes (Siegel, 2020).

Furthermore, a number of studies, including the Study of Early Education and Development (SEED; Melhuish et al., 2017), have shown that children with access to a rich home learning environment (HLE) – including, for example, a variety of books and stimulating toys, and being read to frequently – show accelerated vocabulary and conceptual development, better verbal and non-verbal reasoning skills, and perform better in early school assessments such as the Early Years Foundation Stage Profile (EYFSP; Melhuish & Gardiner, 2021). These findings align with earlier results from the EPPE study, where the HLE-index was a strong predictor of reading and mathematics skills at the end of Year 1 and of socio-emotional/behavioural outcomes. Engaging in enriching learning activities with young children provides valuable opportunities for language acquisition, motor skill development, critical thinking, and problem-solving skills (Sylva et al., 2004). Variations in the home learning environment are linked to socio-economic disadvantage and may partially explain inequalities in early educational outcomes (Cole, 2011).

However, the relationship between parental mental health and parenting is complex: while parental depression/anxiety is associated with less sensitive, more irritable/negative and more disengaged parenting on average, the evidence is mixed on how strongly, and how consistently, parental symptoms directly impact positive parenting behaviours such as home learning provision, once socioeconomic factors are accounted for (Lovejoy et al., 2000) and whether and which parental behaviours mediate the impact of parental mental health on different child outcomes. As Children of the 2020s proceeds, it will capture increasingly rich longitudinal evidence for addressing these important questions.

Children's screen time

Another feature of the home environment that might play an important role in early child development is exposure to screens and digital media. Many studies (Massaroni et. al., 2023) have investigated the association between screen time in young children and their

cognitive, language and socio-emotional development, and broadly speaking these have identified negative associations with all these outcomes. However, most existing studies are not representative in nature and no nationally representative data from England has been collected on screen time in under 3s in a decade. In addition to providing estimates of current screen time among 2-year-olds in England, Children of the 2020s also allows analyses of the social factors associated with greater or lesser screen time in young children. There are few studies, in particular, about postnatal mental health and children's screen time, even though it is plausible that parents who struggle with symptoms of anxiety or depression may rely on screens more when caring for their children.

In this chapter, we examine some key questions related to parental mental health and caregiving cross-sectionally using the data from Wave 2 when children were two years of age. Specifically, we addressed the following questions:

1. How common are significant symptoms of anxiety and depression among primary caregivers of 2-year-olds in England, and have these changed since the children were 9 months of age?
2. Which socio-demographic groups are most at risk of depression and anxiety, and how does this compare to when the children were 9 months old?
3. Does the home learning environment vary depending on parental mental health and socio-demographic circumstances?
4. Does children's screen time vary depending on parental mental health and socio-demographic circumstances?
5. Does parenting style vary depending on parental mental health and socio-demographic circumstances?

Methodological details of the statistical modelling used throughout this chapter can be found in Appendix 2.

3.2. What are the levels of anxiety and depression symptoms among primary caregivers, and have these changed since the children were 9 months old?

3.2.1. Depression and anxiety symptoms

The Wave 1 and Wave 2 surveys included self-completion questions designed to screen for depression and anxiety symptoms in the previous two weeks. These were the Patient Health Questionnaire-2 (PHQ; Kroenke et al., 2003) to screen for the risk of depression, and the Generalized Anxiety Disorder 2-item (GAD; Kroenke et al., 2007) questionnaire to screen for risk of anxiety. PHQ and GAD indicate the possible presence or absence of anxiety or depression, and do not differentiate severity. When interpreting the following findings, it is important to consider that individuals experiencing psychological distress

are generally less likely to take part in surveys (Momen et al., 2022) and therefore the reported prevalence of anxiety and depression may be lower than the actual rates in the population.

The rate of depression symptoms among primary caregivers was similar when the children were aged 9 months and aged 2 years. Nine percent of primary caregivers reported symptoms indicative of depression when their children were 9 months, and 10% reported symptoms indicative of depression at 2 years. Although not exactly comparable, these findings are broadly consistent with population estimates from earlier studies (Office for Health Improvement and Disparities, 2022).

A total of 3% of primary caregivers reported symptoms indicative of depression at both time points, suggesting persistent depressive symptomatology. Others reported symptoms at a single time point: 6% reported symptoms indicative of depression when their child was 9 months but not at 2 years, whereas 7% reported symptoms below threshold at 9 months, but above threshold at 2 years.

The rate of anxiety among primary caregivers was similar when the children were aged 9 months and aged 2 years. When the children were 2 years, 12% of primary caregivers had symptoms indicative of anxiety disorder, and 13% at 9 months. These findings are also broadly consistent with population estimates from earlier studies (Office for Health Improvement and Disparities, 2022).

A total of 4% reported symptoms indicative of anxiety at both time points, suggesting persistent anxiety symptomatology. Others reported symptoms at a single time point: 9% reported symptoms indicative of anxiety when their child was 9 months but not at 2 years, whereas 8% reported symptoms below threshold when their child was 9 months, but above threshold when their child was 2 years.

When considering these two mental health problems together, 6% had symptoms indicative of either depression or anxiety at both time points, suggesting persistent mental health difficulties. A total of 17% had symptoms indicative of either anxiety or depression at 9 months, and a similar proportion (16%) had symptoms above threshold for either anxiety or depression at 2 years.

Overall, 5% of primary caregivers reported symptoms indicative of both anxiety and depression when their child was 9 months, as did the same proportion (5%) when their child was 2 years. Overall, 1% of primary caregivers reported symptoms indicative of both anxiety and depression at both time points.

3.2.2. Mental health support use

Approximately 8% of parents reported using a mental health service since their baby was 9 months of age (the last survey), similar to the rate reported at Wave 1 (8% reporting mental health service use between the baby’s birth and age 9 months).

About 1 in 5 of those with symptoms indicative of depression or anxiety had used a mental health service, see Table 11. The difference between the proportion of primary caregivers reporting symptoms and those receiving treatment is similar to figures from the general population (Department of Health, 2014; Lubian et al., 2016).

Table 11. Percentage of primary caregivers with symptoms indicative of depression and anxiety who used mental health support services between birth and 9 months, and 9 and 24 months.

	Percentage who used mental health service between birth and 9 months (%)	Percentage who used mental health service between 9 months and 2 years (%)
Depression	21	19
<i>Weighted base</i>	773	473
<i>Unweighted base</i>	790	441
Anxiety	21	23
<i>Weighted base</i>	1,142	569
<i>Unweighted base</i>	1,153	556

Base: Primary caregivers above threshold for depression/anxiety at each time point.

Source: COT20s Wave 1 & 2

Table shows column %, all derived using weights

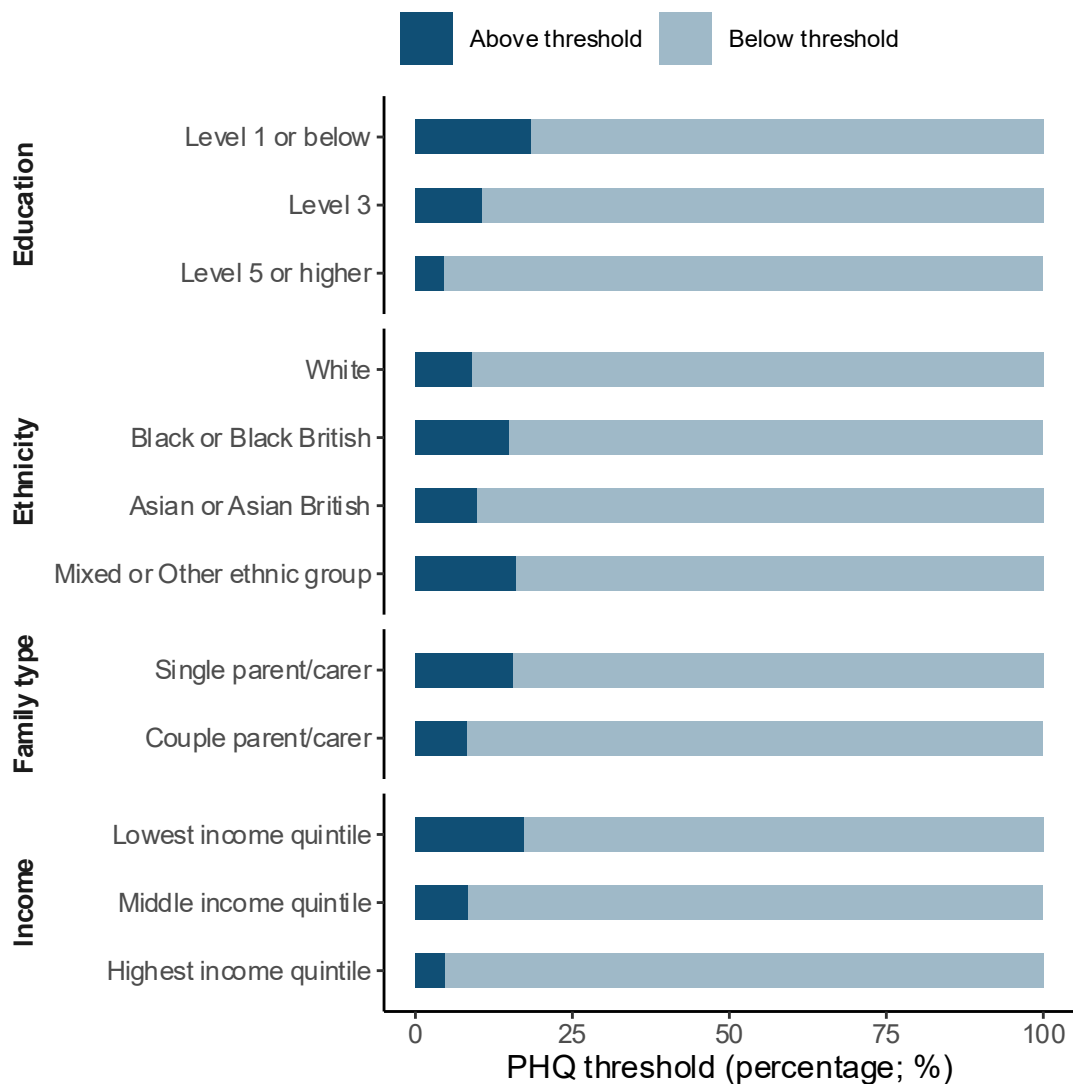
3.3. Does the mental health of primary caregivers when children are 2 years old vary by socio-demographic factors, and how does this compare to when the children were 9 months old?

3.3.1. Primary caregivers’ symptoms of depression by demographic characteristics

The percentage of primary caregivers with PHQ scores indicative of depression when their child was 2 years by family income, primary caregiver education level, primary caregiver ethnicity, and family type are displayed in Figure 9. See Appendix 2 Table 4 for

breakdown of percentages of primary caregivers with scores indicative of depression by demographic characteristics.

Figure 9. Primary caregivers' PHQ threshold at Wave 2 by demographic characteristics



Base: All primary caregivers.

Source: COT20s Wave 2

Figure shows raw weighted bivariate descriptives of those above/below PHQ threshold for depression by different demographic characteristics. Unadjusted results are shown (not controlling for other factors)

3.3.1.1. Multivariate results: depression and demographic characteristics

A multivariate analysis was conducted to assess whether family income, primary caregivers' education level, primary caregiver ethnicity and family type were independently associated with primary caregivers' depression symptoms (as measured by PHQ scores above the threshold to be indicative of depression) when their child was 2 years old. This analysis tested each demographic factor while controlling for the effect of the other demographic factors in the analysis. Results indicated that family income and primary caregiver education associated independently with symptoms indicative of

depression (over and above the association of all other demographic factors added to the analysis).

Specifically, primary caregivers from lower income households were more likely to report symptoms indicative of depression compared to those from higher income households. Illustrating this, 17% of primary caregivers in the lowest family income quintile compared to 5% of primary caregivers in the highest family income quintile reported symptoms indicative of depression. In other words, the rate of depression was over 3 times higher in the lowest income quintile compared to the highest income quintile.

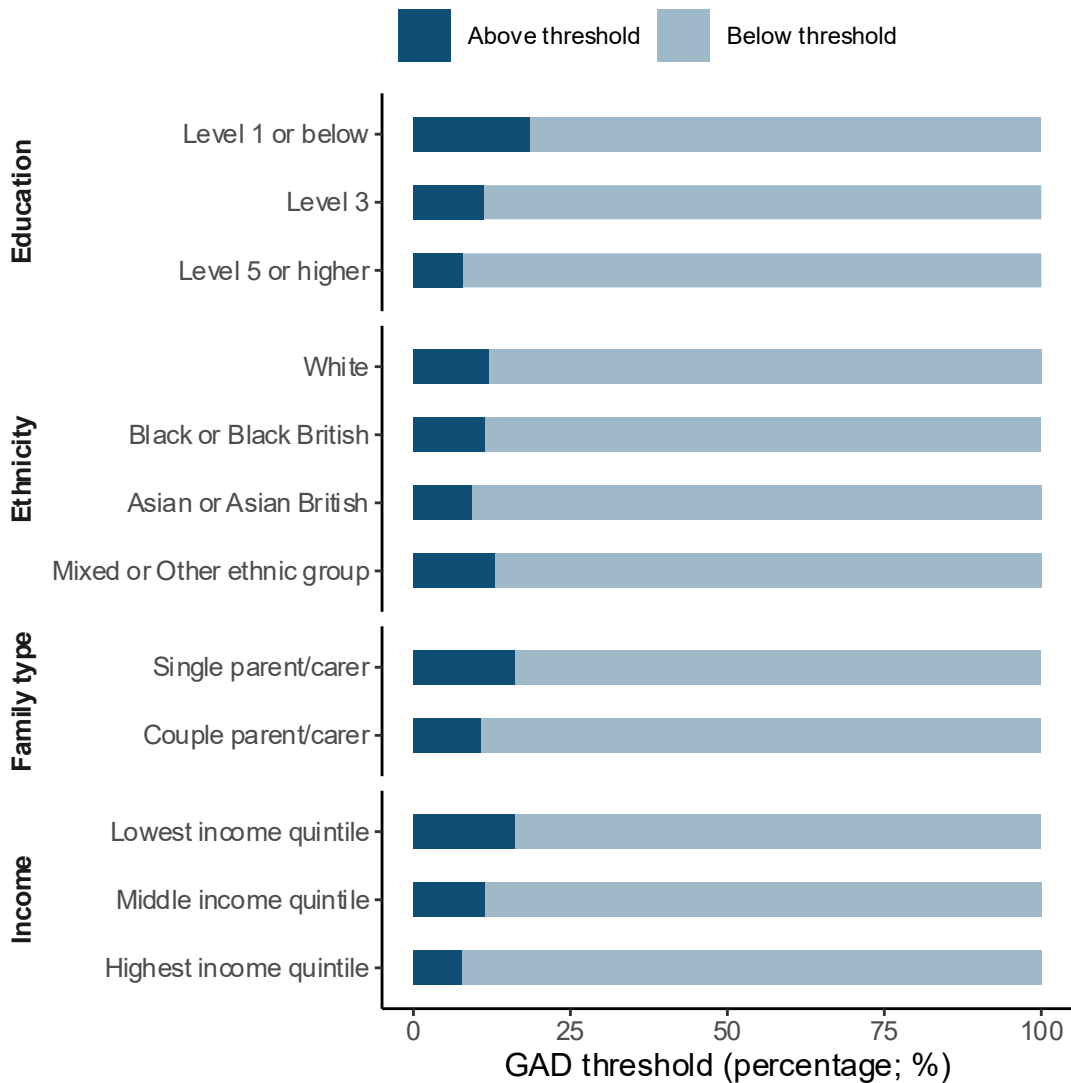
Primary caregivers with lower education levels were more likely to report symptoms indicative of depression compared to those with higher levels of education. Illustrating this, 18% of primary caregivers with the lowest education level, compared to 4% of primary caregivers with the highest education level reported symptoms indicative of depression. In other words, the rate of depression was 4.5 times higher for those with the lowest education level compared to the highest education level.

A similar pattern was found in a multivariate analysis conducted when the children were 9 months old (Bernardi & Fish, et al., 2023), showing lower family income and lower primary caregiver education associated with symptoms indicative of depression. However, single parent status was also linked to symptoms of depression at 9 months, but by age 2 it was not.

3.3.2. Primary caregivers' symptoms of anxiety by demographic characteristics

The percentage of primary caregivers with symptoms indicative of anxiety (based on the GAD questionnaire threshold scores) when their child was 2 years by family income, primary caregiver's education level, primary caregiver's ethnicity and family type are displayed in Figure 10. See Appendix 2 Table 4 for breakdown of percentages of primary caregivers with scores indicative of anxiety by demographic characteristics.

Figure 10. Primary caregivers' GAD threshold at Wave 2 by demographic characteristics



Base: All primary caregivers.

Source: COT20s Wave 2

Figure shows raw weighted bivariate descriptives of those above threshold for anxiety by different demographic characteristics. Unadjusted results are shown (not controlling for other factors)

3.3.2.1. Multivariate results: anxiety and demographic characteristics

A multivariate analysis was conducted to assess whether family income, primary caregivers' education level, primary caregiver's ethnicity and family type were independently associated with primary caregivers' anxiety levels (based on GAD threshold scores). This analysis tested the independent effect of each demographic factor while controlling for the effect of the other demographics in the analysis. Results indicated that family income, and primary caregiver ethnicity were each associated

independently with symptoms indicative of anxiety (over and above the association of other demographic characteristics added to the analysis).

Primary caregivers from lower income families were more likely to report symptoms indicative of anxiety, as indicated by 16% of primary caregivers in the lowest family income quintile, compared to 7% of primary caregivers in the highest family income quintile. Further, primary caregivers of Asian or Asian British ethnicity were less likely to have symptoms indicative of anxiety compared to those of White ethnicity, as highlighted by 9% of those of Asian or Asian British ethnicity compared to 12% of those of White ethnicity.

A similar multivariate analysis was conducted when children were 9 months old (Bernardi & Fish, et al., 2023). The findings suggest that by age 2, family income remained linked to primary caregivers' anxiety, and primary caregivers of Asian/Asian British ethnicity were still less likely to present with symptoms indicative of anxiety than those of White ethnicity. However, Black/Black British primary caregivers showed similar rates of anxiety to White primary caregivers by the time their child turned 2, unlike at 9 months where those of Black/Black British ethnicity were more likely to have symptoms indicative of anxiety.

3.4. The home learning environment for children at 2 years

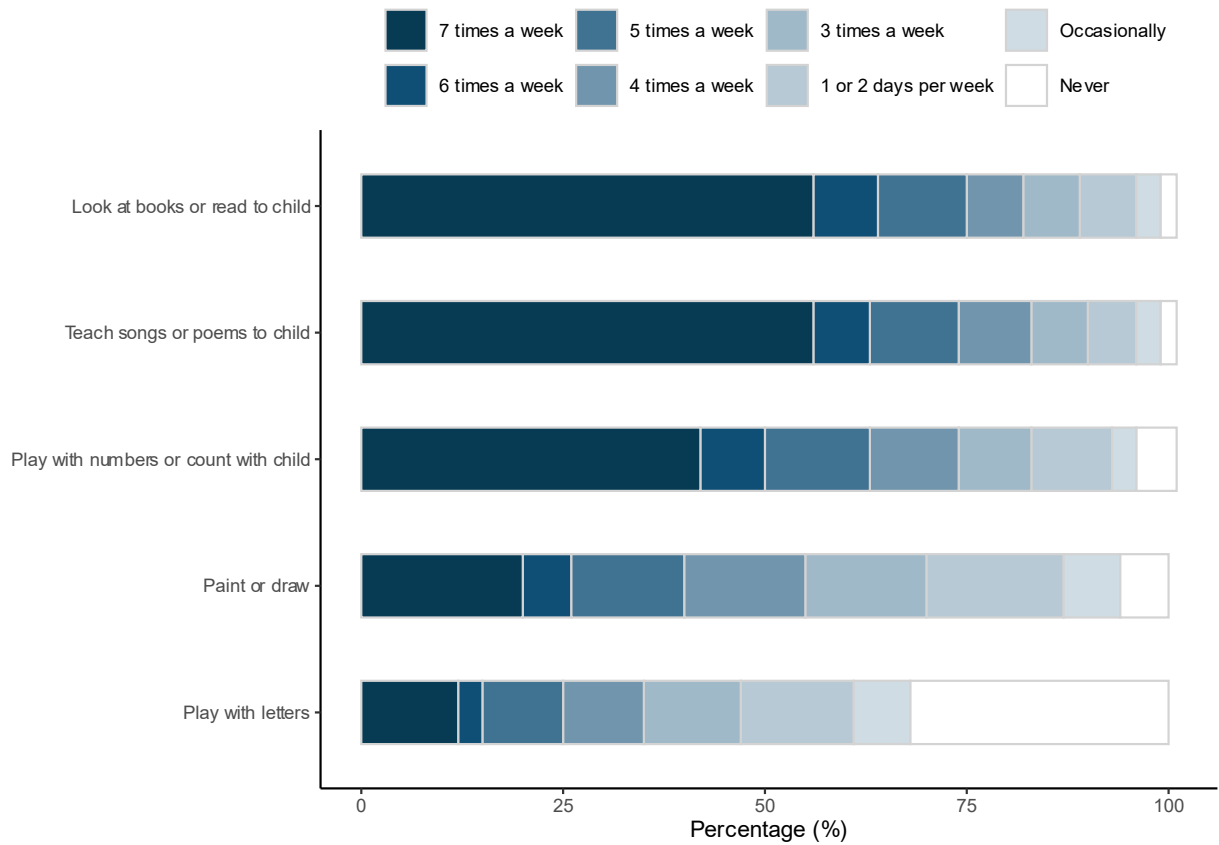
In the Wave 2 COT20s survey, primary caregivers reported how often their child engaged in five key activities at home: looking at books or being read to, playing with letters, playing with numbers or counting, being taught poems, songs, or nursery rhymes, and painting or drawing. Screen-based activities were surveyed separately (see section 3.6). Caregivers rated the frequency from 0 (never) to 7 (daily or more) that someone at home engages in each activity with their child.

The most frequent home learning activity that parents undertook with their 2 years olds was looking at books or reading to the child: over half (56%) did so 7 times a week, and only 2% never did. When further asked how many books they have in their home aimed at children under 5, half (51%) of families reported that they had more than 30 books in their home aimed at children under 5. Fourteen percent had 1 to 10 books for 5-year-olds, and less than 1% indicated they had no books aimed at children under 5.

The least frequent home learning activity of the five was playing with letters, with almost a third (32%) indicating that their child never did this activity compared to 12% who did so 7 times a week.

Figure 11 displays the frequency with which primary caregivers reported that their child engaged in the listed home learning activities.

Figure 11. Engagement in home learning activities with the cohort child



Base: All primary caregivers.

Source: COT20s Wave 2

The Home Learning Environment (HLE) Index can be calculated using the primary caregiver reports of the frequency with which someone in the home engages the child in these five key activities. The HLE-Index is a summed score calculated from these five key learning activities that indicates the variety and frequency of learning activities children experience at home. Higher scores indicate more frequent and varied engagement in home learning activities.

Throughout the report, for illustrative purposes the HLE-Index is described in quintiles. The mean HLE-Index for each quintile is presented in Table 12, and a further breakdown of the frequency of engagement of each activity within each quintile is explored in Appendix 10.

Table 12. Weighted HLE-Index quintiles

Quintile	Percentage of the sample in quintile (%)	Mean HLE-Index score (SD)
Quintile 1	23	13 (4)
Quintile 2	21	20 (1)
Quintile 3	19	24 (1)
Quintile 4	20	27 (1)
Quintile 5	17	32 (2)

Table shows weighted proportion, mean and standard deviation of the HLE-Index in each weighted income quintile group

To measure whether engagement in home learning activities had changed over time, HLE-Index scores from primary caregivers in the COT20s Age 2 survey were compared with those from the Study of Early Education and Development (SEED) Age 2 survey, a population-representative dataset of children in England collected in 2013-2014.

Analysis compared the COT20s data to a subset of 489 children from the SEED Age 2 survey who were of a comparable age. See Appendix 11 for further details on the comparison cohort and statistical analysis.

Analysis showed no significant difference between the COT20s and SEED cohorts in the HLE-Index score, while accounting for the child's age and the Indices of Multiple Deprivation (IMD) quintiles in the two cohorts. This indicates that, overall, parents and carers of 2-year-olds in 2023 were carrying out the home learning activities included in the HLE-Index to a similar degree to parents of 2-year-olds 10 years earlier.

3.5. Does the home learning environment vary depending on parental mental health and socio-demographic differences?

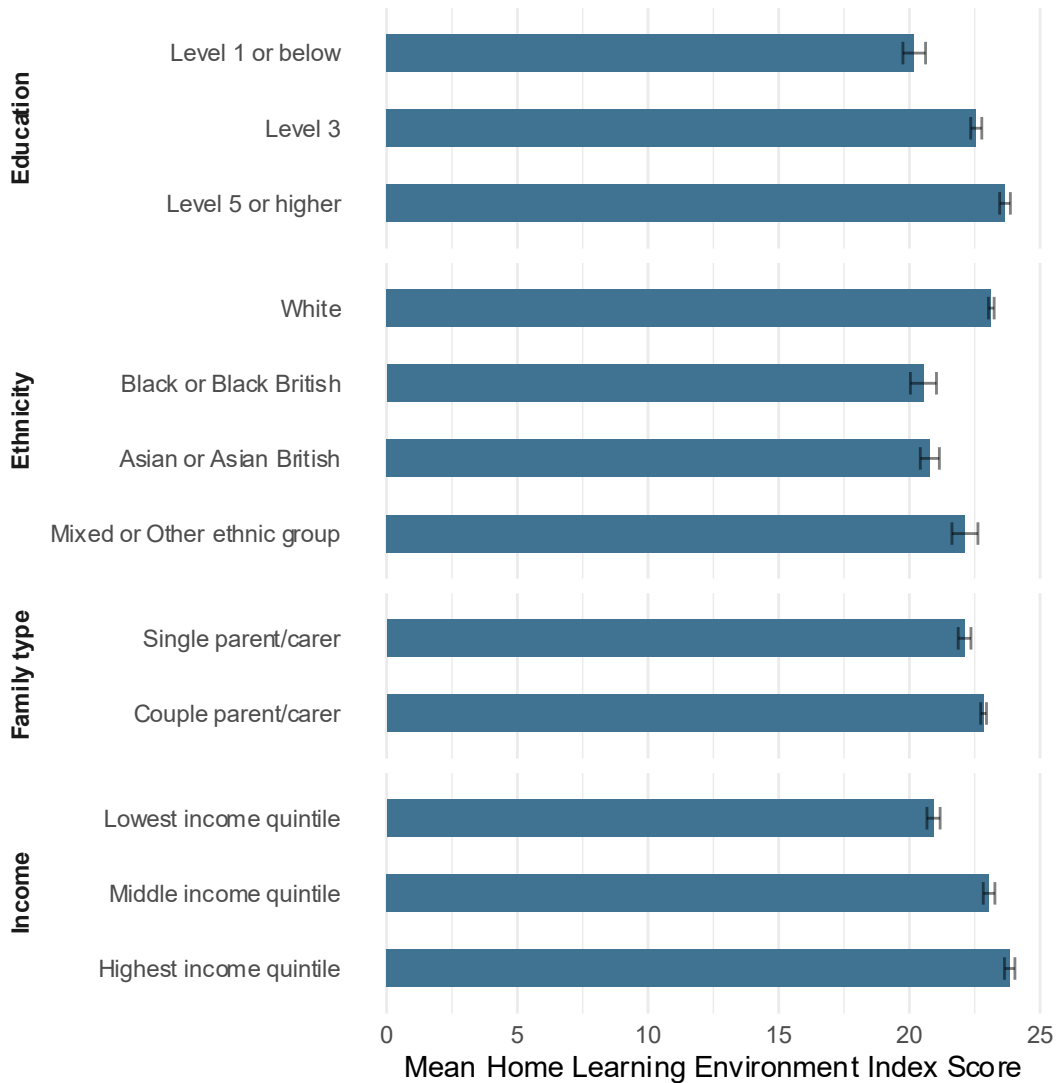
To understand whether the home learning environment at age 2 varied by parental mental health and socio-demographic differences, a multivariate analysis was conducted. This analysis determined whether the primary caregiver's education level, family income, ethnicity, family type and primary caregiver's anxiety and depression symptoms (PHQ and GAD scores above/below screening threshold) were independently associated with the variety and/or frequency of the home learning environment activities (measured using the Home Learning Environment Index; HLE-Index), controlling for the effect of all other factors in the analysis.

The same multivariate analysis model was used to analyse the role of both demographic factors and mental health factors on the home learning environment, but the findings are described separately in subsections 3.5.1. & 3.5.2., respectively.

3.5.1. Demographic differences in the home learning environment

The Home Learning Environment Index (HLE-Index) scores at age 2 by differing family income, primary caregiver education level, primary caregiver ethnicity and family type are displayed in Figure 12. See Appendix 2 Table 5 for a breakdown of mean of HLE-Index score by demographic characteristics.

Figure 12. Home Learning Environment Index score at 2 years by demographic characteristics



Base: All primary caregivers.

Source: COT20s Wave 2

Figure shows weighted mean home learning environment score by demographic factors (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors)

3.5.1.1. Multivariate results: home learning environment index and demographic characteristics

Findings from the multivariate analysis (described above in section 3.5.), adjusting for overlap between the other factors in the model, indicated that family income, primary caregivers' education and ethnicity were each independently associated with the home learning environment, as measured by the HLE-Index score.

Lower family income was independently associated with lower HLE-Index scores, indicating that children in lower-income families were engaged in the home learning activities measured by the HLE-Index less frequently than those from higher-income families. For example, the HLE-Index score was 20.92 on average for children in the lowest income families, compared to a mean HLE-Index score of 23.84 in the highest income families. To illustrate the magnitude of this difference, about one-third (32%) of primary caregivers in the lowest quintile said someone at home looked at books or read to their child 7 times a week, compared to over three-quarters (77%) of those in the highest income quintile.

Lower primary caregiver education level was also independently associated with lower HLE-index scores. The HLE-index score was 20.19 on average for children with primary caregivers with the lowest level of education, compared to a mean of 23.66 for those with primary caregivers with the highest education level. To illustrate, for under a third (29%) of those with the lowest level of education, someone at home looked at books or read to their child 7 times a week, compared to just under three-quarters (73%) of those with the highest level of education.

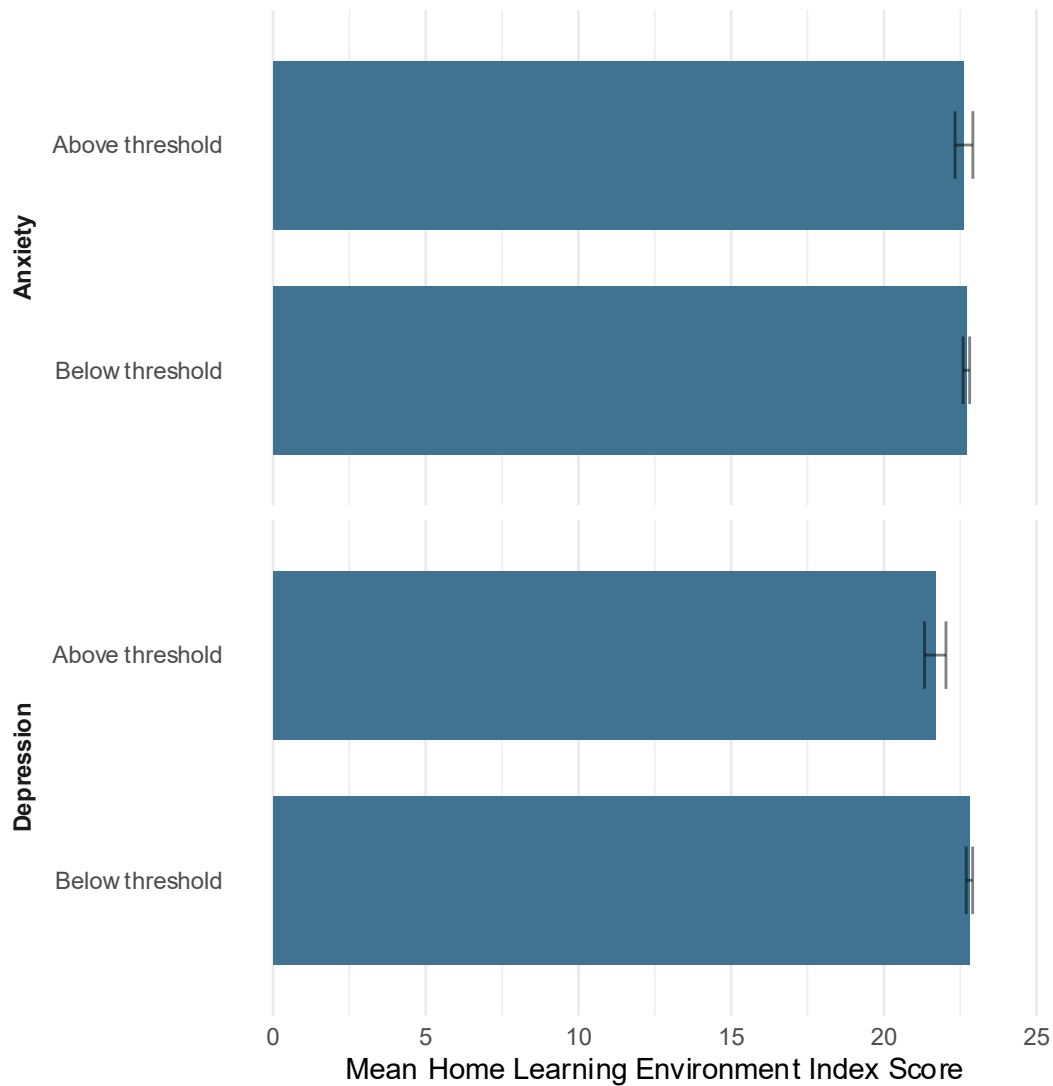
Further, Black or Black British ethnicity or Asian or Asian British ethnicity was independently associated with lower HLE-Index scores, indicating that children with primary caregivers of Black or Black British ethnicity or Asian or Asian British ethnicity were engaged in the home learning activities measured by the HLE-Index less frequently than those with primary caregivers of White ethnicity. For example, the mean HLE-Index scores for children with primary caregivers of Black or Black British ethnicity and Asian or Asian British were 20.54 and 20.78, respectively, compared with an average 23.14 HLE-Index score for children with primary caregivers of White ethnicity. To give a sense of the size of these differences, a third (33%) of primary caregivers of Asian or Asian British ethnicity and a quarter (25%) primary caregivers of Black or Black British ethnicity said someone at home read to or looked at books with their child 7 times a week, compared to 62% of primary caregivers of White ethnicity.

3.5.2. Differences in home learning environment by parental mental health

The Home Learning Environment Index (HLE-Index) scores were examined according to whether the primary caregiver had symptoms indicative of depression or anxiety

according to the PHQ and GAD, the results of which are respectively displayed in Figure 13. See Appendix 2 Table 5 for a breakdown of the mean HLE-Index score by primary caregivers' depression and anxiety symptoms.

Figure 13. Home Learning Environment Index score at 2 years by primary caregiver anxiety and depression



Base: All primary caregivers.

Source: COT20s Wave 2.

Figure shows weighted mean home learning environment score by threshold for depression or anxiety (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors)

3.5.2.1. Multivariate results: home learning environment index and parental mental health

The multivariate analysis (described above in section 3.5.) indicates that neither primary caregivers' depression nor anxiety symptoms were independently associated with the HLE-Index scores (once controlling for each other, and the effects of the other demographic factors).

3.6. What are children's screen time habits at 2 years?

3.6.1. Overall screen time

At age 2, primary caregivers reported the amount of time on a typical day that their child a) watched television, videos or other digital content on a screen (for example on a computer, tablet or phone) and b) played computer games (for example on a computer, tablet or phone).

The average amount of time spent watching television, videos or other digital content on a screen on a typical day at age 2 was 127 minutes, up from an average of 29 minutes when the children were aged 9 months (Bernardi & Fish, et al., 2023). In total, 98% of children were reported to watch some content on a screen on a typical day. For those who did watch screens on a typical day, the average duration of viewing was 129 minutes.

The current World Health Organisation (2019) guidelines recommend no more than 1 hour of sedentary screen time per day for children aged 2-4 years¹⁸. The COT20s data suggest that around a third of 2-year-olds in England (34%) met this recommended level (1 hour or less), while two-thirds (66%) exceeded it. In total, 11% typically watched screens for 1 to 2 hours per day, over half (55%) did so for 2 hours or more, and 14% did so for 4 hours or more. While there is a general lack of representative data from earlier periods to compare this against, the SEED study collected similar data on time spent watching television, videos or DVDs by 2-year-olds in 2013-2014. The proportion of similarly aged children in SEED¹⁹ who watched screens for an hour or less per day was 46%, suggesting a decrease of 12 percentage points in children meeting the WHO recommendation between 2013-14 and 2023-24.

The amount of time the 2-year-olds in COT20s spent playing computer games (including on a phone or tablet) on a typical day was 13 minutes. The majority (81%) of children were reported not to play any computer games on a typical day, while 14% played computer games for 1 hour or less; 3% played for 2 hours or more, and 1% did so for 4 hours or more. The 19% who did play computer games (including on a phone or tablet) on a typical day did so for an average of 70 minutes. Interestingly, a smaller proportion of

¹⁸The WHO guidelines specifically refer to "sedentary screen time" defined as time spent passively watching screen-based entertainment (TV, computer, mobile devices) that does not include active screen-based games where physical activity or movement is required. It should be noted that the COT20s and SEED questions on time spent playing computer games do not distinguish between sedentary or active use, meaning we cannot perfectly align total screen time and therefore report comparisons are based on time spent watching.

¹⁹ SEED screentime statistics are based on data from a subset of 489 children from the SEED Age 2 survey who were of a comparable age. See Appendix 11 for further details on the comparison cohort (who were the same group used for the HLE comparisons analysis).

2-year-olds were reported to play computer games in COT20s in 2023-24 (19%) than in SEED in 2013-14 (29%).

In total, children spent an average of 140 minutes per day either watching screens or playing computer games at age 2. When considering the 98% that had any screen time on a typical day, the average amount of screen time was 142 minutes. One third (29%) used a screen (either to watch content or play computer games) for one hour or less a day, over half (57%) for 2 hours or more, and 17% for 4 hours or more. Boys and girls had a similar amount of screen time: boys had 141 minutes of screen time and girls 143 minutes. The rates of screen time in the COT20s sample are broadly in line with international studies, where meta-analytic syntheses have found that approximately 36% of children aged 2-5 years used a screen one hour per day or less (McArthur et al., 2022), although this comparison is very imprecise because of the wide age ranges and varying time cohorts in the meta-analytic review.

3.6.2. The context of screen time

The COTS survey asked primary caregivers to report what they typically did while their child was watching content on a screen or playing computer games. While around a quarter (26%) reported that they mostly watched with their child, and 46% sometimes watched with their child, an additional quarter (26%) mostly did something else. For the minority of children who played computer games, primary caregivers were evenly split between whether they mostly played with their child, sometimes did so, or mostly did something else, as shown in Table 13.

Table 13. Primary caregiver involvement during child’s screen time

Primary caregivers’ involvement	Watching content on a screen (percentage; %)	Playing computer games (percentage: %)
Mostly watching/playing with child	26	7
Sometimes watching/playing with child	46	6
Mostly doing something else	26	6
Child does not watch screens/play games	2	81
<i>Unweighted Base</i>	4812	4812
<i>Weighted Base</i>	4811	4811

Base: all cohort children

Source: COT20s Wave 2

Table shows column %, all derived using weights

3.7. Does the children's screen time vary depending on socio-demographic differences and the primary caregiver's mental health?

To understand whether the screen time at age 2 varied depending on parental mental health and socio-demographic differences, a multivariate analysis was conducted. This analysis determined whether the primary caregiver's education level, family income, ethnicity, family type and primary caregiver's anxiety and depression symptoms (above/below threshold PHQ and GAD scores) were independently associated with children's screen time, controlling for the effect of all other factors in the analysis.

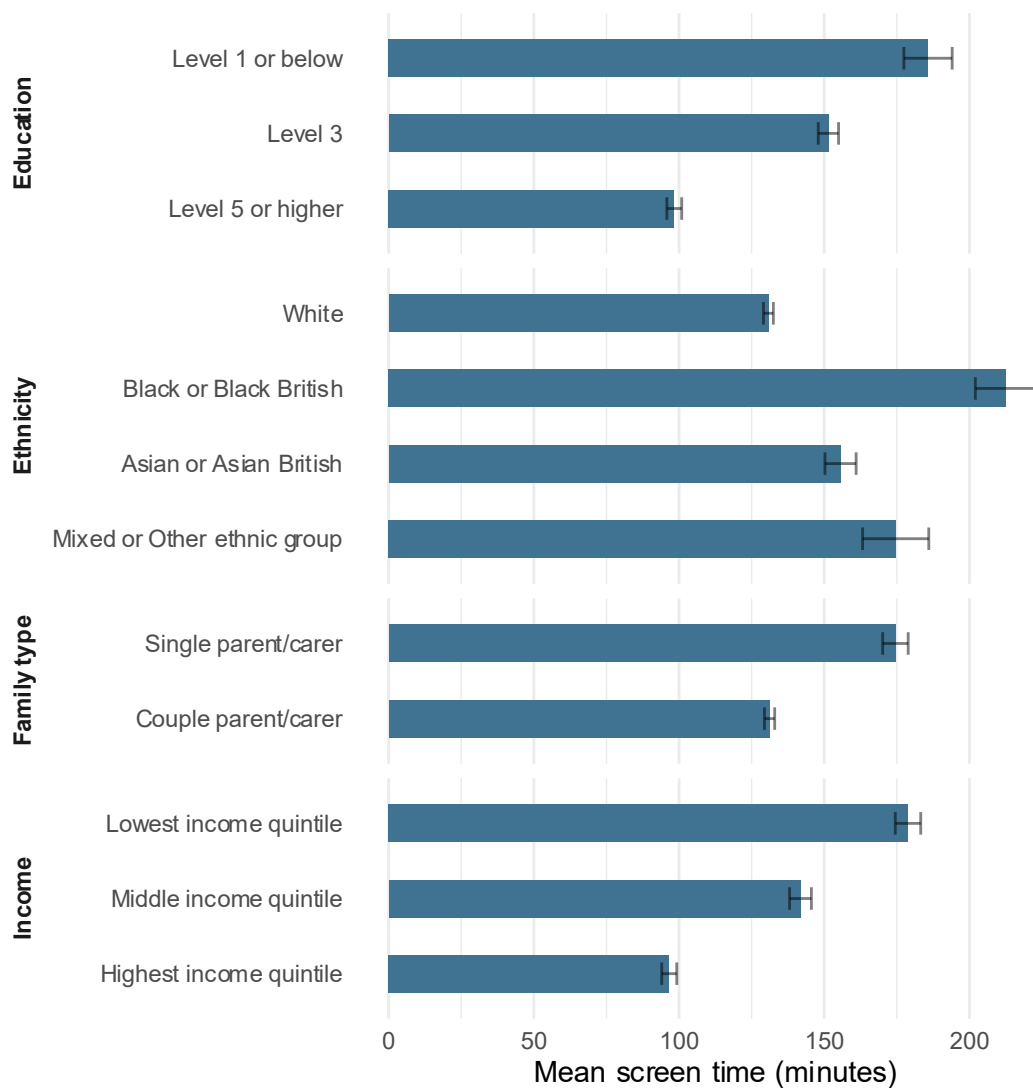
Unless otherwise stated, screen time is hereafter calculated as the combined total time children spent watching screen-based content or playing games on a screen. This is to provide an evaluation of the total amount of screen time.

The same multivariate analysis model was used to analyse the role of both demographic factors and mental health factors on the screen time, but the findings are described separately in subsections 3.7.1. & 3.7.2., respectively.

3.7.1. Demographic differences in screen time

Children's screen time by family income, primary caregiver's education level, primary caregiver's ethnicity and family type are displayed in Figure 14. See Appendix 2 Table 5 for a breakdown of mean screen time by demographic characteristics.

Figure 14. Children's screen time at 2 years by demographic characteristics



Base: All cohort children.

Source: COT20s Wave 2.

Figure shows weighted mean typical daily child screen time by demographic factors (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors)

3.7.1.1. Multivariate results: children's screen time and demographic characteristics

Findings from the multivariate analysis (described above in section 3.7.) indicate that, out of the demographic factors examined, family income, primary caregivers' education and primary caregivers' ethnicity were each associated independently with screen time (over and above the association of the other demographic and parental mental health factors included in the analysis).

Children from lower income families spent more time screen time than those from higher income families. For example, in the lowest income quintile, the average screen time was 179 minutes, compared to 97 minutes for those in the highest income quintile.

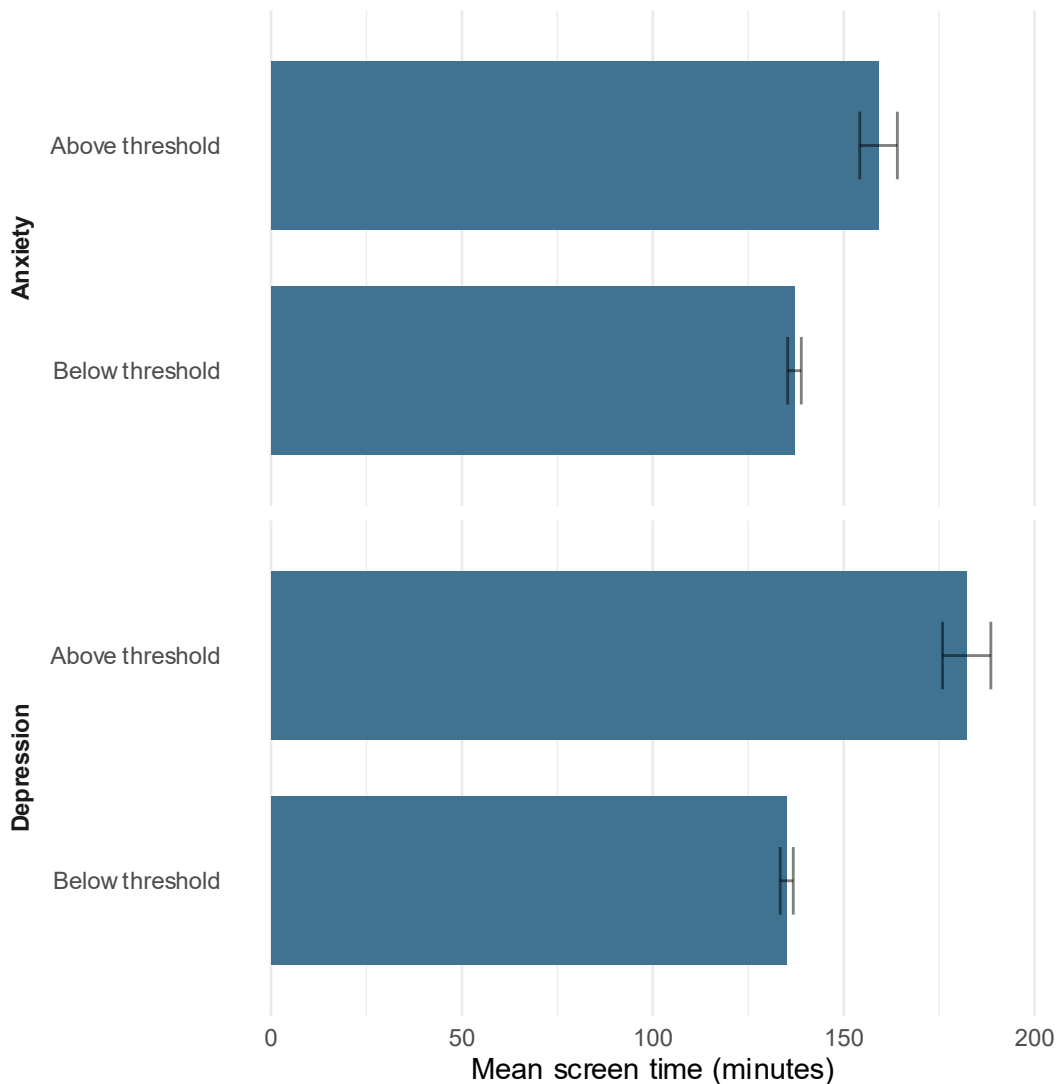
The multivariate analysis also showed children of primary caregivers with a lower level of education had higher screen time on a typical day, compared to children of primary caregivers with higher levels of education. Children of primary caregivers with the lowest level of education had on average 186 minutes a day of screen time, compared to an average of 98 minutes for those whose primary caregiver was in the highest education level group.

Further, the multivariate analysis indicated children of primary caregivers of Black or Black British ethnicity, Asian or Asian British ethnicity or Other/Mixed ethnicity had more screen time on a typical day than those of primary caregivers of White ethnicity. Primary caregivers of Black or Black British ethnicity, Asian or Asian British ethnicity or Other/Mixed ethnicity reported their children had an average screen time of 213 minutes, 156 minutes and 174 minutes per day, respectively, compared to children of primary caregivers of White ethnicity who reported a mean screen time of 131 minutes.

3.7.2. Differences in screen time by parental mental health

Figure 15 displays children's screen in relation to whether the primary caregiver had symptoms indicative of depression or anxiety according to the PHQ and GAD, controlling for the other demographic factors. See Appendix 2 Table 5 for a breakdown of mean screen time by primary caregivers' depression and anxiety symptoms.

Figure 15. Children’s screen time at 2 years by primary caregiver anxiety and depression



Base: All cohort children.

Source: COT20s Wave 2.

Figure shows weighted mean typical daily screen time by threshold for depression or anxiety (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors)

3.7.2.1. Multivariate results: children’s screen time and parental mental health

Findings from multivariate analysis (described above in section 3.7.) indicate that out of the two mental health factors examined, primary caregiver depression was associated independently with the amount of screen time children had (over and above the association of demographic factors and parental anxiety).

The multivariate analysis indicated that children of primary caregivers with symptoms indicative of depression used a screen for more time than other children. This is illustrated by a mean screen time of 182 minutes in a typical day of children with primary

caregivers whose symptoms were indicative of depression, compared to 135 minutes for those primary caregivers without symptoms of depression.

3.8. Primary caregiver parenting

Overreactive parenting refers to displays of anger or irritability in response to a child's challenging behaviour. Research shows that frequent overreactive responses by parents in early childhood are linked to less positive social and emotional outcomes for children (Karazsia et al., 2008; Taraban et al., 2017).

When children were aged 2, primary caregivers completed a shortened version of the Parenting Scale (Arnold et al., 1993), a brief self-report measure of parenting behaviours. The analysis below focuses on the overreactive parenting scale, which assesses the likelihood of responding in an overreactive way in different situations. Examples included being picky with their child when feeling upset or stressed, getting into long arguments when their child misbehaves, or letting situations get out of hand and doing things they do not mean to do. Responses were rated on a 7-point scale, higher scores indicating more frequent overreactive behaviour.

The average score among primary caregivers was 1.44 out of 7, indicating that most reported displaying such behaviours infrequently.

3.9. Does overreactive parenting vary depending on socio-demographic factors and the primary caregiver's mental health?

To understand whether primary caregivers' overreactive parenting varied depending on parental mental health and socio-demographic differences a multivariate analysis was conducted. As before, this analysis determined whether the primary caregiver's education level, family income, ethnicity, family type and primary caregiver's anxiety and depression symptoms (above/below threshold PHQ and GAD scores) were independently associated with overreactive parenting, controlling for the effect of all other factors in the analysis.

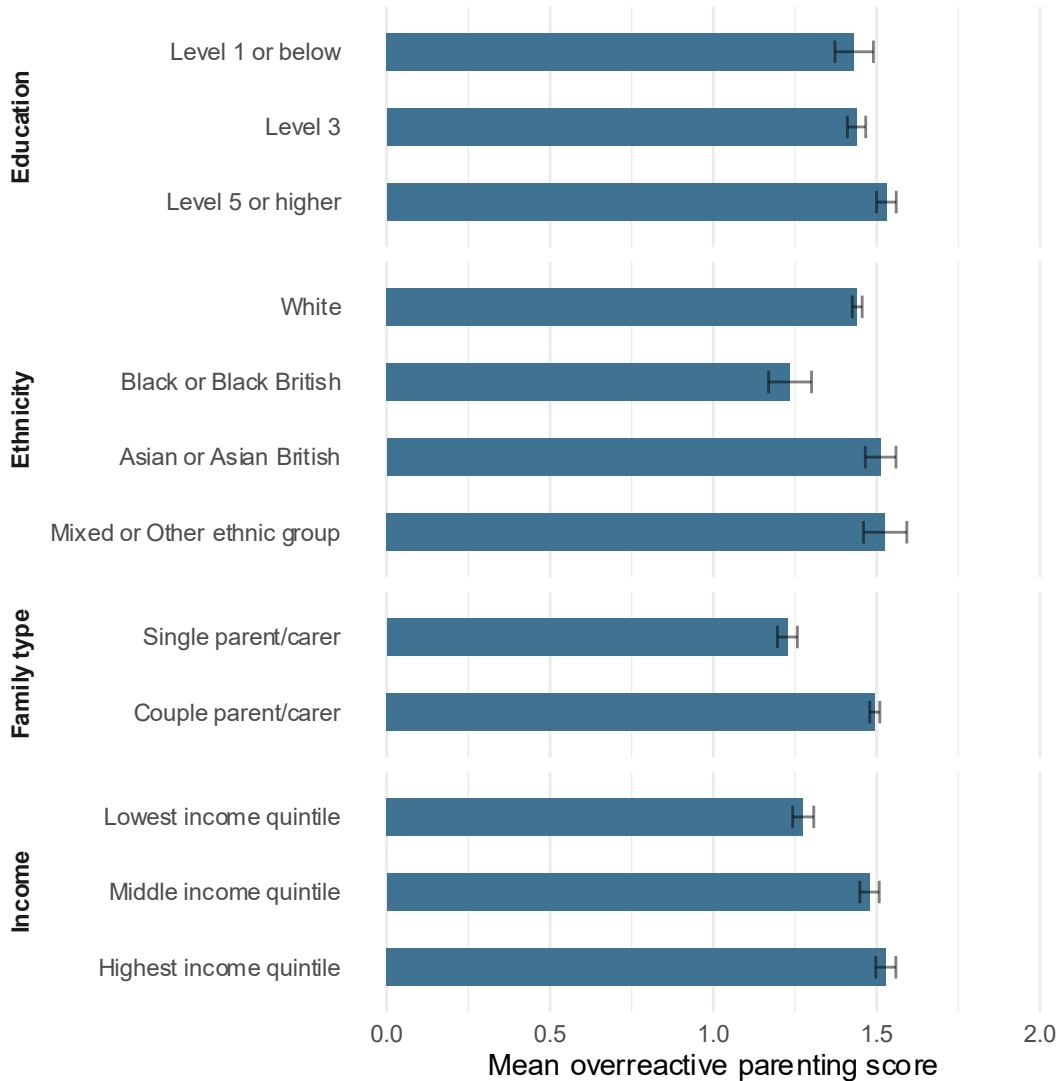
The same multivariate analysis model was used to analyse the role of both demographic factors and mental health factors on the overreactive parenting style, but the findings are described separately in subsections 3.9.1. & 3.9.2., respectively.

3.9.1. Demographic differences in overreactive parenting

The overreactive parenting scores by family income, primary caregiver's education level, primary caregiver's ethnicity and family type is displayed in Figure 16. See Appendix 2

Table 5 for a breakdown of mean overreactive parenting score by demographic characteristics.

Figure 16. Primary caregiver’s overreactive parenting score when their child was 2 years by demographic characteristics



Base: All primary caregivers.

Source: COT20s Wave 2.

Figure shows weighted mean overreactive parenting score by demographic factors (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors)

3.9.1.1. Multivariate results: overreactive parenting and demographic characteristics

Findings from the multivariate analysis (described above in 3.9.), indicated that out of the demographic factors examined, family income, primary caregiver education and family type were each associated independently with overreactive parenting style (over and above the association with other demographic and parental mental health factors).

Primary caregivers from higher-income families reported a higher level of overreactive parenting, compared to those from lower income families. This is demonstrated by a mean overreactive parenting score of 1.53 for the highest income families, compared to a mean of 1.28 for those in the lowest income families. To illustrate the magnitude of this difference, 19% of those in the highest income quintile said they were more likely to respond by yelling or raising their voice when their child misbehaves²⁰, compared to 15% in the lowest quintile.

Primary caregivers with a higher level of education reported a higher level of overreactive parenting, compared to those with lower levels of education. This is demonstrated by a mean overreactive parenting score of 1.53 for the highest education group, compared to a mean of 1.43 for those in the lowest education group. To illustrate the magnitude of this difference, 21% of those in the highest education group said they responded by yelling or raising their voice when their child misbehaves²¹, compared to 13% in the lowest education group.

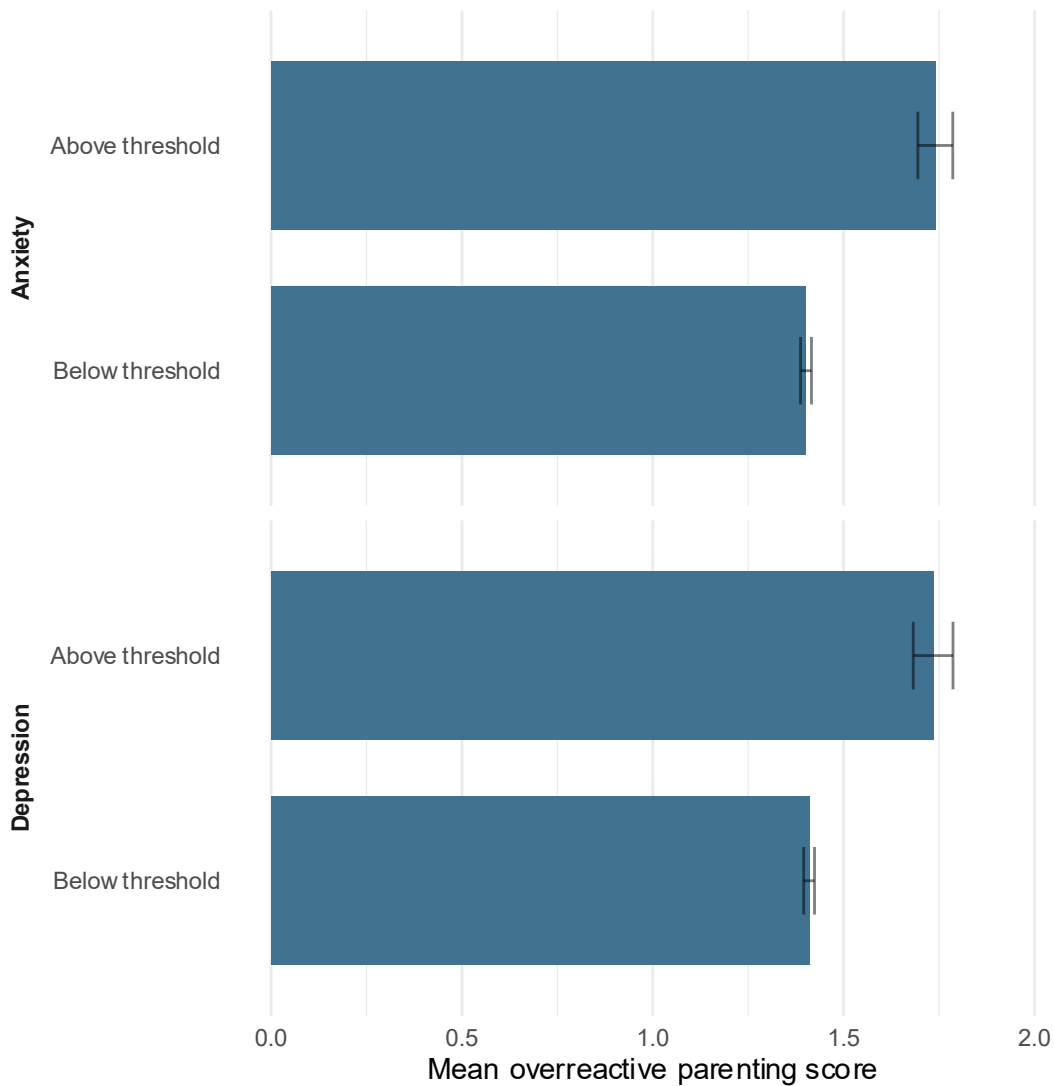
The multivariate analysis also showed primary caregivers who were coupled parents/carers reported higher levels of overreactive parenting, compared to single parent/carer. This is demonstrated by a mean overreactive parenting score of 1.49 for coupled parent/carers, compared to 1.23 for single parent/carers. To illustrate the magnitude of this difference, 18% of coupled parent/carers said they responded by yelling or raising their voice when their child misbehaves²¹, compared to 16% single parent/carers.

3.9.2. Differences in overreactive parenting scale and parental mental health

Figure 17 displays average overreactive parenting scores according to whether the primary caregiver had symptoms indicative of depression or anxiety. See Appendix 2 Table 5 for a breakdown of mean overreactive parenting score by primary caregivers' depression and anxiety symptoms.

²⁰ "Respond by yelling or raising their voice when their child misbehaves" is the percentage of people who indicated 1 to 3 on the 7-point scale of "when my child misbehaves.... 1 – I raise my voice or yell; 7 – I speak to child calmly"

Figure 17. Primary caregiver’s overreactive parenting score when their child was 2 years by primary caregiver anxiety and depression



Base: All primary caregivers. Source: COT20s Wave 2. Figure shows weighted mean overreactive parenting score by threshold for depression and anxiety (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors)

3.9.2.1. Multivariate results: overreactive parenting and parental mental health

Findings from multivariate analysis (described above in section 3.9.) indicated that scoring over the PHQ/GAD threshold for depression and anxiety were each associated independently with more overreactive parenting behaviour (over and above associations with the demographic factors as well as the other parental mental health condition [anxiety or depression respectively]).

The multivariate analysis indicated that primary caregivers with symptoms indicative of depression or anxiety reported higher levels of overreactive parenting, compared to those

who did not have symptoms. The mean overreactive parenting scores reported by primary caregivers whose symptoms were indicative of depression were 1.73, compared to 1.41 for those without symptoms of depression. To illustrate the magnitude of this difference, 25% of those with symptoms indicative of depression respond by yelling or raising their voice when their child misbehaves²¹, compared to 17% without symptoms indicative of depression.

Very similar results were seen for anxiety, with parents with symptoms indicative of anxiety having a mean overreactive parenting score of 1.74, compared to 1.40 for those without symptoms of anxiety. The magnitude of this difference was similar to the depression findings, with 25% of those with symptoms indicative of anxiety responding by yelling or raising their voice when their child misbehaves, compared to 17% without symptoms of anxiety.

3.10. Discussion

This chapter examined data from Wave 2 of the Children of the 2020s Study to better understand parental mental health, parenting and the home learning environment in contemporary English families with 2-year-old children. These analyses were primarily cross-sectional in nature, as longitudinal data collection is ongoing. The data were collected during a period shaped by the aftermath of the COVID-19 pandemic and a sharp rise in inflation and cost of living, a context likely to affect family wellbeing. The current findings provide up to date information on the prevalence of mental health difficulties among parents of 2-year-olds, how socioeconomically patterned these are, and the links between parental mental health and caregiving.

Rates of parental mental health problems

Overall, our findings on parental mental health were consistent with expectations based on the Wave 1 data and previous national surveys, with around 10% of primary caregivers meeting a threshold of symptom frequency indicative of a possible diagnosis of depression, the same proportion observed at Wave 1. Similarly, 12% of primary caregivers were over the threshold for symptoms indicative of anxiety, similar to those at Wave 1 (13%). Around a third of those primary caregivers who had been above these thresholds at Wave 1 were also above the threshold at Wave 2. These caregivers (6%) represent an important group because their difficulties with mental health appear to be relatively longstanding. Broadly speaking, evidence suggests that chronic parental mental health difficulties are associated with poorer child outcomes (Rogers et al., 2020). The findings highlight the importance of effective intervention to support parents and improve child development. Notably, approximately 1 in 5 primary caregivers who had

²¹ “Respond by yelling or raising their voice when their child misbehaves” is the percentage of people who indicated 1 to 3 on the 7 point scale of “when child misbehaves.... 1 – I raise my voice or yell; 7 – I speak to child calmly”

symptoms indicative of anxiety or depression reported having seen a mental health professional.

It is important to note that the measures used in this study were brief screening instruments, so should not be interpreted as producing exact estimates of prevalence of clinical diagnoses. Nevertheless, the findings suggest a possible gap between need and use of services among parents of young children in England. Further work outside of COT20s is needed to better understand the underlying reasons for this gap: for instance, whether it stems from limited availability of mental health services, barriers to access, or a lack of awareness that support is available.

Parental mental health, family circumstances and parenting

In the current analyses we investigated the extent to which parental mental health was linked to parenting and the home learning environment, which are both potentially important factors in children's socio-emotional wellbeing and early learning. It was notable that parental mental health was linked to overreactive parenting (broadly speaking, a tendency to shout, be irritable or angry in response to a child's challenging behaviour), but not the home learning environment, once other factors were controlled for. This implies that many primary caregivers experiencing anxiety and depression are nevertheless providing children with a stimulating home learning environment and that their parenting needs, where they exist, are more likely to revolve around support for managing children's behaviour and associated feelings of parental stress. It was also notable that overreactive parenting was reported more commonly by higher income families. Both these findings could be explored in more depth in future analyses, especially as COT20s longitudinal data on children's outcomes become available.

Parental mental health, family circumstances and the home learning environment

Our analyses indicated that socio-economic and demographic factors, particularly those related to low income and poverty, were more influential in primary caregivers' provision of early learning activities, like reading stories and play, than parental mental health. We observed quite large differences in home learning environment scores between some key variables, including those relating to family income, primary caregiver education and ethnic group. The largest differences were observed in relation to parental education, with home learning environment scores being lower in those with lower levels of education. Those from Black or Black British ethnicity and Asian or Asian British backgrounds and primary caregivers in the lowest quintile of family income had lower home learning environment scores than White parents and high-income parents respectively.

The findings reinforce the key role played by socio-economic factors and educational disadvantage in early inequalities in opportunity, in this case in relation to early learning at home. There are likely many factors linked to poverty that can impact parents' capacity

to provide as rich and stimulating a home learning environment as they might wish, including stress, fatigue, lack of time, other caring responsibilities, complex and insecure patterns of employment or family conflict (Chen et al., 2025, Outhwaite, 2020, Ho et al. 2022). Further work investigating these factors is possible from data collected as part of the study, both at Wave 2 and longitudinally, and would help provide a better understanding of the mechanisms involved and the profile of families needing most support. The findings in general suggest that efforts to reduce child poverty, particularly if combined with support for home learning, may be valuable elements in a strategy for tackling inequalities in early childhood development and education.

Parental mental health, family circumstances and screen time

An important feature of the Children of the 2020s Study is its focus on early-life exposure to digital media and Wave 2 provided some important insights into its prevalence in young children in England. The results from the Wave 2 survey on this issue were quite striking. At age 2, the average time spent on a screen on a typical day was over 2 hours, and a substantial minority (17%) watched or played on a screen for more than 4 hours a day. Only 2% did not regularly watch content on a screen at age 2. These figures stand in contrast to current World Health Organisation guidelines (2019), which recommend no more than 1 hour of screen time per day for children aged 2-4 years. Indeed, fewer 2-year-olds met this WHO-recommended level compared to children in a comparable study 10 years ago (34% in COT20s, compared to 46% in SEED in 2013-14). Understanding the impact of increasing exposure to screens in very early childhood is an important priority for future research.

The data from Wave 2 of Children of the 2020s provided important information about the socio-economic circumstances associated with greater screen time in two-year-olds in England. Primary caregivers in the lowest quintile for family income reported over an hour more screen time a day by their child than parents in the highest level of education, and very similar disparities were observed between children of parents in the lowest education groups compared to those in the highest. Parents from Asian or Asian British, Black or Black British and Other/Mixed ethnic backgrounds also reported more screen time by their child than White parents.

As very little past research has examined the relationship between parental depression and screen time in children this was an area of particular interest in the current report. Our findings showed that parental depression is associated with greater screen time for their child, even after a range of demographic factors and parental anxiety were taken into account.

The findings in general highlight a strong social patterning of screen time in England, with 2-year-olds in families experiencing greater disadvantages or whose primary caregiver is experiencing symptoms of depression using screens more than those in other families.

It is important to recognise that these screen time data are approximate and asked parents to estimate their child's screen time on a typical day, a method that tends to lead to more error and response bias than observational assessments. It is also important to bear in mind that screen time is often perceived by parents as a valuable way to help them juggle the challenges of the modern household or settle children when over-excited, upset or tired. Furthermore, some parents believe that screen time can be beneficial, for example by providing educational content (for a review, see Chong et al., 2023). Indeed, while screen time is often considered to have a negative impact on children's early development (Gath et al., 2025), there is also emerging evidence that the content and context of screen time, rather than - or as well as - the quantity of it may be important in determining its impact. Data from Wave 2 of Children of the 2020s showed that a significant proportion of primary caregivers (26%) usually watched screens with their child, which most likely creates more opportunities for interaction and communication than viewing alone. However, a similar proportion of primary caregivers reported that when their child viewed screens, they (the parent) tended to be doing something else. There is thus considerable variation in how screen time is experienced by children at home and understanding precisely which patterns of use, or co-use, is important for understanding the impact on children's outcomes (Flewitt et al., 2024). Future waves of COT20s will investigate the types of digital content children are exposed to in more detail, as well as the role of co-viewing and household screen time rules, which will allow us to better understand how families manage screens at home, and analyse their impact on early development longitudinally.

4. Early factors associated with child language and emotional and behavioural development at 2 years

Summary

At 2 years, what is the average level of children's language skills in England?

- At 2 years, children could say, on average, 21 words from a set of 34 words commonly said by children this age.
- We found preliminary evidence that children's spoken vocabulary in this cohort was not significantly different from earlier cohorts of 2-year-olds from 2017 to 2020.

What socio-demographic, parental mental health, and home environment factors are most strongly linked to language ability at 2 years?

- Lower family income was independently associated with lower spoken vocabulary. Children from lower-income families could say fewer words at age 2, on average, than those from higher-income families. For example, children in the lowest income quintile could say 53% of the 34 test words on average, compared to 68% by those in the highest income quintile.
- Primary caregiver depression was independently associated with lower vocabulary in children. Children whose primary caregiver reported symptoms indicative of depression could say 56% of the 34 test words on average, compared to 62% of children whose parent did not.
- The home learning environment was independently associated with vocabulary development. Children in the lowest HLE-Index quintile, representing those with the least frequent and varied home learning activities, had the lowest spoken vocabulary. On average, children in the lowest HLE-Index quintile could say 44% of the 34 test words, compared to those in the highest HLE-Index quintile, who could say 74% of the 34 test words.
- Finally, higher screen time was independently associated with vocabulary development. Children in the highest screen time quintile (averaging at around 5 hours per day) could say on average 53% of the 34 test words, compared to 65% for children in the lowest quintile of screen time (with an average of 44 mins per day, which meets the maximum 1 hour per day recommended by the World Health Organization for children aged 2 to 4).

At 2 years, how commonly are children in England presenting with possible emotional and behavioural problems?

- In a standardised questionnaire completed by primary caregivers, a quarter of the children scored above the threshold indicating possible behavioural or emotional problems. This is consistent with the proportion in the original standardisation sample. This threshold is designed to identify children who may benefit from further observation, professional discussion, or support (it does not constitute a diagnosis).

What socio-demographic, parental mental health, and home environment factors are linked to emotional and behaviour problems at 2 years?

- Several demographic factors were independently associated with possible behavioural and emotional problems, including family income, primary caregiver education, family type, and primary caregiver ethnicity. For example, 41% of children in the lowest income quintile had scores indicative of possible problems, compared to 12% in the highest income quintile. Similarly, 48% of children with primary caregivers with the lowest education levels had scores indicative of possible problems, compared to 15% with parents with the highest education levels. Children from single-parent households (39%) and those with primary caregivers of Asian or Asian British ethnicity (38%) were also more likely to have scores indicative of possible problems compared to those with coupled parents (21%) and White primary caregivers (21%), respectively.
- Both primary caregiver depression and anxiety were independently associated with an increased likelihood of children having possible behavioural and emotional problems. For instances, the rate of possible emotional or behavioural problems was 41% among children of primary caregivers with depression symptoms, compared to 23% of those without, and 46% among children of primary caregivers with anxiety symptoms, compared to 22% of those without.
- Higher screen time was independently associated with emotional and behavioural problems: 39% of children in the highest screen time quintile (average 5+ hours/day) had scores indicative of possible emotional and behavioural problems, compared to 17% in the lowest screen time quintile (average of 44 minutes per day).
- Overreactive parenting (the likelihood of displaying anger or irritability in response to a child's behaviour) was independently associated with emotional and behavioural problems, with 43% of children whose primary caregivers were in the highest quintile for overreactive parenting having scores indicative of possible problems, compared to 20% of those whose primary caregivers were in the lowest quintile.

This chapter describes the cohort children's developmental outcomes at age 2 in the areas of language ability and socio-emotional development. It explores associations between child development at 2 years and four key predictors: family socio-demographics, parental mental health, the home learning environment, and parenting style.

4.1. Background

Factors associated with variation in children's early development outcomes

Children's language and socio-emotional skills are key early indicators of positive child development. Variations in these skills impact other areas of a child's development in later years. Better language and socio-emotional skills are associated with higher levels

of educational attainment, making this a key focus area of the COT20s study. Several factors have been found to influence the development of children's language skills. These include family background, parental mental health, the home learning environment, and parenting styles. For instance, responsive, stimulating and age-appropriate language interactions, along with exposure to a rich variety of early learning environments, have been shown to contribute to positive child development across the cognitive, social, and emotional domains (Madigan et al., 2019). In Wave 1 of COT20s, a higher frequency and variety of caregiver-led home learning activities was associated with greater child language comprehension when babies were on average 9.5 months of age. At age 9 months, babies who were read to several times a day understood 36% more words than those who were never read to (15 words on average from a list of 51 test words, compared with 11), and babies who engaged in turn-taking play (such as peek-a-boo, pat-a-cake, "where's baby's eyes?") several times a day understood 50% more words on average than those who did not engage in this activity (15 words on average from a list of 51 test words, compared with 10; Bernardi & Fish, et al., 2023). Notably, in Wave 1, marked socio-economic disparities were identified in home learning activities, with primary caregivers that had higher incomes, higher levels of education, as well as those of White ethnicity, reporting higher frequencies and a greater variety of home learning activities. These findings add important insights into the earliest factors that might contribute to socioeconomic disparities in children's learning and development.

Language development since the COVID-19 pandemic

There has been particular interest in language development in young children in recent years because of concerns that the COVID-19 pandemic and its after-effects may have adversely affected children's opportunities to acquire key developmental skills. Of note, the Children of 2020s cohort was born in the autumn of 2021 and were therefore likely acquiring many of their age 2 language skills between early 2022 and late 2023, when the disruptions to everyday life and services had largely subsided. Nevertheless, some disruption remained evident in the period leading up to the Age 2 survey in 2023. For example, coverage of universal developmental reviews remained below pandemic levels into 2023 and beyond (Office for Health Improvement and Disparities, 2024), paediatric and other health services experienced ongoing extended waiting lists and appointment backlogs and the national Health Visitor Service Delivery Metrics appeared to show fewer children aged 2-2.5 years meeting their milestones in 2022-23 than in 2019 (although the differences were small and the data may not be representative, see Office for Health Improvement and Disparities, 2023). The impact of the pandemic is only one among several possible explanations for these trends. Other factors that have raised concerns in recent times in relation to early language development include the upward trend in relative childhood poverty since the mid-2010s (Platt, 2024) and increasing screen time among young children. The Children of the 2020s Study provides some of the first nationally representative data that can help evaluate the extent to which the language

skills of the generation of 2-year-olds who were born in late 2021 differ from earlier cohorts.

The importance and prevalence of young children's emotional and behavioural problems

Wave 2 of the COT20s study also included questions about children's socio-emotional wellbeing and mental health. There has been a growing awareness of the importance and impact of early childhood mental health difficulties and the need for improved identification, supportive services and professional training (The Academy of Medical Sciences, 2024). Furthermore, while poor wellbeing and mental ill-health in young children are key priorities to better understand, in and of themselves, they are also important to study longitudinally, because they are linked to poorer adjustment later on, such as during the transition to school (Devine et al., 2025). Studies have also found early behavioural problems to be a risk factor for lower academic test scores and lower educational attainment in the school years (Breslau et al., 2009). COT20s provides new and up-to-date nationally representative data on the extent of mental health and behavioural problems in very young children in England which is important for estimating the level of need in the community.

Factors associated with children's emotional and behavioural problems

Studies have shown that a range of family factors can influence the development of mental health symptoms, low wellbeing and emotional/behavioural problems in children. Evidence from the Millennium Cohort Study (MCS), for example, has shown large differences in socio-emotional outcomes linked to family income, with this gap widening between child ages of 3 and 5 years (Dearden et al., 2011). Parent mental health problems, such as depression or anxiety symptoms, have been linked with poorer emotional adjustment in young children (Whelan et al., 2014). Harsh parenting practices and attitudes have also been found to predict worse wellbeing and mental health in young children (Kingsbury et al., 2020). Children's emotional and behavioural problems can also impact on families, so these two factors (children's behavioural difficulties and parenting) are likely to mutually affect each other and lead to cycles of escalating problematic interactions over time (Patterson, 2015). Data from the MCS also showed that across early to mid-childhood, parents' psychological distress was associated with higher levels of harsh parenting (such as smacking and shouting) directed towards their children (Midouhas & Oliver, 2023).

The current chapter

Given the changing prevalence of parental mental health problems and the economic challenges faced by families since the COVID pandemic, new data on the prevalence and predictors of very early childhood mental health and language skills are needed to identify which groups could benefit from intervention. The current chapter presents data

from Wave 2 of the Children of the 2020s Study on children's language outcomes and emotional and behavioural difficulties, and addresses the following questions:

1. At age 2 years, what is the average level of children's language skills in England – as indicated by their spoken vocabulary?
2. What socio-demographic, parental mental health, and home environment factors are associated with differences in children's language abilities at 2 years?
3. At age 2 years, how commonly are children in England presenting with significant emotional and behavioural problems?
4. What socio-demographic, parental mental health, and home environment factors are associated with emotional and behaviour problems at 2 years?

Methodological details of the statistical modelling used throughout this chapter can be found in Appendix 2.

4.2. Language abilities at 2 years

Early language and communication are important developmental milestones. Although there are many dimensions to children's early language skills, a key domain that can be reliably measured through parent report is spoken vocabulary. A shortened version of the widely used caregiver-reported UK Communicative Development Inventory Words and Sentences questionnaire (CDI - Alcock et al., 2020) was administered at Wave 2 to assess children's spoken vocabulary. Primary caregivers were asked to report which words their child could say from a list of 34 everyday words and to include words their child used even if pronounced differently or could say in another language (see Appendix 12 for the list).

At an average age of 24.8 months, children could say an average of 21 words from the set of 34 provided (note this figure should not be taken to directly estimate the total number of words a child says at this age). The standard deviation (SD) was 11 words, indicating that the number of words varied considerably, with the majority of the study children saying between 10 and 32 words out of 34 (29% to 94%).

On average, girls could say 23 (SD = 10) of the 34 words (68% of the 34 test words), with most girls saying between 13 and 33 of the 34 words. Compared to girls, boys could say fewer words on average (18 words [SD = 11], or 53% of the 34 words), with most saying between 7 and 29 of the test words.

As language ability develops rapidly in the first few years of a child's life, and the children's age at the time of the Wave 2 survey ranged between 24 months and 28 months (depending on how quickly the primary caregiver responded to the invitation to take part), we expected some age-related differences. The variation in language

development by age is shown in Table 14. As expected, the number of words children could say increased with age.

Table 14. Percentage and mean number of words cohort children could say (out of a list of 34 common words) by month of age

Age (months)	Percentage of children	Mean number of words
24	54	20
25	27	21
26	10	22
27	5	23
28	3	24
<i>Unweighted base</i>	<i>4812</i>	<i>-</i>
<i>Weighted base</i>	<i>4811</i>	<i>-</i>

Base: All cohort children

Source: COT20s Wave 2

Table shows the weighted percentage of children and the weighted mean (standard deviation) of number of words children could say per age group.

To measure whether the language ability of the COT20s cohort children at 2 years was different to that of an earlier cohort of children of a similar age, we compared the number of words the COT20s children could say out of a list of 34 to the number of words an earlier reference sample could say from the same list. This reference sample consisted of a subset of 217 children who were the same age as the majority of the COT20s cohort children (24 months to 27 months) and were drawn from across the UK between 2017 and 2020. See Appendix 13 for more details of the comparison between the COT20s and reference sample.

Analysis revealed no significant differences in the mean number of words children could say in the COT20s cohort compared to the reference sample, while accounting for the children's ages. These findings provide a useful preliminary comparison of the early language skills of current cohort of English children relative to an earlier cohort. However, the reference sample was relatively small and is likely to be less demographically diverse than the COT20s sample (see Appendix 13). In addition, in these analyses it was not possible to account for important factors which can influence language development, such as children's sex, family composition, socio-economic background, or to employ population weightings, as these data were not available for the reference sample. However, we judge it unlikely that these factors would increase the estimate of vocabulary size in the reference sample, so this tends to favour an interpretation that the current cohort of 2-year-olds are not scoring substantially lower on vocabulary than this

earlier cohort. Nevertheless, further work comparing COT20s with larger, more demographically rich datasets would be needed to corroborate these results.

Further, it is important to note more generally that age 2 is a relatively early stage in language development, and that the language skill measured, spoken vocabulary, is just one aspect of speech, language and communication. Richer analysis will be possible with later waves of the study, as we assess more areas of speech and language development longitudinally.

4.3. What early factors are linked most to language abilities at 2 years?

To understand whether children's language abilities at age 2 varied depending on demographic, parental, and environmental factors a multivariate analysis was conducted. This analysis determined whether any of the following factors were independently associated with children's spoken vocabulary at 2 years (as measured by the number of words the child could say out of a test list of 34 words):

- Demographic characteristics, including primary caregiver's education level, family income, primary caregiver's ethnicity, and family type.
- Primary caregiver's levels of anxiety and depression symptoms measured by the PHQ and GAD (below or above threshold), respectively.
- The home learning environment, measured by the Home Learning Environment Index (HLE-Index).
- Screen time, measured as the child's total amount of time spent watching or playing on a screen on a typical day.
- Primary caregiver's levels of overreactive parenting measured by the overreactive domain of the Parenting Scale.

All listed factors, as well as the child's age at the time of the Wave 2 survey and the child's sex, were included in the same analytic model to test the independent effect of each factor while controlling for the effect of all other factors in the analysis.

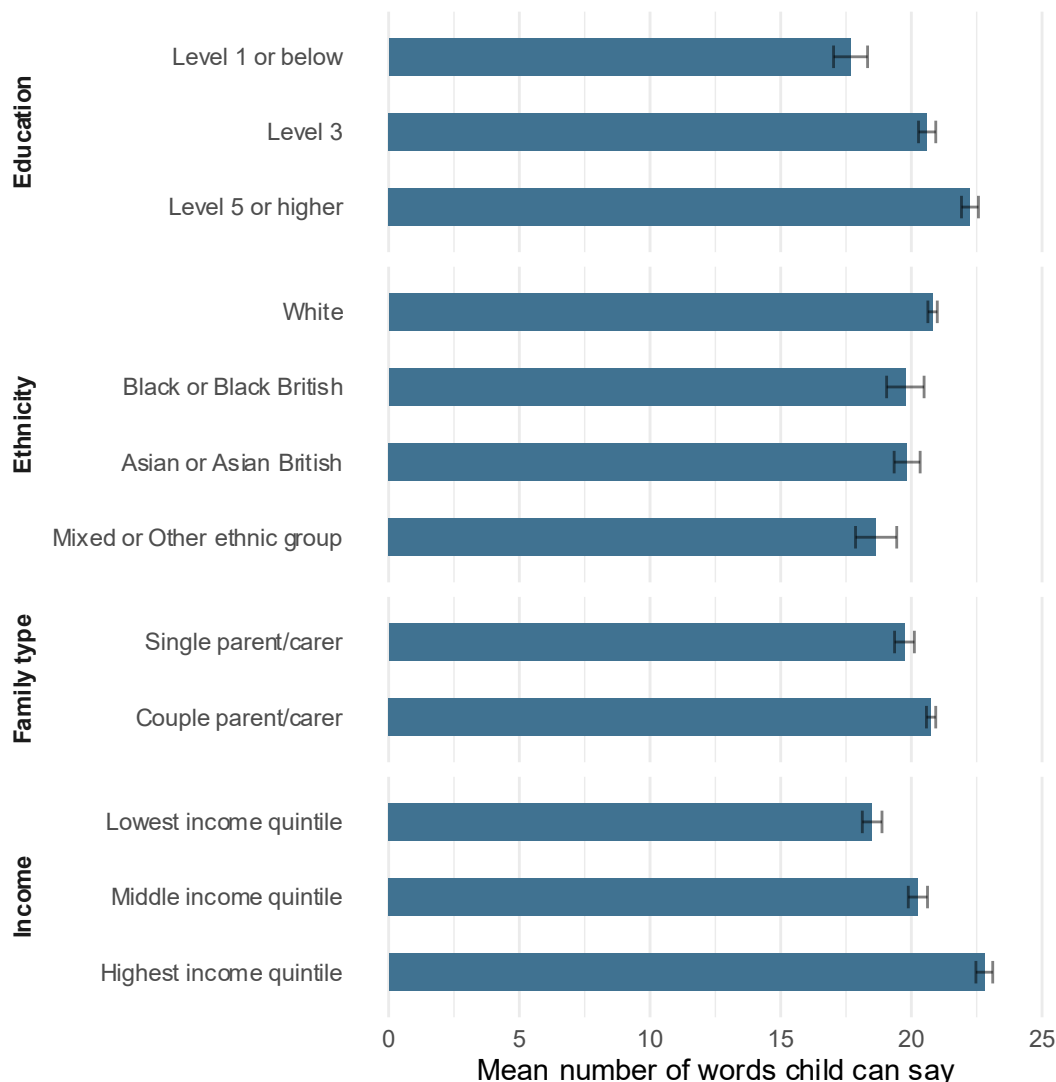
The same multivariate analysis model was used to analyse the role of demographic factors, parental mental health factors, home learning environment, screen time, and parenting style on language abilities, but the findings are described separately in subsections 4.3.1. to 4.3.5.

4.3.1. Language abilities at 2 years by demographic characteristics

The number of words children could say, analysed by family income, primary caregiver's education level, primary caregiver's ethnicity and family type, are displayed in Figure 18.

See Appendix 2 Table 7 for a breakdown of the mean number of words the child could say by demographic characteristics.

Figure 18. Mean number of words children can say at 2 years by demographic characteristics



Base: All cohort children.

Source: COT20s Wave 2

Figure shows weighted mean number of words children could say by demographic factors (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors).

4.3.2.1. Multivariate results: language abilities at 2 years and demographic characteristics

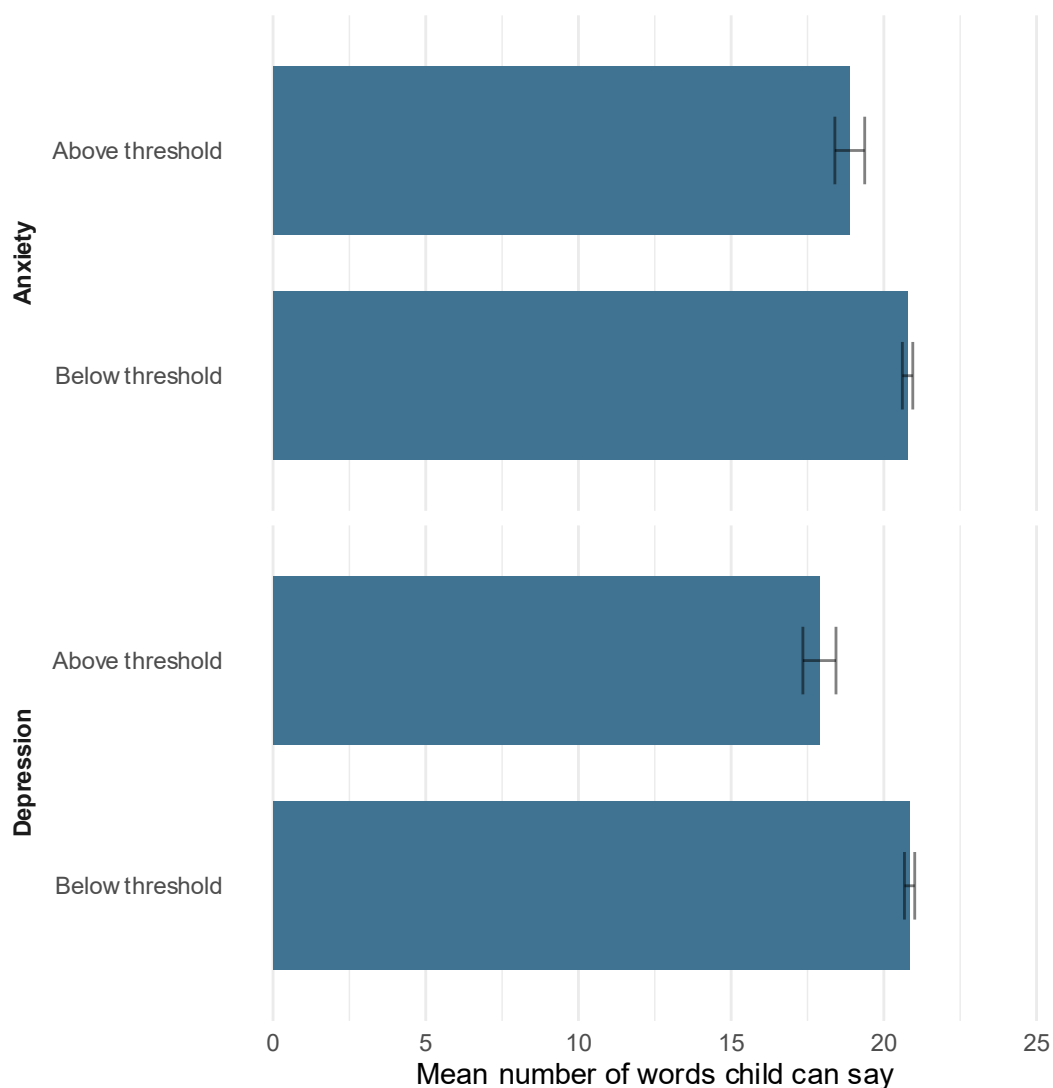
Findings from the multivariate analysis (described above in section 4.3.), indicate that, out of the demographic factors examined, only family income associated independently with the number of words a cohort child could say at 2 years (over and above the association of other demographic and parental mental health factors).

Children from higher income families could say more words on average than children from lower income families when controlling for the effect of other factors in the model. For example, children in the highest income quintile could, on average, say 68% of the 34 test words, compared to children from the lowest income quintile, who on average could say 53% of the 34 test words.

4.3.2. Differences in language abilities at 2 years by primary caregiver mental health

The number of words the cohort child could say at 2 years was examined in relation to whether the primary caregiver reported symptoms indicative of depression or anxiety as measured by the PHQ and GAD, respectively. The data are displayed in Figure 19. Appendix 2 Table 7 for a breakdown of the mean number of words the child could say by the primary caregiver's depression and anxiety symptoms.

Figure 19. Mean number of words children can say at 2 years by primary caregiver anxiety and depression



Base: All cohort children.

Source: COT20s Wave 2.

Figure shows weighted mean number of words children could say by primary caregivers' threshold for anxiety and depression (error bars denote weighted standard error). Unadjusted results are shown (not controlling for other factors).

4.3.2.1. Multivariate results: language abilities at 2 years and parental mental health

It should be noted that anxiety and depression symptoms tend to be highly correlated, which makes it difficult to distinguish their independent association with outcomes. Therefore, an additional analysis was conducted to parse the influence of anxiety and depression on children's language. The findings from this analysis are described below, and are detailed in Appendix 2.

Findings from this multivariate analysis (see Appendix 2 Table 8) indicated that primary caregiver's depression, but not anxiety, associated independently with the number of words their child could say at 2 years (over and above the association of all other factors added to the analysis model).

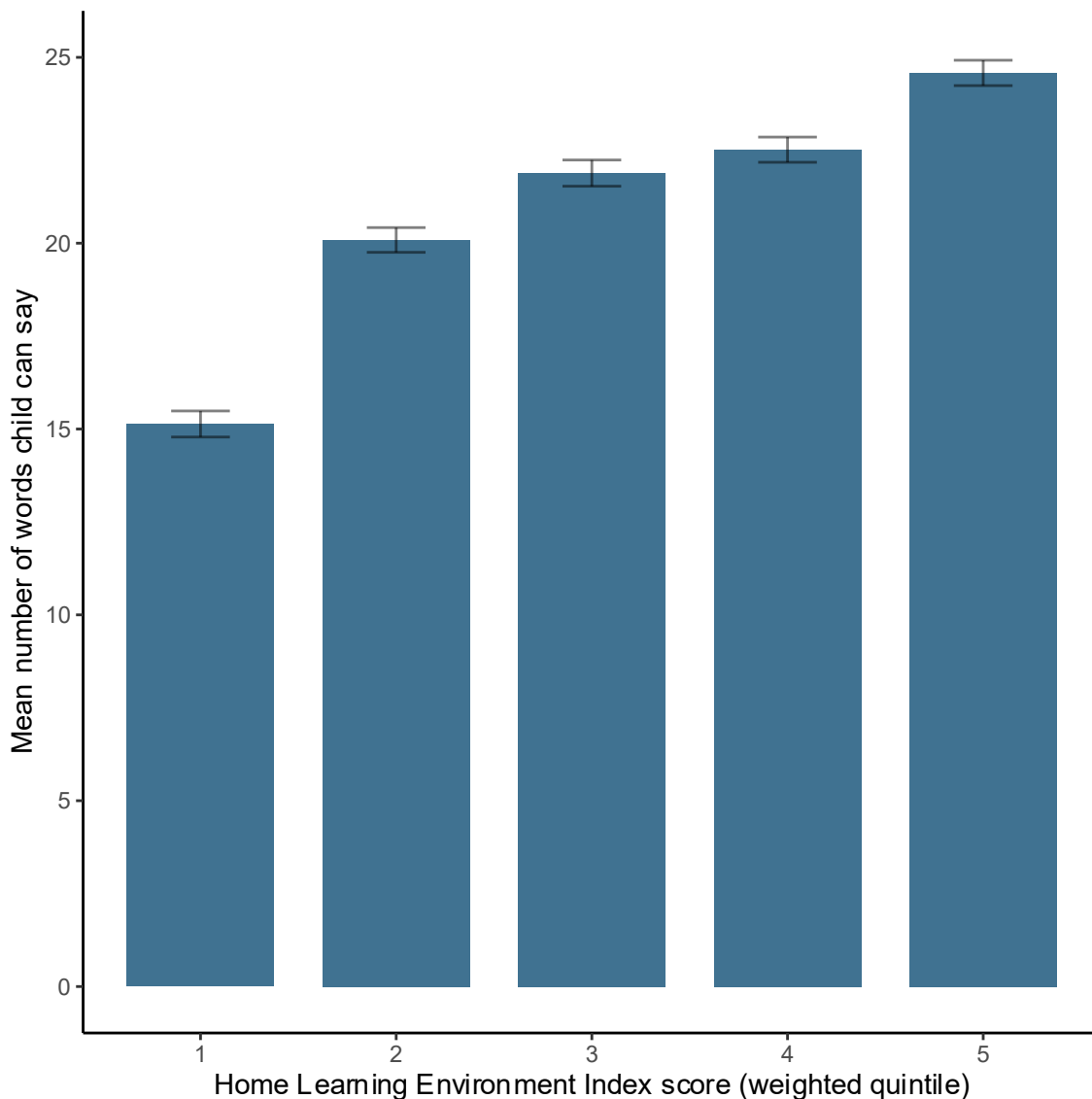
Children whose primary caregivers reported symptoms indicative of depression could say fewer words on average than those children whose primary caregivers did not report symptoms indicative of depression. Illustrating this difference, children whose primary caregiver reported symptoms indicative of depression could say, on average, 56% of the 34 test words, compared to those whose primary caregiver did not show symptoms of depression, who could say an average of 62% of the 34 test words.

The findings above are detailed in Appendix 2 Table 8 and suggest that parental depression is likely more robustly and negatively associated with early vocabulary development than parental anxiety.

4.3.3. Differences in language abilities at 2 years by home learning environment

The number of test words the cohort child could say at 2 years by Home Learning Environment Index score quintile is displayed in Figure 20. See Appendix 2 Table 7 for a breakdown of mean number of words the child could say by quintiles of HLE-Index scores.

Figure 20. Mean number of words children can say at 2 years by weighted quintile of the Home Learning Environment Index score



Base: primary caregivers and COT20s children.

Source: COT20s age 2.

Figure shows weighted mean number of words children could say by weighted quintiles of home learning environment index scores (error bars denote weighted standard error). Range of HLE-Index score by quintile: Q1 = 0 to 17; Q2 = 18 to 22; Q3 = 23 to 25; Q4 = 26 to 29; Q5 = 30 to 35. Unadjusted results are shown (not controlling for other factors). Unadjusted results are shown (not controlling for other factors).

4.3.3.1. Multivariate results: language abilities at 2 years and home learning environment

Findings from the multivariate analysis (described above in section 4.3) indicated that the variety and/or frequency of home learning environment activities (as measured by the HLE-Index score) associated independently with the number of words children can say at 2 years (over and above the association of all other factors added to the analysis model).

On average, at 2 years, children who were in the lowest quintile of HLE-Index scores (scores between 0 and 17) were able to say 44% of the 34 test words on average, compared to those in the highest quintile of HLE-Index score (scores between 30 and 35) who could say on average 74% of the 34 test words.

In addition to this overall positive association, the analysis also showed evidence of a non-linear relationship. While higher home learning environment index scores were associated with more words the children could say, the largest differences were seen at the lower end of the home learning environment scale.

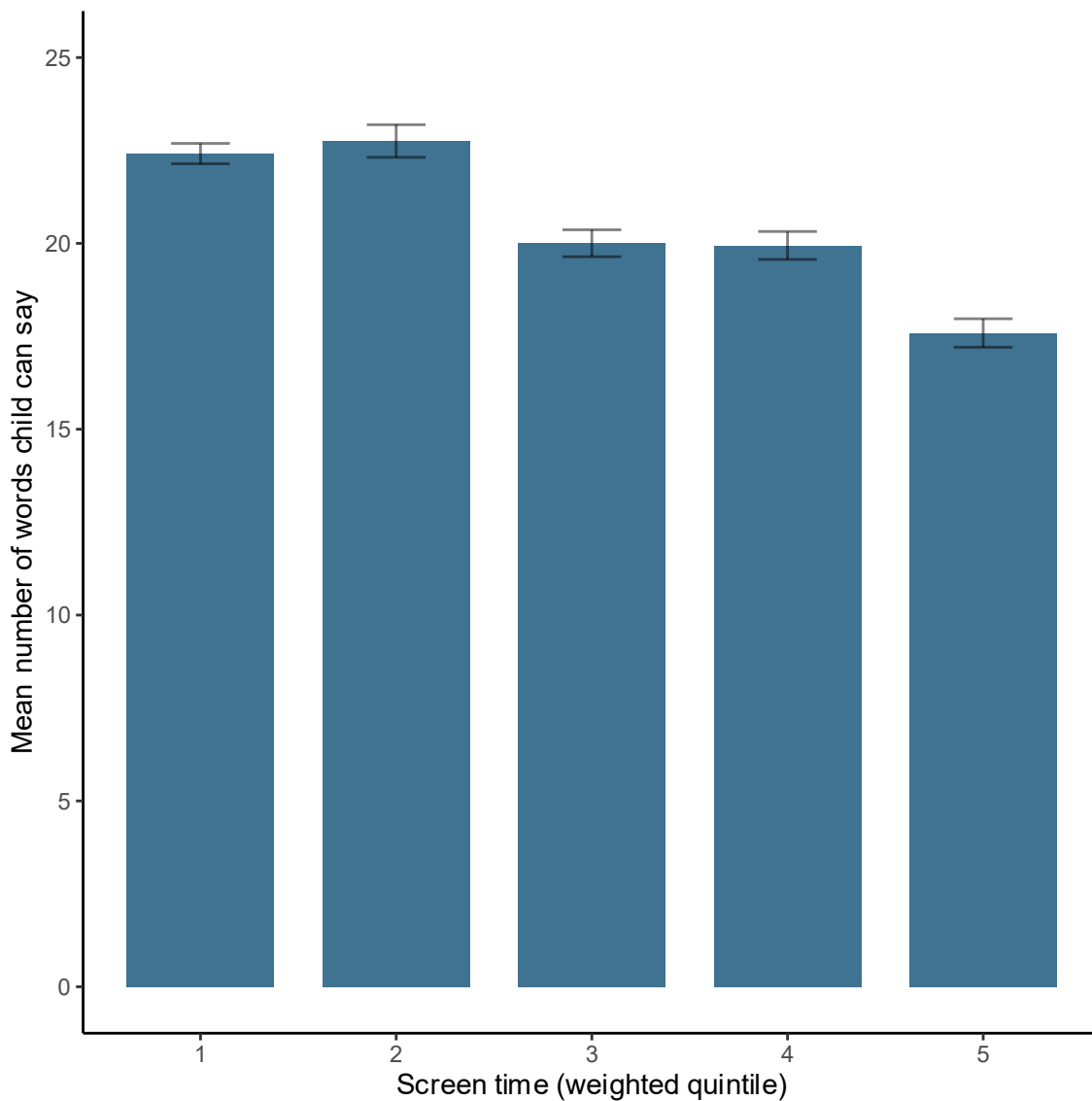
Illustrating this, children in the lowest HLE-Index quintile – where, for example, 21% were read to daily (see Appendix 10 for a further breakdown of the frequency of engagement in home learning activities in this quintile) – were able to say an average of 44% of the 34 test words. In contrast, children in the second lowest HLE-Index quintile – where, on average, 47% were read to daily (see Appendix 10) – were able to say on average 59% of the 34 test words, a difference of 12%. In contrast, children in the top two HLE-Index quintiles (where 72% and 88% were read to daily, respectively, see Appendix 10) were able to say an average of 68% and 74% of the 34 test words, respectively, a difference of just 6%.

These findings, if they were to reflect a causal influence of the home learning environment on language development, could suggest that improvements in the home learning environment would have the greatest impact on children's early language outcomes for those in the lowest HLE-Index quintile. This could suggest that interventions that promote even small increases in home learning activities (such as more frequent looking at books or being read to, playing with letters, playing with numbers or counting, being taught poems, songs, or nursery rhymes, and painting or drawing) could yield meaningful improvements in children's vocabulary if targeted at the most in-need groups.

4.3.4. Differences in language abilities at 2 years by screen time

The number of test words the cohort child could say at 2 years as a function of the child's screen time is displayed in Figure 21. See Appendix 2 Table 7 for a breakdown of mean number of words the child could say by quintiles of screen time.

Figure 21. Mean number of words children can say at 2 years by weighted quintile of screen time



Base: all cohort children.

Source:

COT20s age 2. Figure shows weighted mean number of words the children could say by weighted quintiles of typical daily screen time (error bars denote weighted standard error). Weighted mean screen time by quintile: Q1 = 44 minutes; Q2 = 86 minutes; Q3 = 119 minutes; Q4 = 167 minutes; Q5 = 313 minutes. Unadjusted results are shown (not controlling for other factors).

4.3.4.1. Multivariate results: language abilities at 2 years and screen time

Findings from the multivariate analysis (described above in section 4.3.), indicate that the quantity of screen time was associated independently with the number of words children can say at 2 years (over and above the association of all other factors added to the analysis model).

The analysis indicated that children who had less screen time could say more words at 2 years, on average, than those who had more screen time. Children who were in the lowest quintile of screen time (mean = 44 minutes per day) were able to say, on average, 65% of the 34 test words, compared to those in the highest quintile of screen time (mean = 313 minutes / 5.2 hours per day) who could say on average 53% of the test 34 words.

In addition to the overall negative association, the analysis revealed a non-linear relationship between screen time and vocabulary. It can be seen in figure 21 that there was little difference in vocabulary between children in the first two quintiles of screen time, but vocabulary scores were noticeably lower for those in the third to fifth quintiles. Illustrating this, children in the lowest screen time quintile (average screen time of 44 minutes per day) could say 65% of the 34 test words on average, which was almost the same as the children in the second quintile (average screen time of 86 minutes per day), who could say 68% of the 34 test words. However, spoken vocabulary was appreciably lower in the third quintile (average screen time of 119 minutes) compared to the second, at 59%. There was also a noticeable reduction in vocabulary size between the fourth and fifth quintiles (averaging 167 and 313 minutes, or roughly 2.8 and 5.2 hours per day), from 58% to 53% of the test words spoken.

If the observed associations proved to be causal, they could suggest that guidance or interventions to reduce screen time might yield the greatest improvement in children's language development if they helped to keep screen time among 2-year-olds below approximately 1.5 hours a day.

4.3.4.2. Interaction between screen time and screen-related parenting in language abilities at 2 years

Although the above findings indicate that higher levels of screen time is associated with lower vocabulary at 2 years, we know that screen time can be a shared activity, and practices such as co-viewing during screen time may mitigate the negative impact of screen time on child developmental outcomes (Madigan et al., 2020). This is because when co-viewing, caregivers may monitor content quality (such as age appropriateness, or educational content) or supplement the screen content and make it more interactive, for example by explaining the content and asking questions, providing opportunities for the child to effectively apply learning concepts (Madigan et al., 2020) and engage in conversation. The analysis below explores whether the frequency with which primary caregivers watch alongside their child moderates the negative relationship between screen time and language ability described above (in section 4.3.4.1.).

An expanded version of the multivariate analysis described in section 4.3. and Appendix 2 was conducted to examine whether the significant association previously observed between screen time and the number of words children could say was affected by primary caregiver co-viewing behaviour. The model included all the predictor variables used in section 4.3. However, instead of a combined watching and playing screen time

amount (like in the analysis above), screen time was defined only as the amount of time spent watching television, videos or other digital content on a screen²². Co-viewing was added to the model as a covariate, and an interaction term with amount of time spent watching television, videos or other digital content on a screen, and primary caregiver-reported co-viewing during this screen time.

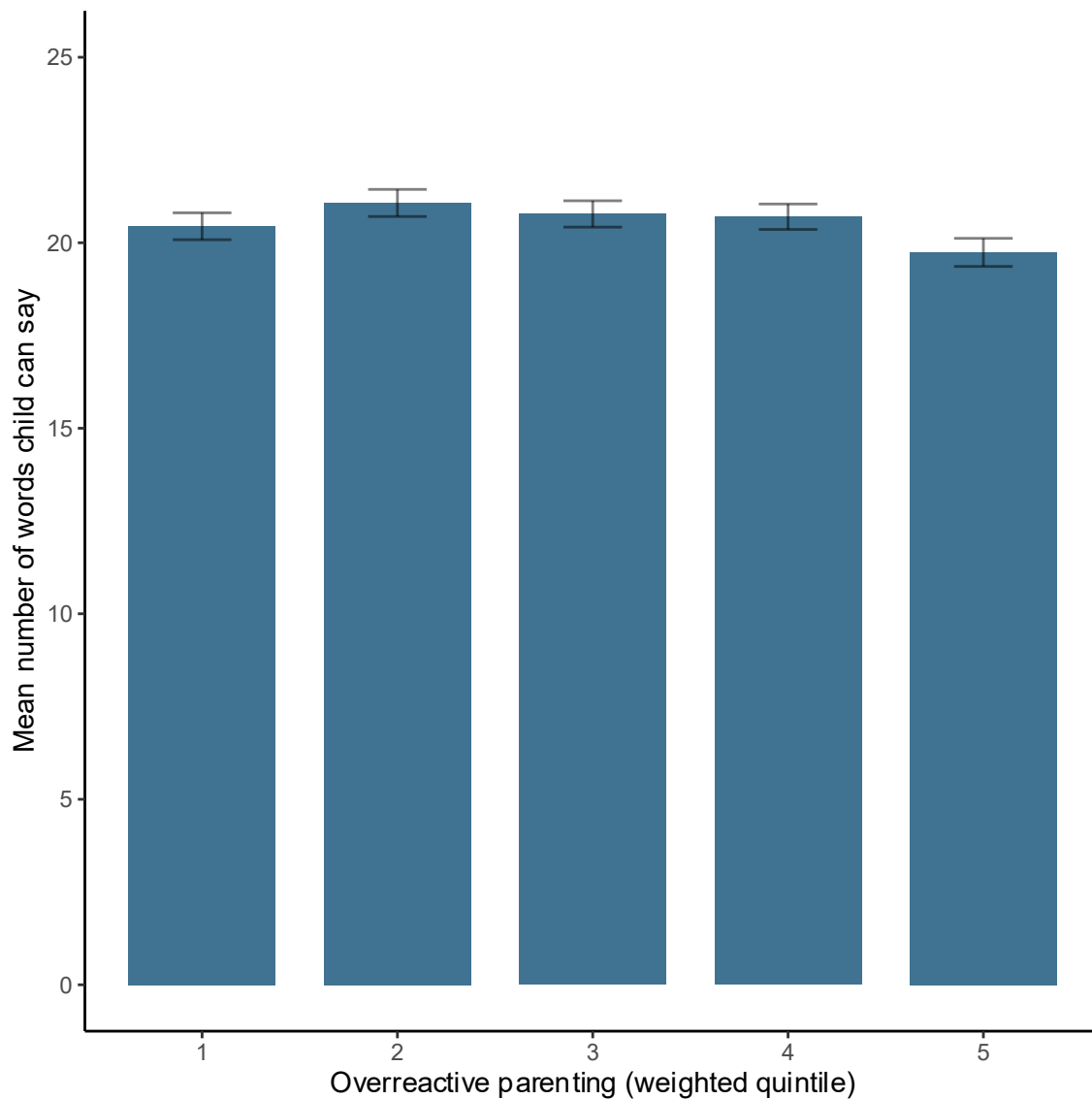
This analysis did not indicate that the frequency of primary caregiver co-watching affected the relationship between screen time and language development at age 2 (full results are displayed in Appendix 14).

4.3.5. Differences in language abilities at 2 years by overreactive parenting style

The number of words the cohort child could say at 2 years by overreactive parenting style quintile is displayed in Figure 22. See Appendix 2 Table 10 for a breakdown of the mean number of words the child could say by quintiles of overreactive parenting score.

²² This inclusion of amount of time spent, and co-viewing behaviours while watching television, videos or other digital content on a screen only was to limit introducing noise in the analysis model from co-viewing play behaviours (which pattern differently in the same, see Table 13).

Figure 22. Mean number of words children can say at 2 years by weighted quintile of overreactive parenting



Base: primary caregivers and COT20s children

Source: COT20s age 2.

Figure shows weighted mean number of words children could say by weighted quintiles of overreactive parenting score (error bars denote weighted standard error). Weighted mean overreactive parenting score by quintile: Q1 = 0.31; Q2 = 0.84; Q3 = 1.31; Q4 = 1.92; Q5 = 3.00. Unadjusted results are shown (not controlling for other factors).

4.3.5.1. Multivariate results: language abilities at 2 years and overreactive parenting

The findings from multivariate analysis (described above in section 4.3.) show that overreactive parenting was not associated independently with the number of words children are able to say at 2 years (over and above the association of all other factors added to the analysis model).

4.4. Emotional and behavioural problems development at 2 years

The Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan & Carter, 2006) is a short parent-completed questionnaire designed to identify potential emotional and behavioural concerns in toddlers aged 12 to 36 months.

This section focuses on analysis of the BITSEA Problem Total score, a measure of the frequency of behaviours indicative of possible socio-emotional and behavioural problems. The maximum possible BITSEA Problem Total score is 62; the COT20s children scores ranged from 0 to 59. In this study, the average BITSEA Problem Total score at age 2 was 10.7, with girls scoring 10.1 and boys 11.3.

The BITSEA includes recommended age- and sex-specific thresholds intended to flag children who may be experiencing elevated emotional or behavioural difficulties and who might benefit from further assessment or support. These thresholds are percentile-based, identifying children scoring in the top 25% of the original normative reference sample, and are not intended to be diagnostic. In the COT20s sample, 25% of children scored above these thresholds, suggesting that the cohort shows similar overall rates of emotional and behavioural difficulties to those observed in the original (earlier, US-based) reference sample.

4.5. What early factors are linked to emotional and behavioural problems in 2-year-olds?

To understand whether the children's behavioural and emotional problems at age 2 varied depending on demographic, parental, and environmental factors a multivariate analysis was conducted. This analysis determined whether any of the following factors were independently associated with children's behavioural and emotional problems (as indicated by being above the BITSEA Problem Total Score threshold) at 2 years:

- Demographic characteristics, including primary caregiver's education level, family income, primary caregiver's ethnicity, and family type.
- Primary caregiver's levels of anxiety and depression symptoms measured by the PHQ and GAD (below or above threshold), respectively.
- Home learning environment, measured by the Home Learning Environment Index (HLE-Index).
- Screen time, measured as the child's total amount of time spent watching or playing on a screen on a typical day.
- Primary caregiver's levels of overreactive parenting measured by the overreactive domain of the Parenting Scales.

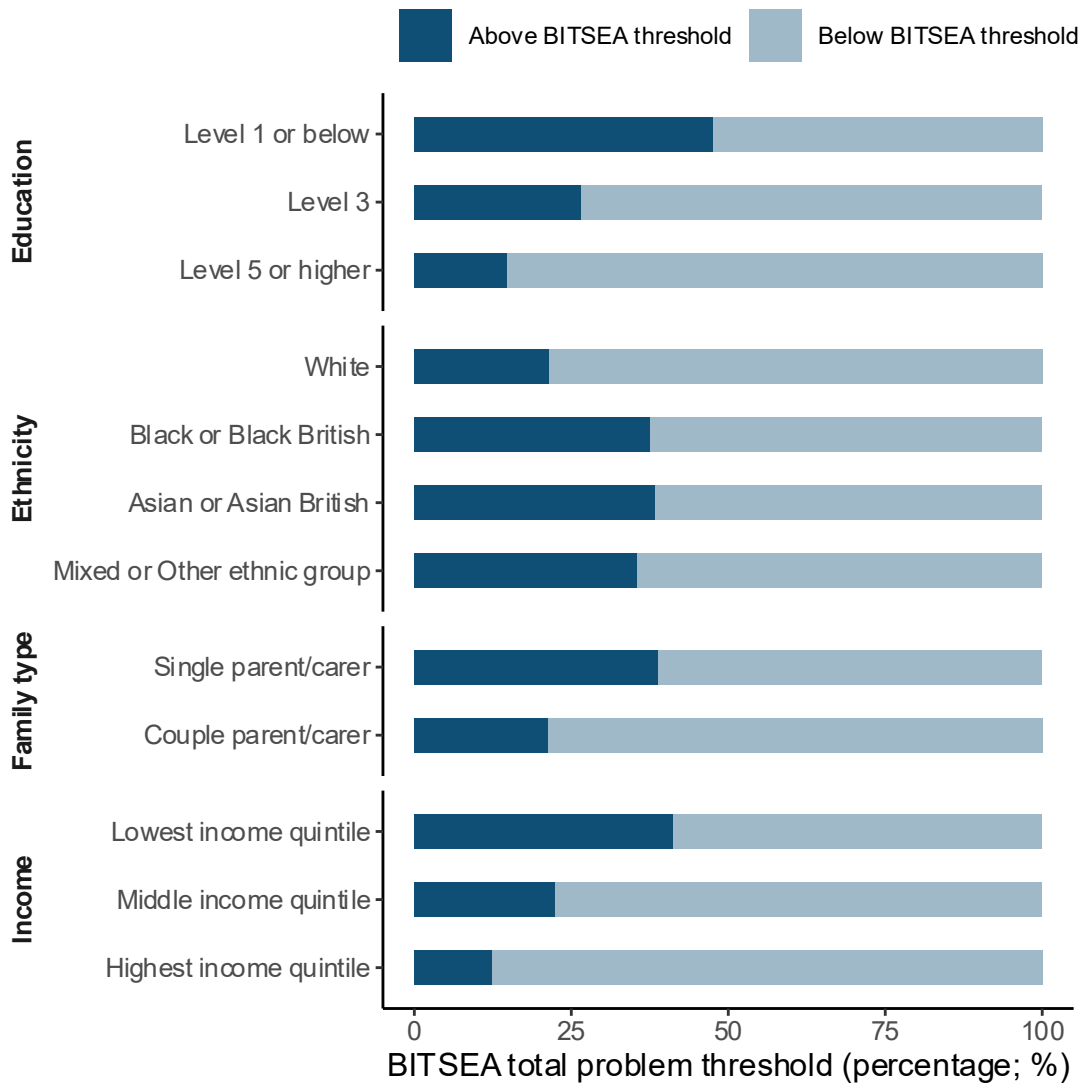
All listed factors, as well as the child's age at the time of the Wave 2 survey and the child's sex, were included in the same analytic model in order to test the independent effect of each factor while controlling for the effect of all other factors in the analysis.

The same multivariate analysis model was used to analyse the role of both demographic factors and primary caregiver mental health factors on screen time, but the findings are described separately in subsections 4.5.1. to 4.5.5.

4.5.1. Emotional and behavioural problems at 2 years by demographic characteristics

The percentage of children above threshold for having possible behavioural and emotional problems by family income, primary caregiver's education level, primary caregiver's ethnicity and family type are displayed in Figure 23. See Appendix 2 Table 10 for a breakdown of the percentage of those with possible emotional and behavioural problems by demographic characteristics.

Figure 23. Rate of possible emotional and behavioural problems at 2 years by demographic characteristics



Base: primary caregivers and COT20s children.

Source: COT20s age 2

Figure shows weighted percentage above or below threshold for emotional and behavioural problems by demographic factors. Unadjusted results are shown (not controlling for other factors).

4.5.1.1. Multivariate results: behaviour and emotional problems at 2 years and demographic characteristics

Findings from multivariate analysis (described above in section 4.5.) indicate that, out of the demographic factors examined, family income, primary caregiver education, family type, and primary caregiver ethnicity were associated with children’s possible behavioural and emotional problems (over and above the association of all other factors added to the analysis model).

This multivariate analysis indicated that children from families with lower incomes were more likely to be above the threshold for possible behavioural and emotional problems, compared to those from families with higher family income. Illustrating this, 41% of children in the lowest income quintile were above the threshold for possible behavioural and emotional problems, compared to 12% of children in the highest income quintile – three and a half times lower than in the lowest income quintile.

This multivariate analysis also indicated that children of primary caregivers with lower levels of education were more likely to be above the threshold for possible behavioural and emotional problems, compared to those with higher levels of education. Illustrating this, 48% of children of primary caregivers with the lowest level of education were above the threshold for behavioural and emotional problems, compared to 15% of children of primary caregivers with the highest levels of education, again nearly a three and half times lower rate (3.2 times lower).

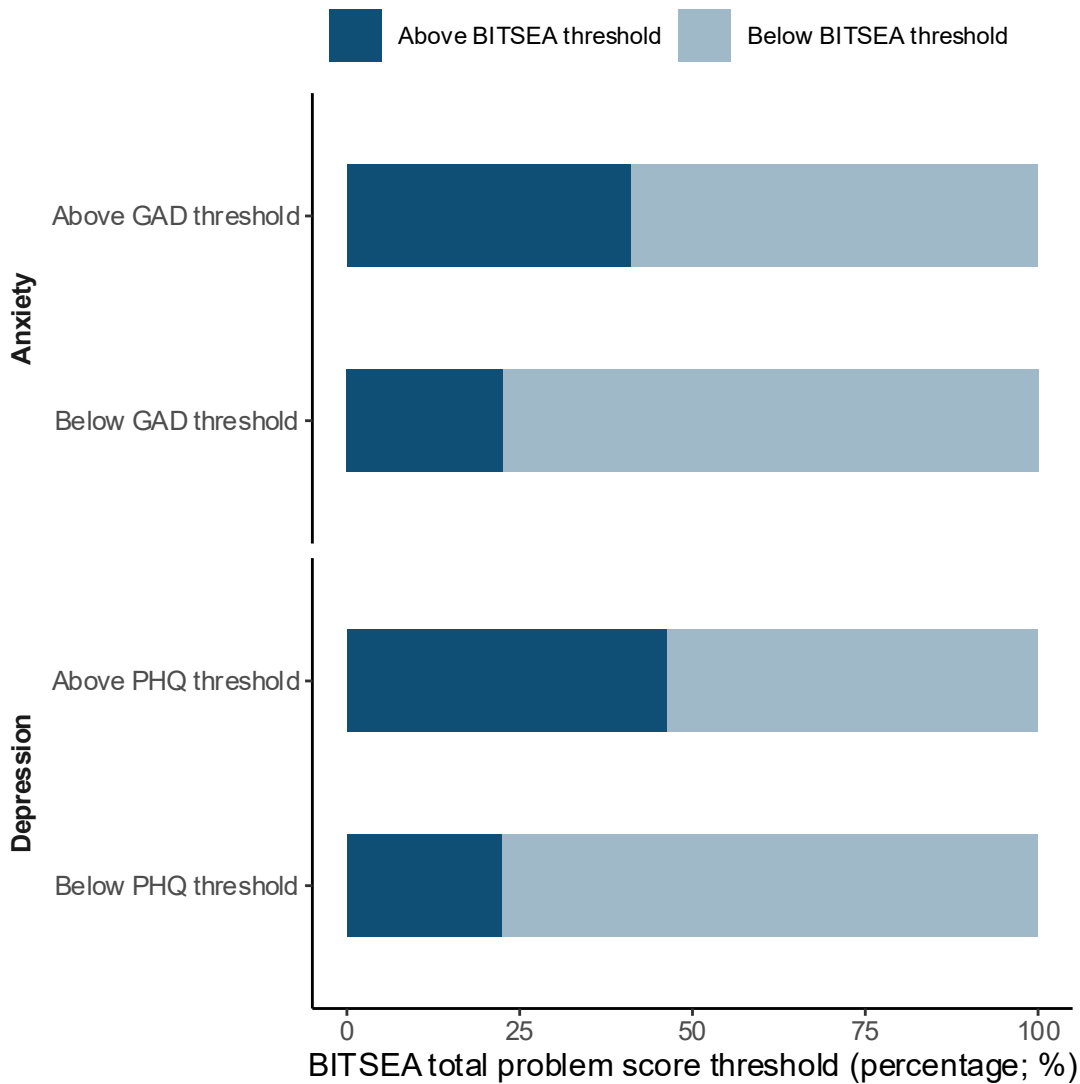
The multivariate analysis also indicated that children from single parent/carer households were more likely to be above the threshold for possible behavioural and emotional problems, compared to those from coupled parent/carer households. Just over one third (39%) of children of single parent/carers were above threshold for possible behavioural and emotional problems, compared to 21% of children with two caregivers in the home, approximately half the rate experienced by single parent/carer households.

This multivariate analysis also indicated that children of primary caregivers of Asian or Asian British ethnicity were more likely to be above threshold for possible behavioural and emotional problems, compared to those of primary caregivers of White ethnicity. Just over a third (38%) of children of primary caregivers of Asian or Asian British ethnicity were above the threshold for possible emotional and behavioural problems, compared to 21% of children of primary caregivers of White ethnicity, 1.8 times lower than the rate among Asian or Asian British families. The differences related to single parent/carer status and ethnicity were notably smaller than those associated with income and education.

4.5.2. Differences in emotional and behavioural problems at 2 years by primary caregiver mental health

The percentages of children above threshold for possible emotional and behavioural problems (according to BITSEA Problem Total Score) according to whether the primary caregiver had symptoms indicative of depression or anxiety (according to the PHQ and GAD, respectively) are displayed in Figure 24. See Appendix 2 Table 10 for a breakdown of the percentage of those with possible emotional and behavioural problems by parental mental health.

Figure 24. Rate of possible emotional and behavioural problems at 2 years by primary caregivers' anxiety and depression



Base: primary caregivers and COT20s children.

Source: COT20s age 2

Figure shows the weighted percentage above or below the threshold for emotional and behavioural problems by primary caregiver's threshold for depression or anxiety. Unadjusted results are shown (not controlling for other factors).

4.5.2.1. Multivariate results: behaviour and emotional problems at 2 years and parental mental health

Findings from multivariate analysis (described above in section 4.5.) indicated that primary caregivers' depression and anxiety symptoms were each associated independently with their child being above threshold for possible behavioural and emotional problems (over and above the association of all other factors added to the analysis model).

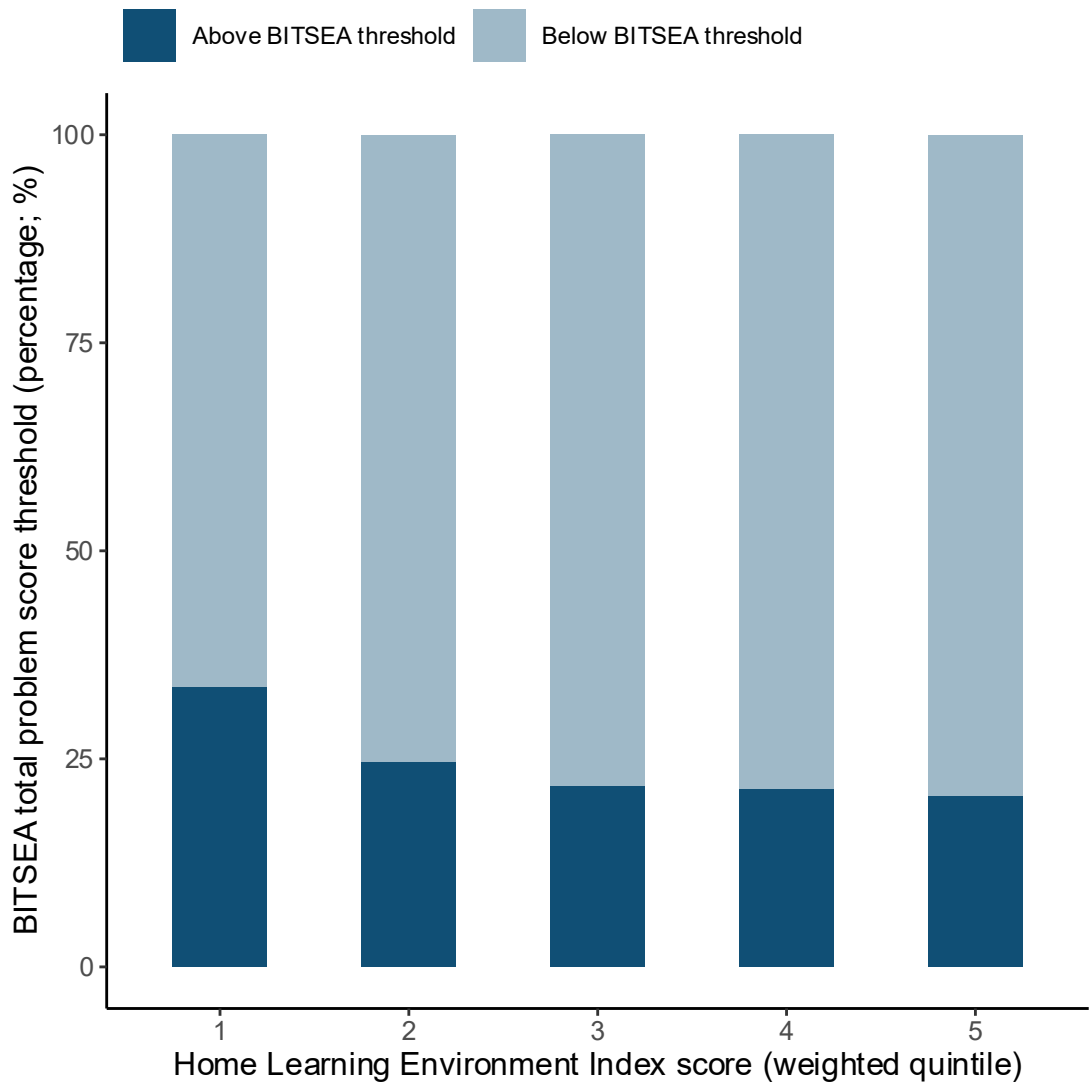
The analysis found that children were more likely to score above the threshold for emotional and behavioural problems if their primary caregiver had symptoms indicative of either depression or anxiety, compared to those without depression or anxiety.

To illustrate the association with parental depression, 41% of children whose primary caregiver reported symptoms indicative of depression were above threshold for possible behavioural and emotional problems, compared to 23% of children who had a primary caregiver without symptoms indicative of depression. Similarly, 46% of children whose primary caregiver reported symptoms indicative of anxiety were above threshold for possible behavioural and emotional problems, compared to 22% of children who had a primary caregiver without symptoms indicative of anxiety.

4.5.3. Differences in emotional and behavioural problems at 2 years by the home learning environment

The percentages of children above the threshold for possible emotional and behavioural problems analysed by Home Learning Environment Index (HLE-Index) scores are displayed in Figure 25. See Appendix 2 Table 10 for a breakdown of the percentages of those with possible emotional and behavioural problems by quintiles of HLE-Index score.

Figure 25. Rate of possible emotional and behavioural problems at 2 years by weighted quintile of home learning environment index score



Base: primary caregivers and COT20s children.

Source: COT20s age 2

Figure shows weighted percentage above or below threshold for emotional and behavioural problems by weighted quintiles of home learning environment index score. Range of HLE-Index score by quintile: Q1 = 0 to 17; Q2 = 18 to 22; Q3 = 23 to 25; Q4 = 26 to 29; Q5 = 30 to 35. Unadjusted results are shown (not controlling for other factors).

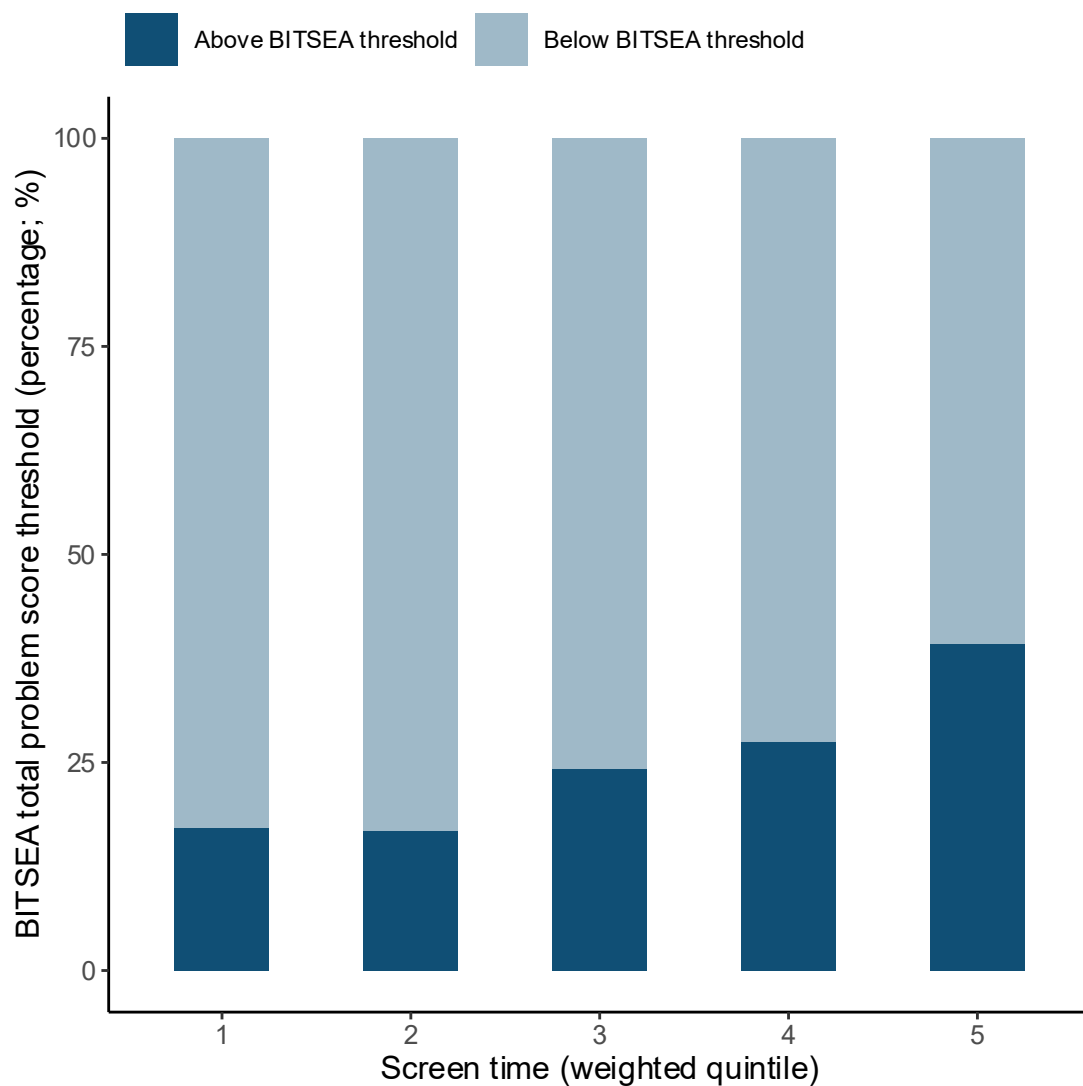
4.5.3.1. Multivariate results: behaviour and emotional problems at 2 years and the home learning environment

Findings from multivariate analysis (described above in section 4.5.) indicated that the variety and/or frequency of the home learning environment activities did not associate independently with the child's being above threshold for possible behavioural and emotional problems (over and above the association of all other factors added to the analysis model).

4.5.4. Emotional and behavioural problems at 2 years by screen time differences

The percentage of children above threshold for possible emotional and behavioural problems cross-analysed by the amount of daily screen time is displayed in Figure 26. See Appendix 2 Table 10 for a breakdown of the percentage of those with possible emotional and behavioural problems by quintiles of screen time.

Figure 26. Rate of possible emotional and behavioural problems at 2 years by weighted quintile of screen time



Base: primary caregivers and COT20s children.

Source: COT20s age 2

Figure shows weighted percentage above or below threshold for emotional and behavioural problems by weighted quintiles of screen time. Weighted mean screen time by quintile: Q1 = 44 minutes; Q2 = 86 minutes; Q3 = 119 minutes; Q4 = 167 minutes; Q5 = 313 minutes. Unadjusted results are shown (not controlling for other factors).

4.5.4.1. Multivariate results: behavioural and emotional problems at 2 years and screen time

Findings from multivariate analysis (described above in section 4.5.) indicated that the amount of screen time was associated independently with children's possible behavioural and emotional problems (over and above the association of all other factors included in the analysis model).

The analysis indicated that children with less daily screen time had lower rates of possible behavioural and emotional problems than those with higher levels of daily screen time. Illustrating this, 17% of children in the lowest quintile of screen time (mean = 44 minutes) and second lowest quintile of screen time (mean = 86 minutes) were above the threshold for possible behavioural and emotional problems, compared to 24%, 27% and 39% of those in quintiles 3, 4 and 5, respectively (Q3 mean = 119 minutes, Q4 mean = 167 minutes, Q5 mean = 313 minutes or 5.2 hours).

4.5.4.2. Interaction between screen time and screen-related parenting on socio-emotional and behavioural problems at 2 years

The above findings suggest that higher levels of screen time are linked with an increased likelihood of socio-emotional and behavioural problems at 2 years. However, as explained in section 4.5.3.2., co-viewing during screen time, may mitigate the negative impact of screen time can have on child development outcomes (Madigan et al. 2020).

An expanded version of the multivariate analysis described in section 4.5. and Appendix 2 was conducted to examine whether the significant association previously observed between screen time and children's socio-emotional and behavioural development (section 4.5.4.1.) was moderated by primary caregiver co-viewing behaviour. The model included all the predictor variables used in section 4.5. However, instead of a combined watching and playing screen time amount (like in the analysis above), screen time was defined only as the amount of time spent watching television, videos or other digital content on a screen (similar to section 4.3.4.2)²³. Co-viewing was added to the model as a covariate, and an interaction term with amount of time spent watching television, videos or other digital content on a screen, and primary caregiver-reported co-viewing during this screen time.

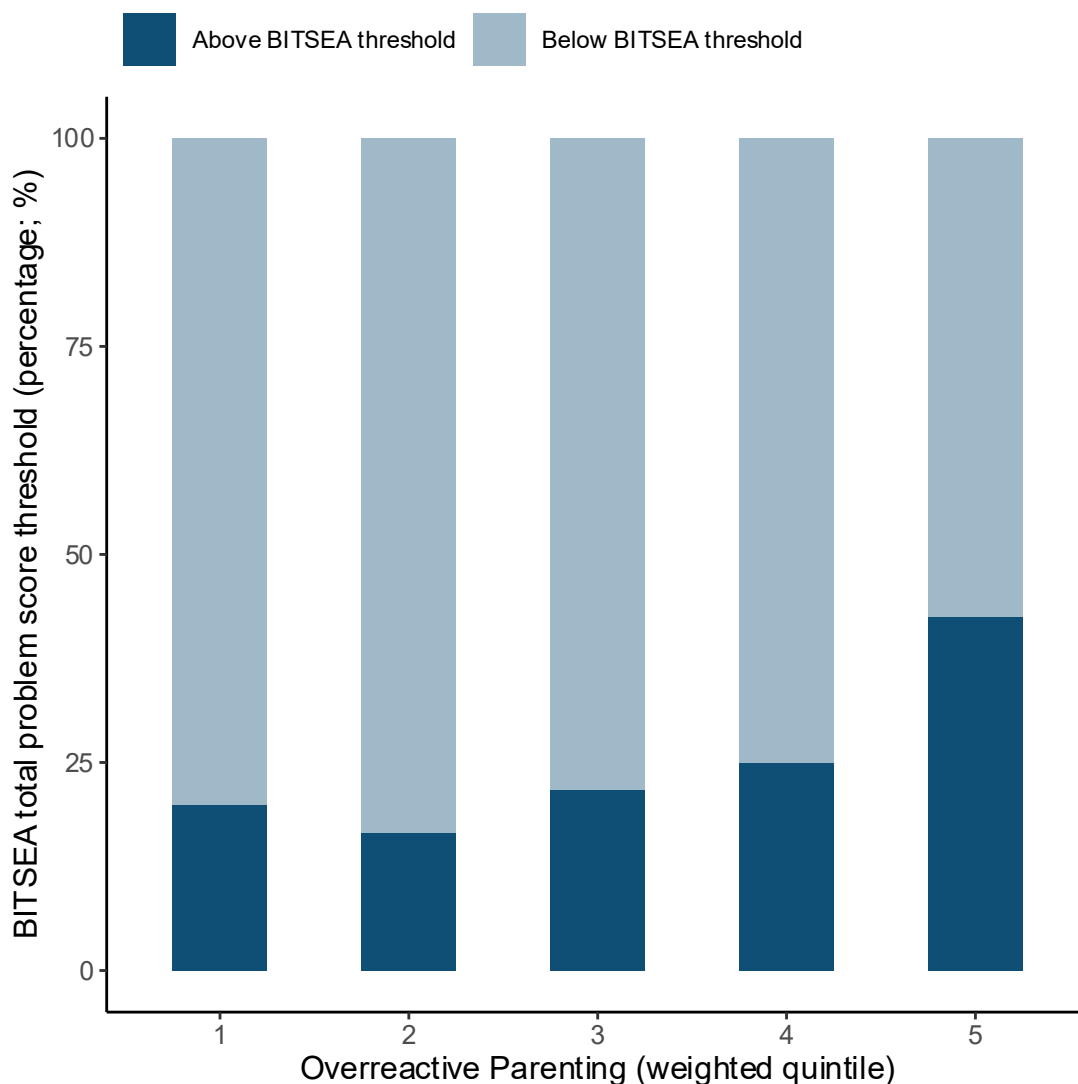
This analysis did not indicate that the frequency of primary caregiver co-watching affected the relationship between screen time and socio-emotional and behavioural problems at age 2 (full results are displayed in Appendix 14).

²³ This inclusion of amount of time spent, and co-viewing behaviours while watching television, videos or other digital content on a screen only was to limit introducing noise in the analysis model from co-viewing play behaviours (which pattern differently in the same, see Table 13).

4.5.5. Differences in emotional and behavioural problems at 2 years by overreactive parenting style

The percentages of children with possible emotional and behavioural problems by levels of parent-reported overreactive parenting are displayed in Figure 27. See Appendix 2 Table 10 for a breakdown of the percentage of those with possible emotional and behavioural problems by quintiles of overactive parenting style score.

Figure 27. Rate of possible emotional and behavioural problems at 2 years by weighted quintile of overreactive parenting style



Base: primary caregivers and COT20s children.

Source: COT20s age 2

Figure shows percentage above or below threshold for emotional and behavioural problems by quintiles of overreactive parenting. Weighted mean overreactive parenting score by quintile: Q1 = 0.31; Q2 = 0.84; Q3 = 1.31; Q4 = 1.92; Q5 = 3.00. Unadjusted results are shown (not controlling for other factors).

4.5.5.1. Multivariate results: behaviour and emotional problems at 2 years and overreactive parenting

Findings from multivariate analysis (described above in section 4.5.) indicated that overreactive parenting was associated independently with children's emotional and behavioural problems (over and above the association of all other factors added to the analysis model).

Children whose primary caregiver reported overreactive parenting behaviours were more likely to be above threshold for possible behavioural and emotional problems, compared to children whose primary caregivers had a less overreactive parenting style. To illustrate, 43% of children whose primary caregivers were in the top quintile for overreactive parenting were above threshold for emotional and behavioural problems, compared to 20% of children who had a primary caregiver in the lowest quintile of overreactive parenting.

4.6. Discussion

Context

This chapter explored early language development and socio-emotional difficulties among children in England at 2 years of age, focusing on how these early outcomes relate to socio-demographic factors, parental mental health, home learning activities, screen time, and parenting behaviours. Children's language and socio-emotional skills are key early indicators of positive child development and lay the foundations for life-long cognitive, attainment and social outcomes (Moffitt et al., 2011; Bleses et al., 2016). Therefore, understanding the factors associated with, and potentially influencing, these early outcomes is important for education policy. Obtaining up-to-date evidence on these factors is particularly critical for the current cohort of children in England who are growing up in a context that is very different to previous generations, impacted by post-COVID-19 pandemic recovery, rising living costs, inflation, widening inequalities and the pervasive presence of digital technology in children's everyday lives.

Children's Language Development

A unique feature of the Children of the 2020s Study is that it is collecting longitudinal information about children's early language development at frequent intervals over the first five years of life. This information represents a rare source of nationally representative data on vocabulary development from infancy and can help to inform ongoing discussions in the early childhood education and care sector about children's language skills following the pandemic and government measures to address post-pandemic delays in speech and language development (for example, the ELSEC programme; DfE, 2025). While the COT20s children would have been acquiring language

at a time when the main pandemic-related disruptions had subsided, some impacts on services for early childhood remained. At the same time, other societal trends relevant to early childhood development were also at play, either linked in part to the pandemic or independently of it, such as rising inflation and the increasing use of digital technology among young children. In that context, the current analysis revealed that children's spoken language development was comparable to an earlier (largely pre-pandemic) reference group. This suggests that moderate to large delays in language skills among 2-year-olds in England, relative to earlier cohorts of 2-year-olds, are unlikely, and provides preliminary evidence that broad population-level delays in expressive language are not apparent in this group of children. However, it should be noted that the reference group was not itself nationally-representative, and was modest in size, so this comparison is not without its limitations. The age 3 COT20s data, which a wider range of language indicators, including direct standardised assessments, will enable a more robust measurement of the extent to which language development differs between the current and previous cohorts.

From a population-level vantage point, the similar vocabulary scores to the earlier reference sample is positive and points to the resilience of children and their families in the face of residual pandemic-related disruptions and other social and economic pressures. However, it is important to note that while the Children of the 2020s Study is generally well powered to detect relatively small differences in population averages, it would be difficult to detect small to moderate increases in the number of children at the very lowest end of the distribution (such as those who may have developmental delays), even with better reference data. It is also important to note that age 2 is a relatively early stage in language development, and that the skill measured in this second wave – expressive vocabulary – is just one aspect of speech, language and communication. More detailed analysis will be possible as COT20s follows children at later ages and assess additional areas of language development, including expressive, receptive and pragmatic language skills.

The analyses presented in this report provided evidence of some differences in children's early language skills that may be important from a policy point of view. In particular, a key finding was that children from lower-income families were at a disadvantage in their spoken vocabulary skills by age 2. Indications of this disadvantage were already evident at 9 months, when income-related inequalities were seen in infants' early word understanding. The results are consistent with extensive prior evidence, which indicates that social and economic circumstances are robustly linked to child development outcomes and give rise to early-appearing inequalities in child development (Sullivan et al., 2013; Cattan et al., 2022), which widen by age 4 (Public Health England, 2020). Existing evidence indicates that language trajectories are stable after ages 5-6 years, suggesting that any early gaps in language attainment are likely to persist into later childhood (Norbury et al., 2017). The developmental assessments conducted at age 3 and early schooling outcomes obtained at age 5 will enable valuable analysis of the

factors shaping these socially patterned developmental trajectories from infancy through school entry, including the effect of these early differences in language development.

The findings of the current analyses provide important evidence about proximal factors within the family environment that could be valuable areas of focus for policy and practice to support early language development. The study found clear evidence that children who are exposed to regular and varied early learning interactions at home (such as being read to or looking at books together, being taught songs or poems, or being taught about numbers) have more extensive vocabularies at age 2 than children who experience fewer or less frequent home learning activities. The data are consistent with evidence from the German Newborn Cohort Study, which found that both the frequency and quality of home learning activities were positively associated with children's vocabulary at age 2 (Linberg, Lehl, & Weinert, 2020), as well as with evidence from MCS which has shown that engagement in home learning activities between 9 months and 5 years is associated with children's developmental outcomes at 5 and 7 years (Hernández-Alava & Popli, 2017). Furthermore, in the COT20s cohort at Wave 2, there were clear differences in the frequency of home learning activities between higher and lower income families, which suggests that the home learning might represent an important mechanism through which socio-economic disadvantages translate into inequalities in early learning and language skills. Further analysis of this possible mediating pathway would be valuable in future research.

The inequalities in the home learning environment we observed in this cohort point to the potential value of targeted home learning support as a means of reducing early childhood developmental and educational inequalities. At the same time, these differences appear to partly reflect variations in the resources available to families and other socio-economic factors, like financial strain. Supportive intervention in this area would likely benefit from taking account of, or directly addressing, these material disadvantages. However, it is important to note that these data on their own cannot prove causality directly.

Nevertheless, they are consistent with considerable evidence from other studies. For example, randomised intervention trials indicate that enhanced support to increase home learning interactions can increase parental verbal responsiveness, which in turn promote early language outcomes (Hackworth et al, 2017). More broadly, there is extensive evidence that caregiving interventions that support responsive parent-child relationships and parental support for learning can improve early childhood development outcomes (Jeong et al., 2021).

The data reported herein also point to the potential impact of high levels of screen time on children's language development. Our findings suggest that the negative association between screen time and language development was not linear, and we observed greater apparent impacts in the highest two quintiles of screen usage. This broadly aligns with guidance from the WHO, which recommends no more than 1 hour per day of screen time for children aged 2 to 4 years, although we saw the main negative association with

language skills when screen time was above 86 minutes (approximately 1.5 hours) per day. In the unadjusted analysis, we observed an approximately 12 percentage point difference in language scores between the highest and lowest quintiles of screen time. In comparison, the equivalent difference related to income was 15 percentage points, and for the variety of home learning activities it was 30 percentage points. Thus, while these analyses indicate that screen time is associated with language outcomes at age 2, independently of home learning activities, the magnitude of the associations was substantially larger for home learning activities than screen time.

It is also important to note that the data presented in this report involved wide categorisations of screen time, so do not allow for a clear demarcation of thresholds. More generally, our analyses were not designed to isolate thresholds per se, and further analytical work would be necessary for the data to directly contribute to policy discussions about thresholds of screen time in young children. We should note that the data from the COT20s study also cannot determine a causal relationship between screen time and language development, and although a number of adjustments were made to correct for potential confounding factors, confounders remain an important potential concern when interpreting this association. We currently lack evidence from other research designs in this age group (for example, clinical trials) to determine whether screen time has a causal effect on language development. Longitudinal analysis of COT20s data in future could be conducted to measure whether screen time at age 2 is associated with outcomes at age 3 to 5.

Another topic of interest is the mechanisms through which screen time might impact language development. Although a direct impact is possible, another possibility discussed in the literature is that it may have an indirect impact by displacing or reducing time that would otherwise be spent on activities supporting the development of language skills. There is some evidence for this in relation to other developmental outcomes such as internalising and externalising behaviour (Hesketh & Dodd, 2023). Further analysis of the COT20s data at Wave 2 and beyond would be able to explore this important issue in detail. Notably though, the associations we observed between screen time and child development outcomes at age 2 included controls for the home learning environment, which would suggest that displacement of those activities does not fully explain the associations.

The data at Wave 2 also highlighted considerable variation in whether 2-year-olds were using screens with or without their parent/primary caregiver. It is likely that the social context of screen time, and particularly the extent to which it involves interaction with carers, plays an important role in whether and how it affects early language development. Although we did not find direct evidence of this in COT20s in relation to language development, we are collecting more detailed data on the role of the context of screen time and language outcomes in later waves, including: the type of activities they mainly use screens and digital media for (for example, for education and learning or for

entertainment); the reasons for screen use (for example, to keep the child occupied, help them to sleep, or divert their attention); and the rules that caregivers may apply, or try to apply, in relation to the child's screen use. This will allow us to explore the extent to which these other factors play a role in shaping the effect of screen time on child development and also how other enriching developmental activities are impacted by screen time. Further research examining these issues in longitudinal perspective will be valuable in the future.

Children's social and emotional development

The data also shed light on social inequalities in children's early emotional and behavioural development. A quarter of children overall were identified as having possible behavioural and emotional problems, which is consistent with prior studies using the same standardised questionnaire to measure socio-emotional development in pre-schoolers in the UK and abroad (Sharp et al., 2024; Karabekiroglu et al., 2010). However, there were marked disparities between children, particularly in relation to family income – with considerably more children with possible emotional and behavioural problems in families in the lowest income quintile, compared to the highest. Children's emotional and behavioural problems at age 2 in the COT20s cohort were also associated with poorer parental mental health and higher overreactive parenting, although not with home learning activities (which were associated with language development but not with possible emotional and behavioural problems). Taken together, these findings suggest that cumulative social and economic stressors may be important factors in children's emotional and behavioural problems, which of course is consistent with much past research. Although not directly addressed in this report, it would be valuable to investigate the cumulative impact of social and economic disadvantages on children's outcomes and the family factors (such as parenting) associated with it, particularly as more data become available from later sweeps of the study. The data also provided some indication of the potential negative impact of screen time on children's behavioural and emotional problems, which is in line with emerging evidence that high screen time (even when reported as educational content) is associated with poorer mental health in 2- to 4-year-old children (Hesketh & Dodd, 2023).

Data from other sources has demonstrated the long-term negative impact of child behavioural problems on later life outcomes (for example, Wertz et al., 2018) and how parental wellbeing and poverty throughout childhood contribute to long-term offspring mental health outcomes in late adolescence (Adjei et al., 2024). This makes child emotional and behavioural problems an important focus for prevention and intervention. Data from COT20s and many other studies indicate that children who show persistent behavioural difficulties in early childhood are likely to have experienced multiple social and economic challenges, including poverty, neighbourhood deprivation and lower parental education (D'Souza et al., 2019). There are effective (and cost-effective) interventions to help families manage children's behavioural problems (Edwards et al.,

2016). Ensuring that all families, including the most disadvantaged ones, can access high-quality support of this kind could make a substantial contribution to promoting early childhood outcomes and reducing developmental inequalities.

It is important to note, again, that these data cannot establish causality and, in addition to the possibility that unidentified confounding variables could explain the observed associations, it is possible that some associations are bidirectional. For example, a child's more frequent challenging child behaviour can increase parental stress, which may in turn heighten overreactive parenting; similarly, parents allowing relatively high levels of screen time may in part reflect their efforts to distract or calm a child who is more often angry, upset or over-excited. The longitudinal data collected in future waves of COT20s may enable analysis that can more clearly disentangle cause from effect. For instance, analyses could examine whether earlier parenting over-reactivity predicts later behavioural or emotional problems, or whether the reverse occurs – earlier child behavioural problems predicting later parental over-reactivity. Further details of what is assessed at age 3 are described in the next section.

5. Conclusion

5.1. Next steps for COT20s

The Children of the 2020s Study is generating much needed contemporary evidence on key issues relevant to researchers and policy makers. The current report provides some initial insights from the data collected at Wave 2 and highlights the potential of the study to inform future analyses and policy development. As a five-wave nationally representative longitudinal study following children from 9 months to age 5 years, COT20s is designed to produce a comprehensive picture of the circumstances of families raising young children in England in the 2020s, and of the factors that influence children's development and wellbeing over the first five years of life. The majority of what has been presented in this report has been cross-sectional in nature, but as more waves of data collection are completed, more powerful longitudinal analysis will become possible. Many of the questions addressed in this report, such as the changing economic circumstances of families raising young children, the decisions they make regarding early childhood education and care, and the family factors associated with variation in children's early developmental outcomes, will benefit greatly from the longitudinal data generated by future COT20s waves, allowing more powerful inferences about potential causes and effects.

At the time of the publication of this report, the Wave 1 data (collected at 9 months of age) are available on the Office for National Statistics Secure Researcher Service²⁴, and the UK Data Service²⁵. Wave 2 data will be deposited soon after the publication of this report. Data on eating habits collected at age 16 to 18 months from a subsample of the COT20s cohort will also be available at the same time. These three sources of data, together with those from subsequent COT20s waves (Wave 3-5 at ages 3, 4 and 5 years), will enable many valuable topics to be investigated longitudinally. Interested data users are encouraged to apply for access.

Wave 3 data collection, when the COT20s children turned 3 years of age, was completed in June 2025, and the data are being prepared for analysis and release to data users. Wave 3 collected particularly rich data by combining direct, objective assessments of children's developmental outcomes with parent reported questionnaires measuring multiple developmental domains. The direct standardised assessments at age 3 included: the British Ability Scales (Elliot & Smith, 2011), specifically the Naming Vocabulary and Picture Similarities subtests, measuring verbal and non-verbal reasoning skills respectively; the Clinical Evaluation of Language Fundamentals (Wiig, Secord & Semel, 2006), Basic Concept subtest, measuring receptive language skills; and the Movement Assessment Battery for Children (Henderson, Sugden, & Barnett, 2007),

²⁴ <https://doi.org/10.57906/d6pm-0r78>

²⁵ <https://datacatalogue.ukdataservice.ac.uk/studies/study/9464#details>

Drawing subtest, adapted for digital administration and measuring fine motor skills. These assessments are widely used to identify developmental risk based on established cut-off points and will enable direct comparisons of the outcomes of children in the COT20s cohort against the performance of children from (pre-pandemic) standardisation samples. This will provide important evidence on whether children's developmental trajectories have shifted in the context of the pandemic, and subsequent social and economic change.

The battery of tasks children completed at age 3 also included the digital administration of two innovative assessments of complex cognitive skills known as executive functions, including a task measuring visuo-spatial working memory, the Corsi Block-Tapping task (Kessels et al., 2000) adapted for pre-schoolers, and a task measuring response inhibition, the Go/No-Go task adapted from the Early Years Toolbox (Howard & Melhuish, 2017). Executive functions have rarely been measured at such an early age and at such scale, yet they have been shown to be amongst the most important predictors of academic achievement (Best et al., 2011) and long-term life outcomes (Moffitt et al., 2011).

Finally, video recordings of parent-child interaction were undertaken at Wave 3, something also rarely done at this scale. A subsample of primary caregivers was recorded for five minutes in their home during two spontaneous interactions with their child: first while reading a wordless picture book provided by the researcher, and then while playing with some toys chosen by the family. These recordings generated a valuable repository of observational data that will allow particularly rich analyses and detailed investigations of a range of dimensions of parent-child interaction such as parental responsiveness, child-parent language interactions and patterns of joint attention. At the time of this report's publication, the fourth wave of data collection is underway, when the children are 4 years old. The Wave 4, 30-minute online survey completed by caregivers includes follow-up measures of many of the same domains considered in this report. Together with the data that will be collected at age 5, these final waves will allow fine-grained longitudinal trajectories of cognitive, language, motor and socio-emotional development and study variability in those growth trajectories as a function of key contextual and family variables. It will also be possible to investigate the effects of these early factors on children's school readiness and outcomes at school entry, collected at Wave 5. COT20s is unique among the UK's portfolio of nationally representative birth cohort studies in following development with such a high degree of temporal resolution, the benefits of which will be further amplified by the monthly data collection through the study app, BabySteps.

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Appendix 1: Missing data approach

Missing data is a common challenge in survey research and may arise from a variety of sources, including participant non-response, attrition/loss to follow-up, and technological or respondent errors. In addition to reducing statistical power, missing data (when systematic) can bias estimates, with the extent of bias depending on the pattern and underlying causes of missingness.

A range of statistical methods can be used to address missing data and reduce bias, including Multiple Imputation, Inverse Probability Weighting, and Full Information Maximum Likelihood estimation. These methods generally assume that data are Missing at Random (MAR), meaning that systematic differences between missing and observed values can be explained by observed data. While the MAR assumption cannot be directly tested, the use of a broad set of auxiliary variables can help bolster its plausibility. Appropriate choice of methods and auxiliary variables requires analytical judgement, but empirical work and simulations suggest that these approaches can effectively reduce bias.

Handling missing data in the current report

In the current report, analyses account for both survey design, survey non-response and item/scale-level missing data. Population and non-response weights were generated (as detailed in the accompanying technical report, Ipsos & UCL 2026) and applied throughout to analysis. In addition, we used Multiple Imputation (MI) to address item-/scale-level missing data prior to descriptive and inferential analyses. MI is a statistical technique that predicts missing observations from observed data while incorporating uncertainty by generating multiple imputed datasets. These are then analysed separately and combined to produce pooled estimates with adjusted standard errors and confidence intervals.

We implemented Multiple Imputation with Chained Equations (MICE) in R using the **mice()** package²⁶, which flexibly models variables of different types (continuous, binary, ordinal, multinomial). We generally followed the Centre for Longitudinal Studies' missing data strategy approach²⁷. All variables used in the report were included as covariates in the imputation models, and variables with missing data were imputed iteratively (10 iterations) as targets. To handle variables involving conditional logic (questions only asked of certain respondents based on previous answers), we used the *predictorMatrix* and *where* arguments in **mice()** to specify tailored imputation parameters that respected survey routing. Derived variables were either created prior to imputation (so that

²⁶ Van Buuren, S., & Groothuis-Oudshoorn, K. (2011). *mice*: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*, 45(3), 1–67. <https://doi.org/10.18637/jss.v045.i03>

²⁷ Mostafa, T., Narayanan, M., Pongiglione, B., Dodgeon, B., Goodman, A., Silverwood, R.J., & G.B. Ploubidis, G.B. (2021) Missing at random assumption made more plausible: evidence from the 1958 British birth cohort, *Journal of Clinical Epidemiology*

imputation could be conducted at the scale level) or after imputation, depending on which approach was most parsimonious. We generated 20 imputed datasets, and post-imputation diagnostics and checks were conducted in accordance with the Centre for Longitudinal Studies' missing data strategy approach.

Analyses were run separately in each of the 20 imputed datasets, and results were then combined (pooled) to produce final estimates reported in the current document with appropriate standard errors and confidence intervals.

Appendix 2: Statistical modelling of demographic characteristics, and other predictors, on outcome variables

Throughout the report comparisons by demographic variables, such as primary caregiver ethnicity, family income, primary caregiver education, and family type, were conducted to examine socioeconomic differences in the cohort. Additional variable such as parental mental health, child's age, child's gender, parenting styles, home learning environment and screen time, were also included in these comparison analyses to address specific research questions.

Linear, logistic or negative binomial multiple regression was used, depending on what was most appropriate model for the outcome variable. These analyses aimed to determine the independent and unique contribution of each independent (or predictor) variable on the outcome of interest while holding other all other predictor variables in the analytic model constant.

The analyses assessed whether results were statistically significant using a p-value threshold equal to or less than 0.01. A statistically significant result means that the result (such as the association of the predictor variable with the outcome) is unlikely to have occurred by chance. Only statistically significant results are discussed in the descriptive report's main text, but all results are reported in this appendix. Having established that a result is statistically significant, it may also be helpful to know whether it should be considered a small, medium or large effect. Therefore, alongside p-values, standardised and unstandardised coefficients (also referred to as beta coefficients or beta weights), odds ratios (for logistic regression) or rate ratios (for negative binomial regression) are provided to quantify the strength of the relationship (also referred to as the effect size) between the predictor and outcome (while holding all other predictors constant) and to allow the interpretation of comparable influence of each predictor variable in the model.

As an informal rule of thumb, the effect size of standardised coefficients of 0.1 or less are considered small, 0.3 are considered medium, and 0.5 are considered large. Odds ratios or rate ratios of 1.5 or less are small, medium between 1.5 and 2.5, and large beyond 2.5. These rules of thumb should be treated with caution, because although they are commonly reported, and are useful reference points, they are not universally agreed upon.

No adjustments were made for multiple comparisons so readers should consider this while interpreting the results.

Methodology

A separate analysis model for each outcome variable of interest was fitted. Below is a listed explanation of how each variable was treated in the analysis:

- Demographic variables

- **Income:** Normalised quintiles of household equivalised income were treated as a factored categorical variable, with the lowest quintile treated as the reference category.
- **Education:** Primary caregivers' highest level of equivalised education was treated as a continuous variable from 1 (no qualification or level 1) to 5 (level 5).
- **Family type:** Whether primary caregiver was a single or coupled parent was treated as a binary variable with coupled parent/carers as the reference category.
- **Ethnicity:** primary caregiver ethnicity was treated as a factored categorical variable (with White ethnicity as the reference category for each of the other ethnicity categories). It should be noted that analyses were conducted using broad ethnic groupings (White, Asian, Black, and Mixed/Other) due to small sample sizes in more detailed categories. While this approach enables more reliable statistical estimates, these broad categories encompass a wide variety of diverse sub-groups. Findings should therefore be interpreted with caution, recognising that important differences within groups may be obscured. Future research with larger samples or alternative data sources will be needed to explore these differences in more detail.

- Primary caregiver mental health variables

- **Anxiety/Depression (above/below GAD/PHQ threshold):** models including parental mental health as the outcome and predictor variable used either GAD or PHQ (for anxiety or depression, respectively) above or below threshold as a binary variable, with below as the reference category. Scores above the threshold are indicative of anxiety or depression. The scores do not differentiate severity.

- Home environment and parenting

- **Home learning index score:** The home learning index score was added to the relevant models as a continuous variable.
- **Overreactive parenting:** The overreactive parenting score was added to the relevant models as a continuous variable.
- **Screen time:** Total minutes of screen time when combining the amount of time spent watching and playing on a screen in a typical day.

- **Child variables:**
 - **Number of words children could say:** number of words children could say were added to the model as a continuous count variable.
 - **Above/below threshold for emotional or behavioural problems (based on BITSEA Problem Total Score cut off):** was treated as a binary variable.
- **Child covariates variables:**
 - **Child's age:** Child's age in months was added as a covariate to the models estimating number of words the child could say and emotion and behavioural problems. This was entered into the model as a continuous variable
 - **Child's sex:** Child's sex was added as a covariate to models estimating words the child could say and emotion and behavioural problems, with female as the reference category.

All analysis was conducted using R (R Core Team, 2021²⁸). All models account for Wave 2 sample and non-response weighting. For details of the survey weights, please refer to the Children of the 2020s Wave 2 Technical Report (Ipsos & UCL, 2026).

Linear and logistic regression models were specified to account for Wave 2 sample weighting using `svydesign` function from the R "survey" package. This function specifies the `design` of the dataset including defining the weighting variable which subsequent R code should use. Linear and logistic multiple regression models were then specified using `svyglm` from the R "survey" package, which incorporates the above specified `design` (which enables the model to account for the weighting variable, clustering and strata). The family parameter of the `svyglm` function was used to specify models with binary outcomes as logistic (i.e., logistic models, with 'family = quasibinomial'). For example,

```
design <- svydesign(ids = ~cluster, data = DATA, weights = weights, strata = strata_id)
```

```
model.linear.regression <- svyglm(outcome_variable ~ predictor_1 + predictor_2 + predictor_3 + predictor_4, design = design)
```

```
model.logistic.regression <- svyglm(outcome_variable ~ predictor_1 + predictor_2 + predictor_3 + predictor_4, design = design, family = quasibinomial)
```

²⁸ Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>

The negative binomial model was specified when modelling the number of words the child could say due to overdispersion of this count variable. This was specified using `glm.nb()` function from the MASS package. Weights were specified using the “weights” parameter. Strata and clustering are not supported in `glm.nb()`. For example;

```
model.negative.binomial.regression <- glm.nb((outcome_variable ~ predictor_1 +  
predictor_2 + predictor_3 + predictor_4, data = DATA, weights = weights))
```

Both standardised and non-standardised test statistics (coefficients/odds ratio/rate ratios) are provided. For standardised test statistics, all continuous predictor and dependent variables were first standardised using the `scale()` function from the R base package before being entered into the model. This standardisation makes it easier to assess the relative influence of each independent, as they are all on the same scale after standardisation (standard deviations).

In linear regression models, the continuous dependent variable was also standardised to allow for comparison of effect sizes across models estimated on different continuous outcomes. Standardised coefficients should be interpreted in standard deviation units of the dependent variable, representing the expected change (in standard deviations) in the outcome associated with a one standard deviation increase in the predictor.

For logistic and negative binomial regressions, the dependent variables were not standardised, as these models require dependent variables on their natural scales (binary and over-dispersed count outcomes, respectively). Unlike linear regression models, in which both dependent and independent variables may be standardised without violating model assumptions, standardising the dependent variable in these models is not meaningful and would compromise interpretability. Coefficients are therefore partially standardised, with only independent variables standardised. For logistic and negative binomial regressions, standardised coefficients, odds ratios, and rate ratios describe how the likelihood or frequency of the outcome changes for a one-standard deviation increase in the predictor variable. In logistic regression, these values indicate changes in the odds of the outcome. In negative binomial regression, they indicate changes in the expected number of occurrences of the outcome. For negative binomial models, results can therefore be interpreted in the original units of the dependent variable (counts), such as the number of words.

Unstandardised test statistics (variables were not standardised before entering the model) are also provided to aid interpretation, with test statistics representing the change in the outcome for a one-unit increase of the continuous independent variable in its original units.

Results

Model results for comparison analyses are displayed in Table 1-4. Model results from Chapter 2 are displayed in Table 1. Percentage of families experiencing persistent financial strain by demographic characteristics are displayed in Table 2.

Table 1. Model results exploring persistent financial strain

Research question	Outcome (shaded in grey) and independent variables	Standardised Coef. (Odds Ratio)	Unstandardised Coef. (Odds Ratio)	p-value
Differences in persistent financial strain by socio-demographic characteristics	persistent financial strain (persistent v not persistent/no strain)			
	Income – 2nd quintile	-0.36 (OR = 0.70)	-0.36 (OR = 0.69)	<0.001***
	Income – 3rd quintile	-0.84 (OR = 0.43)	-0.84 (OR = 0.43)	<0.001***
	Income – 4th quintile	-1.54 (OR = 0.21)	-1.54 (OR = 0.21)	<0.001***
	Income – 5th quintile	-2.05 (OR = 0.12)	-2.05 (OR = 0.12)	<0.001***
	Education	-0.07 (OR = 0.92)	-0.07 (OR = 0.93)	0.08
	Family type – Single	0.40 (OR = 1.48)	0.40 (OR = 1.48)	<0.001***
	Ethnicity – Asian/Asian British	-0.16 (OR = 0.85)	-0.16 (OR = 0.85)	0.32
	Ethnicity – Black/Black British	0.47 (OR = 1.60)	0.47 (OR = 1.60)	0.01*
	Ethnicity – Mixed/Other British	0.26 (OR = 1.30)	0.26 (OR = 1.30)	0.16

Note. OR = odds ratio provided for logistic regression.

Table 2. Percentage of families experiencing financial strain by demographic characteristics

Demographic characteristic	Percentage experiencing persistent financial strain (%)	Percentage NOT experiencing persistent financial strain (%)
Primary caregiver education level		
Level 1 or below	27	73
Level 3	17	83
Level 5 or higher	9	92
Ethnicity		
White	14	86
Black or Black British	30	70
Asian or Asian British	16	84
Mixed or Other ethnic group	22	78
Family type		
Single parent/carer	30	70
Coupled parent/carer	12	88
Family equivalised income quintile		
Lowest income quintile	31	69
Middle income quintile	13	87
Highest income quintile	4	96

Base: All cohort families

Source: COT20s Wave 2

Table shows unadjusted %, all derived using weights

Model results from Chapter 3 are displayed in Table 3. Table 4 displays the percentage of those above and below threshold for anxiety and depression by demographic characteristics. Table 5 displays the mean HLE-Index scores, screen time and overreactive parenting scores by demographics and parental mental health.

Table 3. Model results exploring parental mental health, child’s home learning environment and parenting

Research question	Outcome (shaded in grey) and independent variables	Standardised Coef. (Odds Ratio)	Unstandardised Coef. (Odds Ratio)	p-value
Differences in primary caregiver depression by socio-demographic characteristics	Depression (above/below PHQ threshold)			
	Income – 2nd quintile	-0.34 (OR = 0.71)	-0.34 (OR = 0.71)	0.01*
	Income – 3rd quintile	-0.61 (OR = 0.54)	-0.61 (OR = 0.54)	<0.001***
	Income – 4th quintile	-0.86 (OR = 0.42)	-0.86 (OR = 0.42)	<0.001***
	Income – 5th quintile	-1.08 (OR = 0.34)	-1.08 (OR = 0.34)	<0.001***
	Education	-0.20 (OR = 0.82)	-0.17 (OR = 0.84)	<0.001***
	Family type – Single	0.16 (OR = 1.17)	0.16 (OR = 1.17)	0.25
	Ethnicity – Asian/Asian British	-0.13 (OR = 0.88)	-0.13 (OR = 0.88)	0.47
	Ethnicity – Black/Black British	0.24 (OR = 1.28)	0.24 (OR = 1.28)	0.27
Ethnicity – Mixed/Other British	0.48 (OR = 1.61)	0.48 (OR = 1.61)	0.02	
Differences in primary caregiver anxiety by socio-demographic characteristics	Anxiety (above/below GAD threshold)			
	Income – 2 nd quintile	-0.19 (OR = 0.83)	-0.19 (OR = 0.83)	0.13
	Income – 3 rd quintile	-0.30 (OR = 0.73)	-0.30 (OR = 0.73)	0.03
	Income – 4 th quintile	-0.38 (OR = 0.68)	-0.38 (OR = 0.68)	0.01*
	Income – 5 th quintile	-0.64 (OR = 0.52)	-0.64 (OR = 0.52)	<0.001***
	Education	-0.12 (OR = 0.89)	-0.10 (OR = 0.90)	0.03
	Family type – Single	0.17 (OR = 1.18)	0.17 (OR = 1.18)	0.15
	Ethnicity – Asian/Asian British	-0.40 (OR = 0.67)	-0.40 (OR = 0.67)	0.01*
	Ethnicity – Black/Black British	-0.28 (OR = 0.76)	-0.28 (OR = 0.76)	0.17
Ethnicity – Mixed/Other British	-0.03 (OR = 0.97)	-0.03 (OR = 0.97)	0.85	
Differences in home learning environment index by socio-demographics characteristics and parental mental health	Home Learning Environment Index			
	Income – 2 nd quintile	0.11	0.73	0.04
	Income – 3 rd quintile	0.22	1.53	<0.001***
	Income – 4 th quintile	0.30	2.03	<0.001***
	Income – 5 th quintile	0.28	1.93	<0.001***
	Education	0.10	0.57	<0.001***
	Family type – Single	0.11	0.74	0.04
	Ethnicity – Asian/Asian British	-0.25	-1.74	<0.001***
	Ethnicity – Black/Black British	-0.29	-2.03	0.001**
Ethnicity – Mixed/Other British	-0.08	-0.57	0.31	

	Depression – Above PHQ threshold	-0.09	-0.60	0.18
	Anxiety – Above GAD threshold	0.06	0.44	0.23
Differences in screen time by socio-demographics characteristics and parental mental health	Screen time			
	Income – 2 nd quintile	-0.02	-2.54	0.64
	Income – 3 rd quintile	-0.09	-10.58	0.07
	Income – 4 th quintile	-0.24	-27.36	<0.001***
	Income – 5 th quintile	-0.37	-41.61	<0.001***
	Education	-0.16	-15.61	<0.001***
	Family type – Single	0.07	8.17	0.15
	Ethnicity – Asian/Asian British	0.14	16.23	0.01*
	Ethnicity – Black/Black British	0.57	64.63	<0.001***
	Ethnicity – Mixed/Other British	0.29	32.84	0.003**
	Depression – Above PHQ threshold	0.24	26.79	<0.001***
	Anxiety – Above GAD threshold	0.02	2.28	0.70
Differences in overreactive parenting scale by socio-demographics characteristics and parental mental health	Parenting Overreactive Score			
	Income – 2 nd quintile	0.11	0.11	0.02
	Income – 3 rd quintile	0.15	0.15	0.002**
	Income – 4 th quintile	0.18	0.17	<0.001***
	Income – 5 th quintile	0.19	0.17	<0.001***
	Education	0.04	0.04	<0.001***
	Family type – Single	-0.20	-0.19	<0.001***
	Ethnicity – Asian/Asian British	0.11	0.11	0.03
	Ethnicity – Black/Black British	-0.12	-0.12	0.12
	Ethnicity – Mixed/Other British	0.11	0.11	0.09
	Depression – Above PHQ threshold	0.28	0.27	<0.001***
	Anxiety – Above GAD threshold	0.29	0.27	<0.001***

Note. OR = odds ratio provided for logistic regression.

Table 4. Percentage of primary caregivers above and below threshold for anxiety and depression by demographic characteristics

Demographic characteristic	Percentage above threshold for depression (PHQ: %)	Percentage below threshold for depression (PHQ: %)	Percentage above threshold for anxiety (GAD: %)	Percentage below threshold for anxiety (GAD: %)
Primary caregiver education level				
Level 1 or below	18	82	18	82
Level 3	11	89	11	89
Level 5 or higher	4	96	8	92
Ethnicity				
White	9	91	12	88
Black or Black British	15	85	11	89
Asian or Asian British	10	90	9	91
Mixed or Other ethnic group	16	84	13	87
Family type				
Single parent/carer	16	84	16	84
Coupled parent/carer	8	92	12	89
Family equivalised income quintile				
Lowest income quintile	17	83	16	84
Middle income quintile	9	91	11	89
Highest income quintile	5	95	8	92

Base: All primary caregivers

Source: COT20s Wave 2

Table shows unadjusted %, all derived using weights

Table 5. Mean HLE-Index score, child screen time and overreactive parenting by demographic characteristics and parental mental health

Demographic characteristic/Parental mental health	Mean HLE-INDEX (SD)	Mean minutes of screen time (SD)	Mean overreactive parenting (SD)
Primary caregiver education level			
Level 1 or below	20.19 (8.10)	186 (156)	1.43 (1.11)
Level 3	22.56 (6.99)	151 (116)	1.44 (0.93)
Level 5 or higher	23.66 (6.41)	98 (80)	1.53 (0.94)
Ethnicity			
White	23.14 (6.68)	131 (105)	1.44 (0.94)
Black or Black British	20.54 (7.85)	213 (167)	1.23 (1.04)
Asian or Asian British	20.78 (8.30)	156 (122)	1.51 (1.07)
Mixed or Other ethnic group	22.13 (7.44)	175 (169)	1.53 (0.98)
Family type			
Single parent/carers	22.11 (6.68)	175 (135)	1.23 (0.94)
Coupled parent/carers	22.84 (6.91)	131 (110)	1.49 (0.96)
Family equivalised income quintile			
Lowest income quintile	20.92 (7.88)	179 (139)	1.28 (1.02)
Middle income quintile	23.05 (6.85)	142 (116)	1.48 (0.92)
Highest income quintile	23.84 (6.11)	97 (80)	1.53 (0.94)
Depression (PHQ) threshold			
Above	21.68 (7.64)	182 (137)	1.73 (1.13)
Below	22.80 (6.95)	137 (116)	1.41 (0.93)
Anxiety (GAD) threshold			
Above	22.63 (6.96)	159 (117)	1.74 (1.09)
Below	22.70 (7.03)	135 (113)	1.40 (0.93)

Base: All primary caregivers

Source: COT20s Wave 2

Table shows unadjusted means, all derived using weights. SD = standard deviation.

Model results from Chapter 4's analysis of children's language are displayed in Table 6. Table 7 displays the mean number of words the child could say by demographic characteristics, parental mental health, HLE-Index, screen time and overreactive parenting.

Table 6. Model results exploring early factors associated with child language at 2 years

Research question	Outcome (shaded in grey) and independent variables	Partial-standardised Coef.* (Rate Ratio)	Unstandardised Coef. (Rate Ratio)	p-value
Early factors associated with child's language abilities at 2 years	Number of words child could say			
	Income – 2 nd quintile	-0.03 (RR = 0.97)	-0.03 (RR = 0.97)	0.53
	Income – 3 rd quintile	0.03 (RR = 1.03)	0.03 (RR = 1.03)	0.45
	Income – 4 th quintile	0.12 (RR = 1.13)	0.12 (RR = 1.13)	0.006**
	Income – 5 th quintile	0.10 (RR = 1.11)	0.10 (RR = 1.11)	0.03
	Education	0.009 (RR = 1.009)	0.008 (RR = 1.008)	0.49
	Family type – Single	0.07 (RR = 1.07)	0.07 (RR = 1.07)	0.03
	Ethnicity – Asian/Asian British	0.03 (RR = 1.03)	0.03 (RR = 1.03)	0.39
	Ethnicity – Black/Black British	0.06 (RR = 1.06)	0.06 (RR = 1.06)	0.28
	Ethnicity – Mixed/Other British	-0.06 (RR = 0.94)	-0.06 (RR = 0.94)	0.26
	Depression – Above PHQ threshold	-0.09 (RR = 0.92)	-0.09 (RR = 0.92)	0.06
	Anxiety – Above GAD threshold	-0.05 (RR = 0.95)	-0.06 (RR = 0.95)	0.20
	Home learning index score (linear)	0.13 (RR = 1.14)	0.05 (RR = 1.05)	<0.001***
	Home learning index score (quadratic)	-0.03 (RR = 0.97)	-0.0007 (RR = 1.00)	<0.001***
	Screen time	-0.09 (RR = 0.92)	-0.06 (RR = 0.94)	<0.001***
	Screen time (quadratic)	0.009 (RR = 1.00)	0.003 (RR = 1.00)	<0.001***
	Overreactive parenting	0.02 (RR = 1.02)	0.02 (RR = 1.02)	0.08
	Child's age	0.05 (RR = 1.05)	0.05 (RR = 1.05)	<0.001***
	Child's sex - Male	-0.22 (RR = 0.81)	-0.22 (RR = 0.81)	<0.001***

Note. RR = rate ratio provided for negative binomial regression.

Table 7. Mean number of words the child could say by demographic characteristics, parental mental health, HLE-I, screen time and overreactive parenting.

Factor	Mean number of words the child could say (SD)
Primary caregiver education level	
Level 1 or below	18 (12)
Level 3	21 (11)
Level 5 or higher	22 (10)
Ethnicity	
White	21 (11)
Black or Black British	20 (11)
Asian or Asian British	20 (11)
Mixed or Other ethnic group	19 (12)
Family type	
Single parent/carer	20 (12)
Coupled parent/carer	21 (11)
Family equivalised income quintile	
Lowest income quintile	18 (12)
Middle income quintile	20 (11)
Highest income quintile	23 (10)
Depression (PHQ) threshold	
Above	19 (12)
Below	21 (11)
Anxiety (GAD) threshold	
Above	18 (12)
Below	21 (11)
HLE-Index (quintiles)	
1 (lowest)	15 (12)
2	20 (11)
3	22 (11)
4	23 (10)
5 (highest)	25 (10)
Screen time (quintiles)	
1 (lowest)	22 (11)
2	23 (10)
3	20 (11)
4	20 (11)
5 (highest)	18 (12)
Overreactive parenting score (quintiles)	
1 (lowest)	21 (12)
2	21 (11)
3	21 (11)
4	21 (11)
5 (highest)	20 (11)

Base: All cohort children

Source: COT20s Wave 2

Table shows unadjusted means, all derived using weights. SD = standard deviation.

It should be noted that anxiety and depression symptoms tend to be highly correlated, which makes it difficult to distinguish their independent association with outcomes. Since depression in the above model was approaching significance, with an effect size similar to other significant results in the model, overadjustment for each of the two parental mental health factors was explored. To do this, two additional models were conducted. First, without parental anxiety, and second, without parental depression. This further analysis showed that when anxiety was removed from the model, depression was associated with the number of words their child could say at 2 years independent of the other factors (see Table 8). In an equivalent model (see Table 8), when including anxiety but removing depression, anxiety was not significantly associated with language at the $p < .01$ level. Model results when exploring individual influence of parental mental health factors are displayed in Table 8.

The findings are presented in Table 8 and suggest that parental depression is likely more robustly negatively associated with early vocabulary development than parental anxiety.

Table 8. Model results exploring early factors associated with child language at 2 years when controlling for each parental mental health factor.

Research question	Outcome (shaded in grey) and independent variables	Without including depression: Rate Ratio* (p-value)	Without including anxiety: Rate Ratio* (p-value)
Early factors associated with child's language abilities at 2 years	Number of words child could say		
	Income – 2 nd quintile	0.98 ($p = 0.58$)	0.97 ($p = 0.53$)
	Income – 3 rd quintile	1.04 ($p = 0.40$)	1.03 ($p = 0.45$)
	Income – 4 th quintile	1.14 ($p = 0.004^{**}$)	1.13 ($p = 0.006^{**}$)
	Income – 5 th quintile	1.11 ($p = 0.02$)	1.11 ($p = 0.03$)
	Education	1.01 ($p = 0.45$)	1.01 ($p = 0.47$)
	Family type – Single	1.07 ($p = 0.03$)	1.07 ($p = 0.03$)
	Ethnicity – Asian/Asian British	1.03 ($p = 0.35$)	1.03 ($p = 0.36$)
	Ethnicity – Black/Black British	1.06 ($p = 0.27$)	1.06 ($p = 0.27$)
	Ethnicity – Mixed/Other British	0.94 ($p = 0.24$)	0.94 ($p = 0.27$)
	Depression – Above PHQ threshold	NA	0.90 ($p = 0.008^{**}$)
	Anxiety – Above GAD threshold	0.92 ($p = 0.02$)	NA
	Home learning index score (linear)	1.05 ($p < 0.001^{***}$)	1.05 ($p < 0.001^{***}$)
	Home learning index score (quadratic)	1.00 ($p < 0.001^{***}$)	1.00 ($p < 0.001^{***}$)
	Screen time	0.94 ($p < 0.001^{***}$)	0.94 ($p < 0.001^{***}$)
	Screen time (quadratic)	1.00 ($p < 0.001^{***}$)	1.00 ($p < 0.001^{***}$)
	Overreactive parenting	1.02 ($p = 0.11$)	1.02 ($p = 0.10$)
	Child's age	1.05 ($p < 0.001^{***}$)	1.05 ($p < 0.001^{***}$)
	Child's sex - Male	0.81 ($p < 0.001^{***}$)	0.81 ($p < 0.001^{***}$)

Note. RR = rate ratio provided for negative binomial regression. *Coefficients are unstandardised.

Model results from Chapter 4's analysis into child's socio-emotion and behavioural development are displayed in Table 9. Table 10 displays the percentage of those above and below threshold for possible socio-emotional and behavioural difficulties by demographic characteristics, parental mental health, HLE-Index, screen time and overreactive parenting.

Table 9. Model results exploring early factors associating with child BITSEA Problem Total cut off score at 2 years

Research question	Outcome (shaded in grey) and independent variables	Standardised Coef. (Odds Ratio)	Unstandardised Coef. (Odds Ratio)	p-value
Early factors associated with child's socio-emotional development at 2 years	BITSEA Problem Total score			
	Income – 2 nd quintile	-0.16 (OR = 0.85)	-0.16 (OR = 0.85)	0.13
	Income – 3 rd quintile	-0.47 (OR = 0.62)	-0.47 (OR = 0.62)	<0.001***
	Income – 4 th quintile	-0.83 (OR = 0.43)	-0.83 (OR = 0.43)	<0.001***
	Income – 5 th quintile	-0.94 (OR = 0.39)	-0.94 (OR = 0.39)	<0.001***
	Education	-0.24 (OR = 0.79)	-0.21 (OR = 0.81)	<0.001***
	Family type – Single	0.44 (OR = 1.55)	0.44 (OR = 1.55)	<0.001***
	Ethnicity – Asian/Asian British	0.68 (OR = 1.97)	0.68 (OR = 1.97)	<0.001***
	Ethnicity – Black/Black British	0.41 (OR = 1.51)	0.41 (OR = 1.51)	0.03
	Ethnicity – Mixed/Other British	0.40 (OR = 1.60)	0.40 (OR = 1.60)	0.02
	Depression – Above PHQ threshold	0.42 (OR = 1.52)	0.42 (OR = 1.52)	0.002**
	Anxiety – Above GAD threshold	0.44 (OR = 1.55)	0.44 (OR = 1.55)	<0.001***
	Home learning index score	-0.005 (OR = 0.95)	-0.007 (OR = 0.99)	0.25
	Screen time	0.10 (OR = 1.10)	0.10 (OR = 1.10)	<0.001***
	Overreactive parenting	0.49 (OR = 1.64)	0.52 (OR = 1.68)	<0.001***
	Child's age	0.03 (OR = 1.55)	0.03 (OR = 1.55)	0.43
	Child's sex - Male	0.08 (OR = 1.03)	0.08 (OR = 1.03)	0.31

Note. OR = odds ratio provided for logistic regression.

Table 10. Percentage of those above and below BITSEA problem score threshold by demographic characteristics, parental mental health, HLE-I, screen time and overreactive parenting.

Factor	Percentage above BITSEA threshold (%)	Percentage below BITSEA threshold (%)
Primary caregiver education level		
Level 1 or below	48	52
Level 3	27	73
Level 5 or higher	15	85
Ethnicity		
White	21	78
Black or Black British	37	63
Asian or Asian British	38	62
Mixed or Other ethnic group	35	65
Family type		
Single parent/carers	39	61
Coupled parent/carers	21	79
Family equivalised income quintile		
Lowest income quintile	41	59
Middle income quintile	22	78
Highest income quintile	12	88
Depression (PHQ) threshold		
Above	41	59
Below	23	77
Anxiety (GAD) threshold		
Above	46	54
Below	22	77
HLE-Index (quintiles)		
1 (lowest)	34	66
2	25	75
3	21	79
4	21	79
5 (highest)	20	80
Screen time (quintiles)		
1 (lowest)	17	83
2	17	83
3	24	76
4	27	73
5 (highest)	39	60
Overreactive parenting score (quintiles)		
1 (lowest)	20	80
2	16	84
3	22	78
4	25	75
5 (highest)	43	57

Base: All cohort children

Source: COT20s Wave 2

Table shows unadjusted percentages, all derived using weights

Appendix 3: Mode effects on analysis

If respondents did not start or complete their survey via the web link (CAWI) in time, they were invited to complete their survey via the telephone (CATI). Around 8% cases completed some or all their survey by CATI²⁹, and 92% completed all their survey using the CAWI.

To explore whether there are any mode effects in the analysis models, we conducted two exploratory analyses with mode (CAWI or CATI) as a covariate. We did not conduct an exhaustive check on all variables explored in this report, but selected two key analyses to explore. These analyses were a) differences in overreactive parenting scale by socio-demographics characteristics and parental mental health and b) factors linked to child language development at age 2.

Below is a summary table of the results with and without mode included in the model.

Overreactive Parenting

Table 1 displays the standardised estimates and p-values with and without mode included in the analysis on differences in overreactive parenting scale by socio-demographics characteristics and parental mental health.

Table 1. Standardised estimates and p-values with and without mode in overreactive parenting analysis

Independent variables	Original (without mode) Standardised Coef. (p-value)	Mode effect model Unstandardised Coef. (p-value)
Mode (CATI)	NA	-0.06 (0.09)
Income – 2 nd quintile	0.11 (0.02)	0.11 (0.02)
Income – 3 rd quintile	0.15 (0.002**)	0.15 (0.002**)
Income – 4 th quintile	0.18 (<0.001***)	0.18 (<0.001***)
Income – 5 th quintile	0.19 (<0.001***)	0.17 (<0.001***)
Education	0.04 (<0.001***)	0.05 (<0.001***)
Family type – Single	-0.20 (<0.001***)	-0.20 (<0.001***)
Ethnicity – Asian/Asian British	0.11 (0.03)	0.11 (0.03)
Ethnicity – Black/Black British	-0.12 (0.12)	-0.13 (0.11)
Ethnicity – Mixed/Other British	0.11 (0.09)	0.11 (0.09)
Depression – Above PHQ threshold	0.28 (<0.001***)	0.28 (<0.001***)
Anxiety – Above GAD threshold	0.29 (<0.001***)	0.29 (<0.001***)

Neither the model estimate, nor the p-values substantially differ between the original and the mode effects models. Further, mode did not significantly associate with overreactive

²⁹ As there were so few CATI and CAWI combined, this has been collapsed with CATI.

parenting. These collectively indicate that there are no mode effects on the parent over reactively findings.

Language development

Table 2 displays the rate ratio estimates and p-values with and without mode included in the analysis on factors associated with differences in average number of words children could say.

Table 2. Standardised estimates and p-values with and without mode in language analysis

Independent variables	Original (without mode) RR* (p-value)	Mode effect model RR* (p-value)
Mode (CATI)	NA	1.07 (0.12)
Income – 2 nd quintile	0.97 ($p = 0.53$)	0.97 ($p = 0.55$)
Income – 3 rd quintile	1.03 ($p = 0.45$)	1.03 ($p = 0.44$)
Income – 4 th quintile	1.13 ($p = 0.006^{**}$)	1.13 ($p = 0.006^{**}$)
Income – 5 th quintile	1.11 ($p = 0.03$)	1.11 ($p = 0.03$)
Education	1.008 ($p = 0.49$)	1.01 ($p = 0.56$)
Family type – Single	1.07 ($p = 0.03$)	1.07 ($p = 0.03$)
Ethnicity – Asian/Asian British	1.03 ($p = 0.39$)	1.04 ($p = 0.31$)
Ethnicity – Black/Black British	1.06 ($p = 0.28$)	1.07 ($p = 0.22$)
Ethnicity – Mixed/Other British	0.94 ($p = 0.26$)	0.94 ($p = 0.28$)
Depression – Above PHQ threshold	0.92 ($p = 0.06$)	0.92 ($p = 0.06$)
Anxiety – Above GAD threshold	0.95 ($p = 0.20$)	0.95 ($p = 0.19$)
HLE-Index (linear)	1.05 ($p < 0.001^{***}$)	1.05 ($p < 0.001^{***}$)
HLE-Index (quadratic)	1.00 ($p < 0.001^{***}$)	1.00 ($p < 0.001^{***}$)
Screen time (linear)	0.94 ($p < 0.001^{***}$)	0.94 ($p < 0.001^{***}$)
Screen time (quadratic)	1.00 ($p < 0.001^{***}$)	1.00 ($p < 0.001^{***}$)
Overreactive parenting	1.02 ($p = 0.08$)	1.02 ($p = 0.07$)
Sex (Male)	0.81 ($p = 0.006^{**}$)	0.81 ($p < 0.001^{***}$)
Age	1.05 ($p < 0.001^{***}$)	1.05 ($p < 0.001^{***}$)

*RR = Rate ratio.

Neither the model estimate, nor the p-values substantially differ between the original and the mode effects models. Further, mode did not significantly associate with overreactive parenting, nor with number of words child could say. These collectively indicate that there are no mode effects on the parent over reactively findings or language findings.

Appendix 4: Cohort profile at age 2

Below is a description of key demographics of the cohort children, their primary caregiver, and their household when the cohort children were 2 years old. The descriptive profile below is provided to aid interpretation of findings described throughout this report.

Cohort children

The Wave 2 survey data include information for a total of 4,812 cohort children (1.13% of families had twin cohort members)³⁰.

As in Wave 1, 49% of cohort children were female and 51% were male. The average age of the children at the time of the Wave 2 survey was 24.8 months. Table 1 summarises the proportion of children per month of age at the time of the Wave 2 survey.

Table 1. Age in months of children at the time of the Wave 2 survey

Child's age	Percentage (%)
24 months	54
25 months	27
26 months	10
27 months	5
28 months	3
Unweighted Base	4812
Weighted Base	4811

Base: All cohort children (including twins).
Table shows %, all derived using weights

Source: COT20s Wave 2

Primary Caregiver

Relationship to cohort child

Primary caregivers were defined as the parental figure who provided most of the caregiving for the cohort child at the time of the Wave 1 interview. The majority of primary caregivers were biological parents of the child (99.6%); 91.9% were the child's biological mother and 7.7% were the child's biological father. The remaining 0.4% of primary

³⁰ A two-proportion z-test found no significant difference in the proportion of twin families between Wave 1 (1.3%) and Wave 2 (1.13%), $z = 0.85$, $p = .396$. This suggests that attrition of twin families between waves was not meaningfully different from that of non-twin families.

caregivers consisted of adoptive parents, foster parents, special guardians and full or half siblings.

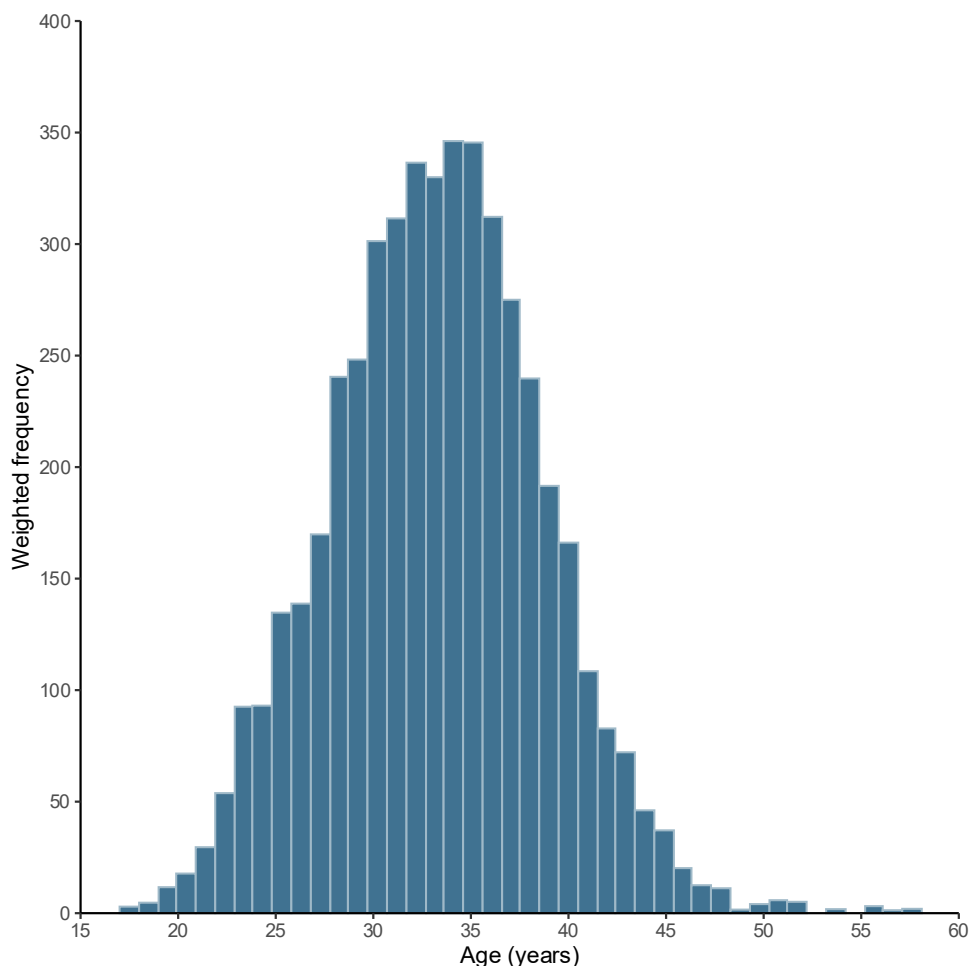
Gender

Primary caregivers reported their gender at the Wave 1 interview; 93% were female and 7% were male.

Age

At the time of the Wave 2 survey, primary caregivers were between 17 and 62 years of age, with an average age of 33 years. Figure 1 shows the distribution of the primary caregivers' ages at the time of the Wave 2 survey.

Figure 1. Primary caregivers age in years at the time of the Wave 2 survey



Base: All primary caregivers

Source: COT20s Wave 2

Education

In the Wave 1 survey, primary caregivers reported what academic and/or vocational qualifications they had. To allow comparisons of highest level of qualification across

academic and vocational qualifications, these were equivalised between both types of qualification, resulting in a scale ranging from no qualification to Level 5 or above equivalised qualification. The methodology for equivalising across academic and vocational qualifications aligned with that used in the Millenium Cohort Study Sweep 6³¹ to allow for comparability. See the Wave 1 report³² for full details of which qualifications are categorised into which level.

As shown in Table 2, just over half of primary caregivers (54%) were qualified to degree level or above at Wave 2: 33% held an undergraduate degree or NVQ level 4/5 or equivalent, and 21% held a postgraduate degree or equivalent, as their highest qualification. Nearly a quarter of parents (23%) held A-level or equivalent qualifications as their highest level of qualification, 16% held GCSEs and 7% had no qualifications.

Table 2. Primary caregiver’s highest equivalent qualification level

Highest level of qualification	Percentage (%)
Level 5: Postgraduate degree or professional qualification	21
Level 4: Undergraduate degree or NVQ level 4/5	33
Level 3: A-level or NVQ level 3	23
Level 2: GCSEs or NVQ level 2	16
Level 1: NVQ level 1	<1
No qualification	7
Weighted base	4758
Unweighted base	4747

Base: All primary caregivers

Source: COT20s Wave 1 data, with Wave 2 respondents

Table shows %, all derived using weights.

Family composition

At the time of the Wave 2 survey, the majority (80%) of children lived in households with two caregivers in residence, while 20% of families were headed by a single parent³³ –

³¹ Agalioti-Sgompou, V., Atkinson, M., Church, D., Johnson, J., Mostafa, T., Murphy, T., Peters, A., & Rosenberg, R. (2017). MCS6 Derived Variables: User guide.

https://cls.ucl.ac.uk/wpcontent/uploads/2018/08/mcs6_derived_variables_user_guide_1sted_2017.pdf

³² Bernardi, M., Fish, L., van de Grint-Stoop, J., Knibbs, S., Goodman, A., Calderwood, L., Mathers, S., Deepchand, K., Ferguson, C., Borges, T., Ploubidis, G., Barnes, J., Dockrell, J., Crawford, C., MacMillan, L., Pickering, K., & Fearon, P. (2023). *Children of the 2020s: First survey of families at age 9 months* (Research report). Department of Education. <https://www.gov.uk/government/publications/children-of-the-2020s-first-survey-of-families-at-age-9-months>

³³ Single parents/carers were defined as those not living with a partner or the cohort child’s other parent. However, it includes parents/carers who are the sole carer of their child and those whose child has contact with another parent living elsewhere.

this was not significantly different to the proportion of single parent families at Wave 1³⁴. Of children cared for in a single parent household, 75% (15% of the whole cohort) had contact with a parent/carer living elsewhere, 3% (<1% of the whole cohort) did not have contact with a parent/carer living elsewhere, but were involved in some other way (such as financial support), and 22% (4% of the whole cohort) did not have any contact with a parent/carer elsewhere.

In total, 5% of primary caregivers who reported having a cohabiting partner³⁵ at Wave 1 were no longer in a cohabiting relationship at Wave 2.

In total, 10% of families had had a new baby since the Wave 1 survey of which less than 1% had new babies that were twins. A further 7% of families were expecting a new baby at the time of the Wave 2 survey.

Ethnicity

Primary caregivers reported their child's, and their own ethnicity in the Wave 1 survey.

Three quarters (76%) of COT20s cohort children were of White ethnicity. Ten percent were of an Asian ethnic group or were Asian British, and 5% were of Black/African/Caribbean ethnicity or were Black/African/Caribbean British. Nine percent of the cohort children were of Mixed/Multiple ethnicities or of another ethnic background that had not been specified in the question.

The majority (79%) of primary caregivers were of a White ethnic background. Eleven percent were of an Asian ethnic group or were Asian British. A further 5% were of Black/African/Caribbean ethnic group or were Black/African/Caribbean British. Five percent of primary caregivers were of Mixed/Multiple ethnicities or of another ethnic background that had not been specified in the question.

Income

All primary caregivers reported their net income from all sources or, if living with a partner, their own and their cohabiting partner's combined net income from all sources (after any deductions, such as income tax or National Insurance).

In order to allow comparisons of the living standards of different family types, income was equivalised using the Modified OECD scale (Department for Work and Pensions, 2021) to take into account variations in the size and composition of the family, including the primary caregiver, their cohabiting partner and their dependent children (see Appendix 4 for details on methodology). This means that households with a different composition or

³⁴ A two-proportion z-test found no significant difference in the proportion of single-parent families between Wave 1 (19%) and Wave 2 (20%), $z = 1.40$, $p = .161$. This suggests that attrition of coupled-parent families between waves was not meaningfully different from that of other family types.

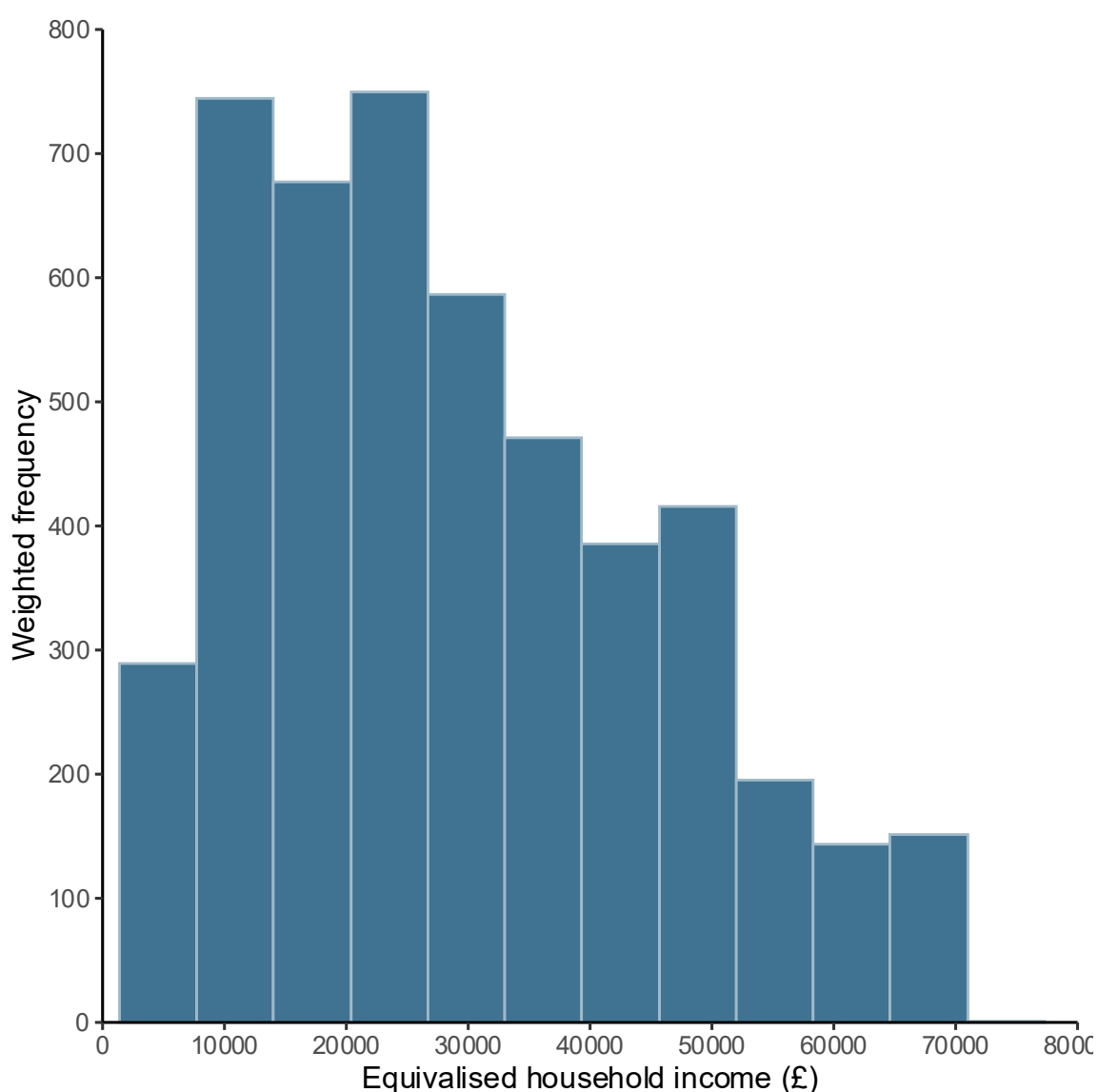
³⁵ Cohabiting partners included all types of partnerships

different net incomes, but the same equivalised income can, be considered to have a comparable standard of living.

The results presented in this report are representative of 2-year-old children in England who were registered on the Child Benefit Register in infancy. The vast majority of children in England are registered on the CBR. However, those from higher income families (those earning over £100,000 per annum) are under-represented.

Figure 2 demonstrates the distribution of equivalised income across the families when their child was 2 years.

Figure 2. Distribution of weighted household equivalised income when children are 2 years old



Base: All primary caregivers' households.

Source: COT20s Wave 2

Figure shows weighted frequency. Equivalised family income Intervals are equal to approximately £6,325.

For analysis, equivalised income was split into five weighted quintiles (see Appendix 5). Table 3 displays the mean income of each weighted quintile. Refer to Chapter 2 (section 2.2.) for further analysis of family income.

Table 3. Mean income of each weighted income quintile

Quintile	Mean income (SD)
Quintile 1	£9,076 (£3,352)
Quintile 2	£18,014 (£2,435)
Quintile 3	£26,666 (£2,445)
Quintile 4	£36,407 (£3,269)
Quintile 5	£54,323 (£8,120)

Table shows weighted mean and standard deviation of the equivalised family income of weighted income quintiles.

Appendix 5: Equivalised income

In the Wave 1 and Wave 2 surveys of Children of the 2020s, all primary caregivers reported their net household (theirs and their partners combined) income after any deductions, such as income tax or national insurance. Respondents were given the option to report their income annually, monthly or weekly over 20 banded response options (see Table 1).

Table 1. Income bands and the corresponding annual, monthly and weekly amount

Band	Annually	Monthly	Weekly
1	Less than £6,500	Less than £550	Less than £120
2	£6,500 to less than- £10,500	£550 to less than £870	£120 to less than £200
3	£10,500 to less than £13,000	£870 to less than £1,100	£200 to less than £250
4	£13,000 to less than £15,000	£1,100 to less than £1,270	£250 to less than £300
5	£15,000 to less than £17,000	£1,270 to less than £1,430	£300 to less than £330
6	£17,000 to less than £19,000	£1,430 to less than £1,600	£330 to less than £370
7	£19,000 to less than £21,000	£1,600 to less than £1,760	£370 to less than £410
8	£21,000 to less than £23,000	£1,760 to less than £1,930	£410 to less than £450
9	£23,000 to less than £25,500	£1,930 to less than £2,100	£450 to less than £490
10	£25,500 to less than £27,500	£2,100 to less than £2,290	£490 to less than £530
11	£27,500 to less than £30,000	£2,290 to less than £2,500	£530 to less than £580
12	£30,000 to less than £32,500	£2,500 to less than £2,700	£580 to less than £630
13	£32,500 to less than £35,000	£2,700 to less than £2,930	£630 to less than £680
14	£35,000 to less than £38,000	£2,930 to less than £3,170	£680 to less than £730
15	£38,000 to less than £41,500	£3,170 to less than £3,460	£730 to less than £800
16	£41,500 to less than £46,000	£3,460 to less than £3,810	£800 to less than £880
17	£46,000 to less than £51,500	£3,810 to less than £4,270	£880 to less than £990
18	£51,500 to less than £59,500	£4,270 to less than £4,940	£990 to less than £1,140
19	£59,500 to less than £75,000	£4,940 to less than £6,270	£1,140 to less than £1,450
20	£75,000 or more	£6,270 or more	£1,450 or more

Note. If respondents had indicated they had no income, this would have been recorded, and they were not asked to report their income in bands.

To allow comparisons of the living standards of different family types, income was equivalised using the HBAI Modified OECD scale³⁶. This takes into account variations in the size and composition of the families across the sample and involves accounting for the number of caregivers (primary caregiver and cohabiting partner) and the number of dependent children. Households with many family members will need a higher income to achieve the same standard of living as households with fewer members.

³⁶ <https://www.gov.uk/government/statistics/households-below-average-income-for-financial-years-ending-1995-to-2020/household-below-average-income-series-quality-and-methodology-information-report-fye-2020#equivalisation-1>

After equivalisation has been applied, households with a different composition or net income, but the same equivalised income can be considered to have a comparable economic standard of living.

Methodology

The same methodology to calculate equivalised income at Wave 1 was used to calculate equivalised income at Wave 2. Below details this methodology.

Step 1: Merge the annual, monthly, and weekly income response bands.

Merging bands involved creating one variable denoting family income. Bands and annual, month, and weekly income are presented in Table 1. For example, households earning Less than £6,500 annually, Less than £550 monthly or Less than £120 weekly would be in income band 1.

Step 2: Prepare the household equivalence scale.

As the question in the survey asked about the primary caregivers' and their partners combined net income, the household equivalence scale should only include the primary caregiver and their partner plus any dependents. Dependents are defined, according to the HBAI Modified OECD scale as individuals in the household who are aged under 18-year-olds and who are the biological/foster/adoptive child of the primary caregiver or their cohabiting partner.

Wave 2 survey did not ask for a complete update of the household when the children were 2 years old. The survey only asked primary caregivers to provide information on whether there was a cohabiting partner, and if there had been any new babies in the family. The Wave 2 survey did not have any updated information on dependents identified at wave 1. Therefore, we used wave 1 information about dependents identified at Wave 1, plus information about any new babies and the W2 collected information about cohabiting partners to calculate the household equivalence scale value.

To calculate the household equivalence scale, each member of the household is assigned an equivalence value. The first adult (the primary caregiver³⁷) in each household is given a value of 0.67, partners, dependent children aged 14 to 17 year are

³⁷ The HBAI modified OECD scale defines the first adult as the first person over 18 years. At Wave 1, we identified some families who reported no adults in the household, or who did not provide their age. These families were kept in the calculation as plausible cases and the primary respondent was assigned a value of 0.67 with the assumption that they were the child's parent. Therefore, at wave 2 the first adult value is assigned to the primary informant.

assigned 0.33, and dependent children under 14 years 0.2. These values are then summed to produce a household equivalence scale value.

Step 3: Divide the midpoint of annual income bands by household composition weight

For the lower income band (Less than £6,500) the midpoint was calculated between 0 and 6500. For the upper income band (75,000 or more), the midpoint was calculated between 75,000 and 90,000 which was set based on a sensitivity analysis of optimal upper cut off at Wave 1³⁸. Those who reported no income, were treated as missing due to uncertainties of measurement error, and were therefore imputed as part of the multiple imputation that was conducted (Appendix 1).

Step 4: Create sample probability weighted deciles and quintiles of the equivalised income.

R function `xtile` (package = "statar"³⁹) was used to create equally weighted deciles and quintiles of the equivalised income. The function divides the input (in this case the equivalised income) into n (in the case of quintile $n = 5$) equal-sample-sized intervals and assigns a numeric value to each observation that indicates the interval to which it belongs.

Results

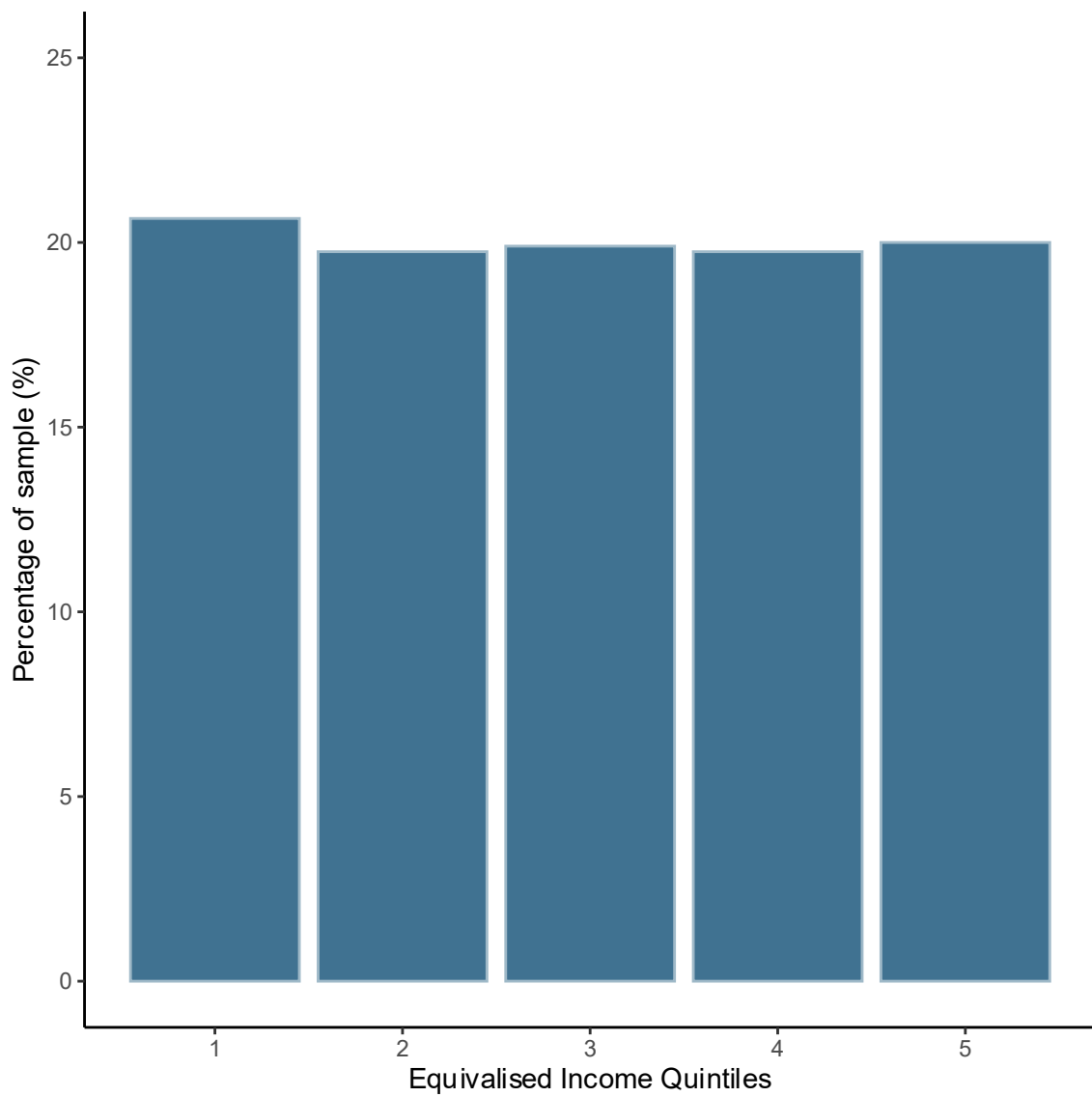
In total there were 400 primary caregivers with missing family equivalised income data at Wave 2, having declined to answer the survey question related to family income. These cases were imputed during the multiple imputation (Appendix 1).

The weighted normalised equivalised income quintiles are displayed in Figure 1, and demonstrate an evenly proportioned distribution of approximately 20% the sample in each quintile.

³⁸ The upper cut off was set the same as identified at Wave 1 for comparability.

³⁹<https://www.rdocumentation.org/packages/radiant.data/versions/1.0.0/topics/xtile>

Figure 1. Distribution of equivalised income over normalised weighted quintiles.



Base: primary caregivers.

Source: COT20s age 2

Figure shows percentage of sample by normalised equivalised income quintiles.

Appendix 6: Analysis comparing equivalised income at Wave 1 and Wave 2

Family income was measured when the children were 9 months and 2 years. The family income was equivalised at each time point to allow comparisons of the living standards of different family types, income was equivalised to take into account variations in the size and composition of the household (see Appendix 5).

To determine if there was a significant change in equivalised family income from when the children were 9 months (measured in the Wave 1 survey) and 2 years (Wave 2 survey), a paired t-test was conducted.

A difference score was then calculated by taking the Wave 1 equivalised income from the Wave 2 equivalised income measure. A positive difference score indicates equivalised income had increased since Wave 1, a negative difference score indicates it is decreased.

A paired weighted t-test was conducted on the difference scores to determine whether the mean difference significantly deviated from zero, indicating a significant change between the two time points. T-test was weighted using Wave 2 weights. Analysis revealed that a significant though very small change in equivalised income across the Wave 1 to Wave 2 period of the COT20s study ($t(156) = 4.91$, $p < 0.001$, $d = 0.10$).

Weighted means suggest the household equivalised income on average £1,189 higher at Wave 2 (mean = £28,713, SD = £16,253) compared to Wave 1 (mean = £27,523, SD = £16,154).

Appendix 7: Reasons primary caregivers were not looking for paid work.

Table 1. Percentages of all reasons why primary caregiver were not looking for paid work

Reason	Percentage not looking for paid work (%)	Percentage (%)
I prefer to look after my child myself	70	16
I would not have enough income left after paying for childcare for working to be worthwhile	31	7
I cannot earn enough to pay for childcare	20	5
There are no jobs with the right hours for me	16	4
I am caring (unpaid) for someone with a long-term health condition, illness or disability	12	3
Household income is enough to live on/do not need the money	10	2
I cannot work because of poor health	7	2
There are no jobs in the right place for me	6	1
I cannot find suitable childcare	6	1
My family would lose benefits if I was earning	5	1
I am caring for my child/children who have additional needs	4	1
There are no jobs available for me	4	1
I prefer not to work	4	1
I am on maternity leave	4	1
Some other reason	4	1
My child is too young – I will look for work when they start nursery	4	1
My partner does not want me to work	3	1
I am in full-time education	3	1
I was made redundant/lost my job	3	1
I am breastfeeding	2	1
I am pregnant	2	1
I am on a training course	2	1
I am taking a break from work	2	<1
Unweighted Base	816	4758
Weighted Base	728	4747

Base: All primary caregivers.

Source: COT20s Wave 2

Appendix 8: Types of ECEC used at Wave 1 and Wave 2.

Table 1. Type and duration of ECEC regularly used by families for the cohort child between birth and 9.5 months old (Wave 1), and 9.5 months and 2 years (Wave 2)

ECEC type	Birth to 9.5 months Percentage of families who had regularly used this type %	9.5 months to 2 years Percentage of families who had regularly used this type %
Formal childcare	13	52
Day nursery	6	25
Childminder	3	11
Nursery school	3	15
Professional nanny	<1	1
Pre-school or playgroup	<1	5
Special school/day nursery	<1	<1
Informal childcare	37	52
Relative/s	36	51
Friend or neighbour	3	6
Au pair	<1	<1
Other	<1	<1
No ECEC used	57	26
Unweighted Base	8628	4758
Weighted Base	8615	4747

Base: All cohort families.

Source: COT20s Wave 1 & 2

Appendix 9: Reasons why families have not used formal ECEC.

Table 1. Reasons why families did not use formal ECEC regularly between 9 months and 2 years

Reason	Percentage (%)
I'd rather look after my child myself	53
I cannot afford childcare/the childcare available is too expensive	38
I rarely need to be away from my child	27
My child is too young	25
Relatives and friends can provide all the childcare I need	24
Not needed as other people in my household can look after my child	10
The times childcare is available doesn't fit with my/our working hours	7
The quality of childcare is not good enough	6
I cannot find a childcare place because local providers are full	4
Not needed as I am/my partner is on maternity/paternity leave	4
My child will start formal childcare soon	4
My child needs special care	3
I would have transport difficulties getting to a provider	2
I have had a bad experience using childcare in the past	2
Other reasons	1
Not needed as I don't work	1
Not needed as I work from home	<1
Not needed (general)	<1
My child does not want to go or does not enjoy it	<1
My child comes to work with me	<1
My child is still breastfeeding	<1
Unweighted Base	2075
Weighted Base	2271

Base: families who did not use formal childcare

Source: COT20s Wave 2

Appendix 10: A breakdown of the frequency of engagement of each activity within each quintile HLE-Index

Table 1. Percentage of primary caregivers indicating the frequency that someone at home engages in each activity with their child within quintile of the HLE-Index score (Quintile 1 to 3, see table 2 for quintiles 4 to 5)

Activity	Never	Occasionally/ less than once a week	1/2 days per week	3 times a week	4 times a week	5 times a week	6 times a week	7 times a week/ constantly
Quintile 1 (lowest HLE-I scores)								
Look at books or read to	6	10	21	17	11	10	5	20
Play with letters	60	12	18	6	2	1	1	1
Play with numbers or count with	17	12	29	18	11	7	2	5
Teach songs, poems or nursery rhymes	9	10	20	16	14	10	4	16
Paint or draw	20	17	30	15	8	5	2	4
Quintile 2								
Look at books or read to	1	2	5	8	11	15	10	47
Play with letters	44	9	18	14	9	3	0	2
Play with numbers or count with	3	2	13	16	21	17	6	24
Teach songs, poems or nursery rhymes	1	1	5	9	14	17	8	45
Paint or draw	5	8	25	21	17	11	3	8
Quintile 3								
Look at books or read to	0	2	4	5	6	12	8	63
Play with letters	31	9	19	13	13	9	2	4
Play with numbers or count with	0	1	2	7	15	20	12	43
Teach songs, poems or nursery rhymes	0	1	1	3	8	14	10	62
Paint or draw	2	4	16	18	22	18	6	14

Base: all primary caregivers

Source: COT20s Wave 2

Unweighted base: Q1 = 990, Q2 = 1017, Q3 = 913. Weighted base: Q1 = 1077, Q2 = 1008, Q3 = 897

Table 2. Percentage of primary caregivers indicating the frequency that someone at home engages in each activity with their child within quintile of the HLE-Index score (Quintile 4 to 5)

Activity	Never	Occasionally/ less than once a week	1/2 days per week	3 times a week	4 times a week	5 times a week	6 times a week	7 times a week/ constantly
Quintile 4								
Look at books or read to	0	0	1	2	5	10	9	72
Play with letters	14	4	11	18	18	20	5	9
Play with numbers or count with	0	0	0	2	7	16	14	60
Teach songs, poems or nursery rhymes	0	0	0	1	3	10	9	76
Paint or draw	1	2	8	14	16	22	9	28
Quintile 5 (highest HLE-I scores)								
Look at books or read to	0	0	1	1	1	4	6	88
Play with letters	0	0	4	5	9	20	10	52
Play with numbers or count with	0	0	0	0	0	4	7	89
Teach songs, poems or nursery rhymes	0	0	0	0	1	4	3	92
Paint or draw	0	0	4	3	11	17	9	56

Base: all primary caregivers

Source: COT20s Wave 2

Unweighted base: Q4 = 974, Q5 = 863. Weighted base: Q4 = 946, Q5 = 817.

Appendix 11: Analysis comparing the Home Learning Environment (HLE) between COT20s and SEED Age 2 surveys

In the age 2 COTs survey, primary caregivers indicated how frequently their child participated in a set of 5 learning and play activities in their home. The same measure, the Home Learning Environment Index (HLE-Index) (Melhuish et al., 2001), was asked to primary caregivers as part of the Department for Education's Study of Early Education and Development (SEED) Age 2 years survey (<https://www.gov.uk/government/collections/study-of-early-education-and-development-seed>).

The variety and/or frequency of the home learning environment activities reported by primary caregivers in the COTs Age 2 survey were compared to those reported in SEED age 2, a pre-pandemic population-representative dataset. Below details the methodology and results.

SEED was a population-representative longitudinal study of nearly 6,000 children from across England focused on the impact of childcare on children throughout their childhood. Data collection for the SEED age 2 survey took place between 2013 and 2014. A subset of 489 children who were of the same age to the majority (81%) of the COT20s cohort sample (children aged 24 months and 25 months) was selected from the SEED dataset.

Methodology

The SEED dataset was publicly available and downloaded from the UK Data Service (University of Oxford, Department of Education, & NatCen Social Research, 2018). Population weights (weights based on the probability of being sampled and for non-response) were available for the SEED cohort and were used in the analysis below.

Initial analysis using weighted independent t tests was conducted to determine if the current cohort significantly differed from the SEED cohort in age and indices of multiple deprivation (IMD) quintiles.

To address whether the current cohort's home learning environment differed from that of the subset of SEED cohort a weighted Analysis of covariance (ANCOVA) was conducted to allow the effect of group on HLE-Index score to be assessed, while controlling for age and IMD, given the known influence of child's age, and socio-economic background on the HLE-Index and the differences determined between the two groups on these key variable. This ANCOVA would determine if there was a significant difference in the mean HLE-Index between the two cohorts. Associations were considered significant when at or below 1% threshold (p-values equal to or less than 0.01).

All analysis was conducted using R (R Core Team, 2021). Weighted t-tests and ANCOVA were specified using the 'survey' R package (Lumley, 2021). Specifically, the *svydesign* to specify the design and weights of the data, and *svytest()* function to conduct the t-test⁴⁰, and *svyglm()* for the ANCOVA.

Results

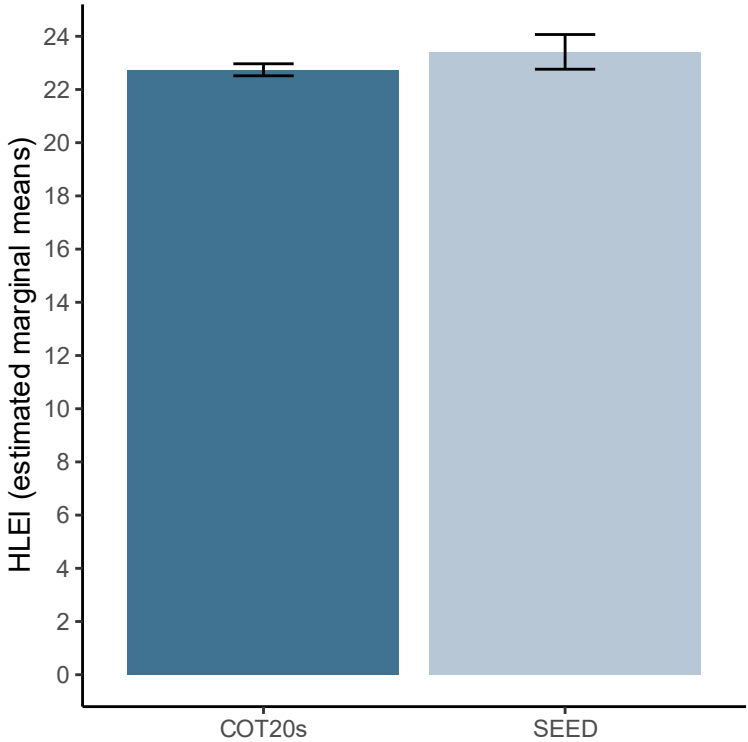
The subset of children selected from the SEED Age 2 cohort were on average 2.3 months older than COT20s cohort at Wave 2. The weighted mean age of the COT20s cohort was 24.8 months (SD = 1.05), and weighted mean age of the subset of SEED Age 2 children was 24.9 months (SD = 0.26). The results of the weighted independent t tests revealed the age of the children significantly differ by each cohort ($t(5244) = 31.96, p < 0.01$). This significant difference supports the inclusion of age as a covariate variable in the ANCOVA analysis below.

The results of the weighted independent t tests revealed no significant difference in the IMD quintiles between the two cohorts ($t(5244) = 0.36, p = 0.71$). Although the t-test revealed no significant differences between the two groups, the COT20s Wave 2 children had a slightly higher average IMD than the subset of SEED children. The subset of SEED children had weighted median IMD quintile of 2, whereas the COT20s cohort at Wave 2 had a weighted median IMD quintile of 3. This difference in medians supports the inclusion of IMD as a covariate variable in the ANCOVA analysis below.

The weighted ANCOVA revealed there was no significant differences between the COT20s and SEED cohort in the HLE-index ($\beta = 0.67, p = 0.05$), while accounting for child's age and IMD. Estimated marginal mean (the mean HLEI score for each group adjusted for the effects of age and IMD as determined by the statistical analysis) HLEI of the COT20s cohort was 22.71 (SE = 0.11), compared to 23.40 (SE = 0.33) among the subset of the SEED cohort. Figure 1 illustrates the estimated marginal means (the mean HLE-Index score for each group adjusted for the effects of age and IMD as determined by the statistical analysis).

⁴⁰ Example R code: `survey_design <- svydesign(ids = ~1, data = combined_data, weights = ~weight); svytest(Age ~ cohort, design = survey_design)`

Figure 1. Average (estimated marginal mean) home learning environment index (HLEI) score at 2 years in COT20s compared to SEED.



Base: COT20s & SEED primary caregivers. Source: COT20s age 2 & SEED age 2
Figure shows estimated marginal mean and error bars denote 95% confidence interval.

Appendix 12: List of 34 CDI words

A shortened version of the widely used caregiver-report UK Communicative Development Inventory Words & Sentences form (CDI W&S; Alcock et al., 2020) was administered to assess children's language ability.

The below list the 34 words that primary caregivers indicated whether or not their child could say. The number of words child could say were summed per child. If the primary informant indicated 'Don't Know' to whether their child could say a particular word, that child would not receive a number of words summed score – and would therefore have scale-level missing data (n = 78) and would have been imputed at score-level. Note that 'Don't know' was coded in the survey to be reactive, meaning that 'Don't know' would only become visible if parents tried to skip the question.

1. When
2. Child
3. Her
4. Fine
5. His
6. Say
7. Door
8. Finger
9. Find
10. Take
11. Cup
12. Orange (*i.e., the fruit*)
13. Rubbish
14. Belly/Tummy
15. Pyjamas
16. Trousers
17. Bathroom
18. Cry
19. Break (*i.e., as in to break something*)
20. Get
21. Hair
22. Ear
23. Kitchen
24. Little
25. Socks
26. Bring
27. Mouth
28. Leg
29. Bed

- 30. Sleep
- 31. Foot
- 32. Hand
- 33. Book
- 34. Table

Appendix 13: Analysis comparing the number of words child could say at 2 years between COT20s and reference sample

Early language and communication are an important early developmental milestone. A shortened version of the widely used caregiver-report UK Communicative Development Inventory Words & Sentences form (CDI W&S; Alcock et al., 2020) was administered to assess children's language ability.

In the age 2 COT20s survey, primary caregivers reported which words, out of a list of 34 everyday words, that their child could say. On average, children could say 21 words from the set of 34 provided (note this figure should not be taken to directly estimate the total number of words a child says at this age). The number of words the COT20s children were reported to be able to say was compared to the number of words children in a reference sample could say.

This reference sample consisted of subset of 217 children who were of the same age to the majority of the COT20s cohort children (24 months and 27 months). The reference group were sampled from across the UK and consisted of data obtained from either a) a pre-pilot study sample of children randomly sampled from research lab databases across the United Kingdom and had CDI data assessments (n = 51)⁴¹, b) a pilot sample of children who were sampled to be demographically diverse and representative of the United Kingdom and whose language had been assessed using a shortened version of the CDI (n = 43) or c) a sample of children from across the UK whose language had been assessed using the Oxford CDI⁴² (n = 123). Data was collected between 2017 and 2022.

It should be noted that the reference sample was relatively small and is likely to be less demographically diverse than the COT20s sample. In addition, it was not possible to account in the analysis for important factors which can influence language development, such as children's sex, family composition, socio-economic background, or population weightings as these data were not available for the reference sample. However, we judge it unlikely that adjusting for these factors would tend to lead to a lower vocabulary size in the reference sample, so this tends to favour an interpretation that the current cohort of 2-year-olds are not scoring substantially lower on vocabulary than this earlier cohort.

⁴¹ It is important to note when interpreting the below findings that the pre-pilot sample and oxford CDI sample are likely to be less demographically diverse than the Children of the 2020s sample as they consist of children whose family chose to participate in research studies (they were not randomly sampled from the population). Additionally, no information on IMD of the sample are provided therefore this was not accounted for in the analysis (unlike the similar analysis for the HLEI in Appendix 11)

⁴² Oxford University. (2012). Oxford Communicative Development Inventory: A UK adaptation of the MacArthur-Bates CDI. https://www.psy.ox.ac.uk/files/research/oxford_cdi.pdf

Nevertheless, further work using larger, more demographically detailed datasets would be needed to corroborate these results.

Methodology

The data for the reference sample were obtained either from colleagues who had given permission to the UCL COT20s team to use (pre-pilot and pilot samples), or downloaded from the Wordbank: an open database of children's vocabulary development (<https://wordbank.stanford.edu/>). Population weights were available for the reference sample, therefore only the COT20s data are weighted in the analysis below.

Initial analysis using weighted independent t tests were conducted to determine if the current cohort significantly differed from the reference sample in age.

To address whether the current cohort's language ability differed from that of the reference sample, a weighted negative binomial regression was conducted to allow the effect of group (COT20s or reference sample) on language ability be assessed, while controlling for age, given the known influence of child's age on language ability. This model would determine if there was a significant difference in the mean number of words children could say between the two groups. Associations were considered significant when equal to or below 1% threshold (p-values equal to or less than 0.01).

All analysis was conducted using R (R Core Team; 2021). Weighted t-tests and were specified using the 'survey' R package (Lumley, 2021), and the negative binomial model was specified using the MASS package. Specifically, the svydesign to specify the design and weights of the data for the svytest() function to conduct the t-test⁴³, and glm.nb() for the negative binomial regression.

Results

The reference group were on average around one week younger than COT20s cohort at Wave 2. The weighted mean age of the COT20s cohort was 24.8 months (SD = 1.05), and weighted mean age of the reference group was 24.5 months (SD = 0.84). The results of the weighted independent t tests revealed the age of the children significantly differ by group ($t(4973) = -3.87, p < 0.01$). This significant difference supports the inclusion of age as a covariate variable in the negative binomial regression analysis below.

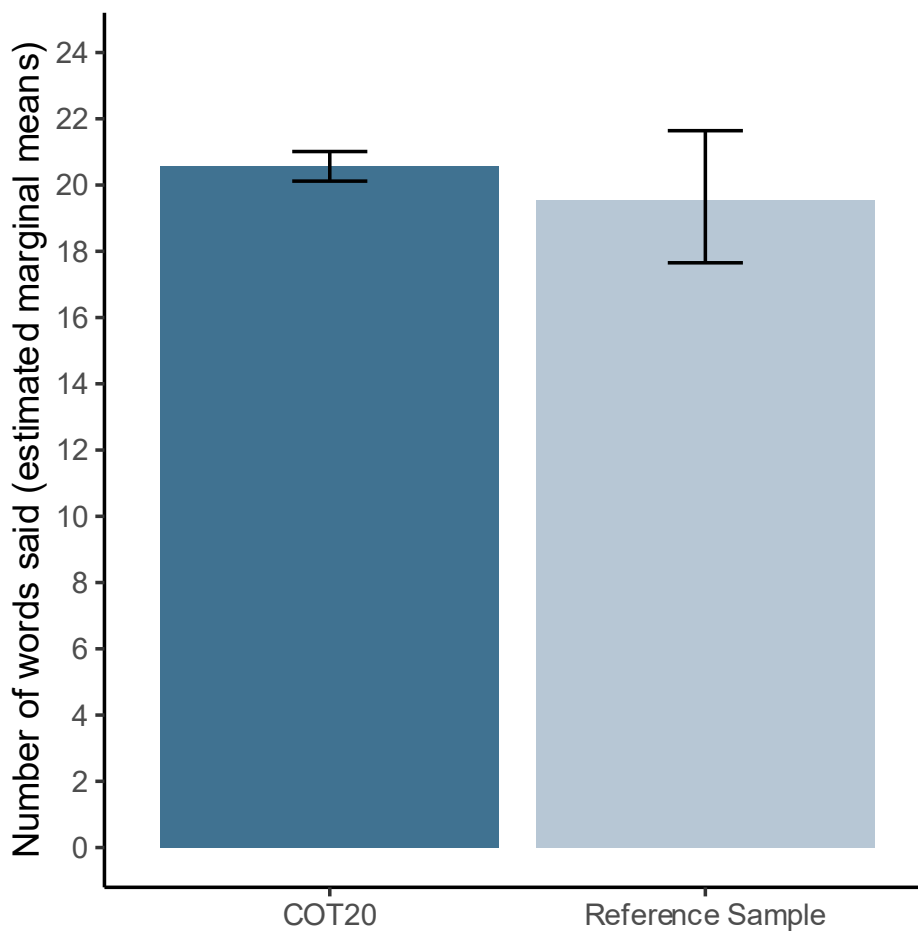
The weighted negative binomial regression revealed that the mean number of words children could say did not significantly differ between the COT20s and the reference sample ($\beta = -0.05, p = 0.34$), while accounting for child's age. The mean number of words

⁴³ Example R code: `survey_design <- svydesign(ids = ~1, data = combined_data, weights = ~weight); svytest(Age ~ cohort, design = survey_design); glm.nb(Language ~ source + Age, design = survey_design)`

children in the COT20s cohort could say was 20.56 (SE = 0.23) and compared to 19.54 (SE = 1.02) of the reference sample.

Figure 1 illustrates the mean number of words children in each group could say.

Figure 1. Average (estimated marginal mean) number of words children at 2 years in COT20s could say compared to a pre-pandemic reference sample.



Base: COT20s primary caregivers & reference sample parents. Source: COT20s age 2 & reference sample
Figure shows estimated marginal mean and error bars denote 95% confidence intervals.

Appendix 14: Analysis exploring the interaction between screen time and screen-related parenting behaviours on child outcomes.

The below analysis explores the interaction between the amount of time spent watching television, videos and other digital content on a screen and whether primary caregivers were watching alongside, on children's outcomes.

Methodology

An expanded version of the negative binomial model exploring early factors associated with children's language abilities at age 2 (described in Chapter 4 and Appendix 2) was conducted to examine whether the significant association previously observed between screen time and the number of words children could say was moderated by primary caregiver co-viewing behaviour. The model included an interaction term between total screen time and primary caregiver-reported activity during screen time (mostly watching with the child, sometimes watching with the child, mostly doing something else [reference group]), while holding constant all other demographic, environmental, and parenting variables. This model was specified in R using the `glm.nb()` function from the **MASS** package⁴⁴, with sample weights applied using the `weights` argument to account for Wave 2 sample and non-response weighting.

An expanded version of the logistic regression model examining early factors associated with children's socio-emotional and behavioural difficulties at age 2 (described in Chapter 4 and Appendix 2) was conducted to explore whether the previously observed association between screen time and likelihood of scoring above the threshold for possible behavioural and emotional problems was moderated by primary caregiver co-viewing behaviour. The model included an interaction term between total screen time and primary caregiver-reported activity during screen time (mostly watching with the child, sometimes watching, mostly doing something else [reference group]), while holding constant all other demographic, environmental, and parenting variables. This model was specified in R using the `svyglm()` function from the **survey** package⁴⁵, with `family = quasibinomial` to account for the binary nature of the outcome. Wave 2 sample and non-response weights were applied using the `svydesign()` function to ensure representativeness of the analysis sample.

All analysis above was conducted only on the 98% of children watched television, video or other digital content on a screens on a typical day.

⁴⁴ Venables, W. N., & Ripley, B. D. (2002). *Modern Applied Statistics with S* (4th ed.). Springer. <https://CRAN.R-project.org/package=MASS>

⁴⁵ Thomas Lumley (2023). *survey: Analysis of Complex Survey Samples*. R package version 4.2-3. <https://CRAN.R-project.org/package=survey>

Results

Early factors associating with language development

Model results from Chapter 4's analysis into the moderating effect of co-viewing on the relationship between screen time and children's language ability, while controlling for all other factors, are displayed in Table 1.

Note that when co-viewing and its interaction with screen time were included, the previously observed quadratic relationship between screen time and language development was no longer significant and was therefore removed from the model for parsimony.

Table 3. Model results exploring early factors associated with child language at 2 years including moderation of co-viewing on screen time

Research question	Outcome (shaded in grey) and independent variables	Partial-standardised Coef.* (Rate Ratio)	Unstandardised Coef. (Rate Ratio)	p-value
Early factors associated with child's language abilities at 2 years	Number of words children could say			
	Income – 2 nd quintile	-0.03 (RR = 0.97)	-0.03 (RR = 0.97)	0.51
	Income – 3 rd quintile	0.04 (RR = 1.04)	0.04 (RR = 1.04)	0.44
	Income – 4 th quintile	0.13 (RR = 1.14)	0.13 (RR = 1.14)	0.006**
	Income – 5 th quintile	0.10 (RR = 1.11)	0.10 (RR = 1.11)	0.03
	Education	0.10 (RR = 1.11)	0.008 (RR = 1.009)	0.41
	Family type – Single	0.09 (RR = 1.10)	0.09 (RR = 1.10)	0.004
	Ethnicity – Asian/Asian British	0.03 (RR = 1.03)	0.03 (RR = 1.03)	0.40
	Ethnicity – Black/Black British	0.03 (RR = 1.03)	0.03 (RR = 1.03)	0.56
	Ethnicity – Mixed/Other British	-0.05 (RR = 0.95)	-0.05 (RR = 0.95)	0.39
	Depression – Above PHQ threshold	-0.08 (RR = 0.92)	-0.08 (RR = 0.92)	0.08
	Anxiety – Above GAD threshold	-0.06 (RR = 0.94)	-0.06 (RR = 0.94)	0.15
	Home learning index score (linear)	0.13 (RR = 1.14)	0.06 (RR = 1.06)	<0.001***
	Home learning index score (quadratic)	-0.004 (RR = 0.96)	-0.0008 (RR = 1.00)	<0.001***
	Overreactive parenting	0.02 (RR = 1.02)	0.02 (RR = 1.02)	0.12
	Child's age	0.05 (RR = 1.06)	0.05 (RR = 1.06)	<0.001***
	Child's sex - Male	-0.22 (RR = 0.80)	-0.22 (RR = 0.80)	<0.001***
	Screen time	-0.08 (RR = 0.92)	-0.05 (RR = 0.95)	<0.001***
	Co-viewing – Sometimes watching with	0.002 (RR = 1.00)	0.002 (RR = 1.00)	0.64
	Co-viewing – Mostly watching with	-0.02 (RR = 0.98)	-0.02 (RR = 0.98)	0.96
	INTERACTION: Screen time * coviewing [Sometimes watching with]	-0.0003 (RR = 1.00)	-0.0003 (RR = 1.00)	0.40
	INTERACTION: Screen time * coviewing [Mostly watching with]	0.0002 (RR = 1.00)	0.0002 (RR = 1.00)	0.52

Note. RR = rate ratio provided for negative binomial regression. *Coefficients are partially standardised on the independent variables only, as negative binomial models require over-dispersed count dependent variables. Therefore, the partial-standardised coefficients are in the units (count) of the dependent variable number of words.

Early factors associating with socio-emotional problems

Model results from Chapter 4's analysis into the moderating effect of co-viewing on the relationship between screen time and children's socio-emotional problems, while controlling for all other factors, are displayed in Table 2.

Table 2. Model results exploring early factors associating with child BITSEA Problem Total score threshold at 2 years including moderation of co-viewing on screen time

Research question	Outcome (shaded in grey) and independent variables	Standardised Coef. (Odds Ratio)	Unstandardised Coef. (Odds Ratio)	p-value
Early factors associated with child's socio-emotional development at 2 years	BITSEA Problem Total score			
	Income – 2 nd quintile	-0.19 (OR = 0.83)	-0.19 (OR = 0.83)	0.08
	Income – 3 rd quintile	-0.46 (OR = 0.64)	-0.46 (OR = 0.64)	<0.001***
	Income – 4 th quintile	-0.81 (OR = 0.44)	-0.82 (OR = 0.44)	<0.001***
	Income – 5 th quintile	-0.97 (OR = 0.38)	-0.97 (OR = 0.38)	<0.001***
	Education	-0.23 (OR = 0.80)	-0.17 (OR = 0.82)	<0.001***
	Family type – Single	0.41 (OR = 1.50)	0.42 (OR = 1.50)	<0.001***
	Ethnicity – Asian/Asian British	0.69 (OR = 1.99)	0.67 (OR = 1.99)	<0.001***
	Ethnicity – Black/Black British	0.40 (OR = 1.50)	0.38 (OR = 1.49)	0.04
	Ethnicity – Mixed/Other British	0.41 (OR = 1.50)	0.38 (OR = 1.50)	0.03
	Depression – Above PHQ threshold	0.36 (OR = 1.44)	0.36 (OR = 1.44)	0.007**
	Anxiety – Above GAD threshold	0.43 (OR = 1.54)	0.43 (OR = 1.54)	<0.001***
	Home learning index score	-0.006 (OR = 0.96)	-0.006 (OR = 1.00)	0.26
	Overreactive parenting	0.50 (OR = 1.64)	0.52 (OR = 1.68)	<0.001***
	Child's age	0.03 (OR = 1.03)	0.03 (OR = 1.03)	0.40
	Child's sex - Male	0.05 (OR = 1.05)	0.05 (OR = 1.05)	0.56
	Screen time	0.31 (OR = 1.37)	0.21 (OR = 1.23)	<0.001***
	Co-viewing – Sometimes watching with	0.09 (OR = 1.09)	0.09 (OR = 1.09)	0.64
	Co-viewing – Mostly watching with	0.48 (OR = 1.62)	0.48 (OR = 1.62)	0.01*
	INTERACTION: Screen time * coviewing [Sometimes watching with]	-0.0007 (OR = 1.00)	-0.0007 (OR = 1.00)	0.56
	INTERACTION: Screen time * coviewing [Mostly watching with]	-0.003 (OR = 1.00)	-0.003 (OR = 1.00)	0.02

Note. OR = odds ratio provided for logistic regression.



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