Department for Education

Children of the 2020s: home learning environment and screen time at age 2

Research brief

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Dr Laurel Fish*[1], Dr Marialivia Bernardi*[1], Jessica van de Grint-Stoop[2], Dr Jean Anne Heng[2], Sarah Knibbs[3], Prof. Alissa Goodman[1], Prof. Lisa Calderwood[1], Dr Sandra Mathers[4], Kavita Deepchand[3], Chris Ferguson[3], Prof. George Ploubidis[1], Prof. Jacqueline Barnes[5], Prof. Julie Dockrell[1], Prof. Claire Crawford[1], Prof. Lindsay MacMillan[1], Kevin Pickering[3], Prof. Pasco Fearon[1&2]

* These authors contributed equally to this work and are joint first authors of the report.
[1] University College London, [2] University of Cambridge, [3] Ipsos, [4] University of Oxford, [5] Birkbeck, University of London

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Introduction

The Children of the 2020s (COT20s) study is a nationally representative birth cohort study in England. It measures the circumstances and outcomes of children, and their families, longitudinally, with annual data collections over the first 5 years of life. It is DfE's Education and Outcomes Pathways Study of the Early Years (EOPS Early Years).

This research brief provides a summary of key findings from COT20s on the home learning environment at age 2, including screen time and digital media use, using data 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. Results cannot identify causal factors directly but highlight correlations worthy of further investigation.

A longer forthcoming report will provide a focused exploration of three key policy-relevant research topics in more detail:

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 COT20s study began with Wave 1 in 2022, when the cohort children were aged 9 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 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. 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.

Summary of home learning environment findings at age 2

Primary caregiver's mental health, the home learning environment and screen time

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

- The Home Learning Environment Index (HLE-Index) (Melhuish et al, 2001) 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: lower family 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) (2019) 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 levels, 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).

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

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 (measured using a shortened version of the UK Communicative Development Inventory Words and Sentences questionnaire (CDI - Alcock et al., 2020)).
- Analysis 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 in children at age 2. Children from lower-income families could say fewer words, 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% of 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, 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 lower 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 threshold 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).

Discussion

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).

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 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).

Home learning environment and children's 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, Lehrl, & Weinert, 2020), as well as with evidence from the Millennium Cohort Study (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 responsivity, 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. 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.

The forthcoming in-depth report on the Children of the 2020s survey of families at age 2 will provide more detail about these findings and a range of other topics. In addition, further data collection from the COT20s cohort at ages 3, 4 and 5 will enable more powerful longitudinal analysis of the factors associated with children's early development and wellbeing.

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