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Factors shaping children's language skills in the first year following the Covid-19 pandemic

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Abstract

Research suggests that pandemic-related disruptions have significantly impacted the language development of young children. The main aims of this UK-based study were to explore the language skills of children in Reception and Key Stage 1 (ages 4 years to 7 years) in the 2021/2022 academic year, and investigate which individual, family, and school factors were related to language outcomes at the end of the summer term (May to July). Participants were assessed using the LanguageScreen once in the spring term (Jan to April 2022) and once in summer (May to July 2022). Data regarding the children's home learning environment and parental well-being were collected once through an online questionnaire. Demographic information about the children and their schools was obtained from a government database. Results showed that most children achieved LanguageScreen scores in the expected range at both timepoints. Further analyses revealed that children's scores in the summer were mainly related to child-level factors; only their total scores and expressive vocabulary scores were also predicted by school factors. None of the family factors investigated were significant predictors. These results suggest that while most children have language skills expected for their age, some children struggle more due to individual factors and environmental characteristics. These groups of children may require additional support in developing their language skills in a post-pandemic world.

Keywords

Covid-19, language skills, young children, vocabulary, comprehension, family

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Introduction

Since the start of the pandemic, research has explored how this global crisis has affected children's development, learning, and education. Early language skills predict future academic and social outcomes (e.g. Aro et al., 2014; Burchinal et al., 2020; Dale et al., 2023; Lee, 2011). Therefore, it is important to investigate the long-term impact of the pandemic to understand how to support children moving forward.

Most research to date has concluded that COVID-19 lockdowns and restrictions were harmful to children. Schools in England have reported significant concerns regarding children's language skills (e.g. Bakopoulou, 2024; I CAN, 2021; Nicholls et al., 2020; Tracey et al., 2022). Some schools have reported that children starting Reception have not been "school-ready" (Nicholls et al., 2020; Powell et al., 2024; Tracey et al., 2022), with literacy, communication, and language development among the main areas of concern (Tracey et al., 2022). In a survey conducted by I CAN (2021), 67% of participating primary teachers reported having at least one child with receptive or expressive language difficulties, which they attributed to COVID-19. Similarly, a report from the UK Government body of school inspectors (Ofsted, 2022) indicated that early year's staff felt children had smaller vocabularies and found it more difficult to express themselves compared to children before the pandemic. Significant concerns have also been reported by parents and practitioners. Parents have observed a delay in their children's communication skills, and practitioners have reported a delay in speech and language (La Valle et al., 2022). These studies suggest that the pandemic and associated restrictions negatively impacted children's language skills.

The pandemic's negative impact on young children's language is also evident internationally (Byrne et al., 2023; Ferrari et al., 2022; Fung et al., 2023; Giesbrecht et al., 2023; Murillo et al., 2023). Giesbrecht et al. (2023) found that children born during the pandemic had overall lower scores in a language assessment and higher odds of screening positive for a communication delay compared to children born pre-pandemic. This suggests that while different countries approached the pandemic and associated restrictions differently, the impact of COVID-19 on children's language development and opportunities is a global issue.

Contrary to the research discussed so far, a few studies have shown no changes in school-aged children's language skills and development. Hadley et al. (2023) found no difference between pandemic and pre-pandemic children's language and literacy skills when starting kindergarten. Similarly, Hallin et al. (2022) found no differences in the decoding and reading comprehension skills of children in primary education during the pandemic compared to pre-pandemic. However, it is important to note that this study was conducted in Sweden, and educational settings for children ages 1–15 remained open during the pandemic (Hallin et al., 2022). Davies et al. (2021) showed that young children in England who attended early childhood education and care during the pandemic showed better receptive vocabulary skills than children who did not attend any educational setting. Therefore, differences in results could be due, in part, to the differences in children's experience of the pandemic and school disruptions.

While all children have experienced this crisis, not all children have been impacted in the same way. Research has shown that environmental or personal circumstances played a role in the extent of the impact. For example, the language skills of children from disadvantaged backgrounds were more affected (Bartholo et al., 2023; Fung et al., 2023), potentially exacerbating existing inequalities. Additionally, as mentioned above, children who attended an educational setting during the pandemic showed better receptive vocabulary skills, particularly children from more deprived backgrounds (Davies et al., 2021). This suggests that certain characteristics, such as being from a disadvantaged background, might have been a risk factor, but attending an early years setting during the pandemic played a protective role.

The fact that research investigating children's language skills in the context of the pandemic has found differences depending on children's characteristics, opportunities, and environments shows that context and the environments that children are part of play a crucial role in shaping language development (Bronfenbrenner, 2005; Bronfenbrenner and Morris, 2006; Rowe and Weisleder, 2020). The bioecological theory of development emphasises that environments, ranging from children's immediate family to broader cultural contexts, influence children's development (Bronfenbrenner, 2005; Bronfenbrenner and Morris, 2006). The COVID-19 pandemic has provided a unique example of how changes in policies and practices can impact other systems, affecting children's immediate environments and interactions. For example, national policies impacted children's access to education, and in turn, might have affected their opportunities for social interaction and, in turn, their language development. This highlights the importance of understanding language development as a multifaceted process that is directly and indirectly influenced by the broader context of the child's life.

Since two academic years were impacted by the COVID-19 pandemic, home environments also significantly changed to support children's education and learning. It is well established that home learning environments and family characteristics play a role in children's language development. For example, exposure to books at home has been related to later language proficiency in young children (Nag et al., 2024; Volodina et al., 2024). Similarly, activities at home that provide learning opportunities (playing with letters/numbers; painting or drawing) have been related to literacy achievement, vocabulary, and grammar skills (Kluczniok and Mudiappa, 2019; Melhuish et al., 2008). Research looking at children's home learning environments during the pandemic reports increases in play, learning activities and use of digital technology at home (Schmeer et al., 2023; Sonnenschein et al., 2021; Wheeler and Hill, 2021). Research also highlighted significant inequalities in home learning environments during the pandemic (Andrew et al., 2020a, 2020b). To fully understand children's language development and skills, their home learning environment should also be investigated.

The activities parents do at home are not the only home environment characteristic that can influence children's language development. Maternal mental health and wellbeing are related to young children's language skills (Kahn et al., 2002; McGillion et al., 2024). However, most extant literature focuses on infants. To our knowledge, only one study has looked at this relationship in a pandemic context, with results suggesting that caregiving sensitivity can be associated with vocabulary size at the start of the pandemic, but not with vocabulary growth 1 year later (McGillion et al., 2024). Since the pandemic was a period of stress and worry for many adults, further research is needed to understand the impact that parental well-being had on the language skills of children in the first few years of formal education.

To assess the differentiated, long-term effects of COVID-19 on children, this study aimed to (1) explore the language skills of children in Reception and Key Stage 1 in UK classrooms during the 2021/2022 academic year, and (2) to explore which individual, family, and school factors were impacting children's language performance at the end of the 2021/2022 academic year.

Method

Participants

630 children were assessed in the spring term (Jan to April) and 694 children in the summer term (May to July) of the 2021/2022 academic year (Table 1 for participants' characteristics). Participants attended one of 33 different schools in England and were enrolled in Reception and KS1. In

Table 1. Participants characteristics.

Timepoint	Age (years) M (SD)	Gender	FSM	EAL	SEND
Spring	5.94 (0.88)	47.30% female 51.90% male	18.09%	13.17%	12.63%
Summer	6.28 (0.88)	47.11% female 52.44% male	18.29%	13.68%	12.82%

England, children typically start primary school at age 4 in Reception and then progress to Key Stage 1 (KS1), from 5 to 7 years. Participants' schools had an average of 23.79% of children eligible for Free School Meals (FSM) (SD = 13.03; range = 8.90%–60.50%; national average = 22.5%), an average of 13.77% of children learning English as an additional language (EAL) (SD = 14.78; range = 0%–54.20%; national average = 19.5%) and 12.46% of children with SEND (SD = 6.22; range = 3.20%–32.10%; national average = 12.2%).

Data was collected as part of the ICICLES project: a 3-year longitudinal project exploring the impact of the pandemic and school disruptions on children's language, socioemotional, and educational skills in Reception and KS1. The project received ethical approval from the National Institute of Economic and Social Research ethics committee. Schools signed a memorandum of understanding and data sharing agreement at the start of the study. Parents/carers signed an online consent form for their children to take part. Children gave verbal assent for all testing and had the right to withdraw at any time during data collection. Schools received £200 as a financial contribution for a tablet needed to complete the assessments. An additional financial contribution was provided to schools for the time taken to complete the assessments. Parents/carers were entered into a prize draw for a chance to win an online shopping voucher.

Materials and procedure

Parent/carer survey. After signing up for the project, schools were asked to send an email to all parents/carers with children in Reception and KS1, which had a link to an online information sheet, a consent form, and a questionnaire. Parents/carers who consented for their children to take part in the project completed the questionnaire between October 2021 and June 2022. This questionnaire included questions regarding children's characteristics (age, year group), their home learning environment, and parent/carer well-being.

Home learning environment was assessed using the Home Learning Environment Index (HLE; Melhuish, 2010), a questionnaire assessing the types and frequency of activities children and their families engage in (reading, sports, painting). This questionnaire consists of 8 items, and for each item, parents/carers were asked if they engage in a specific activity at home and how often. One item was removed at the coding stage due to the response options provided for that question being incorrect ("How often does someone at home take your child to the library"). Responses to the remaining seven items were scored and added to generate a total score (range: 0–49). Higher scores indicate greater engagement with learning activities at home.

Parent/carer wellbeing was assessed using the Personal Wellbeing Score (PWS; Benson et al., 2019). This is a four-item questionnaire that asks to what extent parents/carers agree or disagree with four statements regarding their wellbeing. A total score was calculated (range: 0–12), with higher scores indicating higher levels of well-being.

Schools' and children's factors. For each school, the percentage of children eligible for FSM, with SEND, and children learning EAL was obtained through the National Pupil Database (NPD), as well as children's gender, age, EAL status, SEND status, access to FSM, and ethnicity.

Language assessment. Schools were asked to complete the LanguageScreen (Hulme et al., 2024) with all participating children once in spring and once in summer. The LanguageScreen is an app-based assessment that assesses four areas of language: expressive and receptive vocabulary, listening comprehension, and sentence repetition. Teachers, teaching assistants, and headteachers carried out this assessment with each child individually. The LanguageScreen provides a total raw and standard score, as well as a raw and standard score for each subscale. For both timepoints, standard scores were classified into one of three categories: Green (90 or above), Amber (82–89), and Red (81 or below). Scores in the *Green* category indicate that the child's skills are not a cause of concern. Scores in the *Amber* category suggest that the child may benefit from support, while scores in the *Red* category indicate that the child needs support.

Results

Children's language skills in spring (January to April) and summer (May to July)

Schools completed 630 LanguageScreens in spring and 694 in summer. Results showed that in spring ($M = 109.34$, SD = 14.12) and summer ($M = 112.47$, SD = 13.69), most participants had a total standard score in the *Green* category (see Table 2), suggesting that the language skills of most participants were not a cause of concern. Scores divided by year group followed the same pattern; therefore, only the results for the sample as a whole are reported here. See the Supplemental Material for scores by year group.

Table 2. Percentage of standard total scores.

Timepoint	Green	Amber	Red
Spring	91.27%	4.92%	3.81%
Summer	94.09%	3.89%	2.02%

Participants' standard scores on each subscale were also classified into the same three categories. At both timepoints, most participants achieved scores in the *Green* category for all subscales (Tables 3 and 4). See Supplemental Material for scores by year group. Results suggest that overall, most children were achieving scores as expected for their age in all subscales, with a small percentage of children requiring some support.

Table 3. Scores of each subscale in Spring.

Subscale	Raw score M (SD)	Standard score[a] M (SD)	Percentage of participants in each category		
			Green	Amber	Red
Receptive vocabulary	19.37 (2.93)	106.63 (13.81)	88.10%	7.30%	4.60%
Expressive vocabulary	16.92 (4.13)	108.92 (14.26)	91.90%	5.24%	2.86%
Sentence repetition	10.74 (2.95)	106.41 (13.80)	87.78%	7.30%	4.92%
Listening comprehension	11.11 (3.45)	106.32 (14.18)	87.78%	7.30%	4.92%

[a]The average Standard Score on any subtest is 100.

Table 4. Scores of each subscale in summer.

Subscale	Raw score M (SD)	Standard score[a] M (SD)	Percentage of participants in each category		
			Green	Amber	Red
Receptive vocabulary	20.00 (2.58)	107.85 (12.50)	92.51%	5.62%	1.87%
Expressive vocabulary	17.99 (3.81)	111.58 (13.79)	93.52%	4.32%	2.16%
Sentence repetition	11.33 (2.68)	107.96 (13.11)	91.50%	5.04%	3.46%
Listening comprehension	12.14 (2.94)	109.63 (13.91)	90.78%	7.06%	2.16%

[a]The average Standard Score on any subtest is 100.

Factors predicting language outcomes in summer

Five regression analyses were conducted to investigate which individual, school, or family factors predicted scores in the summer for: (1) total score, (2) expressive vocabulary, (3) receptive vocabulary, (4) sentence repetition, and (5) listening comprehension. Only 407 participants had complete data across all assessments and questionnaires (Table 5). Due to the amount of missing data, multiple imputation was used to estimate the missing values, increasing the sample size for these analyses to 605.

Table 5. Descriptive statistics of participants with a complete dataset.

Variables	Mean (SD)	Min	Max	Percentage
Children's age (in months)	75.07 (10.45)	58	93	
Gender				
Male				51.35%
Female				48.65%
Percentage of children with SEND				10.56%
Percentage of children learning EAL				16.70%
Percentage of children eligible for FSM				17.69%
Ethnicity				
Asian + Chinese				7.86%
Black				5.15%
Mixed				6.14%
Other				<2.5%[a]
Total score—Spring	58.73 (10.87)	5	76	
Total score—Summer	62.80 (9.86)	7	76	
Receptive vocabulary score—Spring	19.49 (2.86)	0	23	
Receptive vocabulary score—Summer	20.12 (2.42)	3	23	
Expressive vocabulary score—Spring	17.00 (4.02)	0	24	
Expressive vocabulary score—Summer	18.51 (3.91)	0	24	
Sentence repetition score—Spring	11.04 (2.72)	0	14	
Sentence repetition score—Summer	11.56 (2.64)	0	14	
Listening comprehension score—Spring	11.18 (3.48)	0	16	
Listening comprehension score—Summer	12.59 (2.83)	0	16	
Percentage of children eligible for FSM in schools	21.13 (11.94)	6.14	51.88	
Percentage of children learning EAL in schools	18.18 (16.97)	0	53.17	
Percentage of children with SEND in schools	13.04 (7.03)	1.80	30.91	
HLE (max = 49)	25.05 (9.09)	5	47	
PWS (max = 12)	8.35 (2.44)	0	12	

Note. This table includes the descriptive statistics before multiple imputation and iterative proportional fitting.
[a]< 2.5% indicate suppression due to low counts.

Since the sample was not representative of the national population, a weight calibration procedure known as iterative proportional fitting was implemented. We weighted our sample using five measures: FSM, EAL, SEND, region, and school type. Due to small numbers in our sample, the nine regions of England (East Midlands, East of England, London, North East, North West, South East, South West, West Midlands and Yorkshire and The Humber) were further contracted to the following 5 broader categories: Midlands, East of England, London, North, and South. Types of schools were classified as: Academy, Local authority school, and Other (free schools, independent schools, and pupil referral unit). Children's ethnicity was grouped into the following five categories to ensure sufficient sample sizes: Asian + Chinese, Black, Mixed, White, and Other. See the Supplemental Material for descriptive statistics of all regression analyses after multiple imputation and weighting calibration.

For each regression analysis, the outcome variable was the raw score obtained in the summer. We controlled for the raw scores obtained in spring and also included the following predictor variables: age (in months), gender, EAL status, eligibility for FSM, SEND status, ethnicity, HLE score, parent/carer PWS, percentage of children eligible for FSM in the school, percentage of children learning EAL in the school and percentage of children with SEND in the school.

Total score. Results (Table 6) showed that only the following variables were significant predictors of children's total raw score in the summer: total raw score spring ($t = 24.11$, $p < 0.001$), percentage of children with SEND in school ($t = 2.21$, $p = 0.027$), age ($t = 2.64$, $p = 0.008$), gender ($t = 2.36$, $p = 0.018$), SEND status ($t = -2.27$, $p = 0.023$), EAL status ($t = -3.42$, $p < 0.001$) and ethnicity (Other ethnic background; $t = 2.25$, $p = 0.024$).

Table 6. Total score regression results.

Variables	Coefficient	Standard error
Total score—Spring	0.709***	0.029
Percentage of children eligible for FSM in schools	0.008	0.030
Percentage of children learning EAL in schools	−0.001	0.016
Percentage of children with SEND in schools	0.093*	0.042
HLE	0.064	0.046
PWS	−0.198	0.118
Age	0.103**	0.039
Gender (Male = 1)	1.123*	0.475
SEND	−2.080*	0.914
EAL	−2.326***	0.680
FSM	0.462	0.751
Ethnicity		
1. Asian + Chinese	0.023	0.828
2. Black	−1.354	0.663
3. Mixed	−0.220	0.915
4. Other	5.333*	2.370
Constant	11.940***	3.602
R-squared	0.746	
Adj *R*-squared	0.739	

*$p \leq 0.05$. **$p \leq 0.01$. ***$p \leq 0.001$.

Receptive vocabulary. Results (see Table 7) indicated that only the receptive vocabulary raw scores in spring ($t=9.07, p<0.001$), age ($t=3.75, p<0.001$), SEND status ($t=-2.46, p=0.014$) and EAL status ($t=-3.48, p<0.001$) were significant predictors of children's receptive vocabulary raw scores in the summer.

Table 7. Receptive vocabulary regression results.

Variables	Coefficient	Standard error
Receptive vocabulary score—Spring	0.479***	0.052
Percentage of children eligible for FSM in schools	−0.009	0.009
Percentage of children learning EAL in schools	0.000	0.006
Percentage of children with SEND in schools	0.011	0.014
HLE	0.000	0.012
PWS	0.018	0.034
Age	0.042***	0.011
Gender (Male = 1)	0.188	0.151
SEND	−0.618*	0.251
EAL	−0.641***	0.184
FSM	0.171	0.193
Ethnicity		
1. Asian + Chinese	−0.331	0.279
2. Black	−0.459	0.250
3. Mixed	−0.459	0.230
4. Other	0.751	0.526
Constant	7.564***	1.182
R-squared	0.540	
Adj *R*-squared	0.529	

*$p \leqslant 0.05$. **$p \leqslant 0.01$. ***$p \leqslant 0.001$.

Expressive vocabulary. Results (Table 8) indicated that only expressive vocabulary raw scores obtained in spring ($t=21.91, p<0.001$), percentage of children learning EAL in school ($t=-2.19, p=0.028$), percentage of children with SEND in school ($t=3.33, <0.001$), age ($t=4.35, p<0.001$), SEND status ($t=-2.28, p=0.022$), EAL status ($t=-4.69, p<0.001$), and ethnicity (Other ethnic background, $t=4.28, p<0.001$) were significant predictors of children's expressive vocabulary raw scores in the summer.

Sentence repetition. Results (Table 9) indicated that only sentence repetition raw scores obtained in spring ($t=20.23, p<0.001$) and age ($t=2.19, p=0.028$) were significant predictors of children's sentence repetition raw scores in the summer:

Listening comprehension. Results (Table 10) indicated that only listening comprehension raw scores obtained in spring ($t=10.93, p<0.001$), age ($t=2.69, p=0.007$), gender ($t=2.44, p=0.014$), SEND status ($t=-2.80, p=0.005$), EAL status ($t=3.22, p=0.001$), and ethnicity (Other ethnic background. $t=2.41, p=0.015$) were significant predictors of children's listening comprehension raw scores in the summer.

Table 8. Expressive vocabulary regression results.

Variables	Coefficient	Standard error
Expressive vocabulary score—Spring	0.675***	0.030
Percentage of children eligible for FSM in schools	−0.007	0.012
Percentage of children learning EAL in schools	−0.012*	0.005
Percentage of children with SEND in schools	0.064***	0.019
HLE	0.022	0.019
PWS	−0.024	0.057
Age	0.059***	0.013
Gender (Male = 1)	0.279	0.221
SEND	−0.804*	0.352
EAL	−1.156***	0.246
FSM	0.244	0.328
Ethnicity		
1. Asian + Chinese	−0.311	0.413
2. Black	−0.197	0.383
3. Mixed	−0.126	0.541
4. Other	2.790***	0.651
Constant	1.767	1.472
R-squared	0.703	
Adj *R*-squared	0.696	

*$p \leqslant 0.05$. **$p \leqslant 0.01$. ***$p \leqslant 0.001$.

Table 9. Sentence repetition regression results.

Variables	Coefficient	Standard error
Sentence Repetition score—Spring	0.684***	0.033
Percentage of children eligible for FSM in schools	0.014	0.010
Percentage of children learning EAL in schools	−0.006	0.006
Percentage of children with SEND in schools	0.014	0.016
HLE	0.015	0.013
PWS	−0.084	0.042
Age	0.023*	0.010
Gender (Male = 1)	0.289	0.194
SEND	−0.368	0.342
EAL	−0.415	0.291
FSM	−0.216	0.296
Ethnicity		
1. Asian + Chinese	0.790	0.396
2. Black	0.509	0.439
3. Mixed	0.299	0.343
4. Other	0.749	0.749
Constant	2.062*	0.987
R-squared	0.605	
Adj *R*-squared	0.595	

*$p \leqslant 0.05$. **$p \leqslant 0.01$. ***$p \leqslant 0.001$.

Table 10. Listening comprehension regression output.

Variables	Coefficient	Standard error
Listening Comprehension score—Spring	0.501***	0.045
Percentage of children eligible for FSM in schools	0.004	0.011
Percentage of children learning EAL in schools	0.003	0.007
Percentage of children with SEND in schools	0.032	0.019
HLE	0.030	0.017
PWS	−0.082	0.053
Age	0.031**	0.011
Gender (Male = 1)	0.581*	0.238
SEND	−1.370**	0.489
EAL	−0.870**	0.270
FSM	0.381	0.297
Ethnicity		
1. Asian + Chinese	0.096	0.551
2. Black	−0.093	0.277
3. Mixed	0.285	0.344
4. Other	1.200*	0.496
Constant	3.765**	1.316
R-squared	0.473	
Adj *R*-squared	0.460	

*$p \leq 0.05$. **$p \leq 0.01$. ***$p \leq 0.001$.

Discussion

The main aims of this paper were to explore the language skills of children in Reception and KS1 in the 2021/2022 academic year and to explore which factors were related to children's language scores in the summer of 2022. This study has two main findings. First, results of the LanguageScreen showed that at least 87.78% of participants showed the total language skills expected for their age, as well as the expected scores for each subscale at both timepoints. Second, we found that scores in the summer were mainly predicted by individual factors, with only the total and expressive vocabulary scores being predicted by school factors. Contrary to previous research (Kahn et al., 2002; Kluczniok and Mudiappa, 2019; McGillion et al., 2024; Melhuish et al., 2008; Volodina et al., 2024), we did not find that any of the family factors (HLE and PWS) were related to participants' scores.

The finding that most children in this study achieved scores expected for their age on the LanguageScreen is contrary to previous research (Bakopoulou, 2024; La Valle et al., 2022; Murillo et al., 2023; Ofsted, 2022; Tracey et al., 2022). Importantly, the percentage of children who were not performing as expected is similar to the percentage of children requiring additional support pre-pandemic. Approximately 10% of children in England will have persistent speech, language, and communication needs regardless of their background (Public Health England, 2020). In our study, less than 9% of children in spring and less than 6% in summer showed any need for support in their total language skills. When looking at each subscale, only receptive vocabulary, sentence repetition, and listening comprehension in spring had slightly more than 10% of children with a need for some support (11.9%–12.22%). However, this difference was reduced by the summer to less than 10% in all subscales, suggesting that the percentage of children with language difficulties in our study was similar to pre-pandemic levels.

Interestingly, not only did we not find an increase in language difficulties, but our sample also performed in the high average range. The average standard score for any subtest is 100, yet participants in the current study scored significantly higher on the total score and all subscales at both timepoints (range: 106.32–111.58). The same pattern was observed when looking at each year group separately. Thus, our sample did not exhibit the expected decline in language scores post-pandemic.

Our findings may differ from previous research for a few reasons. First, previous research has shown that learning EAL can have an impact on different areas of children's language development and skills (e.g. Burgoyne et al., 2011; Dixon et al., 2023; Mahon and Crutchley, 2006), with our regression analyses also showing this pattern. However, the percentage of children learning EAL participating in the current study was less than the national average in the 2021/2022 academic year (19.5%). As such, findings could primarily reflect non-EAL children, who might have experienced less impact. Second, the sample is self-selecting and may not be representative of the population from which it is drawn. For example, in England, 42% of adults in families with dependent children hold a degree or higher education qualification (Social Mobility Commission, 2024). In our sample, 62% of parents/carers in spring and 65% in summer had a degree or higher education qualification. Third, the type of measure used and time of assessment may be playing a role. The LanguageScreen measures four components of language (receptive and expressive vocabulary, sentence repetition, and listening comprehension), but not broader communication skills. Further research should be conducted to assess how other components of language may have been impacted. Additionally, our sample was assessed a few months after all restrictions were lifted, allowing for uninterrupted schooling that may have provided language learning opportunities not available to children assessed during the pandemic.

Despite these overall findings, we did find that children with certain characteristics were at a higher risk of language difficulties. Most of the significant factors were child-level factors, followed by school factors. This is in line with theories of development that propose that children's characteristics are important, however the characteristics of their environment and their interactions can also impact their development (Bronfenbrenner, 2005; Bronfenbrenner and Morris, 2006; Rowe and Weisleder, 2020). It is important to note that multiple imputation and proportional fitting were implemented for these analyses, which resulted in a decrease in all LanguageScreen scores of approximately 1 point or less compared to the scores in our original sample. This minor difference suggests that any downward shift was minimal and unlikely to significantly alter the interpretation of our findings.

Certain characteristics significantly related to children's scores in our analyses have long been recognised as important for language development and have remained relevant post-pandemic. Unsurprisingly, older children and children with higher scores in spring also had higher scores in summer. We also found that being a child with SEND and learning EAL were two risk factors significant for all regression analyses, except for sentence repetition, which aligns with previous research (Azpitarte and Holt, 2024; Burgoyne et al., 2009; Dixon et al., 2023; Hulme et al., 2024). For example, research conducted in England has shown that children with SEND have fewer chances of achieving expected language goals than their peers (Azpitarte and Holt, 2024). Similarly, compared to monolingual English speakers, children learning EAL tend to show lower scores in standardised assessments in both expressive and receptive vocabulary, with the difference between groups on receptive vocabulary getting smaller as age increases (Dixon et al., 2023). One thing to note is that due to the difference in the assessments used in the current study and the studies described above, it is not possible to assess whether the difference in performance is the same post-pandemic or if this difference has increased. Nevertheless, the fact that these groups of children are

still performing at a lower level than other children highlights that they are at a disadvantage and may require even more support to close the pre-existing gap.

Interestingly, while we found gender to be a significant predictor for the total score and the listening comprehension subscale, the direction of this relationship was unexpected, with boys in our sample achieving higher scores than girls. In previous research, small but significant gender differences have been found in young children, with girls performing better than boys in assessments of different language domains (Bornstein et al., 2004; Hulme et al., 2024; Lange et al., 2016). However, some of these differences decrease with age and may disappear once children start schooling (around 6 years of age; Bornstein et al., 2004; Lange et al., 2016). Children in our study were on average 5.94 and 6.28 years old in spring and summer. Therefore, it may be that this is the age where some of these differences decrease, and that is why we did not observe this relationship. The difference in the direction of the relationship could also suggest that, although girls typically show higher attainment, they may have lost some of their usual advantage, indicating that they might have been impacted more by the pandemic than boys.

Finally, results showed that children in the Other ethnic category (i.e. any other ethnic group besides White, Black, Mixed, Asian, or Chinese) had significantly higher scores in the total scale, and also the expressive vocabulary and the listening comprehension scale. However, we are not drawing any conclusions from this finding as this group is made up of less than 10 children (i.e. less than 2.5% of our sample) with a mix of ethnic backgrounds, different languages and cultural practices.

Two school factors were significant predictors, but only for two of the subscales: percentage of children with SEND in schools for the total score and expressive vocabulary scores, and the percentage of children learning EAL for expressive vocabulary scores. Our results showed that children attending schools with a higher percentage of children with SEND scored higher in the total score and expressive vocabulary subscale. While it is difficult to know why this is the case, schools with a higher percentage of children with SEND may already be experienced in supporting children with additional needs or equipped with resources to do so. Therefore, the rest of the children may indirectly benefit from an environment with those additional resources or activities implemented to target language difficulties. Finally, we found that children from schools with a higher percentage of children learning EAL had lower expressive vocabulary scores. This finding could be interpreted to mean that since many children learning EAL need support with English oral language skills (Babayiğit, 2014; Babayiğit and Shapiro, 2020; Bowyer-Crane et al., 2017), a higher number of pupils with these needs may impact the entire school, including other children, as teachers might need to dedicate more attention, time, or resources to supporting EAL learners, potentially requiring additional staff training and resources to meet their needs. It is important to note that both of these school factors had the smallest coefficients of the models; thus, interpretations should be taken with caution.

In conclusion, the current study found that overall, most children in our sample are scoring as expected for their age in a language assessment. However, some children remain vulnerable to language difficulties. The majority of significant factors related to children's scores in the summer were their characteristics, with only two school-related factors also being significant. This highlights how both individual characteristics and children's environments can impact children's language development and opportunities. No family factors showed to significantly predict children's scores in the summer. It is important to note that the measure of HLE used here relies on self-report and was designed to measure a home environment not impacted by a global pandemic. Nonetheless, these findings indicate that certain groups of children are facing greater challenges and may need additional support in a post-pandemic world.

Authors' note

Data were collected while CZM and CBC were based at the National Institute of Economic and Social Research (NIESR) and EL was based at the University of Portsmouth. This work contains statistical data from ONS which is Crown Copyright. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates. Analyses were carried out in the Secure Research Service, part of the Office for National Statistics. This publication includes analysis of the National Pupil Database (NPD; https://www.gov.uk/guidance/data-protection-how-we-collect-and-share-researchdata). The Department for Education is responsible for the collation and management of the NPD, and is the Data Controller of NPD data. Any inferences or conclusions derived from this publication are the responsibility of the authors and not the Department for Education.

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Ethical considerations

The study was approved by the Ethics Committee of the National Institute of Economic and Social Research.

Consent to participate

Written consent was obtained from all schools and parents/carers.

Consent for publication

Not applicable.

Author contributions

Cecilia Zuniga-Montanez—Project administration, Investigation, formal analysis, data curation, writing—original draft, review and editing. Elena Lisauskaite—Formal analysis, data curation, writing—review and editing. Jo Hutchinson—data curation, writing—review and editing. Silke Fricke—Conceptualisation, writing—review and editing. Claudine Bowyer-Crane—Principal Investigator—conceptualisation, supervision, writing—review and editing.

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Data availability statement

The full data set cannot be publicly shared as it contains NPD data that can only be accessed through the Secure Research Service, part of the Office for National Statistics. The rest of the data can be found at https://osf.io/y6q7c/

Supplemental material

Supplemental material for this article is available online.

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