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REGULAR ARTICLE

Exposure to electronic media was negatively associated with speech and language development at 18 and 24 months

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Abstract

Aim: This study evaluated early speech and language development at 18 and 24 months, and associated factors, based on parental reports.

Method: We followed up the CHILD-SLEEP birth cohort of 1667 Finnish-speaking families, who were randomly recruited in 2011–2013 during routine visits to maternity clinics in the Pirkanmaa Hospital District of Finland. The women were approximately 32 weeks' pregnant at enrolment. Parents reported the size of their child's expressive vocabulary, word combinations, intelligibility, finger-pointing and adherence to instructions. A subsample was studied using the Expressive Language subscale of the Bayley Scales of Infant and Toddler Development, Third Edition.

Results: The children's vocabulary was smaller than previously reported. At 18 months of age, 68.8% of the 997 children had a vocabulary of 20 words or less and 35.7% used about five words at most. At 24 months, 32.4% of the 822 children had a vocabulary of 50 words or less and 18.4% used about 20 words at most. Longer child and parental exposure to electronic media was negatively associated with the size of the child's expressive vocabulary.

Conclusion: Vocabulary size at 18 and 24 months was smaller than previously reported and negatively associated with exposure to electronic media.

KEYWORDS
children, electronic media, expressive vocabulary, language acquisition, speech development

1 | INTRODUCTION

The ability to speak and communicate is a critical skill for humans. Slow language development has been shown to be related to poor school success and underachievement, difficulties in peer relations and emotional and behavioural problems.[1,2] Up to 20% of children have been reported to experience delays in speech and language development.[3–5] Early lexical growth has been associated with later language development.[6–8] Predictions of language development were strongest for expressive vocabulary and word combinations, both at 18 months and at 24 months of age.[6,7]

Average development from the onset of word production to the acquisition of a 50-word vocabulary has been found to be very similar in various language environments.[9] However, early lexical development varies substantially between individuals. Studies have reported that the average number of words in the expressive

vocabulary was as high as 50 words at 18 months of age and 260–340 words at 24 months of age, with great variations in vocabulary development at these ages.[5,10,11]

Expressive vocabulary is a key indicator of a child's development in the first 2 years of life, and children should be able to form early word combinations before they are three years of age.[8] Difficulties in early language development at this age are commonly captured through parent reports, as expressive vocabulary is difficult to test in clinical settings.

During the last 10 to 15 years, clinical observations in both primary health care and special health care have questioned whether children's early expressive vocabulary has been growing slower than indicated by earlier studies. Studies have also suggested that slowed language development was associated with increased screen time. Frequently watching television has been found to increase the risk of delayed language development.[12,13] It has been argued that what parents do with their children is critical, even when structural aspects of social disadvantage, such as family income and housing, have been considered.[8] The quantity of communication has been reported to be lower when watching television or DVDs than when playing and reading books.[14,15] Background television has also been found to reduce the quality and quantity of parental communication and, therefore, infants' opportunities to acquire language.[14,15] Furthermore, heavy parental use of mobile devices has been associated with fewer verbal and nonverbal interactions between parents and children.[16]

This study aimed to assess the early phases of development in a large and representative birth cohort. It also aimed to identify the associated factors. The main outcome variable was the child's expressive vocabulary size. We also studied a subsample using the Bayley Scales of Infant and Toddler Development Third Edition (Bayley-III) Expressive Language subscale. This enabled us to compare parental reports with professional evaluations.[17]

Key Notes

- This randomly recruited Finnish birth cohort study used parental reports to evaluate early speech and language development.
- Vocabulary size was smaller than previously reported in 997 children at 18 months of age and 822 children at 24 months of age.
- Longer child and parental exposure to electronic media was negatively associated with the size of the child's expressive vocabulary.

2 | METHODS

The study was based on the Finnish CHILD-SLEEP birth cohort of families who were randomly recruited in 2011–2013 during regular visits to maternity clinics in the Pirkanmaa Hospital District, Finland. They were recruited when the mothers were approximately 32 weeks' pregnant and followed up for five years, between 2011 and 2017. All maternity clinics in the target area were included, and only Finnish-speaking families were eligible for the study. There were no other exclusion criteria. The sample is based on systematic sampling in the pre-set timeframe comprising all the families in the target health centres.

The participating families were asked to complete a set of questionnaires, prenatally, at birth and when the children were three, eight, 18 and 24 months of age. The questionnaires included several items regarding general health, socio-economic factors, medication, mental health, screen use and sleep quality. Data on children aged 18 and 24 months were collected using a web-based questionnaire that could be answered by either of the parents.

2.1 | Study participants

The questionnaires generated 1163 and 950 responses when the children were 18 and 24 months of age, respectively. That was 69.8% and 57.0% of the original 1667 birth cohort. We excluded 150 and 114 children because the questionnaire was not completed within two months of the 18- and 24-month dates. A further 11 and nine children were excluded due to severe neurological or somatic conditions, such as Down syndrome or Hirschsprung disease. In addition, all children from twin pregnancies were excluded at both ages ($N = 5$). After these exclusions, data were available for 997 and 822 children at 18 and 24 months of age, respectively, and 689 at both time points.

Questions focusing on speech and language development concerned the size of expressive vocabulary and combining words. We also asked questions about the intelligibility of spoken words, finger-pointing to show something and how well the subjects followed short and simple instructions (Appendix 1). The parents' reports seemed to be reliable up to the 50-word vocabulary level, but declined after the child's vocabulary had started to grow quickly.[18] Therefore, we did not enquire more closely about the size of the expressive vocabulary if it markedly exceeded 50 words. However, we wanted to describe the percentage of children who still had an expressive vocabulary of about up to 50 words at 24 months.

In the data analysis, the size of the vocabulary was dichotomised in two different ways at both time points. At 18 months of age, the cut-off was approximately five words maximum and 20 words maximum, and at 24 months of age, it was approximately 20 words maximum and 50 words maximum. Intelligibility was dichotomised into usually or often intelligible versus usually erroneous or aberrant word forms. The dichotomies were chosen based on the frequently used definition of late talking[19] and the distributions of the developmental pathways in our data.

Socio-economic status, maternal age, the number of adults and children in the household, and maternal illnesses were gathered from maternal prenatal questionnaires. Gestational age, which ranged from 33 to 42 weeks, was gathered from the hospital's birth register.

Daily screen time, including television viewing and watching other electronic devices, was measured in a number of ways

including the number of hours the child watched television, DVDs, videos or electronic devices. We also captured the number of hours parents watched television and videos and the number of hours the television or videos were kept on. Screen time was recorded separately for weekdays and weekends and averaged to represent the mean time per day. Shared reading was measured by how often the parents read pictures, storybooks or comic books to the child. Responses were dichotomised into daily or more often versus less than daily. Sleep duration was evaluated by asking how many hours, on average, the child slept during the night and the day. The daytime and night-time sleep durations were summarised to obtain an estimate of the total sleep duration. It was then categorised at the 10th percentile, which was 11.25 hours.

To validate the parental reports, a subsample was evaluated using Bayley-III at the age of 24 months.[17] The subsample of children was derived from the sub-studies of the main cohort, including typically developing children without developmental diagnoses. The 24-month Bayley-III and questionnaire data were available for 136 children at 18 months of age and 112 children at 24 months of age. Bayley-III consists of five subscales that measure cognitive, language and motor development. The subscales were performed by a trained examiner and scored in a standardised manner using American norms, with a mean of 10.0 and standard deviation of 3.0. In total, the assessment took approximately one and a half hours. We were interested in the expressive language subscale in order to validate the parental reports of vocabulary size. In the data analysis, the expressive language subscale was dichotomised to find children at risk of delay. Standard scores of up to eight indicated a risk for slower expressive vocabulary development and scores of at least nine indicated normal or advantaged expressive vocabulary development.

2.2 | Statistical analysis

Prevalence rates were calculated with 95% confidence intervals (CIs). Pairwise comparisons were performed using the chi-square test or Student's *t* test. Comparisons over time, namely 18 versus 24 months, were based on McNemar's test. A series of multivariate logistic regression models were constructed to define the factors related to expressive vocabulary development. First, only age and sex were controlled for. In the second phase, gestational age, socioeconomic status, maternal age, health and the number of children in the household were also controlled for. Statistical significance was set at $p \leq 0.05$. Statistical analyses were performed using SPSS Statistics, version 27 (IBM Corp).

2.3 | Ethics

The study protocol was approved by the ethical committee of the Pirkanmaa Hospital District, Tampere University Hospital (code: R11032). The parents provided written, informed consent at the beginning of the study.

3 | RESULTS

At 18 months, the sample comprised 997 children (52.4% boys) who were mainly born at term (Table 1). The mothers were generally healthy and well-educated. The parents were somewhat better educated than the national average, but otherwise the sample was highly representative of children born after the 32nd week of pregnancy in the target area. At 24 months, the sample size was 822 (51.7% boys). We had data for 689 infants at both time points.

Language development at 18 and 24 months of age is presented in Table 2. At 18 months, 68.8% (95% CI 65.9%–71.7%) of the children were reported to use approximately 20 words at most and 35.7% (95% CI 32.7%–38.7%) of the children were reported to use five words at most. At 24 months, the vocabulary was less than 50 words in 32.4% (95% CI 29.2%–35.6%) of the children, and 18.4% (95% CI 15.8%–21.0%) were reported to use 20 words at most.

At 18 months, 70.7% only used one-word expressions, and during the follow-up at 24 months, this percentage had decreased to 16.8%. Most (89.8%) of the children aged 24 months used word combinations when they had a vocabulary of about 50 words ($p < 0.001$).

At 18 months, 24.7% often used erroneous or aberrant word forms and 11.5% only babbled. Six months later, the prevalence rates were 11.9% and 2.8%, respectively. At 24 months, children with usually intelligible word forms tended to have a greater vocabulary ($p < 0.001$) and 89.5% of children with usually intelligible word forms used word combinations. In contrast, only 44.1% of children with often or usually deviant word forms used word combinations ($p < 0.001$).

The ability to follow short and simple instructions was at least somewhat deficient in 7.5% of the children at 18 months of age and 3.4% at 24 months of age. This was related to the size of expressive vocabulary at both time points ($p = 0.037$ and $p = 0.001$, respectively).

At the ages of 18 and 24 months, finger-pointing was related to a smaller expressive vocabulary ($p = 0.012$ and 0.008) and only using one-word expressions ($p = 0.022$ and 0.015). Finger-pointing was also associated with less intelligible word forms at 18 months ($p = 0.040$).

Speech and language developed more slowly in boys than girls. At 18 months, the odds ratio (OR) was 2.2–2.7, and at 24 months, it was 2.0–3.2 (Table 3).

A smaller vocabulary at 18 months was related to the child's vocabulary size at 24 months. For example, most 18-month-old children with one word or less in their vocabulary only had about five to 20 words in their vocabulary at the age of 24 months (Table 4).

Expressive vocabulary at 18 ($p < 0.001$) and 24 months of age ($p < 0.001$) was related to the expressive language scale of Bayley-III at 24 months of age (Table 5). At 18 months, 51.4% of the children who spoke approximately 20 words or less received lower scores on the Bayley-III expressive language subscale. The same was true for the 68.4% of the children with less than 50 words at 24 months. None of the children with over 20 words at 18 months of age and only 2.7% of the children with over 50 words at 24 months of age received low Bayley-III scores.

TABLE 1 Characteristics of the 997 children who participated at 18 months[1]

	Total *n*	*n* (%) or mean ± SD, range
Gender	997	
Girls		475 (47.6%)
Boys		522 (52.4%)
Age (months)	989	18.7 ± 0.5, range 16.9–20.0
Gestational age (weeks)	976	39.6 ± 1.3, range 33–42
Infertility treatment	981	89 (9.1%)
Smoking during pregnancy	994	47 (4.7%)
Problems during pregnancy	976	242 (24.8%)
Single-parent families	997	18 (1.8%)
Number of previous children in the family	922	
None		459 (49.8%)
One		308 (33.4%)
2 or more		155 (16.8%)
Maternal health	994	
Some health-related problems		223 (22.4%)
Maternal basic education	996	
Primary school		207 (20.8%)
High school		789 (79.8%)
Maternal vocational education		
None	996	51 (5.2%)
Vocational or polytechnic		569 (58.1%)
University		359 (36.7%)
Maternal income per month after taxes	978	
<1000€		210 (21.5%)
1000–2000€		495 (50.6%)
2000–3000€		230 (23.5%)
>3000€		43 (4%)

[1]150 (13.1%) children outside the age range were excluded, and a further 16 were excluded for other reasons.

TABLE 2 Development of language at 18 and 24 months

	18 ± 2 months (*n* = 997)	24 ± 2 months (*n* = 822)
	n (%)	*n* (%)
Expressive vocabulary		
None	53 (5.3%)	13 (1.6%)
1 word	80 (8.0%)	7 (0.9%)
About 5 words	223 (22.4%)	27 (3.3%)
About 10 words	188 (18.9%)	41 (5.0%)
About 20 words	141 (14.2%)	63 (7.7%)
About 30–40 words	139 (14.0%)	115 (14.0%)
About 50 words	63 (6.3%)	88 (10.7%)
More than 50 words	109 (10.9%)	467 (56.9%)
Used word forms		
Babbling only	115 (11.5%)	23 (2.8%)
Usually erroneous forms	67 (6.7%)	21 (2.6%)
Often erroneous forms	169 (17.0%)	76 (9.3%)
Usually intelligible	646 (64.8%)	699 (85.3%)
Word combinations		
No word combinations	705 (70.7%)	136 (16.8%)
Word combinations	292 (29.3%)	674 (83.2%)
Pointing		
No	29 (2.9%)	39 (4.8%)
Yes	967 (97.1%)	775 (95.2%)
Following instructions		
Does not understand instructions	5 (0.5%)	1 (0.1%)
Does not seem to always understand instructions	70 (7.0%)	28 (3.4%)
Follows instructions	922 (92.5%)	789 (96.5%)

Note: Number of missing values was 0–12.

Finally, we characterised the factors that could be related to vocabulary development. We found that increased screen time (OR 1.69) and increased time TV was kept on (OR 1.73) were related to a smaller vocabulary at 18 months, as reported in Table 6. Parents' screen time (OR 2.16) and shared reading less than daily (OR 0.65) were also associated with a smaller vocabulary at 24 months. However, the association with reading became insignificant when background factors were considered (Table 6).

4 | DISCUSSION

This study was performed to evaluate children's expressive vocabulary, as reported by their parents, and to evaluate the related environmental factors. The main emphasis was on the size of the children's expressive vocabulary, but we also assessed the use of word combinations, the intelligibility of spoken words, finger-pointing and being able to follow short and simple instructions. We found that in the majority (68.8%) of the children, the expressive vocabulary at 18 months was about 20 words or less and a third (35.7%) only spoke about five words at most. This was less than previously reported. Other studies showed that expressive vocabulary included approximately 50 words at the age of 16 to 18 months[10,20] and that dyslexic children used approximately 40 words at 18 months of age.[21]

A commonly suggested cut-off for late talking is producing fewer than 50 words at 24 months of age and, or, none or only a few word combinations by the age of 2 years.[3,19,22,23] In our study, 32.5% of the children were reported to use approximately 40 words at most at 24 months of age. In addition, 10.7% of the children were reported to use more than 40 words, but approximately 50 words at most. Therefore, the prevalence of children who had an expressive vocabulary that was smaller than 50 words at 24 months was

TABLE 3 Difficulties in language development in boys and girls

18 months	Boys ($n = 522$)	Girls ($n = 475$)		
	n (%)	n (%)	OR	*p*
Expressive vocabulary ≤5	240 (46.1%)	116 (24.4%)	2.6 (2.0–3.4)	<0.001
Expressive vocabulary ≤20	410 (78.7%)	275 (57.9%)	2.7 (2.1–3.5)	<0.001
Word forms not usually intelligible	227 (43.5%)	124 (26.1%)	2.2 (1.7–2.8)	<0.001
Single-word expressions only	418 (80.1%)	287 (60.4%)	2.6 (2.0–3.5)	<0.001
Not always or often following instructions	50 (9.6%)	25 (5.3%)	1.9 (1.2–3.1)	0.010
24 months	**Boys ($n = 425$)**	**Girls ($n = 397$)**		
Expressive vocabulary ≤5	36 (8.5%)	11 (2.8%)	3.2 (1.6–6.5)	<0.001
Expressive vocabulary ≤50	169 (39.8%)	97 (24.5%)	2.0 (1.5–2.7)	<0.001
Word forms not usually intelligible	81 (19.1%)	39 (9.8%)	2.2 (1.4–3.3)	<0.001
Single-word expressions only	94 (22.7%)	42 (10.6%)	2.5 (1.7–3.7)	<0.001
Not always or often following instructions	18 (4.3%)	11 (2.8%)	1.6 (0.7–3.3)	0.256

TABLE 4 Vocabulary at 18 and 24 months for the 689 infants who were assessed at both time points

		At 24 months							
At 18 months		None	One	About 5	About 10	About 20	About 30–40	About 50	>50
None	*n* (%)	8 (20.5%)	3 (7.7%)	7 (17.9%)	6 (15.4%)	8 (20.5%)	2 (5.1%)	1 (2.6%)	4 (10.3%)
One	*n* (%)	2 (3.5%)	1 (1.8%)	10 (17.5%)	15 (26.3%)	5 (8.8%)	10 (17.5%)	3 (5.3%)	11 (19.3%)
About 5	*n* (%)	2 (1.3%)	1 (0.7%)	2 (1.3%)	11 (7.2%)	28 (18.4%)	38 (25.0%)	25 (16.4%)	45 (29.6%)
About 10	*n* (%)				4 (3.0%)	13 (9.8%)	33 (25.0%)	21 (15.9%)	61 (46.2%)
About 20	*n* (%)					2 (1.9%)	9 (8.7%)	11 (10.6%)	82 (78.8%)
About 30–40	*n* (%)						3 (3.3%)	9 (9.9%)	79 (86.8%)
About 50	*n* (%)								46 (100%)
>50	*n* (%)								67 (100%)

approximately, or slightly less than, 43%. Earlier studies reported that the prevalence of children who talked late was about 20% at most.[4,5,24] The difference between our study and earlier findings was so large that it seems to suggest that the growth of expressive vocabulary could now be slower than in previous years.

However, due to methodological differences, we were unable to directly compare our results to earlier reports, because our aim was to study language development using a short screening questionnaire. Parents' estimates of the vocabulary size might not have been very accurate, particularly when their child spoke more than 50 words, as previously reported.[18] Yet the parents' reports of vocabulary size at 18 months predicted the vocabulary size at 24 months well. The reported vocabulary size was also well in line with our validation sample, where professional assessments supported the validity of parental reports. Furthermore, in our study, 70.7% of the 18-month-old children and 16.8% of the 24-month-old children did not combine words. This corresponded to the size of their vocabulary, as 82.8% of the children at 18 months and 32.4% at 24 months spoke up to 40 words. Children usually begin combining words when they have acquired an expressive vocabulary of approximately 50 words.[20,25] Expressive vocabulary was also related to their ability to follow instructions at both ages and to mostly from intelligible words at 24 months. Finally, our results showed the common phenomenon that language development was slower in boys than in girls.[10]

TABLE 5 Bayley-III expressive language at 24 months of age and expressive vocabulary at 18 and 24 months of age

	Productive vocabulary at 18 months of age (n=136)		
	<20 words	>20 words	Total
Bayley-III expressive language	n (%)	n (%)	n (%)
Standard score ≤8	36 (51.4%)	0 (0%)	36 (26.5%)
Standard score ≥9	34 (48.6%)	66 (100%)	100 (73.5%)
Total *n*	70 (100%)	66 (100%)	136 (100%)
	Productive vocabulary at 24 months of age (*n* = 112)		
	<50 words	>50 words	Total
Bayley-III expressive language	*n* (%)	*n* (%)	*n* (%)
Standard score ≤8	26 (68.4%)	2 (2.7%)	28 (25%)
Standard score ≥9	12 (31.6%)	72 (97.3%)	84 (75%)
Total *n*	38 (100%)	74 (100%)	112 (100%)

Note: No missing values.

TABLE 6 Factors associated with slower vocabulary development

Prevalence of small expressive vocabulary (<5 words) at the age of 18 months (*n* = 977)						
		n (%)	**OR (95% CI)**	**P**	**AOR[1] (95% CI)**	**AOR[2] (95% CI)**
Watching TV or using electronic devices (child)	<77 min per day	291 (34.3%)				
	>77 min per day	42 (45.2%)	1.58 (1.02–2.43)	0.038	1.72 (1.09–2.70)	1.69 (1.02–2.81)
Watching TV or videos (parents)	<231 min per day	305 (35.1%)				
	>231 min per day	42 (41.6%)	1.32 (0.87–2.00)	0.198	1.39 (0.90–2.16)	1.56 (0.96–2.53)
TV on at home	<360 min per day	311 (35.2%)				
	>360 min per day	40 (43.5%)	1.42 (0.92–2.19)	0.116	1.38 (0.88–2.16)	1.73 (1.05–2.86)
Reading to the child	less often than daily	137 (38.3%)				
	daily or more often	219 (34.3%)	0.84 (0.65–1.10)	0.213	0.87 (0.66–1.15)	0.94 (0.69–1.28)
Sleep duration at the age of 18 months	>10 percentile	311 (35.1%)	1.32 (0.84–2.08)	0.230	1.43 (0.89–2.31)	1.65 (0.98–2.78)
	<10 percentile	35 (41.7%)				
Prevalence of small expressive vocabulary (<20 words) at the age of 24 months (*n* = 822)						
Watching TV or using electronic devices (child)	<77 min per day	116 (17.5%)				
	>77 min per day	21 (29.2%)	1.94 (1.12–3.34)	0.016	1.95 (1.11–3.41)	1.33 (0.67–2.64)
Watching TV or videos (parents)	<231 min per day	115 (17.0%)				
	>231 min per day	23 (31.5%)	2.25 (1.13–3.83)	0.002	2.27 (1.32–3.94)	2.16 (1.16–4.05)
TV on at home	<360 min per day	121 (17.7%)				
	>360 min per day	19 (26.0%)	1.63 (0.93–2.85)	0.083	1.60 (0.90–2.83)	1.85 (0.99–3.48)
Reading for the child	less often than daily	64 (23.4%)				
	daily or more often	79 (15.9%)	0.62 (0.43–0.89)	0.010	0.65 (0.44–0.94)	0.69 (0.45–1.06)
Sleep duration	>10 percentile	122 (18.1%)				
	<10 percentile	15 (21.4%)	1.23 (0.68–2.26)	0.494	1.21 (0.65–2.25)	1.21 (0.61–2.40)

[1]Controlled for age and sex.

[2]Controlled for age, sex, gestational age, maternal education, maternal age, maternal illnesses and number of children in the family.

Despite this, more studies are needed to investigate the speed of language development in different generations.

We also studied environmental factors that might have been related to slower speech development. The most significant factor in our study, which was associated with smaller expressive vocabulary, was higher exposure to screen time. In addition, the amount of time that parents spent watching television and videos, and the time these media were kept on was associated with a smaller vocabulary at 24 months of age. The same was true for shared reading less than daily.

Screen time has increased significantly, even during early childhood.[12,13,26,27] One study of children aged 8–17 months found that their favourite digital devices were televisions and smartphones. When it came to children aged 18–36 months, they preferred smartphones to televisions.[28] Longer exposure to digital devices was related to lower mimic-gestural skills in children from 8 to 17 months and to lower language skills in children from 18 to 36 months, regardless of age, gender, socio-economic status, content and modality of use.[28] The children who spent more time using digital devices displayed less communicative gestures, and the lexical quotient was negatively related to the time spent on digital devices in children aged 18–36 months.[28]

The main limitation of our study was attrition. The initial sample size was approximately 1,600 families, and the loss of participants during follow-up was rather high. There were 1163 (69.8%) families left in the study at 18 months and 950 (57.0%) at 24 months. However, 73% of those who responded at 18 did so at 24 months. The parents were also highly educated, on average, and Finnish speaking, while premature children were underrepresented, as the mothers were enrolled during the 32nd week of pregnancy.[29] The study population was not entirely representative of all two-year-old children, and the bias was probably towards a somewhat greater vocabulary than the entire child population. This was because children have advantages in language development if they have highly educated mothers and the data were not compromised due to prematurity before 32 weeks. These factors tend to support our findings, rather than make them less significant. The same was true when it came to only including children from Finnish-speaking families. Finally, we asked parents to assess the size of their children's expressive vocabulary and screen time. This is feasible in large cohort studies, although the findings are not directly comparable to previous studies that are based on interviews, diaries or parental checklists, such as the MacArthur-Bates Communicative Development Inventory questionnaire. Therefore, our findings cannot be directly compared with studies that used those. Checklists are seldom the first method used to follow young children's speech and language development in clinical settings or at the population level. That is why primary care professionals typically ask parents to assess the size of their children's expressive vocabulary.

5 | CONCLUSION

The study used parental reports to quantify slow early speech development, and we found that it was highly prevalent at both 18 and 24 months of age. The percentage of children who used less than 20 words at those ages were 68.8% and 18.4%, respectively. We also found that exposure to screen time was negatively related to expressive vocabulary size at both ages. Children with language disorders need frequent repetition to learn new words and verbal concepts.[30] If verbal interaction at home decreases markedly when children are young, the different words they repeatedly hear in daily life may also decrease. This may be particularly risky for children who find it difficult to learn language. It is also possible that, in the future, an increasing number of children may need support to learn a language. Given the importance of language for social, emotional and academic development, further studies are needed to determine whether methods, such as a word checklist, would replicate our findings.

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CONFLICTS OF INTEREST

The authors report no conflicts of interest.

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APPENDIX 1.

Questions on speech and language at the ages of 18 and 24 months

1. Expressive vocabulary
   a. So far, the expressions are only babbling or vocalisation
   b. Includes one word
   c. Includes about five words
   d. Includes about ten words
   e. Includes about twenty words
   f. Includes about 30 to 40 words
   g. Includes about 50 words
   h. Includes markedly over 50 words
2. Besides spoken words
   a. The child often points to an object when wishing to do something with the object
   b. The child does not usually point to objects
3. Expressed words
   a. Are usually intelligible
   b. Are often erroneous or aberrant
   c. Are usually erroneous or aberrant
   d. So far, the expressions are only babbling or vocalisation
4. Word combinations
   a. The child uses word combinations
   b. So far, the child uses only one-word expressions
5. Following instructions
   a. The child follows short everyday instructions
   b. The child usually does not always seem to understand short everyday instructions
   c. The child usually does not seem to understand short everyday instructions