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# Do kindergartens mitigate or exacerbate socioeconomic inequalities in language exposure? The case of home-based and kindergarten-based shared book reading activities in China

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Shared book reading is a well-established practice for boosting children's language exposure and enhancing early development at home and in child care settings. The present study examined the socioeconomic gaps in home-based and kindergarten-based shared book reading practices in China. The participants were 1095 parents and 111 teachers in 69 classes from kindergartens in Chongqing, China. Differences in terms of the quantity of both home-based and kindergarten-based shared book reading across SES spectrums were tested. Multi-level modelling was conducted to examine the factors associated with the quantity of home-based and kindergarten-based shared book reading. The results revealed that the socioeconomic gap in home-based shared book reading and the resultant language exposure were significant. Family SES and home literacy resources were associated with the quantity of home-based shared book reading and the availability of literacy resources in the classroom is associated with the quantity of kindergarten-based shared book reading. Kindergartens did not mitigate the socioeconomic inequities of language exposure related to shared book reading. Intervention programs shall focus on improving access to both home-based and kindergarten-based literacy materials.

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## Introduction

Children's early language exposure exerts an influence on their later literacy skills, academic skills and even brain function (Hoff, 2003; Romeo et al., 2018; Rowe, 2012). Specifically, parents' child-directed speech facilitates their child's language processing efficiency and vocabulary growth when they are as young as 24 months old (Weisleder and Fernald, 2013). What is more striking, children's exposure to conversation is associated with language-related brain function, according to some recent neurological studies. More robust and direct evidence has shown the effects of word exposure on children's brain development and supported the suggestion that word exposure is positively related to children's linguistic development (Romeo et al., 2018). Both the quantity (e.g. number of word tokens, number of unique words, utterances) and quality (e.g. lexical diversity, connectedness and fluency) of language exposure matter for children's language development (Hirsh-Pasek et al., 2015; Rowe, 2012, 2018). Apart from the differences in vocabulary associated with socioeconomic status (SES), syntax and language processing skills have also been differentiated between low- and middle-SES children as early as the age of three (Levine et al., 2020).

Though the language exposure gap and its consequences have been addressed and discussed extensively in Western countries, less is known about whether such a gap exists and what it is like in the Chinese context. The purpose of this study is to examine the language exposure gap related to SES in shared book reading activities at home and in child care settings before school entry, covering both the quantity and quality of language exposure, in the city of Chongqing, China. Additionally, we explore how factors in families and in child care settings are associated with such a language exposure gap.

## Language exposure and socioeconomic status

A word gap across different SES spectra has been found by a consolidated body of research. In the United States, Hart and Risley (1995) extrapolated that children from low-SES families had heard 30 million fewer words than their better-off counterparts by the age of four. Inspired by their seminal work, researchers subsequently conducted similar studies concerning word gaps over the past two decades and verified the socioeconomic gradients in language exposure (Hirsh-Pasek et al., 2015; Rowe, 2012; Weisleder and Fernald, 2013). Furthermore, recent research has revealed that such a gap emerged at an early age, between 12 and 18 months and became evident by 18 months (Brushe et al., 2021; Fernald et al., 2013). Such a word gap is a source of variation in the language development of children across SES spectra, especially for children's vocabulary development (Hoff, 2003). The word gap focused on the influence of the quantity of language experience on linguistic skills, particularly on vocabulary development. Meanwhile, disparities in quantity and quality have been found within and across SES groups (Gilkerson et al., 2017).

## Language exposure in shared book reading

Shared book reading (SBR) is a common practice of language input both at home and in early child care settings, such as kindergartens and it contributes to children's language skills (Grolig et al., 2019; Mol et al., 2009; Noble et al., 2019; Heidlage et al., 2020). A consolidated body of research addresses SBR covering traditional print books, e-books (Eggleston et al., 2022) and even books via new media, such as digital personalised books (Kucirkova et al., 2021). The beneficial role of SBR, especially home-based SBR, in children's language development is well documented. Both the quantity and quality of home-based SBR

have been found to be predictors of children's early learning skills. A substantial body of research shows that the quantity of home-based SBR is an important predictor of a child's early literacy and academic skills, including early vocabulary development (Farrant and Zubrick, 2012; Sénéchal et al., 1996), the internal motivation of a child's reading (Ece Demir-Lira et al., 2019) and early reading outcomes (Barnes and Puccioni, 2017). More specifically, the language exposure of home-based SBR, excluding other language input, such as parents' utterances irrelevant to the book reading context and the child's own contribution to interactions in book reading sessions, could explain the unique variation in the language development of children (Ece Demir-Lira et al., 2019). What is noticeable, as the quality of language experience even surpasses quantity regarding its importance for language development (Rowe, 2012), is that home-based SBR is particularly an important parental engagement in language input, as researchers found that parental language that occurs during book reading interactions is more sophisticated than parental language outside book reading interactions in terms of vocabulary diversity and syntactic complexity (Ece Demir-Lira et al., 2019). Furthermore, the quality of home-based SBR is a predictor of the growth of children's receptive vocabulary (Tompkins et al., 2017) and early mathematics outcomes (Barnes and Puccioni, 2017). There has been less examination of the impact of SBR in early child care settings, in comparison with home-based SBR. A higher quantity of SBR in early child care settings is associated with the growth of short-term receptive vocabulary (Zucker et al., 2013), and the quality of SBR in early child care settings has been found to be positively associated with children's literacy and vocabulary skills (Rezzonico et al., 2015; Sun et al., 2020; Zucker et al., 2013).

Given that the positive effects of SBR on children's language growth are well-established, examining variations and predictors of the quantity and quality of SBR is critical for bridging the word gap. The quantity of home-based SBR varies across socioeconomic spectra, with more SBR in higher-SES families (Baker and Scher, 2002; Weigel et al., 2006; Barnes and Puccioni, 2017). Additionally, the quantity and quality of home-based SBR are positively related to the home literacy environment, such as the number of books and children's books in the home (Marjanović-Umek et al., 2019; Luo et al., 2020), which are related to SES. Mothers' educational level and literacy beliefs about the importance of SBR are positively associated with the quantity and quality of SBR (Peixoto et al., 2022). Furthermore, book genre also matters for the quantity and quality of book sharing. Parents share books over a longer period of time and with more diversified vocabulary and longer sentences when they read information books to their children, in comparison with storybook reading (Price et al., 2009). The variations and factors associated with the quantity and quality of SBR in early child care settings are much less examined in the extant literature. A handful of studies have revealed that less quantity and lower quality of SBR in early child care settings are more likely to be associated with lower SES in the location of preschools (Adam and Barratt-Pugh, 2020; Neuman et al., 2018).

## Language gap in shared book reading before entering school

As shown above, SBR, especially home-based SBR, constitutes an important predictor of early learning outcomes and the variations of its quantity and quality could lead to a noticeable language gap in early years. As Logan et al. (2019) pointed out in their study, home-based SBR is an important component of conversational word exposure and is found to be a source of word gaps. They estimated that the word exposure gap during

home-based SBR between American children who have never been read to and those with rich experiences of SBR at home is ~1.4 million words cumulatively by the age of five (Logan et al., 2019). Such a gap could contribute to disparities in children's school readiness (Anderson et al., 2019). Employing the SBR frequency data from the Early Childhood Longitudinal Study Birth Cohort (ECLS-B) and combining it with the word counts of those children's books most circulated by a public library, Logan et al. (2019) estimated the word exposure gap resulting from differences in the frequency of home-based reading activities. This approach was also inspirational for the present study, conducted in Chongqing, China.

### Present study

To provide a more comprehensive understanding of the word gap resulting from SBR before school entry in China, as well as to test for a double dose of disadvantage, this study examines the socioeconomic gap regarding quantity and quality of shared book reading among young children in China, both at home and in kindergarten, which was rarely explored before. Additionally, this study investigates several predictors of both home-based and kindergarten-based SBR to offer insights for targeted measures to combat inequalities, specifically the role of kindergarten literacy resources in children's language exposure in SBR, which has been seldom explored in previous studies.

Specifically, this study aims to address the following questions. (1) What is the socioeconomic gap in the quantity of home-based SBR? (2) How does the quality of home-based SBR differ in terms of the diversity of vocabulary in books typically read to children in urban and rural areas? (3) Are there differences in the categories of books shared by rural and urban parents/kindergarten? (4) What is the socioeconomic difference in the quantity of kindergarten-based SBR? (5) After controlling for SES, how are the literacy environments at home and in kindergarten associated with the quantity of shared book reading experienced by children?

We hypothesise that children from lower socioeconomic backgrounds are exposed to less home-based SBR than their better-off peers, contributing to a language exposure gap. Children in rural families would experience less home-based SBR than those in urban families. Furthermore, we also hypothesise that kindergartens serving more advantaged families would provide more shared book reading opportunities than those serving less advantaged families. We further hypothesise that the quantity of home-based SBR is positively associated with the literacy resources available at home and in kindergarten, after controlling for family SES. Lastly, we hypothesise that the quantity of kindergarten-based SBR is related to the literacy resources in the kindergarten.

### Method

**Study design.** To delineate the socioeconomic gap of home-based and kindergarten-based SBR and examine the predictors of both, we adopted a cross-sectional research design and primarily collected quantitative data through surveys administered to parents and kindergarten teachers. While a mixed approach would provide a more comprehensive understanding of the predictors of SBR by incorporating qualitative data, the current study focuses solely on examining the associations between a selected number of predictors and SBR using quantitative data.

**Participants.** All the subjects in the present study were treated in accordance with established ethical standards as stated in the Declaration of Helsinki, and all the respondents participated in the study freely and with consent and were fully informed about

the purposes of this research and how their responses would be used and stored.

The current study was realised in the city of Chongqing, one of the four municipalities (together with Beijing, Shanghai and Tianjin) directly under the Chinese central government, with a per capita disposable annual income of 33,803 RMB (\$5115) in the year 2021 (Statistics Bureau of Chongqing city (2022)). Data collection of the present study started in March 2021 and continued with intermittent interruptions caused by repeated closures of kindergartens during Covid-19 until June 2022. Thus, the data collected may reflect a specific context related to Covid-19 and the restrictions enacted in the municipality. We drew up our representative sample by employing two-stage stratified random sampling in one community in the city. Chongqing is a big city composed of more than 40 small cities, in many of which there are both urban and rural areas, thus allowing us to use an urban/rural division together with public/private provision as a stratification criterion in the first stage of sampling kindergartens to represent diverse populations according to their socioeconomic profile.

For this survey, we used two-stage probability sampling, first with the selection of kindergartens and second with the selection of teachers and parents in those kindergartens. In the first stage, we selected from all 206 kindergartens in one community of Chongqing ten kindergartens proportionally to two stratification criteria based on the provider (public/private, with 55% of kindergartens being public) and locality (urban/rural distinction, in which 52% of kindergartens are urban). The final sample comprised ten kindergartens representing four public kindergartens (one of these is in an urban area) and six private kindergartens (four of those in urban areas). In the second stage, we involved in the study all the classes ( $N=69$ ) attended by three-to-six-year-old children in each kindergarten and administered questionnaires to all the parents and also to all the teachers in those 69 classes. In total, we distributed 1500 questionnaires (parents could choose between an online or pen-and-pencil version of the questionnaire) to parents and 1197 were returned, out of which 102 that were invalid were excluded, leaving 1095 parents' responses for analysis (a 73% response rate). Online questionnaires were administered to all 173 kindergarten teachers to collect information on the literacy environment and shared book reading in the kindergartens, and 111 were returned (a 64% response rate). The socioeconomic characteristics of the respondents involved in the study are presented in Table 1, which documents that the chosen sampling approach, with stratification criteria, resulted in wide coverage of the socioeconomically diverse population of parents, which is important for the research questions in this study.

### Measures

**Quantity of SBR at home and in kindergarten.** Parents were asked whether they read to their child at home and the number of books they had shared with their child in the last week, on a scale ranging from one to eight, with one representing never and eight corresponding to more than 35 books. These two items were derived from a reliable question frequently used in previous studies to measure the quantity of SBR by assessing the reading frequency over a week (Festa et al., 2014; Barnes and Puccioni, 2017). For children who were never read to at home, we supposed that they were read to incidentally and, referring to what Logan et al. (2019) did in their research, we supposed that they had 0.11 books read to them each week at home, about one book every two months. The other seven levels of SBR at home are defined as 0.5 per week, 1.5 per week, 3.5 per week, 5.5 per week, 10.5 per week, 25 per week and more than 35 books per week. Teachers also

**Table 1 Demographic characteristics of participants.**

	Parents (N = 1095) % or M(SD)	Teachers (N = 111) %
Location of kindergarten		
Urban	54%	44%
Rural	46%	56%
Private or public kindergarten		
Public	64%	54%
Private	36%	46%
Class level of child		
Lower kindergarten class (36–47 months)	25%	
Middle kindergarten class (48–59 months)	35%	
Upper kindergarten class (60–72 months)	40%	
Age of main caregiver		
25 and below	4.6%	
25–35	60.2%	
35 and above	35.2%	
Parents' highest education level		
Secondary school and below	18.5%	
High school	26.8%	
Junior College	20.5%	
Undergraduate	29.2%	
Master	5%	
Parents' occupation		
Unemployed	10.6%	
Small business owners	53.4%	
Professionals (teachers, doctors, lawyers)	24.3%	
Managers	11.6%	
Monthly household income		
Less than 4000 RMB (\$605)	14%	
4000–5000 RMB (\$605–757)	14%	
5001–7000 RMB (\$758–1059)	15%	
7001–8000 RMB (\$1060–1210)	15%	
More than 8000 RMB (\$1210)	42%	
Family SES	5.59 (1.69)	

Kindergartens in Chongqing, China are mainly age-segregated. The lower kindergarten class, middle kindergarten class and upper kindergarten class serve children aged 36–47 months old, 48–59 months old and 60–72 months old.

reported the number of books they shared with children in class each week, ranging from one to seven, with one representing less than one book and seven representing more than 14 books. On the basis of the number of books reported by the teachers, we defined seven levels of quantity of SBR, responding to 0.5 per week, 1.5 per week, 3.5 per week, 5.5 per week, 8.5 per week, 12.5 per week and more than 14 per week.

*Categories of children's books at home and in kindergarten.* Parents and teachers were asked to list the names of the three children's books they had most recently read to their child. In the extant literature, children's books are divided into two major genres: information and narrative books (Kümmerling-Meibauer and Meibauer, 2005). On the basis of such major typologies, four specific genres were developed further in the extant literature for classifying children's books read by teachers and parents, including information books, fictional information books (Lee et al., 2011) and traditional narrative, fictional narrative and non-narrative life skill books (Henkaliné and Wagner, 2020). In the present study, we developed further the genres of books according to the characteristics of Chinese children's books reported by parents and teachers, on the basis of the four genres mentioned above. Finally, the following five categories were employed to code the content of children's books: (1) non-fiction or information books about scientific facts, knowing Chinese characters, ancient Chinese poems and mathematics; (2) traditional narratives characterised by a focus on a coherent portrait of story plots and events; (3) fictional narratives with more focus on the

character's personality trait than storytelling (e.g. *David Goes to School*); (4) fictional information books which meant to convey scientific facts by means of fictions (e.g. *The Very Hungry Caterpillar*); (5) life skills books which teach children about life skills (e.g. rules, good behaviours, safety, emotional regulation, peer relations) with a very simple plot structure, containing a series of events in a linear sequence.

*Language exposure from text reading of children's books.* Parents and teachers were asked to list the names of the three children's books they had most recently read to their child. On the basis of the books reported by the parents and teachers and the quantity of shared book reading in each week, we approximated the weekly language exposure from text reading of children's books in the following steps, referring to the approaches adopted in previous studies (Logan et al., 2019).

We first sampled 75 representative children's books from the book lists reported by the parents and teachers in our survey. Before the sampling, among the 3741 children's books reported by parents and 333 children's books reported by teachers, we excluded children's books which could not be found in children's libraries and bookshops, as well as those which are in one collection, without specific sub-titles to avoid ambiguity and potential bias. After the exclusion of ineligible children's books, we checked the identical items and recorded the titles of the books, as well as the occurrences of books mentioned by the parents and teachers, respectively. Then we randomly selected 75 children's books which were mentioned more than two times in



the list and counted verbatim the Chinese characters and sentences in the 75 representative books read by teachers and parents, respectively.

On average, a typical children's book reported by parents reading to their child at home included 575 Chinese characters (median=392, SD = 488, range 50–2001) and 34 sentences (median=28, SD = 23, range 7–132). A typical children's book reported by teachers reading to children in class included 814 Chinese characters (median=584, SD = 799, range 57–4409) and 43 sentences (median=34, SD = 29, range 8–135). We then calculated the product of the median of Chinese characters and sentences in a typical children's book multiplied by the average number of books read by parents to their child and by teachers in kindergartens in each week. By doing so, we estimated the weekly language exposure from text reading in parent-child's book sharing sessions and teacher-child's book sharing sessions, excluding parents' and teachers' extra-textual talk with children.

*Quality of children's books read at home.* The quality of children's books read at home was measured by the diversity of the vocabulary in the texts. In the literature, the diversity of the vocabulary of children's books read at home was measured by type-token ratios (TTR) (Ece Demir-Lira et al., 2019; Montag et al., 2015). As reported in the literature, this index of the diversity of the vocabulary depends on the sample size and thus children's books with different numbers of tokens could not be compared, as the more tokens there are in the text, the lower the word TTR are (Montag et al., 2015). Following the approaches used in previous studies, we calculated the TTR in the corpus of 30 books sampled from urban and rural home-based SBR, respectively, by taking progressively larger random samples of tokens with increments of 200 tokens with replacement (Dawson et al., 2021; Montag et al., 2015; Price et al., 2009). We sampled from 200 to 13,000 tokens in the corpus of books in urban and rural SBR, respectively. This procedure was repeated 100 times for each sample size, yielding 100 different random samples from the total corpus at each selection size. Then, on the basis of all the samples of tokens selected from each corpus, we calculated the mean TTR for each corpus.

With the same approach, the TTRs of six narratives with six information books read by parents to their child were also compared. We took samples from the size of 100 to 2000 tokens progressively, with an increase of 100 tokens each time, as the corpus of six children's books contains much less than the corpus of 30 children's books above.

*Availability of literacy resources at home and in kindergarten.* The availability of literacy resources at home was measured by the frequency of parents purchasing children's books for their child, scaled by 0 (never), 1 (occasionally) and 2 (frequently). The availability of literacy resources in the classroom was measured by two items. Item 1 asked about the presence of a reading area in the classroom, dichotomously scaled as 0 (absent) and 1 (present). Item 2 asked about the number of children's books in the reading area, from 1 (less than 10) to 8 (more than 200). Likewise, two items were used for measuring literacy resources in the kindergarten, item 1 about the presence of a library in the kindergarten (yes/no) and item 2 about the number of children's books in the kindergarten library, scaling from 1 (less than 10) to 11 (more than 500). The items for measuring literacy resources at home and kindergartens were adapted from reliable questions frequently employed in previous studies, such as: 'How many children's books do they possess at home?' 'How many books are there for children learning to read in the child care setting?' (Georgiou et al., 2021; Grolog et al., 2019).

*Socioeconomic status.* SES was measured by a combination of parental education, household income and prestige of parental occupation. The highest levels of education of the father and mother were both measured from 1 (primary school and below) to 6 (master's and above). The monthly household income was measured by a five-point scale, where one was less than \$605 (4000 RMB) and five was more than \$1210 (8000 RMB). The parental occupation ranged from one (unemployed) to four (managers) on the basis of the International Standard Classification of Occupations (ISCO-08 – International Labour Organization, 2012). A composite score for SES was created by principal component analysis.

*Demographic measure.* The main caregivers' ages in years and the age of the child in months were reported by the parents.

*Analytic approach.* We performed descriptive analysis to explore the quantity of home-based and kindergarten-based shared book reading, the language exposure from text reading of books in SBR, the categories of books read in SBR at home and in kindergarten, family SES, literacy resources at home and in kindergarten, etc. One-way ANOVAs and Bonferroni post hoc pairwise tests were performed to address the socioeconomic gaps regarding the quantity of home-based and kindergarten-based shared book reading. For the effect size of the ANOVAs, we referred to the benchmarks of defining small ( $\eta^2 = 0.01$ ), medium ( $\eta^2 = 0.06$ ) and large ( $\eta^2 = 0.14$ ) effects (Cohen, 1988), while for the effect sizes of independent t-tests and post hoc pairwise t-tests, we employed the criteria of Cohen's d-values equal to or greater than 0.20, 0.50 and 0.80 as indicating small, medium, and large effect sizes, respectively (Cohen, 1988). Chi-square tests were used to compare the categories of books shared by rural and urban families and kindergartens for children. Additionally, to analyse the TTR for books, we first parsed the texts of 30 books read by rural and urban parents, respectively, then took samples of tokens and calculated the TTR by following the way described above. Furthermore, considering the nested nature of our data, we conducted multi-level linear regression to analyse both child-level and kindergarten-level factors associated with the quantity of SBR both at home and in kindergarten. We processed the data in R version 4.1.0, using mainly the packages of Psych, lme4, JiebaR and Quanteda.

## Results

**What is the socioeconomic gap in the quantity of home-based SBR?** To answer research question 1, we will use three operationalisations of SES for comparison of groups of parents and their home-based SBR. First, we will use a composite indicator of SES derived from the data obtained through the parents' questionnaires. Second, we will use two proxy variables indicating SES, based on the kindergarten characteristics which served as stratification criteria for sampling, specifically urban/rural and public/private types of kindergarten. The advantage of the second approach is that the results are more understandable and such well available categories might be used for targeted measures if inequalities are found, as expected by our hypothesis.

As presented in Table 2, 18% of the parents reported that they never read to their children. The average number of books shared by parents with their child was 2.65 and that by teachers four in each week. The average weekly exposure to Chinese characters in home-based SBR was 1525 and that for sentences was 90. The average numbers of Chinese characters and sentences children were exposed to in kindergarten-based SBR each week were 3096 and 164 respectively. In 29 classes out of the total of 69 involved in the present study, more than one teacher in each class reported

the weekly number of books they shared with the children in class. In these classes, teachers in 48% of the classes reported the same quantity of kindergarten SBR, teachers in 38% of the classes reported the quantity with a difference of one level and teachers in 14% of the classes responded with more than one level of difference. Thus, there were variations between the teachers in each class regarding the quantity of SBR. To account for this difference in teachers reporting for the same class, in our later multilevel analysis we used the aggregated mean of all the teachers' answers for a given class.

Table 3 shows the comparison of the quantity of home-based shared book reading and language exposure across family SES levels. Though family SES is a continuous variable, to better interpret the socioeconomic gap of home-based SBR quantity, we divided the family SES into high-, middle- and low-SES groups (with groups of equal size based on the SES scores). The first, second and third SES quantile groups are low-, middle-, and high-SES groups correspondingly. The results of a chi-square test show that the rate of children who are never read to differs across

the three SES groups ( $\chi^2 = 24.1$ ,  $df = 2$ ,  $p < 0.001$ ). Post hoc tests show that not reading to children at home is more prevalent in low-SES families than middle-SES and high-SES families. Besides, as shown in Table 3, the quantity of home-based SBR shows statistically significant differences across SES spectra, though the effect size is small ( $\eta^2 = 0.03$ ). The post hoc tests with Bonferroni correction show that high-SES families read more books to their children each week than middle-SES and low-SES families. Middle-SES families read more to their children than low-SES families did. The resultant Chinese character exposure resulting from the home-based SBR each week also differs across the three SES groups, though the effect size is also small ( $\eta^2 = 0.03$ ). The post hoc tests show that children from high-SES families are exposed to more Chinese characters as a result of home-based SBR than their counterparts in middle-SES and low-SES families. The language exposure from home-based SBR of children in middle-SES families is higher than that of children in low-SES families. Furthermore, the home literacy resources are significantly different across the SES levels, and the effect size is medium ( $\eta^2 = 0.07$ ).

Aside from the comparisons based on the SES category, we also use two proxies for social status based on kindergarten type and locality, and thus we are comparing the differences in the quantity of home-based SBR between rural and urban kindergartens as well as between public and private kindergartens. Such a comparison is made to further explore the socioeconomic gaps in the quantity of home-based SBR because in China the differences between rural and urban kindergartens, as well as between public and private ones, are often associated with SES achievement gaps (Liu et al., 2012; Ma et al., 2021; Cui, 2023). As shown in Table 4, family SES is significantly different between children from rural and urban kindergartens, as well as between those from public and private kindergartens; the effect sizes are from medium to large (Cohen's  $d = 0.77/1.23$ ). The language exposure gap and differences in terms of the quantity of home-based SBR between children from rural and urban kindergartens are both statistically significant. In comparison with children from urban areas, more children in rural areas were never read to; at 26% of children from rural areas and 15% of children from urban areas, the difference is significant ( $\chi^2 = 18.6$ ,  $df = 1$ ,  $p < 0.001$ ). Compared with children from private kindergartens, more children from public kindergartens were never read to and

**Table 2 Descriptive statistics.**

	<b>N(%)/ M(SD)</b>
Never being read to	217 (18%)
Weekly quantity of home-based SBR	2.65 (2.98)
Weekly Chinese character exposure in home-based SBR	1525 (1714)
Weekly sentence exposure in home-based SBR	90 (101)
Weekly quantity of kindergarten-based SBR	3.8 (2.58)
Weekly Chinese character exposure in kindergarten-based SBR	3096 (2100)
Weekly sentence exposure in kindergarten-based SBR	164 (111)
Literacy resources at home (continuous)	1.34 (0.56)
Literacy resources in classroom	7.35 (2.15)
Literacy resources in kindergarten	4.69 (2.06)
Classes with consistent kindergarten-based SBR quantity between teachers	(14) 48%
Classes with one level of difference in kindergarten-based SBR quantity between teachers	(11) 38%
Classes with more than one level of difference in kindergarten-based SBR quantity between teachers	(4) 14%

**Table 3 Home-based SBR quantity and language exposure across SES groups.**

	<b>Low-SES (1)</b>	<b>Middle-SES (2)</b>	<b>High-SES (3)</b>	<b>F(df)</b>	<b><math>\eta^2</math></b>	
Never being read to	105 (29%)	68 (19%)	44 (12%)			1 < 2, 1 < 3, 2 < 3
Weekly quantity of home-based SBR	1.96 (2.54)	2.73 (2.97)	3.24 (3.24)	17.87 (2,1092)***	0.03	1 < 2, 1 < 3, 2 < 3
Weekly Chinese character exposure in home-based SBR	1125 (1460)	1569 (1708)	1863 (1863)	17.87 (2,1092)***	0.03	1 < 2, 1 < 3, 2 < 3
Home literacy resources	1.13 (0.54)	1.28 (0.53)	1.50 (0.55)	42.73 (2,1092)***	0.07	1 < 2, 1 < 3, 2 < 3

\*\*\* $p < 0.001$

**Table 4 Home-based SBR quantity and language exposure across different groups of kindergartens.**

	<b>Rural</b>	<b>Urban</b>	<b>Cohen's d</b>	<b>Private</b>	<b>Public</b>	<b>Cohen's d</b>
Never being read to	129 (26%)***	88 (15%)		59 (15%)**	158 (22%)	
Weekly quantity of home-based SBR	2.26 (2.77)***	3 (3.12)	0.25	2.95 (3.14)*	2.49 (2.88)	0.15
Weekly Chinese character exposure in home-based SBR	1298 (1591)***	1720 (1792)	0.25	1695 (1804)***	1434 (1658)	0.15
Home Literacy resources	1.19 (0.56)***	1.40 (0.55)	0.38	1.36 (0.56)*	1.28 (0.56)	0.08
Family SES	4.64 (1.54)***	6.42 (1.35)	1.23	6.4 (1.4)***	5.16 (1.68)	0.77

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

the difference is statistically significant ( $\chi^2 = 6.49$ ,  $df = 1$ ,  $p = 0.01$ ). Children in urban areas are read to at home more than children from rural areas ( $t = 4.09$ ,  $df = 1093$ ,  $p < 0.001$ ), with a small effect size (Cohen's  $d = 0.25$ ). Children from private kindergartens are read to at home more than their counterparts from public kindergartens ( $t = 2.40$ ,  $df = 1093$ ,  $p = 0.02$ ); though such a difference regarding the quantity of home-based SBR is significant, the effect size is negligible (Cohen's  $d = 0.15$ ). Language exposure gaps are statistically significant as well, with children from rural kindergartens exposed to fewer Chinese characters at home than their counterparts in urban kindergartens ( $t = 4.09$ ,  $df = 1093$ ,  $p < 0.001$ ), with a small effect size (Cohen's  $d = 0.25$ ). Children in private kindergartens are exposed to more Chinese characters at home than children in public kindergartens ( $t = 2.40$ ,  $df = 1093$ ,  $p = 0.02$ ), though the effect size is negligible.

On the evidence of the results in Tables 3 and 4, the differences in the quantity of home-based SBR and the resultant language exposure gap are all significant across SES groups and between rural and urban kindergartens, as well as private and public ones. However, the gaps between rural and urban kindergartens are more dramatic than those between private and public kindergartens. Children from urban and private kindergartens are more advantaged than their peers in rural and public kindergartens. However, as we could see in Table 4, the differences of literacy resources at home between urban and rural kindergartens, as well as public and private ones, are smaller than the gaps associated with SES levels.

**What is the difference in quality of home-based SBR in terms of the vocabulary diversity of books typically read to children in urban and rural areas?** Table 5 shows the comparison of TTRs between the texts of children's books read by urban and rural families, indicating no statistical difference ( $t(10,998) = 0.33$ ,  $p = 0.7$ ). Thus, the vocabulary diversity is not significantly different between the texts of children's books read by parents in urban and rural areas, as shown in Table 5. We also compared six narrative books with six information books in the representative

book lists reported by parents; information books feature a higher vocabulary diversity than narrative books, and the effect size is large ( $t(2998) = 33.56$ ,  $p < 0.001$ ), which is consistent with findings for English children's books (Price et al., 2009).

**Are there any differences regarding the categories of books shared by parents by rural and urban parents/kindergartens?** A chi-square test was conducted and a significant difference was found regarding the categories of children's books recently shared by parents in rural and urban families ( $\chi^2 = 12.51$ ,  $df = 4$ ,  $p = 0.01$ ). The categories of children's books read in rural kindergartens were also significantly different from those in urban kindergartens ( $\chi^2 = 10.44$ ,  $df = 4$ ,  $p = 0.03$ ). Additionally, significant differences were found between the family and kindergarten in terms of the genres of children's books in urban areas ( $\chi^2 = 23.44$ ,  $df = 4$ ,  $p < 0.001$ ) as well as in rural areas ( $\chi^2 = 45.41$ ,  $df = 4$ ,  $p < 0.001$ ). As shown in Table 6, traditional narratives were those most frequently mentioned by parents and teachers in both rural and urban areas in both the home and kindergartens. Non-fiction or information books were the ones least mentioned by teachers in both rural and urban kindergartens, while parents reported them more frequently in their recent shared book reading with their children at home in both rural and urban families. And fictional information books formed the category least mentioned by parents in both rural and urban areas.

**What is the socioeconomic difference in the quantity of kindergarten-based SBR?** To answer research question 4, we compared the quantity of kindergarten-based SBR and the resultant Chinese character exposure across class SES levels. The family SES in each class was averaged as class SES, and we then categorised the average SES of the class into three groups of equal size. The first, second and third SES quantile groups corresponded to the low-, middle- and high-SES groups respectively. As Table 7 shows, the differences regarding the quantity of kindergarten-based SBR reported by teachers across class SES levels are not statistically significant ( $F(2,107) = 0.07$ ,  $p = 0.93$ ).

**Table 5 Home-based SBR quality across different groups of kindergartens.**

	Rural	Urban	Cohen's <i>d</i>	Narrative books	Information books	Cohen's <i>d</i>
Type-token ratios	0.46 (0.59)	0.45 (0.58)	0.01	0.30 (0.12)***	0.45 (0.14)	1.21

\*\*\* $p < 0.001$

**Table 6 Categories of books read at home and in kindergartens.**

Category of children's books	Rural family (%)	Urban family (%)	Rural kindergartens (%)	Urban kindergartens (%)
Information books	19	25	14	6
Traditional narratives	39	38	37	51
Fictional narratives	8	10	22	17
Fictional information books	6	7	16	9
Life skills books	28	20	11	17

**Table 7 Kindergarten-based SBR quantity and language exposure across class SES groups.**

	Low-SES	Middle-SES	High-SES	<i>F</i> ( <i>df</i> )	$\eta^2$
Quantity of shared reading in kindergarten	3.79 (2.68)	3.93 (2.99)	4.05 (3.28)	0.07 (2,107)	0.001
Weekly Chinese character exposure in kindergarten	3089 (2185)	3198 (2431)	3294 (2670)	0.07 (2,107)	0.001
Class literacy resources	7.15 (2.70)	7.11 (2.39)	7.79 (2.27)	0.93 (2,107)	0.02

**Table 8 Kindergarten-based SBR quantity and language exposure across different groups of kindergartens.**

	Rural	Urban	Cohen's <i>d</i>	Private	Public	Cohen's <i>d</i>
Quantity of shared reading in kindergarten	3.67 (2.64)	4.22 (3.37)	0.19	4.58 (3.55)*	3.33 (2.26)	0.43
Weekly Chinese character exposure in kindergarten	2985 (2150)	3434 (2741)	0.19	3727 (2886)*	2713 (1842)	0.43
Class literacy resources	7.23 (1.99)	7.56 (2.78)	0.13	8.22 (2.35)**	6.73 (2.36)	0.63

\* $p < 0.05$ , \*\* $p < 0.01$

**Table 9 Multilevel regression of home-based SBR quantity.**

Fixed effects	Dependent variables		
	Home-based SBR quantity		
	<i>B</i>	$\beta$	SE
Intercept	-1.04	0	0.74
(Level-1) Middle kindergarten class (48-59 months old)	-0.17	-0.03	0.23
(Level-1) Upper kindergarten class (60-72 months old)	-0.16	-0.03	0.23
(Level-1) Age of main caregiver (25-35)	0.54	0.09	0.43
(Level-1) Age of main caregiver (35 and above)	0.62	0.10	0.45
(Level-1) family SES	0.13*	0.08*	0.07
(Level-1) literacy resources at home	1.01***	0.25***	0.41
(Level-2) literacy resources in class	0.03	0.36	0.05
(Level-2) Average SES in class-level	0.15	0.16	0.11
(Level-2) literacy resources in kindergarten	0.01	0.02	0.03
(Level-2) Urban	0.58	0.10	0.44
(Level-2) Private	-0.16	-0.03	0.26
Random Effects			
$\sigma^2$	8.06***		
$\tau_{00}$	0.01*		
ICC	0		
Marginal $R^2$ /Conditional $R^2$	0.097/0.099		

\* $p < 0.05$ , \*\*\* $p < 0.001$ .

Note: The reference group is children in lower kindergarten classes, aged 36-48 months old. The reference group of the main caregivers is the group aged below 25 years old.

Likewise, the differences in kindergarten-based SBR and language exposure between rural and urban kindergartens are non-significant ( $t = 0.97$ ,  $df = 109$ ,  $p = 0.34$ ). However, the gap in the quantity of kindergarten-based SBR between public and private kindergartens is significant; children in private kindergartens are read with more and exposed to more Chinese characters than their counterparts with public kindergartens ( $t = 2.24$ ,  $df = 109$ ,  $p = 0.03$ ), with a small effect size (Cohen's  $d = 0.43$ ). It is noticeable that the differences in literacy resources in classes between public and private kindergartens are striking ( $t = 3.30$ ,  $df = 109$ ,  $p = 0.001$ ), with a medium effect size (Cohen's  $d = 0.63$ ) (Table 8).

**After controlling for SES, is the literacy environment at home and in kindergarten associated with the quantity of shared book reading experience of children?**

To examine the association of the literacy environment at home and in kindergarten with the quantity of home-based shared book reading, we conducted a hierarchical (two-level) linear regression. As Table 9 shows, at the child level, family SES was positively associated with the quantity of shared book reading after controlling for other variables; a higher family SES was associated with more shared book reading. A one-unit change of family SES was associated with a 0.13 increase in the books shared by parents with their children. The home literacy resources were also positively associated with more shared book reading; more literacy resources at home are related to more home-based SBR. Comparing with family SES, home literacy resources even showed a stronger association with home-based SBR ( $\beta = 0.25$ ). However, at the

class level, no predictors were associated with the quantity of home-based SBR.

We also examined the association of literacy resources in kindergarten, class SES and other factors with the quantity of kindergarten-based SBR reading. By using the average SBR quantity reported by teachers in each class as a dependent variable, we included the following predictors into the model: the class SES, age of the child and literacy resources in class as level-1 variables, and literacy resources in kindergarten and urbanicity, as well as being public or private kindergartens, as level-2 variables. The results presented in Table 10 indicate that the class level and age of the child are associated with the quantity of kindergarten-based shared book reading. In comparison with children in the lower kindergarten class, middle kindergarten class children have 1.71 more books shared by teachers each week, and upper kindergarten class children have 1.95 more books shared by teachers each week. The variable of literacy resources in class was positively associated with the kindergarten-based SBR, indicating that more literacy resources in the class are related to more kindergarten-based SBR. As shown in Table 10, the literacy resources in the class were the variable with the largest effect size compared to other variables ( $\beta = 0.50$ ). Class SES is not significantly associated with the quantity of kindergarten-based SBR after controlling for other variables. At the kindergarten-level, no predictors were associated with kindergarten-based SBR quantity.

**Discussion**

This research revealed a gap in the quantity of shared book reading and the resultant language exposure gap related to family



**Table 10 Multilevel regression of kindergarten-based SBR quantity.**

Fixed effects	Dependent variable		
	Kindergarten-based SBR quantity		
	B	$\beta$	SE
Intercept	2.65***	0	0.74
(Level-1) Middle kindergarten class (48-59 months old)	1.71**	0.33**	0.44
(Level-1) Upper kindergarten class (60-72 months old)	1.95**	0.35**	0.47
(Level-1) Class SES	0.18	0.11	0.16
(Level-1) Literacy resources in class	0.58***	0.50***	0.11
(Level-2) Literacy resources in kindergarten	0.10	0.29	0.18
(Level-2) Urban	0.04	0.03	0.76
(Level-2) Private	0.04	0.03	0.71
Random Effects			
$\sigma^2$	4.71***		
$\tau_{00}$ school	0.77*		
ICC	0.14		
Marginal $R^2$ /Conditional $R^2$	0.28/0.38		

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .  
 Note: The reference group of children is children in lower kindergarten classes, aged 36-48 months old.

SES. It showed that family SES was positively associated with the probability of children being read to at home after controlling for other variables. Furthermore, higher family SES was also related to more home-based SBR, though the effect size was small, which is consistent with previous research conducted in the USA (Barnes and Puccioni, 2017). As family SES is also associated with urbanicity in China, according to our results, such an association also manifested itself as a gap in the quantity of home-based SBR between young children from urban and rural areas. Specifically, our study showed that children from rural areas were exposed to less home-based SBR than their counterparts in urban areas, and children in public kindergartens were exposed to less home-based SBR than those in private kindergartens. Accordingly, we estimated the resulting gap in exposure to Chinese characters and found that such a gap is significant between urban and rural kindergartens, and also between children in public and private ones. An important finding which provides an answer to the main question raised in the title of this paper is that the socioeconomic gap in language exposure resulting from differences in family social status in terms of resources and habitus is neither exacerbated nor mitigated through kindergarten SBR. The differences in the amount the kindergartens read to children were found to be statistically significant but not meaningfully interpretable (between public and private kindergartens) or not even statistically significant (across mean kindergarten class SES categories and between rural and urban kindergartens), indicating that the socioeconomic word-exposure gap disadvantage lies for the most part in home-based SBR. Such a result diverges from the study of Neuman et al. (2018), which found a double dose of disadvantage in that children born into low-SES families from the poorest communities were provided with more limited language development opportunities in kindergartens. And it differs from findings in some low and middle-income countries showing that increased attendance of kindergartens could potentially compensate significant urbanicity gaps in terms of children’s academic advantages, especially with larger gains associated with attendance in private kindergartens (Betancur et al., 2024). But the results, which do not confirm the urban/rural differences in

kindergarten-based SBR, should be interpreted cautiously as our study was conducted in a relatively developed region of China and our sample size of kindergartens was limited. Nevertheless, as home-based SBR could contribute to the language development of children more than kindergarten-based SBR (Grolig et al., 2019), given the small group size of home-based SBR, one to one in the parent-child dyad under most circumstances, the gap in the quantity of home-based SBR in the present study is still a prominent source of a language development gap.

Our study contributed to the extant literature by estimating the Chinese character exposure gap resulting from SBR in early years across socioeconomic spectra. We found that children in high-SES families were exposed to 738 more Chinese characters each week at home than their counterparts in low-SES families, because of the home-based SBR gap. Such a gap could cumulatively reach up to more than 0.2 million Chinese characters before children’s school entry upon reaching 6 years old, if we assume that such a gap remains consistent each year and the onset age of home-based SBR is the same for all children. Though these assumptions might lead to a biased estimation of such a gap due to the potential variability of the onset age of home-based SBR and longitudinal variation of the quantity of SBR, it is still worth noting. Given that young children’s shared book reading is positively associated with their language skills (Farrant and Zubrick, 2012; Hindman et al., 2008; Lenhart et al., 2022; Sénéchal et al., 1996), a disadvantage in home-based SBR for children from lower-SES backgrounds would lead to a huge language gap before school entry in comparison with their more advantaged counterparts. Besides, in the present study, private kindergartens were also found to be more advantaged than their counterparts in public kindergartens. As the kindergarten-based SBR quantity is found to be associated with children’s vocabulary growth (Zucker et al., 2013), such disparities between public and private kindergartens could also be a source of an early language skill gap.

In the current study, the quality of the texts in home-based SBR showed no significant differences between rural and urban families. However, we found that the content of the books shared by parents with children and by teachers in kindergartens differed significantly. Among the variety of book genres, traditional narratives were the most read by teachers and parents with children, indicating that children were primarily exposed to this genre of books both at home and in kindergartens, which is consistent with previous findings (Robertson and Reese, 2017; Yopp and Yopp, 2006). In contrast, we found that information books were those least read by teachers in kindergartens in both rural and urban areas, such a result is partly consistent with previous findings in the USA (Yopp and Yopp, 2006). However, contrary to previous findings in the USA, we found that in Chongqing, China, information books were read more at home than in kindergartens. Such differences could stem from the divergence between the academically-oriented educational beliefs of parents and teachers’ play-based pedagogical beliefs. Parents’ emphasis on more content-based learning from information books could be a result of the profound influence of Confucian culture; however, teachers’ teaching beliefs have undergone a shift as a result of the ongoing educational reform in Chinese kindergartens, emphasising a play-based curriculum instead of academically-oriented pedagogy. However, according to the analysis in the present study, the vocabulary diversity of information books is higher than that of narrative books, indicating a higher quality in terms of vocabulary learning. Furthermore, in light of previous research findings that the vocabularies of information books are more conceptually complex and content-based than those of narrative books (Hiebert and Cervetti, 2012) and the structure of information books leads to more abstract extra-textual talk in SBR

than is the case with narrative books (Henkaline and Wagner, 2020; Price et al., 2009), it is beneficial to share more such books with children in kindergartens, as the inclusion of information books in shared book reading could promote young children's learning of new words about scientific facts and contents and help their comprehension of informational texts in later school years (Deitcher et al., 2019; Yopp and Yopp, 2006).

Family SES was related to the quantity of home-based SBR, but kindergartens' class average SES showed no association with the quantity of kindergarten-based SBR. As we included only 69 classes, it could be that the small sample size did not allow us to detect the relatively small effect size of class SES on the quantity of kindergarten-based SBR. Meanwhile, the rural-urban gap, as well as the private-public gap, is no longer significant after controlling for other variables. Such results partially support our hypotheses and is somewhat inconsistent with previous research stressing the huge rural and urban disparities in China in terms of educational development (Ayoroa et al., 2010). Such results could be derived from the small effect size of the gap and the association of SES gaps with urbanicity. That is interpretable as the huge rural-urban disparities in China reported in previous findings are generally found in border regions containing a prevalence of ethnic minorities (Ayoroa et al., 2010), while in our sample from Chongqing, the economic and educational gaps between rural and urban areas could be much narrower.

The availability of literacy resources at home is also positively related to the probability of children being read to at home based on the evidence from our results. Thus, more literacy resources are related to more shared book reading experiences for young children. Such an association could explain the connection between family SES and shared book reading, as the extant literature has identified home literacy resources as one pathway between SES and child language development (Pace et al., 2017). Family SES is related to greater access to home literacy resources, which allow children to engage in more literacy activities, such as shared book reading and, in consequence, promote children's language development (Farver et al., 2013; Froiland et al., 2013). Moreover, availability of home literacy resources in early childhood could also be associated with the reading gains in middle childhood through reading motivation (McNally et al., 2024). In such a sense, the gap in home literacy resources between rural and urban families that we found in the present study could also be related to family SES and could represent an important issue to be addressed for tackling the language exposure gap for children. Apart from that, above the child or family level, this study also revealed the positive association between literacy resources in the classroom and kindergarten-based SBR quantity as well. Thus, as we found in this study, in terms of literacy materials, public kindergartens were significantly more under-resourced than private ones. Given the potential subsequent language exposure gap resulting from SBR, this finding highlights the importance of narrowing the gap in literacy resources between kindergartens and compensating especially for disadvantaged children.

**Policy implications.** The results of this study have implications for policies and practices aimed at addressing the language gap before school entry for young children in China from a lower-SES background. Given the correlation between language exposure and children's verbal skills, the language exposure disparities resulting from SBR found in this study imply that children in families of lower SES would be significantly disadvantaged in language skills by the time they reached school entry age in comparison with their better-off peers. Closing such a gap is of great importance for improving equity in the early years of education. SBR sessions offer children a more diversified and

complex language experience compared with daily dyadic conversations (Crain-Thoreson et al., 2001). As both the diversity and sophistication (Weizman and Snow, 2001) and the syntactic complexity of parents' language input (Huttenlocher et al., 2010) is found to be positively correlated with children's language development, more language exposure in SBR would contribute to high-quality language input. As greater availability of literacy resources at home and in the kindergarten classroom are found to be associated, respectively, with the quantity of home-based and kindergarten-based SBR, intervention programmes that aim to address the language gap in early years should focus on improving access to both home-based and kindergarten-based literacy materials, especially targeting families and kindergartens in rural areas.

**Limitations.** This study was not without limitations. Firstly, because of the limitation of the cross-sectional self-reported data from parents and teachers on shared book reading practices, the estimates of the quantity of shared book reading and resultant language exposure could be biased. Further longitudinal studies using observational research tools would be needed to better measure the above two variables. Secondly, the low sample size of kindergartens in this study restricted the generalisability of the results, especially at the kindergarten level and might not allow some effects at the kindergarten level to be detected. Thirdly, although this study identified the factors associated with the quantity of shared book reading, such as family SES and home and kindergarten literacy resources, these factors do not explain a large portion of the variation in the quantity of home-based SBR. Further studies are needed to explore other potential predictors, such as the motivations of parents for shared book reading, teachers' beliefs concerning shared book reading, public library resources, etc. However, this is beyond the scope of the present study and remains open to further research.

## Conclusion

This research revealed a socioeconomic word-exposure gap associated with the quantity of home-based SBR before school entry in Chongqing, China. The study found that this language gap, related to family SES, was neither exacerbated nor mitigated through kindergarten SBR. Enhancing the literacy resources both at home and in kindergarten, particularly for disadvantaged families and kindergartens in rural areas, has the potential to narrow this gap. Additionally, interventions aimed at improving home-based SBR are especially crucial for disadvantaged children during periods of disruption, such as the Covid-19, when this study was conducted. During these times, the intermittent closure of kindergartens necessitated that children spend more time at home, relying solely on home-based SBR opportunities.

## Data availability

The data that support the findings of this study are available from the corresponding author, SC, upon reasonable request.

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## Author contributions

The authors confirm contribution to this paper as follows: study conception and design: Shujing Cui, David Greger; data collection: Shujing Cui; analysis and interpretation of results: Shujing Cui, David Greger; draft manuscript preparation: Shujing Cui, David Greger. All authors reviewed the results and approved the final version of the manuscript.

## Competing interests

The authors declare no competing interests.

## Ethical approval

We declare that the subjects were treated in accordance with established ethical standards as stated in the Declaration of Helsinki, and all the respondents participated in the study freely and with consent and were fully informed about the purposes of this research and how their responses would be used and stored. The informed consent form is presented at the beginning of the questionnaire to outline the purposes of the study and to ensure the voluntary participation of respondents. Ethical approval for this research was obtained from the Research Ethics Committee of the Faculty of Education at Charles University. The research, which involved a population of kindergarten parents and teachers, was conducted for the dissertation of the first author, on which this paper is based. The ethics approval number is UKPedF/323019/2024.

## Informed consent

Informed consent is presented at the beginning of the questionnaire, respondents are informed about the purposes of this research and that they are free to reject or quit to participate in the research.

## Additional information

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