



The importance of sensorial and spatial aspects in family reading at home: Insights from a national survey in Norway

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ABSTRACT

Purpose: The study investigated the relationships between spatial, multisensorial, and structural factors in family reading routines.

Materials: 1001 survey responses and 926 open-ended answers of parents of 3- to 6-year-olds living in Norway, were analysed.

Results: Parents who reported having a reading routine with their child valued more highly the spatial aspect of reading than parents who didn't have established reading routines at home and fathers valued the spatial aspect more than mothers. Highly educated parents valued more the visual sensorial aspect of the reading experience and described the book's visual appearance as salient for prompting reading conversations. The auditory aspects of reading were perceived negatively, while child's haptic engagement was rated as motivating for children's book interest.

Conclusion: Parents have a hierarchical perception of the role of senses in children's reading and place a high value on the place where they read with their child. These aspects need to be integrated into future SBR studies and home interventions.

The present study engages with recent theoretical shifts in reading research that argue against cognition- and human-centred studies in favour of socially and materially embodied reading networks and platforms (Ehret & Rowsell, 2021; Johri, 2022). Recent socio-material approaches to literacy studies highlight the importance of affective (Leseman & de Jong, 1998) and socio-contextual factors as critical to the reading situation (Levy & Hall, 2021; Klomberg, Schilhab & Burke, 2022). From the socio-material perspective, reading is conceptualised as being situated in space (Leander & Boldt, 2013), as an activity that is embodied and distributed (Trasmundi et al., 2021), and as an activity that involves the full sensorium (Stougaard Pedersen et al., 2021). While there have been many conceptual studies adding to an expansive understanding of children's contemporary reading practices (e.g., Mangen & van der Weel, 2016), the multisensorial and spatial factors hold further opportunity for empirical exploration. This study investigated the multisensorial and spatial factors in the context of shared book reading in Norwegian families.

Few family activities have received more research focus than the activity of adult-child book reading, also known as shared book reading

(SBR). Cumulative empirical literature (e.g., Bus, Van Ijzendoorn & Pellegrini, 1995; Niklas, Cohrssen & Tayler, 2016; Pace et al., 2019; Dickinson & Morse, 2019) has documented the contribution of SBR to children's literacy development and socio-emotional well-being (Martin et al., 2022). As a culturally grounded activity (see Leyva et al., 2022; Carmiol, Sparks & Conejo, 2022), SBR's benefits vary in relation to a range of socially contingent factors, including the frequency and quality of parents' reading at home (Noble et al., 2019; Dowdall et al., 2020).

In this study, we follow the socio-material perspective on reading to document and analyse the relationship between spatial and sensorial aspects of reading and parents' reports of their SBR practices at home. Our primary focus is on explaining variation in parents' reports of reading with their pre-school-aged children, in relation to their spatial and sensory orientations towards SBR. In correspondence with traditional SBR explanatory frameworks (Fletcher & Reese, 2005), we take into account the explanatory role of structural factors in family reading routines and expand it with a focus on the, as yet, understudied factors of spatial and sensorial stimulation.

Thus far, the theory-driven call for a more detailed examination of

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the spatial and sensorial aspects of reading has been taken up by small-scale qualitative studies that have documented the socio-material features of various reading substrates and the complex ecosystem of contemporary reading practices in modern childhood (e.g., Rowsell & Walsh, 2011; Mills, 2015; Djonov, Tseng & Lim, 2021; Pacheco-Costa & Guzmán-Simón, 2021; Trasmundi et al., 2021). For example, Mills (2015) outlined how spatial, socio-material, and sensory literacies impact the diverse ways in which families read together, and suggested that researchers pay more attention to the ways in which reading routines are spatially and sensorially situated. Mills concludes that the place where parents read and the interplay of visual, auditory and haptic senses in their reading might play a role in how often, which books and why parents read with their children. Zooming in on the reasons parents cite for selecting print books for their children, Bergman Deitcher, Aram and Adar (2019) reported the importance of the reading purpose, the quality of the illustrations, and the centrality of the written text and structure.

In a qualitative study focused on parents' book selection choices for infants and toddlers with language impairment, Daniels et al. (2022) identified four key factors: physical aesthetics, text difficulty, physical properties, and educational considerations. To our knowledge, no study has thus far examined the relationship between spatial and sensorial aspects quantitatively, or in a large-scale sample. Our study addresses this gap with a survey of a nationally representative sample of parents living in Norway.

Definitions of key terms and concepts

In studying parents' reports, we adopt the term "orientations" as an umbrella term for related but distinct concepts including individuals' perspectives, beliefs, viewpoints, or attitudes (Kluczniok et al., 2013). Examining parents' orientations towards SBR is important because of the close relationship between attitudes and actual behaviour in relation to various family values and other traditions, for example religion (Bader & Desmond, 2006). Parents' positive attitudes towards SBR during interviews were found to correlate with observational data of SBR with US rural families (Barnyak, 2011), and mothers' goals and motivations to engage in SBR correlated with the quality of their reading styles, including their use of interactive strategies (Leyva et al., 2021).

SBR routines and structural factors in families

Survey and intervention data in SBR are typically studied in relation to families' reading habits and the impact of those habits on children's learning, with attention to the families' structural characteristics. SBR uniquely predicts children's literacy skills above and beyond the family SES (Sylva et al., 2004), but structural factors influence the variation in diverse families (Bus, van Ijzendoorn & Pelligrini, 1995). In an evaluation study of ten European countries, families with lower SES engaged in fewer literacy activities with their children, especially when the children were younger (Hemmerichs, Agirdag & Kavadias, 2017). With Dutch families, children from families with higher SES experienced more stimulating home literacy environments, which affected children's vocabulary and reading comprehension skills at primary school (van Steensel, 2006).

Gender is an important factor in SBR studies given that both mothers' and fathers' reading with children uniquely contributes to children's experience, and can effectively support children's receptive vocabulary skills (Malin, Cabrera & Rowe, 2014). Although there are many similarities between mothers' and fathers' reading styles (van Steensel et al., 2022), observational studies have shown that fathers tend to use more interactive strategies during SBR than mothers (Anderson et al., 2004). For example, Hispanic fathers used many physical and movement-based reading strategies to engage their 9- to 35-month-olds in the activity (Campbell & Schindler, 2022). Text genre and children's gender further influence the differences between fathers' and mothers' reading

(Anderson et al., 2004), with qualitative differences in parents' talk during reading, for example, in terms of references to the gender of story characters (Endendijk et al., 2014).

In our study, which was part of a larger project focused on sensory reading in Norway, we included the following structural characteristics: parents' education levels, parents' gender, child's gender, and child's age. We examined the relationship between these structural characteristics and parents' orientations towards the spatial and sensorial aspects of shared book reading with their children.

SBR and sensory characteristics

Parents' orientations towards sensorial and spatial factors of SBR have not been previously studied, and our interest in these aspects stems from the theoretical perspective of socio-materiality. Socio-materiality has its roots in post-humanism and the notion of socio-material assemblages (Müller, 2015), which are combinations or collections of 'materials, ideas, symbols, desires, bodies, natural forces, that are always active and reconstituting themselves' (Fenwick & Landri, 2012, p. 3). Socio-materiality goes beyond the focus on individual cognitive processes and spotlights the multiple spatial and sensorial assemblages that are activated when humans (parents, children) and non-humans (books) inter- and intra-act (Fenwick & Landri, 2012). These assemblages are intertwined with our senses of vision (visual sense), hearing (auditory sense), smell (olfactory sense), touch (haptic sense), and taste (gustatory sense). As a theoretical framework, socio-materiality responds to the dynamic literacy landscape in which today's children grow up, with the reading of narratives happening in multiple formats, including apps and paperbacks. To evaluate the sensorial factors in SBR, we focused on parents' perceived importance of the auditory, visual, haptic, and olfactory senses in SBR with their child.

We studied the associations between parents' reports of sensory factors and their SBR routines in a nationally representative sample of parents living in Norway.

The place and space of reading: the Norwegian context

Norway can be described as a special case in children's reading studies because of the country's strong support for family literacy and a long tradition of children's literature. Norway outperforms other OECD countries on a number of wellbeing and welfare indices, such as disposable income per capita and the proportion of 25 to 64-year-olds who have completed upper secondary education (OECD, 2022). Norway has a high standard of living, with several family-friendly state policies, including subsidised childcare and parental leave, with a quota of parental leave reserved for fathers. In comparison to other European countries, Norwegian children are known to be high media users (Erstad & Gilje, 2008), living in households with almost universal Internet coverage, and having access to highly digitalised public services, including school and library access.

As for reading in Norwegian families, the public perception and strategic government support for children's literature is high in Nordic countries. For example, Finland, Norway, and Sweden have dedicated institutes for children's books, and children's reading is actively supported through library and school initiatives (Berry, 2014). Critical Nordic children's literature studies are a vibrant research field and Norwegian children's print books are known to be an internationally acknowledged cultural export (Rudvin, 1994).

The Nordic tradition of embodied, aesthetic, and artistic experience of reading has been documented by Norwegian literary studies of children's use of digital books in kindergartens (e.g., Hoel & Tønnessen, 2019; Hoel, Stangeland & Schulz-Heidorf, 2020), as well as theoretical approaches to embodied and haptic digital reading experiences (Mangen, Hoel & Moser, 2019). The pedagogical guidance for Norwegian early childhood practitioners rests on the recommendation that the 'spatial aesthetic qualities of the place of reading should be taken

advantage of, with placing of books, paintings (wall pictures) and furniture which all influence how inviting the room is for reading for both adults and children' (Thorbergesen, 2007, p. 98). We were therefore interested in the extent to which parents report the importance of the space where they read, including the visual / lighting in the room and comfortable seating, as well as sensorial engagement during SBR.

The present study

Our objective was to map the relationships between parents' reported orientations towards sensorial and spatial aspects of the reading experience, their reading routines, and the structural characteristics affecting these. For this purpose, we selected questions that were included in the national survey as indicators for structural variables (Parents' highest education level, parents' gender, child's gender, and child's age), indicators for reading routines (self report of having an established reading routine and the number of books read to the child per week), and parents' perceived importance of spatial and sensory factors during reading.

Given the structural supports for SBR in Norway, and the known high incidence of socially desirable answers in parenting-orientated survey questions (Bornstein et al., 2015), we hypothesised that parents would report high frequency of SBR at home. Since this is the first study that examines sensorial aspects in parents' SBR reports, we did not have a hypothesis regarding the strength or direction of the relationships between the role of space and senses of vision, hearing, touch, and smell.

Our research questions were:

- What are parents' orientations towards the sensorial and spatial aspects of reading and how do they relate to structural characteristics and reports of SBR at home?
- What reasons do parents report for these orientations?

Methods

Materials

The questions from the survey, that provide data for this article, were based on areas that emerged as salient in our literature review, as well as questions used in a questionnaire examining parents' reading habits in a previous small-scale study. The draft questions were modified with feedback from early childhood experts from the National Reading Centre (Lesesenteret) at the University of Stavanger. The team of authors agreed on all the questions used in the parents' survey. For the purpose of this study, we selected and analysed the survey questions which tapped into well-studied predictors of SBR (structural characteristics) as well as theoretically driven predictors (multisensorial and spatial characteristics of reading). The fieldwork for the survey was outsourced to an online survey company (Norstat Ltd.) that has been specialising in conducting online surveys in Norway since 1997 and has access to a nationally representative database of parents from diverse backgrounds and geographical locations across Norway. Norstat was involved in the recruitment of participants for the survey, distribution of the survey to the participants, and ensuring a 100% response rate and equal gender distribution amongst the participants.

Respondents' demographic characteristics

The survey was completed by 1001 parents living in Norway, with a mean age of 37.9 years. Given the targeted recruitment strategy, the parents' gender was evenly distributed across male ($N = 496$) and female ($N = 502$), with less than 1% responding that they preferred not to answer or identified as non-binary. The children's gender was also relatively evenly distributed across girls ($N = 515$) and boys ($N = 480$), with less than 1% of respondents stating that they preferred not to provide the gender of the child or that the child identified as non-binary.

Over 96% of respondents had completed high school, and 65% reported that they have also completed university education. As per the recruitment request, all respondents had at least one child aged between 3 and 6 years. In the case of families with more than one child in the target age group, the parents were instructed to answer the survey thinking only of one child in the household. The children's ages were evenly distributed across 3, 4, 5, and 6 years old (mean 4.3), and 97% of the children were attending an Early Childhood Education and Care Centres (ECEC). On average there were 2.1 children per household, with 20% being one child households, 56% being two child households, and 24% of households reporting three or more children. Norwegian was spoken at home in 96% of cases, and 15% of parents reported speaking another language either in addition to, or instead of, Norwegian.

SBR, spatial, and sensorial variables

To identify whether and how much parents read with their children at home, parents were asked to report on several aspects of book reading, including how many books they had read to their child in the previous week (used as our variable for shared book reading) and whether they had established regular reading sessions and routines. Their orientations towards the spatial aspects of reading were measured with questions asking how important they considered the place where they read with their child to be, and the order of importance that they attributed to several characteristics of the reading place (the visual/lighting in the room, comfortable seating, the sounds in the room, and the smell in the room). Finally, parent's orientations towards the sensorial aspects of SBR were measured with a question asking what sensorial aspects of reading was most important for the child's reading enjoyment (where they ranked in order of importance the sounds in the room, the pictures/visual aspect of the book, the touch/feeling of the book, and the smell of the book). A table showing these survey questions, the response type for each, and a breakdown of the responses received, is included in the Appendix.

Analysis procedure

We used Pearson Chi-square tests and Pearson correlations to identify relationships between the selected survey categories in all 1001 responses to the relevant survey questions. No assumptions of causality or directionality were made, due to the non-experimental nature of the data. For the categorical variables of interest, Pearson Chi-square tests were performed to investigate differences in distribution across categories when grouped by other categories, beyond what could reasonably be expected to randomly occur. The reported statistics respond to the distribution across the complete contingency table, with specific mention made of the largest contributions to these differences. Effect sizes and 95% confidence intervals were calculated using Cramér's V (V) to complement statistically significant chi-square values where reported. Pearson correlations explored possible linear relationships between continuous and ordinal variables that had a consistent and meaningful order. Analyses were conducted in R version 4.0.3 (R Core Team, 2021) and RStudio version 1.1.463 (RStudio Team, 2021). Alpha was set at 0.05, and p -values are reported with the standard notation of *** $p < 0.001$, ** $p < 0.01$, and * $p < 0.05$.

In addition to closed-ended multiple-choice questions, the survey contained an open-ended response option where parents could list the reasons for why they selected the visual, auditory, haptic, or olfactory sensorial aspect of reading as the most important. The question in the survey was phrased "Why did you choose this response?" and parents were free to type in a response of any length. Fifty-one responses were left blank or with incomprehensible replies (random strings of letters) and twenty-four responses were "don't know". The remaining 926 responses were analysed with a content analysis with open coding, following survey analysis traditions (e.g., Grandpierre et al., 2019; Farinosi, Lim & Roll, 2016). The analytical steps consisted of grouping

the responses according to key topics – visual, auditory, haptic, or olfactory sensorial aspect of reading – derived inductively from the data. The coding was performed first by the main author (first-author) of the study and checked by the study co-authors. Only small discrepancies were noted (for example the choice of representative quotes) and resolved through discussion. Representative quotes illustrating the topics were translated from Norwegian to English by the authors.

Results

Reading frequency and routine

As per our hypothesis, statistically significant correlations between structural factors and SBR orientations were observed in all instances (see Table 1). The larger of these correlations were between the age of the child and the number of books read to the child ($r = -0.21, p < 0.001$), education level of the parent and reporting an established reading routine ($r = 0.17, p < 0.001$), and the education level of the parent and the number of books read to the child ($r = 0.14, p < 0.001$). Overall, the largest observed relationship in the data was between reporting having reading routine and the number of books read to the child ($r = 0.45, p < 0.001$).

Chi-squared tests were used to evaluate whether significant differences existed in the frequency that sample subgroups reported having a reading routine. Results indicated that a small but significant difference existed between mothers and fathers (68% of mothers, compared to 62% of fathers, reported having reading routines with their child, $\chi^2 = 4.49, p < 0.05, V = 0.07$ (95% CI [0.00,0.13])), and that university educated parents more frequently reported reading routines than parents with lower levels of education ($\chi^2 = 29.26, p < 0.001, V = 0.17$ (95% CI [0.11,0.23])). The child’s age and gender were not related to the frequency that parents reported having a reading routine.

Chi-squared tests were also used to evaluate whether significant differences existed in the number of books parents reported reading to their child in the last week. Results indicated that mothers more frequently reported reading more books to their child than fathers ($\chi^2 = 22.25, p < 0.001, V = 0.15$ (95% CI [0.08,0.21])), that university educated parents more frequently reported reading more books than parents with lower levels of education ($\chi^2 = 29.97, p < 0.001, V = 0.12$ (95% CI [0.07,0.16])), and so too did parents of a child aged 3–4, compared to parents of a child aged 5–6 ($\chi^2 = 49.41, p < 0.001, V = 0.23$ (95% CI [0.16,0.29])). The child’s gender was not related to the number of books that parents reported reading to the child.

Spatial and sensory factors in SBR

To evaluate spatial factors in SBR, parents were asked ‘How important is the place where you read with your child for a good experience?’ (1= very important, 2= somewhat important, 3= neutral, 4= not very important; 5= not important). Answers revealed that for over half of the parents who reported reading with their children, place was either

‘somewhat important’ ($n = 481, 48\%$) or ‘very important’ ($n = 175, 18\%$). Place was not important for only 46 parents (less than 5%). Parents who reported having a reading routine with their child more frequently reported the spatial aspect of reading as important than parents who didn’t ($\chi^2 = 8.52, p < 0.01, V = 0.10$ (95% CI [0.03,0.16])), and fathers more frequently reported the spatial aspect as important than mothers (69% male respondents, 62% female respondents, $\chi^2 = 4.39, p < 0.05, V = 0.07$ (95% CI [0.00,0.13])). However, when grouped by level of education, ($\chi^2 = 0.35, p = 0.84$), child’s age ($\chi^2 = 0.43, p = 0.51$), and child’s gender ($\chi^2 = 0.73, p = 0.39$), no differences across groups were observed. Parents that reported reading more books with their child also did not report a level of spatial importance that was significantly different from the complete sample ($\chi^2 = 0.54, p = 0.77$).

To explore which aspects of place were important for parents, they were asked to rank the spatial aspects of reading, including the visual / lighting in the room, comfortable seating, the sounds around them, the smell in the room, or whether all aspects were equally important. Just over half of responding parents (52%) considered ‘comfortable seating’ to be the most important sensorial aspect, and 19% considered all aspects to be equally important.

To evaluate the sensorial factors in SBR, parents were asked to rank the importance of the aspects of sound, visual, touch, and smell for a good reading experience with their child (1=most important, 4=least important). The majority of parents responded that the visual aspect was most important ($n = 698, 70\%$), followed by the auditory ($n = 140, 14\%$), haptic ($n = 75, 7\%$), and finally olfactory ($n = 6, < 1\%$) sensorial aspects. Some responded that they did not know ($n = 82, 8\%$). The distributions were further explored across reading frequency, parents’ gender, parents’ education, child’s gender, and child’s age. Fig. 1 illustrates how female respondents selected the visual aspect of books as most important more frequently than male respondents ($\chi^2 = 17.15, p < 0.01, V = 0.13$ (95% CI [0.05,0.18])), parents with a higher level of education selected the visual aspect as most important more frequently than those with lower levels of education ($\chi^2 = 16.28, p < 0.05, V = 0.09$ (95% CI [0.00,0.12])), and so too did parents who reported reading more books with their child ($\chi^2 = 17.77, p < 0.05, V = 0.09$ (95% CI [0.00,0.12])). In each case, the subgroup that more frequently selected the visual aspect of books as most important, selected the ‘I don’t know’ response less frequently than the other subgroups. However, despite the observed relationship between the number of books read and the visual sensory aspect, parents that reported having a reading routine with their child, did not report sensory book preferences that were significantly different from the complete sample ($\chi^2 = 8.48, p = 0.08$), and child’s age ($\chi^2 = 15.42, p = 0.22$) and child’s gender ($\chi^2 = 4.01, p = 0.41$) were also not significant.

The following figure (Fig. 2) summarises and maps the relationships found in this study between spatial and sensorial aspects, structural factors, and SBR orientations. Each relationship is described earlier in this section (with corresponding statistics), and is represented in this map with + for a positive or – for a negative statistically significant association (to at least $p < 0.05$). Overall, parents were more likely to report reading more books with children aged 3–4 than 5–6, and mothers and parents with a university level education were more likely to have a reading routine and to read more books with their child. Fathers were more likely to value the spatial aspect of reading (especially comfortable seating), and mothers were more likely to value the sensorial aspect of books (especially the visual aspect). Having a reading routine was positively associated with valuing the spatial aspect of reading, and the number of books read was positively associated with valuing the sensorial aspect of reading. Given the differing question construction and a high level of missingness in response to the question on spatial aspects ‘‘How important are the following characteristics of the place for reading with your child?’’ (answered by 504 parents), we could not reliably assess whether there was any relationship between the reported importance of spatial and sensorial aspects.

Table 1
Correlation matrix of reading routines and books read.

	Parent’s education	Parent’s gender (female)	Reading routine (yes)	Books read
Parent’s education		0.06 *	0.17 ***	0.14 ***
Parent’s gender	0.06 *		0.07 *	0.15 ***
Reading routine	0.17 ***	0.07 *		0.45 ***
Books read	0.14 ***	0.15 ***	0.45 ***	

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

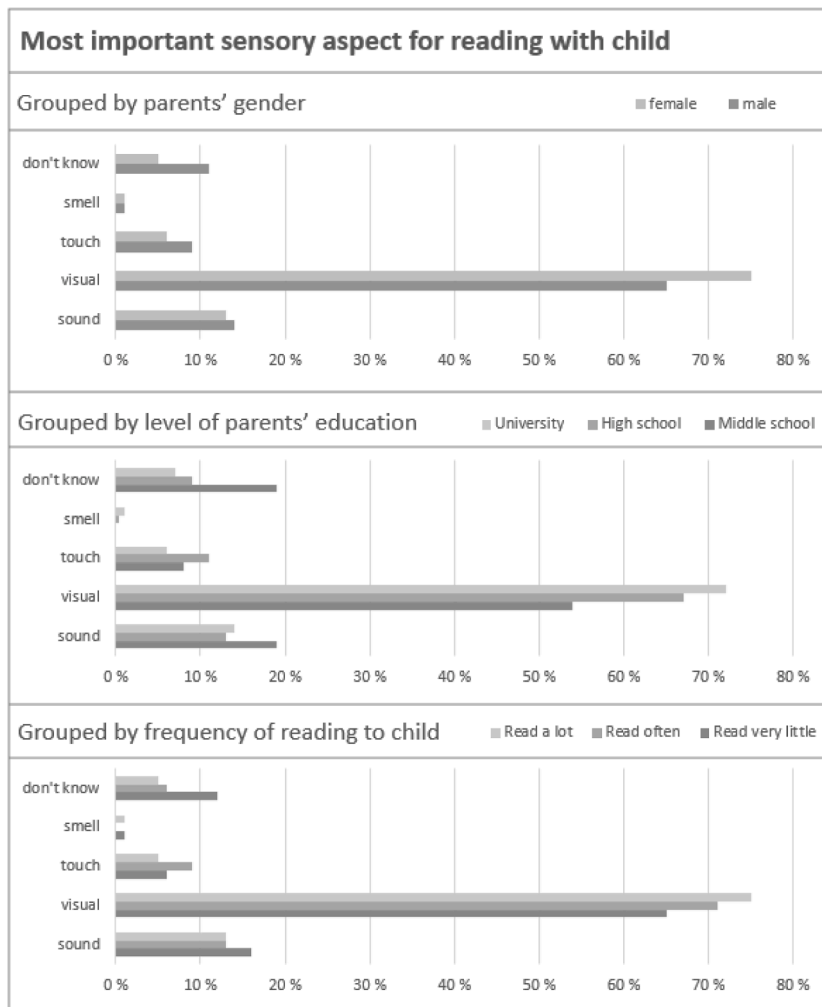


Fig. 1. Frequency of most important sensory aspect of reading, grouped by parent's gender, parents' education, and reading frequency.

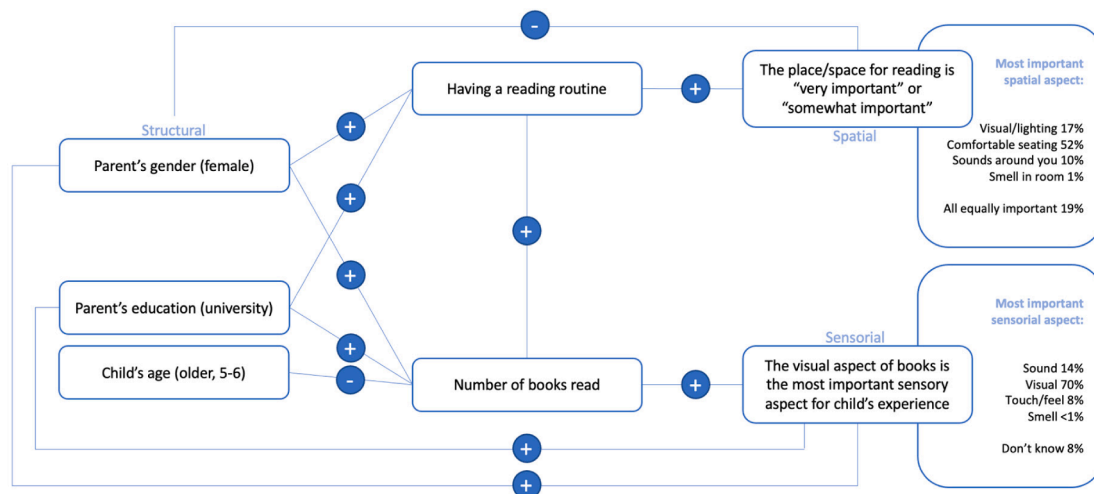


Fig. 2. Map of relationships identified in the correlational and chi-squared analyses

Overall, the strongest observed association in the data was between reporting to have an established reading routine and the number of books read to the child in the last week, such that parents who reported having a reading routine reported to read an average of 3.7 books with their child, whereas parents who reported no reading routine reported to

read an average of only 1.5 books. This finding confirms the consistency in parents' answers to the survey questions.

Reasons for parents' selection of sensorial preferences

The content analysis of parents' answers commenting both on their own and the child's preferences, provided further insights into parents' ranking of their spatial and sensorial preferences in reading. While the parents commented positively on the role of the images within, and the feel of books for children's reading (visual and haptic senses), their reasons for highly ranking the importance of sound (auditory sense) were their negative perceptions of auditory interruption during reading. While the visual and haptic senses were commented on in relation to the images inside the book, and the child's physical engagement with them, the auditory sense was described in relation to the background noise in the reading environment. Smell (the olfactory sense) was related to the smell of the books but also to the reading environment, and was commented on both in terms of its positive and negative influence on reading. Fig. 3 summarises parents' comments in relation to the positive/negative role of each sense and its attribution to the book or the reading environment within the context of the relationships identified in this study.

We further analysed the reasons that parents provided for ranking the importance of the five senses during reading and derived key themes from parents' quotes. Parents elaborated on why they ranked the visual sense as the most important for children's reading in relation to four positive impacts of books' visual appearance (specifically the quality of colours and images): support for children's fantasy, comprehension, conversation with the parent, and first steps towards learning. In contrast, the parents who chose the auditory sense as the most important sense during SBR, articulated the reasons in relation to the possible negative influence of sounds on the child's focus and enjoyment of the activity. The haptic sense was perceived to be important in relation to the visual sense and the visual-haptic interplay was especially highlighted by parents who positively commented on the role of physical (print) books for the child's reading experience. The few parents who commented on the olfactory aspect referred to smell as an important characteristic of print books that the child should experience as part of a balanced reading approach. Table 2 provides an overview of the themes related to each sense, with two illustrative quotes for each theme.

Given the nature of the survey question, most parents focused their comments on the importance of individual senses. However, some also recognised the interplay of senses in reading and elaborated on this aspect in the open-ended comments. The themes in Table 2 are therefore not exclusive, because, for some parents, the reasons overlapped and they justified their ranking in relation to a joint influence of two or more senses in reading. For example, the low importance of sounds and smell

was commented on by one parent: 'Because kids love pictures. Smell and sound I guess do not matter', while another commented on the positive experience of touch and smell: 'I love reading a proper book, where having to flip through and smell it is part of the whole sensory experience of reading a book.'

Many parents explained their ranking in relation to the experience of reading physical books. One parent wrote: 'Touching a book physically indicates that now it is possible to have a quiet moment, where I can read without feeling guilty. It also gives peace of mind to occupy your hands with something, that is to hold the book and you can often feel that the letters themselves protrude a little from the side. And that it is good to be able to easily move the book as opposed to a PC screen.' Shorter comments expressing the same sentiment included: 'The feeling of holding a book is different from holding a tablet.'

Discussion

The spatial and sensorial qualities of reading are important aspects that may have been neglected in previous SBR initiatives and policies. Our findings show that both spatial and sensorial aspects are important markers of reading in families living in Norway, and we discuss these findings in relation to previous research, theoretical extensions, and overall study implications.

The role of spatial and sensory aspects in reading has thus far not been explored through a systematic, quantitative approach. The first significant contribution of this paper is the finding that parents who have an established reading routine at home value the spatial aspect of reading. These orientations are significantly associated with parents' demographic characteristics, whereby mothers and parents with a university education more frequently report having established reading routines, whereas fathers place a higher value on the spatial aspect of SBR, especially in terms of a comfortable place to sit and read.

Furthermore, the sensorial aspects of reading matter to parents when reading with their children: mothers and parents with higher education are more likely to read more frequently with their child and they are also more likely to value the visual aspect of the sensory experience (and less likely to respond "I don't know" to the sensory question).

With adult readers, the importance of space has been highlighted in smaller-scale studies that investigated the spatial and aesthetic contribution of a specific reading place to the experience of pleasure in reading (Kuzmíčová, 2016). The purpose of reading and the selected reading medium (print or digital) has also been shown to influence the spatial choices of proficient adult readers (Kuzmíčová et al., 2018). Norwegian children's books are known to be 'visually advanced and poetically

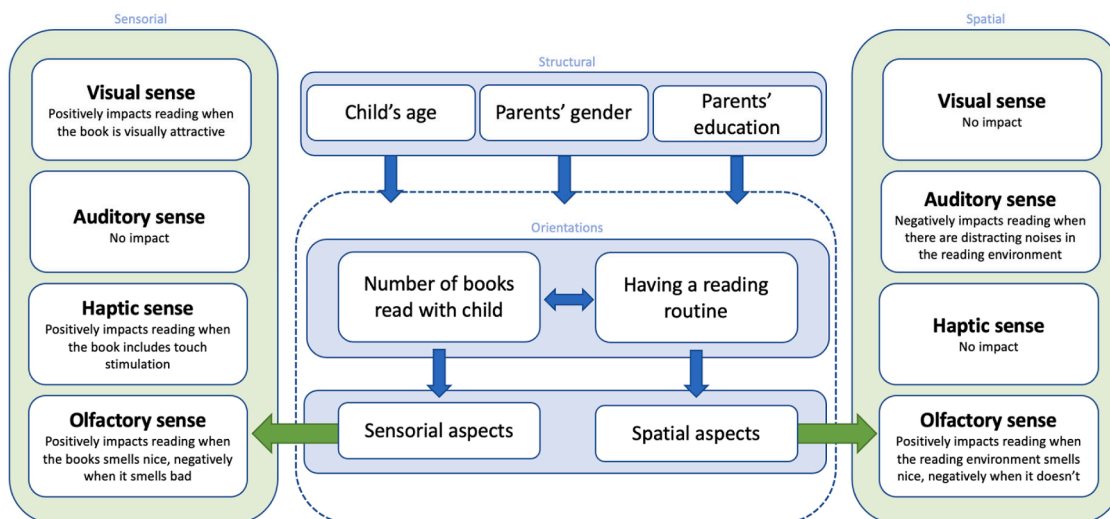


Fig. 3. Overview of parents' comments in relation to the sensorial aspects and other key variables of reading

Table 2
Key themes and representative quotes from parents' comments regarding each sense.

Sense	Theme	Representative quote
Visual	Early learning	'Because she is still so small yet, for her it is important that a book is not just long texts.'
	Support for fantasy	'Strong colours and nice pictures are what captivates him.'
		'Then it can quickly get boring for her to read, and I notice that she sits waiting for a picture to appear. I believe that this can help to stimulate the imagination, and that based on just one image, the imagination can freely roll.'
	Support for comprehension	'Because my child is easily "caught" by pictures and fantasizes about them.'
		'The pictures are easy to look at and increase the understanding of what is being read.'
	Support for conversation	'He is very happy to look at the pictures while I read. He understands the story better with pictures at the same time as he is read to.'
'Because my child likes to look at pictures. Pictures explain a lot. They also provide something we can talk about.'		
Auditory	Interference with concentration and focus	'My child is often preoccupied with the pictures and talks about what is in the pictures.'
		'The child can more easily lose concentration and focus when there are other sounds and things happening.'
	Interference with meaning and interest	'When it is quiet in the room, children can focus more on the book.'
		'It must be quiet. He can't get the meaning if there are other sounds that interfere.'
Haptic	Support for reading habits	'My child is sound-sensitive and quickly loses interest.'
	Support for learning	'It feels real to have contact with the book, reading habits matter.'
		'Because holding on, and feeling the book in your hands is related to the good experiences of reading'
Support for child's enjoyment	'Because children learn from touch.'	
Olfactory	Support for child's experience	'My child likes to look at the picture to point, count and discuss what he sees.'
		'The child likes to touch and touch different patterns.'
	Attribute of books	'She really likes books you can touch.'
		'Smell is important for children.'
		'The child should experience that the book can smell too.'
		'A book has a good smell from old times.'
		'Some books smell bad.'

narrated, based on a close interaction between text and picture' (Westin, 2003, p. 1157) and it could therefore be that parents living in Norway particularly value the visual aspect of SBR in print books.

The differences between the surveyed fathers' and mothers' ranking of the spatial and sensorial aspects of reading add insights to the nascent field of embodied family choreography (Goodwin & Ceikate, 2018). They illuminate how diverse families engage in daily routines and suggest that bodily engagement in reading carries a different value for men and women caring for young children (Doucet, 2006). Previous observational studies show divergent perspectives on the suitability of individual book titles for individual children amongst both parents and early childhood educators (Daniels et al., 2022), and our study elucidates some possible factors for the reported variation. It seems that parents with higher education might be more inclined to, not only read more often with their child, but to also value more highly the visual aspect of books, possibly through more frequent exposure to the reading material (although the flow of effects cannot be gauged from our correlational data).

Our qualitative analysis showed that the key reason associated with the visual sense in reading was parents' perceived importance of images for children's fantasy and learning. The haptic sense was linked closely to the importance of the visual sense in parents' reports, but the presence of sounds and background noise during reading was perceived negatively. The sensory experience of holding a physical book was highlighted mostly in relation to the sense of touch, but also smell. These findings map onto multisensory studies that highlight the contribution of individual senses (e.g., gustation, see Alaca, 2022) during children's picturebook reading.

Cingel and Piper (2017) examined how individual senses collude in reading digital books at home and found a direct relationship between the sense of touch and parents' increased elaboration of the story narrative. The role of individual senses during SBR has also been highlighted in studies with special populations, for example touch, sound, and smell during analogue reading, were central to a pleasurable SBR session for visually impaired children (Edirisinghe, Podari & Cheok, 2018). In our study, the auditory aspect was perceived to be part of the reading surroundings that should be minimised during reading. Although research shows significant associations between children's language learning and oral discourse, music and sound effects (e.g., Korat, Shamir & Heibal, 2013), the surveyed parents only commented on the absence of sounds and background noise during reading print books. It would be interesting to further study the contribution of visual and auditory aspects of children's books, digital and print, to the enjoyment that parents and children experience during SBR at home.

Theoretical extensions

The affective turn in literacy studies and the importance of affective cues for readers' interest and motivation (Makransky et al., 2019; Leander & Ehret, 2019) have drawn attention to spatial and sensory cues during reading. According to socio-material theories, shared reading involves the interaction between adults, children, and the book they read, as well as multisensorial intra-action with the place of reading (Kucirkova, 2021).

That reading is a multi-sensorial activity has been argued since early 2000s (e.g. Mangen, 2008) but this argument has not reached the public discourse on reading (Baron, 2021). Visually-centred resources and logographic curricula have been criticised by disability scholars (e.g. Tilley, 2018) and feminist scholars (e.g. Uzwiak & Bowles, 2021), but more recently also by reading scholars (Stougaard et al., 2021). Parents' positive perceptions of the importance of the visual and haptic senses in our study indicate a perception of sensory hierarchies in reading, and this finding expands the theoretical knowledge in the multi-sensorial reading field.

Parents alluded to the audio-visual integration in SBR, and perceived them as being the most important for children's learning, dismissing the role of olfaction and touch. This perception seems to be related to the linear, two-dimensional printing and phonetic media of the past, rather than the multimedia that facilitate today's reading. McLuhan's (1964) media ecology theory is useful in explaining that the media that are dominant in a particular historic period alter the perceptions and attitudes towards them, with each historical stage corresponding to a specific dominant medium. The 21st century is characterised by multimedia technology that include virtual reading possibilities with immersive reading experiences that activate several senses simultaneously (Mills, Scholes & Brown, 2022). It is not a selective engagement of individual senses but rather their integration along spatial, temporal, semantic, and synaesthetic congruencies, that explains how learning occurs (Spence, 2011). Thus, the dominance of the visual and auditory senses in parents' orientations corresponds to the theoretical analysis of socio-culturally, historically, and pedagogically constructed values in SBR. Parents' perception of sensorial hierarchies in reading interactions contrasts with reading concepts advanced by embodied cognition and multisensory reading theories (Klomberg, Schilhab & Burke, 2022).

Study limitations

Aware of the socio-cultural significance of SBR in the Norwegian society, we expected that parents' reports of their reading routines would reveal socially desirable answers. We were therefore keen to bring to the fore reasons for why parents like reading with their children, not only whether they read. Nevertheless, our probing for reasons could have been perceived by the parents as an indication to respond positively about their reading routines. It should also be noted that while positive orientation towards SBR is an important proxy for actual reading practices, these assumptions are based on correlational data and should not be interpreted in causal terms.

Systematic investigations of parents' orientations towards SBR in national cohort studies are still lacking. The gap makes it difficult to estimate unbiased, or objective, relationships between parents' orientations and their SBR practices. Our study adds a systematic and large-scale evaluation of parents' SBR orientations, but is limited due to the specific focus on the Norwegian sample. Given the highly positive public orientation towards reading and its learning benefits for children in Nordic and Western countries, it could be that Norwegian parents' positive orientations towards SBR, and their visual and spatial preferences, are unique to this cultural group.

Future studies could usefully expand our findings with survey questions that examine whether and how parents report reading different types of books (e.g., digital books) when they are in different places (e.g., when travelling with children) and engagement of various senses when appreciating the multimodal meaning-making facilitated through children's books (see [Serafini, 2020](#); [Serafini & Reid, 2022](#)).

Although we were able to analyse parents' open-ended answers to the survey questions, interview data could further contextualise parents' viewpoints. Interview studies provide detailed snapshots of parents' attitudes in relation to specific reading situations, for example parents' views on reading digital books ([Strouse & Ganea, 2017](#); [Kucirkova & Flewitt, 2022](#)). The content analysis allowed us to reveal, for example, that the visual and auditory senses were ranked as important, and that while this was the positive impact of the visual sense, it was a negative impact of the auditory sense. Further probing of parents' orientations towards these aspects could nuance our findings.

Study implications

Shared book reading is a principal activity in early childhood studies and practice, and a body of research documenting SBR's benefits on children's learning exists. Extant research has documented variations in SBR practice across and within families with a number of observational and intervention studies (see [Sénéchal, 2017](#), for an overview). This strong evidence base of SBR's benefits for children's development, has led to several government- and private-funded initiatives supporting SBR in families. Some focus on providing universal access to books (e.g., Bookstart, originally from the UK and now in 16 countries; <https://www.booktrust.org.uk/what-we-do/programmes-and-campaigns/bookstart/>), and some on parents' training in reading to their children (e.g., dialogic reading interventions, see [Hargrave & Sénéchal, 2000](#)). These intervention studies have not considered spatial and sensorial aspects of families' reading and our findings could usefully expand their foci. For example, investments in comfortable and quiet reading places,

and the design of aesthetically pleasing children's books might be especially appealing to parents invited to read with their children.

Shared book reading is often recommended as a bedtime routine to Western parents ([Partridge, 2004](#)) and our study details the spatio-sensory aspects that might affect the extent to which parents follow such routines. In particular, the negative associations the surveyed parents had with the auditory sense and their perception that sounds interfere with the child's focus and concentration during reading should be also recognised in future home reading studies. Although digital media researchers have noted a potentially positive contribution of e-books in aiding children's understanding by playing sounds and images synchronously ([Savva, Higgins & Beckmann, 2022](#)), parents in this study did not comment positively on any auditory stimulation, other than their and their child's voice, during reading.

Although we did not compare, nor encourage parents to compare, digital and print books in their responses, it was clear from parents' comments that they based their positive evaluations of sensory stimulation on print books. This role of the physical book in sensory engagement is in agreement with literary studies where physical books are highlighted for involving "different haptics" ([Mangen, 2016](#)) and different materiality, such as weight, texture, and thickness ([Mangen, Walgermo & Brønnick, 2013](#)). For the parents in this study, the feeling of the physical book, holding it in their hands together with the child, was mentioned as an important reason for why they selected the haptic sense as important. This finding could be capitalised on in future reading intervention studies that focus on providing access to high-quality print books for families. Furthermore, given that the visual aspect of the books they read was especially important for parents, the visual appearance of children's books should not be underestimated in future reading interventions. [Sipe \(2001\)](#) appeals to the pleasure of reading involved in appreciating the visual, or aesthetic aspects of the book in his detailed description of the visual narrative of children's picture books. We connect to his call and encourage attention to the visual framing of books, including the arrangement of the illustrations on the page, choice of paper, style, size, and cover.

In conclusion, the accumulated positive evidence on SBR is reflected not only in a vibrant research field but also in the range of policy measures and interventions targeting SBR in families. Unlike access to books or acquisition of specific reading styles, parents' orientations are less malleable and considered to be a relatively stable variable that needs to be better understood in diverse families and diverse reading contexts ([Holden & Edwards, 1989](#); [DeBaryshe, 1995](#)). Our findings substantiate the need for comprehensively mapping the sensorial and spatial aspects of reading with a systematic documentation of their role in parents' positive orientations towards SBR with their children.

Declaration of Competing Interest

The authors have no conflict of interest to declare.

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Appendix

Survey questions used in this study for the number of books read, reading routine, and spatial and sensorial aspects

Category	Question	Response categories	Mean (SD) or response percentage
Number of books read	During the last week, how many books have you read with your child?	1 book (1) 2 books (2) 3 books (3) 4 books (4) 5 books (5) 6 books (6) More than 6 books (coded as 7) No books (coded as 0)	2.98 (2.31)
Reading routine	Do you have regular reading sessions / reading routines at home, such as, before dinner, at bedtime, Saturdays at the library?	Yes (coded as 1) No (coded as 0)	Yes=65%
Spatial aspects	How important is the place where you read with your child for a good experience?	1 very important 2 somewhat important 3 neutral importance 4 not very important 5 not important 6 Don't know	17% 48% 19% 9% 5% 2%
	How important are the following characteristics of the place of reading with your child? (ranked, % selected as most important) $n = 504$	1 visual / lighting in the room 2 comfortable seating 3 the sounds around you 4 the smell in the room 5 all are equally important	17% 52% 10% 1% 19%
Sensorial aspects	What is most important for your child to have a good reading experience? (% selected as most important)	1 sounds around/in the room 2 pictures/visual aspect of the book 3 touch/feeling of touching book 4 smell of the book 5 don't know	14% 70% 8% <1% 8%

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