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# Parent–child shared reading of scratch-and-sniff books: the communicative affordance of olfaction

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## ABSTRACT

This study extends the research on shared book reading (SBR) by specifically examining the role of smell in parent–child SBR sessions observed at home. Drawing on qualitative methods, we analysed the verbal engagement of ten Norwegian families and their three to five-year-olds reading an olfactory book (the scratch-and-sniff book *Peter Follows His Nose*). We followed socio-semiotic theorisations (Kress and Van Leeuwen 2002), to critically evaluate the role of olfaction as a communicative resource in SBR. We outline the principal ways in which smell fulfils three linguistic metafunctions during adult–child SBR with olfactory storybooks: the interpersonal function of signalling individual interests, the textual function of creating a dialogic space and the ideational function of revealing divergent interpretations. We propose that olfaction can be seen as a semiotic mode in SBR, which similarly to colour, has distinct grammar and systematic communication properties, with unique multimodal qualities.

## KEYWORDS

Shared book reading; socio-semiotic theory; olfaction; communication

Multisensory early childhood research is concerned with children’s learning that involves the full sensorium (Stougaard Pedersen et al. 2021). Our study focuses on the role of one of the less studied senses: smell, or olfaction. The sense of smell constitutes a critical biological component in predicting degenerative diseases such as Alzheimer’s (Murphy 2019) or infections, such as COVID-19 (Soler et al. 2020). Scholars have suggested that activating the sense of smell can influence immersion in stories, particularly in relation to autobiographical memory and personally meaningful texts (Verbeek and Van Campen 2013). The most cited example has been the ‘Proust’s madeleine-memory’ effect described in poetic detail by the writer Marcel Proust, who, when eating a madeleine, got immediately immersed in his childhood olfactory memories (Fuchs 2012). Although the socio-cultural-historical value of olfaction has been highlighted as part of olfactory book heritage studies in adult reading (Bembibre and Strlič 2022), to the best of our knowledge, olfaction in children’s reading has not been

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considered in previous research. We were interested in exploring the role of olfaction in a typical early literacy activity: adult–child shared book reading at home.

## Shared book reading literature

Since the mid-1980s, a significant body of knowledge has accumulated regarding the benefits of adult–child shared book reading (SBR) for children’s learning, especially language skills (see Noble et al. 2019 for a meta-analysis). When adults read with young children, they create a language-stimulating environment that can positively impact children’s language development (e.g. Zauche et al. 2016), socio-emotional understanding (Schapira and Aram 2020), executive functioning (Hutton et al. 2015) and child’s interest in reading (Evans, Williamson, and Pursoo 2008). The effects vary depending on several factors (Noble et al. 2019), especially when different outcome measures and child characteristics are taken into account. Our study builds on the rich tradition of SBR literature with a multisensory interest – the interest in exploring the involvement and interaction of all senses, which some argue can encompass as many as 22, but we narrow it down to the fundamental six senses: vision, hearing, touch, taste, smell, and proprioception (sense of movement).

## Multisensory reading

Reading is not limited to the visual sense and children’s engagement with texts and pictures but rather, it is a multisensory experience that involves the full multisensorial apparatus, including the haptic (touch) sense and the role of hands (Mangen 2016) and the so-called lower senses of olfaction (smell), gustation (taste) and proprioception (sense of movement and position in space, see Kucirkova 2022). As a multisensory experience, adult–child book reading might engage children’s sense of smell in unique ways, but this potential has not been formally explored in empirical studies yet. Indeed, the focus on olfaction is a neglected area in early childhood studies more broadly, and in reading more specifically (Kucirkova and Tosun 2023). A recent analysis of children’s olfactory books specified that children’s sense of smell can be activated during reading indirectly with textual and/or pictorial references to odours in the story, or by directly enhancing books with odours that get released during a reading activity (Kucirkova and Tosun 2023). Our study targets the odour-enhanced fiction books with a traditional narrative structure (‘olfactory storybooks’ hereafter).

Olfactory storybooks can appear in both print and digital formats. A typical example of print olfactory storybooks are ‘scratch and sniff books’ that have fragranced areas on selected pages, which, when scratched, release a smell. For the purpose of this study, we selected a scratch-and-sniff book title to examine how the book’s affordances might play out in adult–child SBR. Our focus was driven by a theoretical position that interprets book characteristics as *affordances* and pays attention to the semiotic functions of activities.

## Theoretical framework: affordances and social semiotics

In his discussion of sensory experiences from the perspective of ecological psychology, Gibson (1977) described affordances as properties of a context, object or environment,

that are contingent, or relative to, the observers and users of the environment. Through users' interaction with the environment, affordances take on different roles (for example, they can be functional or non-functional, potential or actual, see Stendal, Thapa, and Lanamäki 2016), but they all afford action possibilities (e.g. a cup affords the action of grasping). It follows that book affordances alter as they are interacted with by diverse parents and children; some can be supportive of the reading experience and some disruptive, some can be acquired over time while others are ephemeral (Schmitt, Hurwitz, and Nichols 2022). Expanding on this research, we understand olfaction as an affordance, which, when activated by readers, can act as a resource for meaning-making. The comprehension of the processes involved in this meaning-making, the specific signs or communicative acts used, is grounded in social semiotic literacy theories, as we explain next.

The context of SBR, with an adult and child reading a book together, is an example of social learning where meaning-making happens in interaction with others and social objects, such as texts and illustrations. Vygotsky's (1978) socio-cultural theory positions the adult as the child's more knowledgeable other who gradually and contingently supports the child's understanding by reading the text aloud, pointing to pictures, asking questions and so on (Zevenbergen and Whitehurst 2003). The texts and pictures in children's books are important *signs* that support psychological processes such as remembering, problem-solving and ultimately, learning (Cole 1985; Vygotsky 1978). Semiotics is a theory of signs that specifies that signs are socially constituted and become realised in different forms. Signs in picture books give rise to 'semiotic events' (Golden and Gerber 1990), where the semiotic mode of verbal language reflects the iconic sign (for example illustrations in a book). Adults and children are sign users and sign makers, they make semiotic choices that influence how they engage with books and how they respond to them. In our study, we adopted the social semiotic theoretical framework, which is nested in Vygotsky's socio-cultural theory and within the general theory of semiotics and which pertains to the exploration of meaning in all its manifestations (Kress 2009). The social semiotic perspective further posits that 'the social' serves as a generative force for meaning, semiotic processes, and forms, which emerge from social environments and interactions – in our case the SBR interaction in the home environment.

Drawing on van Leeuwen (2005), we perceive social semiotics as a guiding framework that 'comes into its own when it is applied to specific instances and specific problems' (van Leeuwen 2005, 2). In alignment with the framework, we aimed to examine the ways in which olfaction, similarly to other socio-semiotic modes such as music, colour or verbal language, follows a distinct rhythm and grammar, and thus might be regarded as a distinct communicative resource in SBR. In sensory reading, each individual sense, as well as the synergistic interplay of all senses, holds a communicative potential that surpasses the traditional mind–body dualism (Kucirkova 2022). The interplay of all these senses enriches the reading experience, emphasising the communicative potential of lower senses in broadening our understanding of how individuals engage with and comprehend text. To understand this potential, we set out to document, analyse and critically evaluate the communicative functions of olfaction in parent–child talk during a shared book reading session.

## Aims of the present study

Given that no previous study has considered how parents and children interact with olfactory storybooks before, we aimed to first map the key themes in parent–child dialogue and ascertain their socio-semiotic role. This exploratory approach was guided by the theoretical framework of social semiotics in that we paid attention to the discursive meta-functions of utterances (Halliday 1978; Kress and Van Leeuwen 2002) and critically appraised the communicative affordance of olfaction in SBR. While all six senses play a unique role in readers' interactions with stories, we foregrounded olfaction to delineate its communicative function in adult–child SBR. Using the socio-semiotic lens and the empirical insights, we set out to advance the conceptual understanding of the role of olfaction in SBR and consider its potential to be considered an independent semiotic mode.

Our research questions were:

What are the communicative affordances of olfactory storybooks and socio-semiotic functions of olfaction in adult–child shared book reading at home?

To what extent can the communicative affordances of olfaction be seen as an independent semiotic mode?

## Methods

### *Study participants*

Ten families of children aged between 3 and 5 years (seven boys and three girls) agreed to participate in the study. We followed a snowball sampling procedure with the first participant known to the researcher and this participant then introducing the next participant and so on. Our inclusion criteria were broad in that they only specified the age of the child (between 3 and 5 years to reflect the Norwegian pre-school age range) and the family's ability to communicate in Norwegian to understand the study storybooks. One father, one aunt and eight mothers chose to participate in home observations. In two of the sessions, a younger/older sibling also took part in the observed shared book reading sessions. The families were all native Norwegians living in the surroundings of the (reference withheld) university in Western Norway.

### *Study procedure*

Families were instructed to engage in book reading 'as they normally would at home,' with our focus on observing adult–child interactions around diverse books. We emphasised our interest in capturing naturally occurring reading interactions and reassured families that there were no prescribed right or wrong ways of reading. Furthermore, they were free to choose any family member to read with the child, adhering to their regular reading routines. The families were also free to choose for how long and where they wished to read.

The families were invited to read three books: the child's favourite book, selected by the family from their home library and two books supplied by us, the researchers. One book that we supplied the parents with was a popular children's book, titled *A Fly*

*Flew* by Sondre Lerch (2021). This book was without any olfactory cues and was used as a warm-up. The other book, the target book for this study, was the scratch-and-sniff book *Peter Follows His Nose* by Beatrix Potter (2019 edition). This book is about a rabbit called Peter, who smells his way through the environment by tasting and smelling various foods and herbs, such as lavender, strawberries, mushrooms, and onions. On each page, there is a fragranced area, which when scratched, releases a scent that corresponds to the image of the item in the book.

All three books were read in a single session. The favourite book was selected either by the child alone or in discussion with the adult reading the book with the child and unlike the two books provided by the researcher, was already familiar to the families. The adults' perusal of all three books occurred as part of the reading session and our observation. To keep our observations consistent in terms of child's comfort and response to novelty, we asked the families to start with the child's favourite book, followed by the new book about the fly and finally the olfactory book. All sessions were videorecorded and the verbal engagement in the families transcribed by the second author. Both authors translated the quotes presented in Findings.

### ***Ethical considerations***

The study received ethical approval from the Norwegian Centre for Research Data (NSD project number 664252) and we followed the NSD ethical guidelines that correspond to international educational ethical guidelines and include the need to respect, at all times, the participants', including the child's, explicit consent to participate in research. According to the guidelines, the child's consent to participate needs to be negotiated and ongoing, with provisions made if the child refuses to participate in any aspect of the study (e.g. read a book or be videorecorded during reading).

Given the snowball recruitment, some of the participating parents had some, although distant, connection to the researcher. We therefore took extra care in making our ethical stance explicit to the parents and transparently shared the study aim and later the study analysis, with them. We emphasised that we were not interested in their parenting style or general interactions with their child but rather book-related interactions with three different types of books. So that the families were as comfortable as possible during the observations, the camera was placed on a tripod in the room's corner where the families decided to read. The researcher was either in the room and quietly observed the session with minimal interference or she left the camera in the room and the parents switched it off when they finished reading. This protocol was intended to make the families as relaxed as possible during the interactions and approximate the observed interactions to the families' natural SBR sessions at home.

### ***Analytical framework***

The audio data from videos of all families reading the olfactory storybooks were transcribed and coded by hand by both authors. To answer research question one, we qualitatively described the main patterns in parents' and children's speech by relying on thematic analysis. Thematic analysis is not bound to a specific theoretical framework and is a flexible method for 'experiential' research which seeks to understand what

participants ‘think, feel, and do’ (Terry et al. 2017, 19). To establish the primary themes and sub-themes, we read and re-read the data and arrived at final themes through discussion and mutual agreement. The thematic analysis was driven by the framework adopted from Halliday’s (1978) concept of three metafunctions of utterances and Kress and Van Leeuwen’s (2002) socio-semiotic extension of Halliday’s linguistic premises. Accordingly, textual utterances were defined as those utterances that ‘create flow and cohesion in texts and communicative events’ (Kress and Van Leeuwen 2002, 347).

The thematic analysis identified three themes, which we mapped onto the characteristics of ideational, interpersonal and textual metafunctions of utterances, as per Halliday (1978) and Kress and Van Leeuwen (2002): (1) textual function of creating a dialogic space, (2) ideational function of revealing divergent interpretations and (3) interpersonal function of signalling individual interests. The textual function involves creating a dialogic space, where communication is established as a two-way exchange. The ideational function, on the other hand, reveals divergent interpretations within the discourse as it is concerned with the expression and representation of ideas, experiences, and events, allowing different perspectives and understandings to emerge. The interpersonal function signals the participants’ interests and intentions within an interaction, highlighting their personal motivations, desires, and emotional responses.

To answer research question two, we analysed the transcripts with attention to grammar, or communicative regularities, that were activated by the adults and children in their interaction with the olfactory book. Kress and Van Leeuwen (2002) conducted a comparable process regarding colour, and we followed their analytical approach to explore olfaction as a distinct semiotic mode. Our reasoning was thus informed by both their theory and analytical procedure.

## Findings

### *Creating a dialogic space (textual function)*

The first theme captures instances of adult–child conversations when the participants were discussing the odours depicted in the book by enquiring, challenging, and negotiating each other’s odour knowledge. The children’s olfactory references were predominantly food-based, which reflects the general odour knowledge of pre-school children (Sorokowska et al., 2015) and the book’s words in the scratch-and-sniff areas. However, as the example from Family 3 shows, the children and adults shared different perceptions of the odours included in the book. The interpretations of what the fragranced areas smelled like unfolded reflections on which objects, people or places the individual odours represented.

#### Family 3:

- Mother: [finished reading text on the page]. Then we have to smell here and there.  
Scrape here, like that.
- Child: Can I smell it?
- Mother: Yes.
- Child: It smells like blackberries.
- Mother: Does it?
- Child: Yes. I mean, it actually is ...

- Mother: Can you smell anything else, then?  
 Child: Mmm. I have to smell it.  
 Mother: Yeah, I think you can scratch it. But do you recognise any more smells than blackberries here?  
 Child: Mmm. It actually smells like tomato.  
 Mother: It smells like a tomato? Yeah, well, I think it smells a bit spicy. Cinnamon. What do you think?  
 Child: I don't know.  
 Mother: [laughs, continues reading]

The children and adults openly expressed their enjoyment or disgust of individual smells in the book. The following example from Family 4 shows how feelings of disgust were revealed and how this revelation opened the space for displaying contrasting emotions during the reading activity.

Family 4:

- Mother: Does it smell like mushrooms?  
 Child: Can't smell anything!  
 Mom: Can't you?  
 Child: It smells really like mushrooms.  
 Mother: Did you get any smell? Maybe if we smell the picture. Smell it.  
 Child: Æsj! [Norwegian expression for disgust similar to Ew]  
 Mother: Laughter. smell there.  
 Child: EEEw!  
 Mother: [Laughs]

The odour references seemed to have created a textual meaning that continued beyond the fragranced areas in the book. For example, as illustrated in the following extract, the meaning transmitted by the textual component of the olfactory cue was inferred because of the metafunction that the olfactory cue played in the book. The child visually recognised the main character's smelling behaviour on the book's cover and pointed to it on the book's cover and the mother drew on the meaning constructed on previous pages to confirm the child's understanding.

Family 2:

- [later in the interaction after they finished reading the book]  
 Mother: What do you think of the book then?  
 Child: Great. Why is he looking at the strawberry?  
 Mother: Maybe he is smelling it, don't you think? He has his nose next to the strawberry.

***Revealing divergent interpretations (ideational function)***

The second theme captures examples when the adults' and children's odour perceptions, or more precisely, the adult-child *verbal* expressions of their perceptions, differed and when the SBR provided an arena for revealing these differences. The olfactory cues in the book denoted the individual foods described and illustrated in the book, which both the adults and children referred to when talking around the text and illustrations. However, the associations that adults and children



made with the odours diverged, as exemplified in extracts from Family 7 and Family 3.

Family 7:

Child: Eww.  
 Mother: It smells good. Does it smell like Eww?  
 Child: It smells like labelo [a lip balm].

Family 3:

Mother: Smell here, then.  
 Child: Smells like mushrooms.  
 Mother: Does it?  
 Child: Yes.  
 Mother: Yes.  
 Child: But I think it smells a little different. Blackberry.  
 Mother: Does it smell like blackberries?  
 Child: Yes.  
 Mother: Yes, it can be. Do you think they have similar smells?  
 Child: Yes.

The example from Family 5 shows how the child drew on her personal knowledge and resisted the interpretation that the onion odour came from the book.

Family 5:

Child's aunt: Do you smell it? Are you going to smell the onion? Did it smell anything?  
 This one?  
 Child: It smells like your house.  
 Aunt: Yes. I do not know if I'm doing something wrong, but. Do you smell it now?  
 'Petter hides among the trees in the forest, where he is greeted by delicious  
 berries.' [book text] Maybe we should just scratch. Scrape with your finger  
 in the middle of the strawberry.  
 Child: No.  
 Aunt: You found it. Does it smell anything?  
 Child: Yes.  
 Aunt: What does it smell like, then?  
 Child: Like you again.  
 Aunt: Like me?

Another illustrative example of ideational function of olfaction is the following extract from Family 1, where the mother and child refer to the mushrooms' smell, which the child considered to be a pleasant smell reminiscent of flowers, while the mother stayed close to the story and conveyed the meaning identified in the text.

Family 1:

Mother: Yes, it smelled like mushrooms!  
 Child: It smells like ...  
 Mother: No, not there, you have to scrape there. It actually smelled like mushrooms.  
 Child: It smelled pretty ... Smell, mum!  
 Mother: 'He jumps to the kiosk as fast as a wind, the scent of mintdrops lures him in.'  
 [book text].

- Child: It smells like flowers.  
 Mother: Does it smell like flowers?  
 Children: Eww.  
 Mom: It smelled like mint drops, yes. It smells like chewing gum, almost. Are you going to try there? Try on your finger here. Smell.  
 Child: I want to smell it.  
 Mother: [laughs]. And look here. [the mother continues reading the text]

### ***Signalling individual interests (interpersonal function)***

The olfactory cues in the book opened room for children to add their own interpretations that the parents took as invitations for joint meaning-making. Example from Family 3 shows how the child brought new aspects into the dialogue as she asserted that the released aroma was that of a soft drink and a candy.

#### Family 3:

- Mother: Yes, now you have to smell it.  
 Child: It smells a little bit like soft drink [Norwegian word 'brus' denotes popular children's soft drinks like Fanta etc.]  
 Mother: Did it smell a bit like 'brus'?  
 Child: Yes.  
 Mother: [laughs]. Yes, it smelled a bit like that ... what else does it remind you of, then?  
 Child: Some spicy candy.  
 Mother: Yes. Have you smelled it anywhere else, that smell there?  
 Child: No.  
 Mother: And here then. 'In the evening ...' [mother continues reading]

The child's interest in the diverse smells is captured in the extract from Family 6, which shows how the personal meanings associated with odours gave rise to humorous interactions.

#### Family 6:

- Child: Smelled not so good. But good!  
 Father: What did it smell like then?  
 Child: A little pee and a little poop.  
 Father: [laughter.]

The unpleasant onion aroma in the book created an interactive event, which both the child and adult needed to co-construct an interpersonal meaning of. The example from Family 2 shows how the child's initial judgment of the smell as unpleasant was justified with her referring to the materiality of the odour (the odour being included in the book). The mother acknowledged the child's meaning by expressing her attitude towards the smell and marking the smell's unpleasantness as an interpersonal (joint) meaning.

#### Family 2:

- Child: Yes, [it smells] very much! No need to scratch.  
 Mother: Yes, it smelled like onions, it smelled like dinner. It smelled quite nice, don't you think?

- Child: I did not like it anyway.  
Mother: Did it smell bad?  
Child: It smelled like a mixture of book and onions.  
Mother: Yes, it smelled a bit like the book too, that's true. [Continues reading the book text]

## Discussion

Our thematic analysis captured the ways in which the olfaction-enhanced shared book reading session with adults and children realised the ideational, interpersonal and textual metafunctions of communication. In this section, we consider the extent to which these observations might position olfaction as an independent semiotic mode.

Unlike basic colours, odours are typically categorised in terms of top notes (e.g. lemon), heart notes (e.g. cinnamon) and base notes (e.g. vanilla). The notes have different evaporation and duration properties, which constitute the perceptual individuality of odours (Foley and Bates 2019). Individual notes can be combined to generate new odours and their harmonious or disharmonious combinations are based on some 'grammars', similar to colour schemes. What seems distinct is the permanence or stability of the metafunctional qualities of odours and colours (cf Kress and Van Leeuwen 2002): while colours disappear when the book and its specific pages are not the focus of attention, olfactory cues remain in the environment. This quality is exemplified with the following data extract with Family 2. In the interaction, the child made it clear that odour was 'there', without the need to scratch the surface – it lingered in the air and did not require the activation of other senses for its perception. The child noted this for the pungent onion odour, which was clearly perceived as intense for her.

### Family 2:

- Mother: Does it smell like onion?  
Child: Yes, a lot! Don't need to scratch!!!

Our findings describe the various ways in which olfactory books serve key metafunctions. The descriptions are important because metafunctions realise 'speech acts', which are statements or questions that create a communicative situation. Kress and Van Leeuwen (2002, 348) describe how colour allows for realising 'colour acts' in that some colours can be used in lieu of warning or influence people's moods. Similarly, in our observations, the hedonic value of the odours embedded in the text, i.e. whether they smelled bad or good to the children and adults, gave rise to diverse 'olfactory acts' in the adult-child dialogue. In other words, the metafunctions enabled a distinct communicative situation. By directing attention to olfaction as a communicative act, we shed light on sensory dimensions that have been understudied in parent-child SBR discussions. This exploration opens up many possibilities for better comprehending the intricate dynamics of parent-child reading verbal exchanges within shared reading sessions.

Recently, the importance of sensory aspects in the reading experience has been supported by a large-scale survey that collected responses from 1001 parents of 3- to 6-year-olds, along with 926 open-ended answers, representing a nationally representative sample (Kucirkova et al. 2023). In this survey, highly educated parents placed greater value on the visual

sensorial aspect of reading, emphasising that the book's visual appearance played a pivotal role in fostering reading conversations. In addition, these parents perceived haptic experiences as significant for motivating their child to read through touch. Interestingly, however, the surveyed parents did not consider olfaction as significant, possibly because scratch-and-sniff books are not commonly found among typical reading materials at home, and thus were not mentioned in the survey. This survey offers an interesting contrast to our small qualitative study, where we introduced olfactory books to parents. In our study, olfaction took centre stage, highlighting how the introduction of olfactory books can shift the importance of sensory elements in parent-child reading interactions.

Unlike the well-established grammar for colours in terms of basic colours (red, yellow, blue) and secondary colours (green, orange and purple), odour language and odour perception are highly individual (Lenochová et al., 2012). The abstract character of odours and the idiosyncrasy of individual odour perceptions give olfaction a highly personalised character. We provide an example that substantiates this point and that shows how children referred to odours to convey abstract and personalised meanings during the reading session:

Family 3:

- Mother: I'm wondering if we can get the lavender scent out. Wow, let's see if we can make it ... . Yes, it's a bit weak, a little weak. Do you feel that it smells a little floral?
- Child: No.
- Mother: Doesn't it?
- Child: It actually smells like strawberries. No, raspberries. The other smells like strawberries. One smells like strawberries and the other smells like raspberries.
- Mother: But the onion, then?
- Child: It smells like blueberries.
- Mother: Does the onion smell like blueberries?
- Child: Yes.
- Mother: No, come on.
- Child: Yes it does!
- Mother: You! Smell here.
- Child: Yes it does!
- Mother: Yes, yes. I guess we smell a bit differently, that's fun. You smell one thing, I smell another. This one then?
- Child: Smells like butterfly.
- Mother: Does it smell like a butterfly?
- Child: Yes.
- Mother: Oh, it smells delicious.

Kress and Van Leeuwen (2002) note that colour fulfils the textual, ideational and interpersonal metafunctions simultaneously, and this simultaneous activation was the case also with the odour-related metafunctions in our study. Although Bezemer and Kress (2015) made references to all five sensory modalities, including olfaction, they distinguished the modalities in relation to various contexts of communication and the values and power structures associated with specific semiotic approaches; for example, the static text being a powerful semiotic mode for communication above and beyond other sensory modalities. Furthermore, Kress and Van Leeuwen (2002) posited that colour did not exist as an independent semiotic mode but rather as part of multimodal

communication: colour ‘can combine freely with many other modes, in architecture, typography, product design, document design, etc., but not exist on its own. It can survive only in a multimodal environment’ (351). We conclude that the interpersonal function of signalling individual interests, the textual function of creating a dialogic space and the ideational function of revealing divergent interpretations, might position olfaction as a semiotic mode in SBR that needs to be studied in its own right. Similarly to colour, olfaction has distinct systematic communication properties, in that it communicates knowledge and narrative intentions and these become visible when studied in interplay with other sensory modalities. In our study, olfaction served as a means to establish joint attention, complementing and working in tandem with visual signs, such as illustrations found in the book. Drawing upon Kress’ social semiotic theory, we, therefore, propose to incorporate olfaction into future studies of SBR as it might convey meanings between parents and children that surpass verbal expressions and evade linguistic descriptions.

### ***Study limitations***

This qualitative study reports one reading occasion and verbal engagement of a homogenous snowball sample, with data interpretation that was triangulated and member-checked but inevitably, remains limited, particularly in relation to generalisability. These limitations can be usefully addressed by future research, particularly with a systematic study of the impact of socio-economic status, the families’ reading habits at home or attitudes towards reading. These factors are known to impact SBR practices (see e.g. Aram, Bergman Deitcher, and Adar 2017) and are likely to play a role in SBR stimulated with olfactory books, too. Future research could explore further elements related to shared book reading and olfaction, such as the extent to which children’s literary appreciation, vocabulary growth or reading motivation might be influenced by olfaction. The extent to which adults’ and children’s olfactory behaviours become child-initiated or adult-initiated could be also explored in future studies with attention to their verbal as well as multimodal interactions. To address the limitation of parent-child verbal responses to books, our follow-up study considered behavioural responses to parent-child olfactory book reading.

### ***Study implications***

Shared book reading is a well-known activity in European early childhood educational settings, but its study has paid little attention to olfaction. Our study introduces a novel focus to early childhood studies – the role of smell in shared book reading activities between adults and children. We analysed in fine detail parent-child verbal interactions during the reading of an odour-enhanced ‘olfactory’ book. We found that olfactory book reading afforded three metafunctions of utterances and created a dialogic space that was dominated by emotional expressions, divergent and highly personal interpretations of smell. We found that the communicative affordances of olfactory storybooks in adult-child shared book reading mapped onto the textual, ideational and interpersonal meta-functions of utterances. Inspired by our findings and the socio-semiotic theory, we propose that smell can act as a resource for communication and its potential to act as a semiotic mode merits further study.

In conclusion, SBR provides rich opportunities for communication through the text and illustrations in the books and through the adult–child extratextual talk that occurs during reading. Smell is considered the sense of future, and following the COVID19 crisis, there is an urgent need to explore the role of smell in everyday activities. Conceptualised as a resource for communication and semiotic mode for meaning-making (see Kress 2009), olfaction presents differently in different families and could be thus studied as a distinct source of variation in SBR practices. In particular, we conclude that olfaction serves a unique communicative function in SBR and that the sense of smell, which has thus far been positioned at the bottom of the sensory hierarchy, could be considered an independent semiotic mode that realises a distinct meaning for adults and children reading books together.

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