

Differential contributions of home literacy, vocabulary and grammar on narrative production and
comprehension

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Abstract

We investigated the development of 4- to 6-year-olds' narrative skills in relation to their receptive vocabulary, grammar, and the home literacy environment. At Time One, 82 children aged 4 to 6 years completed standardised assessments of cognitive ability, vocabulary, and grammar. Narrative production and comprehension were assessed by the narration of a wordless picture book and questions about the book's content, respectively. Parents completed a questionnaire about home literacy practices. Concurrently, vocabulary explained unique variance in narrative comprehension, but not narrative production. In addition, the teaching of literacy-related skills in the home was negatively related to both narrative comprehension and production, and the frequency with which parents and children engaged in interactive reading was positively related to narrative production. One year later, one aspect of the home literacy environment (print exposure) explained unique variance in later narrative comprehension, after controlling for earlier narrative skills. These data show that vocabulary and grammar skills and home literacy practices are related to different types of narrative skills and suggest that literacy experiences in the home make a unique contribution to the development of narrative comprehension and production.

Keywords: narrative production; narrative comprehension; home literacy environment; oral language

Differential contributions of home literacy, vocabulary and grammar on narrative production and comprehension

Narratives are stories about real or fictional events (Petersen, Gillam, & Gillam, 2008). In the home, children are surrounded by activities involving narrative discourse from an early age, including the retelling of memories and shared experiences, viewing television programs, sharing books, and listening to stories (Skarakis-Doyle & Dempsey, 2008). The ability to understand and produce narratives develops before children start formal schooling (e.g., Paris & Paris, 2003) and predicts later reading comprehension (e.g., Adlof, Catts, & Lee, 2010; Griffin, Hemphill, Camp, & Wolf, 2004; Kendeou, van den Broek, White, & Lynch, 2009; Author, 2012; Authors, 2015). The comprehension and production of narratives involves the organisation of different events in a story, providing a theoretical basis for this relationship. Because of the growing consensus that early narrative skills serve as a foundation for later reading comprehension, it is important to determine the linguistic skills and environmental influences that support and foster early narrative development (Dickinson, Golinkoff, & Hirsh-Pasek, 2010). The aim of the current study was to examine the contributions of vocabulary and grammar, and the home literacy environment (HLE) to narrative comprehension and production.

The Development of Narrative Structure

There is a large literature on the development of children's narrative skills. One strand of research has focused on the age at which children are able to construct a canonical story, which is described as a narration conveying the expected elements and sequences of this genre (e.g., Peterson & McCabe, 1991). There is widespread agreement about the elements that are critical for a good story (or narrative). A story should include: an introduction to orient the reader, which usually includes the setting and descriptions of the main characters; initiating events, goals or

motivations, which provide meaning to the actions carried out by the characters; and a problem or conflict that must be resolved so that the main characters can accomplish their goal(s) (see Peterson & McCabe, 1991, for a review). More sophisticated stories also include consequences and reactions to the outcome (Shapiro & Hudson, 1991; Stein, 1988), and unexpected situations or complications (Labov, 2001). McCabe and Rollins (1994) describe the development of narrative structure knowledge. They state that typically developing 3-year-olds construct stories with no more than two of these elements. As children mature, they include more elements but those are not necessarily organised in an appropriate sequence. By five years of age, a sequence of events is typically produced, but stories often lack a proper resolution and instead have an abrupt ending. By six, children can construct a story that includes the necessary elements and organise them appropriately (McCabe & Rollins, 1994). Despite evidence of significant developments in narrative ability up to the age of 5 to 6 years, there is considerable variation in performance in this age group, which is related to environmental features such as parental socioeconomic status and the household environment (Fiorentino & Howe, 2004; Peterson, 1994).

In addition to which elements are included in a story, how the events are related to each other is also important. The structural coherence of a narrative specifies how the main events and episodes are related in the mental representation constructed for a story, thus, it involves the integration of ideas to build a mental model (Author, 2003; Sanders & Maat, 2006), a skill critical for listening and reading comprehension (McNamara & Magliano, 2009). As children include more key elements in their narrative productions, they also produce narratives with a clearly organised structural sequence of events (McCabe & Rollins, 1994).

In children, narrative production and, in particular, the structural coherence of these productions is related to reading comprehension skills (Author, 2003; Author, 1996; Griffin et al., 2004; Kendeou et al., 2009). As a result, narrative coherence abilities have been used to measure discourse-level comprehension in non-independent readers. The rationale is that similar cognitive processes are displayed when understanding stories presented in text or in different formats other than text. For instance, Paris and Paris (2003) used a wordless picture book to assess comprehension in pre-schoolers. Likewise, Kendeou and colleagues (2009) evaluated early comprehension presenting aural and audiovisual stories.

The comprehension and production of narrative draw on the higher-level skills critical to successful text comprehension, ones that enable the language user to specify the coherence relations between events, for example establishing a causal sequence (van den Broek, Lorch, & Thurlow, 1996). Even though narrative comprehension and production are related, previous research suggests they are independent constructs. For instance, Author (2012) found that the correlations between both skills were positive but moderate, and Westerveld reported different performance between comprehension and production tasks, where the former is better accomplished (Westerveld & Heilman, 2012). In accordance, there are different approaches to assess narrative skills that vary mainly on the elicitation materials and the specific task (Liles, 1983). Wordless picture books are widely recommended and used to elicit both comprehension and production (Paris & Paris, 2003). Concerning the tasks, there is a long tradition that uses questions to assess narrative comprehension, and storytelling to look at production. Storytelling is a less constrained task, because it is based on the child's knowledge instead of a previously given account. Thus, it allows to assess how the child constructs meaning from the story (Liles, 1983).

Language basis of narrative skills

Given the importance of early narrative skills as a foundation for later reading comprehension, it is important to understand the factors that influence the development of narrative competence. One such factor is oral language. Narrative comprehension and production are complex discourse-level skills, which can be described as higher-level language skills because they are involved in the comprehension and construction of discourse-level meaning (see Author et al., 2011, for a discussion of the lower- and higher-level distinction). Children are immersed in narrative discourse through autobiographical memory and shared story book reading throughout preschool (Mol & Bus, 2011; Reese, Haden, & Fivush, 1993). In turn, lower-level oral language skills such as vocabulary and grammar, which also develop significantly during the preschool years, serve as the foundation for understanding and producing discourse. This was demonstrated in a study by Sénéchal and colleagues, which found that the structural quality of narratives produced by 4-year-olds using a picture book prompt was related to independent measures of vocabulary, morphology, and syntax (Sénéchal, Pagan, Lever, & Ouellette, 2008).

As stated, comprehension and production of narrative involves going beyond the meanings of individual words and phrases to establish a coherent causal structure of events (van den Broek et al., 1996). Certainly for children in elementary school, there is good evidence that narrative comprehension (assessed using standardised measures of reading comprehension) is not solely determined by word- or sentence-level processes, but also by higher-level language processes of inference and knowledge and use of narrative structure (Author et al., 2004; Language and Reading Research Consortium, & Logan, 2017; Lepola, Lynch, Kiuru, Laakonen, & Niemi, 2016; Author, 2012). Similarly, children's narrative production is influenced by a

range of knowledge and language skills (Author, 1996; Cragg & Nation, 2006).

Studies of younger children's narrative production indicate that different skills may be more influential at different ages. For example, Lynch et al. (2008) found that vocabulary was related to the structural quality of narrative retells in 4-year-olds, but not in 6-year-olds, and Trionfi and Reese (2009) found that vocabulary did not predict narrative production skills in 5-year-olds. However, the extent to which these findings extend to comprehension, as well as production, is not known. Lynch et al. (2009) suggest that the early influence of vocabulary is because it plays an enabling role in narrative skills: a certain degree of word knowledge supports understanding of the text and subsequent retelling. Nonetheless, other skills or knowledge are also important. As children get older and produce more structurally complex narratives, a key aspect is how they organize the information beyond the word level, for instance, producing and/or comprehending syntactically adequate sentences (Bock, 1982). Previous studies looking at reading comprehension predictors have found that not only vocabulary but also grammar are relevant predictors of the ability to understand what is read (Muter et al., 2004).

Considering that word and sentence level knowledge is an important building block to construct more complex discourse, the current study will look at the contribution of vocabulary and grammar to the development of narrative comprehension and production.

The Home Literacy Environment (HLE)

In addition to linguistic influences on narrative skills, environmental influences may play a role. Here, the focus is on the HLE. In the home, children are exposed to a range of activities that include narratives such as playtime, shared book reading, recalling memories, and conversations during mealtime (e.g., Dickinson & Snow, 1987; Stein & Albro, 1997). A series of studies have shown the benefits of home literacy practices on a range of language outcomes,

such as phonological awareness, word recognition skills, and vocabulary (Bus, van Ijzendoorn, & Pellegrini, 1995; Evans & Shaw, 2008; Mol & Bus, 2011; Whitehurst et al., 1994), but there are a few studies looking at its relation to narrative production or comprehension.

The HLE varies and different home literacy practices may influence specific aspects of language and literacy development. For instance, Sénéchal (2006) found that parental teaching practices in kindergarten, such as teaching letter names and sounds, predicted later word reading skills, whereas frequency of shared reading predicted vocabulary, reading comprehension, and reading for pleasure. Sénéchal (2006) found no relation between these two different types of practice, indicating that they might reflect different parental styles; not all of the parents who read to their children will also teach them early literacy skills. Later research has tested the HLE model proposed by Sénéchal, including expansions or new dimensions of the same components. The role of teaching on early literacy has yielded different results. For instance, Krijnen et al. (2020) found that teaching practices predicted oral language skills in children, and Silinskas et al. (2020) found that teaching predicted children's engagement in reading. Conversely, Pfof and Heine (2023) reported that teaching practices were not related to children's reading comprehension and reading for pleasure.

Another indicator of children's literacy experience is print exposure (Stanovich & West, 1989), typically assessed through recognition of authors or book titles. It is considered a proxy indicator of reading habits and correlates well with diary records of reading frequency (Allen, Cipielewski, & Stanovich, 1992). Several studies demonstrate that these measures of print exposure predict language and literacy skills such as vocabulary, word reading and spelling (e.g., Cunningham & Stanovich, 1991; Ecalle & Magnan, 2008; Stanovich & West, 1989) and at different developmental stages (Mol & Bus, 2011). Of note, not only measures of children's print

exposure are related to language improvements, but also, parental exposure to print, as reported in previous literature (e.g. Symons et al., 1996).

Investigations into the impact of home literacy practices on narrative performance have produced contradictory findings. Detection of relations between the HLE and narrative might depend on the measure used to assess storybook reading, and also the task used to assess narrative competence. For example, Grolig, Cohrdes, Tiffin-Richards, and Schroeder (2018) found non-significant relations between preschoolers' narrative comprehension and the home literacy environment assessed by a questionnaire; in contrast, they found a significant relation between story book exposure assessed with title recognition checklists, which control for socially desirable responding. However, in a study of children's narrative production by Sénéchal et al. (2008) that used similar checklist measures, there was no significant relation between the frequency of shared book reading in the home and production of either fictional and personal narratives.

When considering how to assess experience with narrative in the home, it may be that quality, rather than quantity, of shared reading is the more important predictor. There is considerable variability in parental style during shared book reading and the nature of the interactional style adopted by parents during makes a difference. For example, in a longitudinal study, Haden, Reese, and Fivush (1996) found that children whose parents focus on description during shared story book reading have lower vocabulary and story comprehension outcomes than those whose parents included comments that encouraged inference making and prediction. The benefits of shared reading that focus on meaning construction through a dialogic approach have been confirmed in intervention studies (Aram, Fine, & Ziv, 2013; Lever & Sénéchal, 2011; Zevenbergen, Whitehurst, & Zevenbergen, 2003). In addition, Mol, Bus, and de Jong (2009)

reported in a meta-analysis that interactive reading was related to gains in language skills.

Further complementary research on autobiographical memory and personal narratives has shown that children of parents trained to use a more interactive style when reminiscing with their child about past events produced narratives of better quality (Reese & Newcombe, 2007).

The quality of shared reading experiences may be important because narrative production and comprehension involve the organisation and integration of ideas and events. Enriched or interactive reading activities with adults, such as dialogic reading, provide children with scaffolds during book reading and support the child's active construction of meaning because adults ask questions, engage the child in discussions about the book, and encourage the child to tell them back the story. An alternative (though not mutually exclusive) hypothesis is that home literacy practices influence early narrative development because they support the development of important oral language foundation skills such as vocabulary knowledge (Sénéchal et al., 2008). Although there are strong links between narrative production and comprehension in older children and adults (Author, 1996; 2003; Pickering & Garrod, 2013), narrative production relies more heavily on knowledge retrieval and planning than does narrative comprehension, and there is asymmetric development of language production and comprehension during childhood (see Pickering & Garrod, 2013, and commentaries for full discussion). To date, studies on the HLE have not addressed the contribution of different practices at home to the production and comprehension of more extended discourse, that is, narrative. The current study will expand current models of HLE (e.g. Sénéchal, 2006) by including not only frequency of shared reading and teaching, but also testing print exposure and interactive reading. In addition, this work will build upon the findings of Grolig et al. (2018) by looking at the contributions of a broader model of the HLE not only on narrative comprehension, but also on narrative production.

The current study

Narrative skills are important because they are related to later reading comprehension. The current one-year longitudinal study was designed to identify whether lower-level oral language (vocabulary and grammar) and home literacy practices are related to the structural coherence of young children's narrative comprehension and production. The influence of these variables was examined both concurrently and longitudinally, to determine which variables support narrative skills concurrently and which support the development of narrative skills in a key period in the acquisition of reading skills. A measure of non-verbal IQ was included to control for general cognitive ability, considering its relation to language development and the potential confound (Earle et al., 2015; Sénéchal et al., 2008). The following research questions were addressed:

Do lower-level language skills predict narrative comprehension and production over and above age and general cognitive abilities? And, if that is the case, does this contribution change with time? In line with previous research, it was predicted that oral language (vocabulary and grammar) would explain variance in the quality of narratives when first assessed (e.g., Sénéchal et al., 2008) but not one year later (e.g., Lynch et al., 2008).

Do the different components of the HLE contribute to narrative comprehension and production over and above age, general cognitive ability and lower-level language skills? And does the pattern change in time? It was predicted that the quality of shared reading experiences, rather than frequency, would make an independent contribution to narrative skills, because the frequency provides the opportunity, but whether or not parents use that opportunity is determined by the quality (e.g., Haden et al., 1996). A significant contribution from parental teaching of letters and sounds to narrative production and comprehension was not expected, because these

skills are more strongly associated with word reading than discourse comprehension (Sénéchal, 2008). Finally, it was expected that print exposure, as an overall indicator of reading activities developed at home, would make a contribution to the prediction of narrative skills.

Method

Participants

Eighty-two children from three UK primary schools participated in this study. To capture general developmental trends, a broad age range of children at the early stages of literacy instruction was included. All spoke English as their first language and were aged 4 to 6 years at the start of the study. Children with special educational needs were excluded from the study. There were 40 children from Reception classes (23 boys and 17 girls, $M = 62$ months, $SD = 3.50$), and 42 children from Year One classes (21 boys and 21 girls, $M = 74$ months, $SD = 3.58$). Reception is the first year of primary school, and children could be enrolled at this level if they reached their 4th birthday before September. In this year group, the UK national curriculum includes activities and focus to promote communication and language, and also literacy, and one of the aims of instruction is that children learn to read and write simple sentences (Statutory Framework for the Early Years Foundation Stage, 2014). One year later, 69 of the original sample were retested: 34 children from the original Reception class (19 boys and 15 girls) and 35 from the original Year One class (19 boys and 16 girls). Signed parental consent was obtained for all participants. Parental report of educational qualifications indicated a mixed sample: Just 35% had finished their education with GCSEs (General Certificate of Secondary Education) examinations that are usually taken at 16 years; nearly 24% had completed A-levels (Advanced level examinations) or an equivalent qualification (usually taken at 18 years); and 41% of the sample had completed a University degree.

Design and Materials

Children completed a range of cognitive and language assessments and parents completed a set of measures to assess the HLE. The standardised measures completed by children were administered according to the manual guidelines. For these measures, standardised scores are reported to relate performance to age norms, but raw scores were used in the analysis. For the experimental narrative measures, raw scores are reported throughout.

Time 1 measures: Standardised measures of general cognitive ability, lower-level oral language, and HLE.

General cognitive ability. The Matrix Reasoning subtest from the Weschler Preschool and Primary Scale of Intelligence (WPPSI III; Weschler, 2002) was administered to evaluate (non-verbal) cognitive ability. In this task, the child is presented with a series of four visual patterns with a blank space and is asked to choose, from a range of patterns, which one fits best (Cronbach's α reported in the manual is good = .90).

Receptive vocabulary. Receptive vocabulary knowledge was assessed using the British Picture Vocabulary Scale – II (BPVS II; Dunn, Dunn, Whetton, & Burley, 1997). In this task, the child is shown sets of four pictures. For each set, a word is spoken by the assessor and the child's task is to point to the picture that depicts the spoken word (Median Cronbach's α reported in the manual is good = .93).

Knowledge of grammar. The Test for Reception of Grammar (TROG-2; Bishop, 2003) was used to assess knowledge of different grammatical structures. In this task, the child is shown a set of four pictures. A sentence is spoken by the assessor and the child's task is to point to the picture that depicts the sentence (the reported split-half reliability calculated for blocks for each set of grammatical contrasts, is good $r = .88$).

Reading in the home questionnaire. Parents completed a short questionnaire to investigate different aspects of reading habits at home based on the work of Sénéchal, Le Fevre, Thomas, and Daley (1998) and Umek, Podlesek, and Fekonja (2005). They were asked to indicate the frequency of a range of behaviours, including: reading with their child at home (shared reading); their child's independent reading; visits to the children's library; and a range of interactive reading activities which included how often parents asked questions when reading with their child, allowed the child to create his/her own stories, and talked about book content with their child. In addition, questions about the frequency of teaching children about letters, writing, reading, and counting were included (as in Sénéchal et al., 1998). Parents were asked to estimate the number of children's book at home and report the age of the child when the parent started to read to them. Response options were determined through pilot work. The full questionnaire showed a good reliability (Cronbach's alpha: $\alpha = .74$) and is provided in Appendix B.

Child title recognition test (C-TRT). Parents completed a title recognition test comprising titles of popular children's books (and foils) to provide an index of children's print exposure (Sénéchal et al., 2008). When used with pre-readers, this is an indicator of how frequently parents read to their children (Hood, Conlon, & Andrews, 2008). The C-TRT comprised 40 titles: 20 were popular titles of children's books and 20 were foils, all selected from items tested in pilot work with parents of young children to ensure a range of recognition and discriminability between real titles and foils. The participants were instructed that some names were foils, and that they should tick only the names they knew to be real authors. The checklist technique reduces the likelihood of socially desirable responding by taking guessing (ticked foils) into account. The number of ticked foils was subtracted from the number of real

recognised authors, to obtain a corrected total score that was used in the analysis. The full list of titles and foils is provided in Appendix C. Parents recognised a mean of 53% of real titles and only 1% of foils were ticked. Cronbach's alpha indicated good reliability: $\alpha = .82$.

Adult author recognition test (A-ART). To gain a broader assessment of the home literacy environment, an index of parents' print exposure was obtained with an Author Recognition Test (Stanovich & West, 1989). After pilot work, the final measure comprised 40 names: 20 were popular authors and 20 were foils (not real author names) (see Appendix D). The foil names were obtained from Masterson and Hayes (2007). The participants were instructed that some names were foils, and that they should tick only the names they knew to be real authors. Scores were calculated in the same way as for the C-TRT and the corrected scores were used in the analysis. Stanovich and colleagues have shown that performance on this task correlates well with diary measures of reading habits (e.g., Stanovich & West, 1989). Parents recognised a mean of 39% of real authors and only 1% of foil authors. Cronbach's alpha indicated good reliability: $\alpha = .87$.

Longitudinal measures: Experimental narrative task.

At Times One and Two, the wordless picture book '*Frog on his own*' (Mayer, 1973) was used to assess narrative skills. The Frog books' series have been extensively used in previous research (for instance, Bamberg, 1985; Berman & Slobin, 1987). The main feature that makes the book suitable for this type of task is that the pictures depict a clear plot line (Paris & Paris, 2003). The book is about a child who goes to the park with his animal friends: a dog, a frog, and a turtle. The frog escapes and has some adventures in the park before he is finally saved from a dangerous situation by the boy, resulting in a happy ending. For this study, the original version of the book was edited to create a shorter version of 18 pictures by deleting those that were not

necessary to understand the main problem and its resolution. The final version was scanned, printed, laminated, and assembled into a book format, including the cover page with title.

The narrative task was a modified version of the ‘Narrative Comprehension’ task used by Paris and Paris (2003) and had three parts: picture viewing, narrative production, and narrative comprehension. The latter two parts of the task were audio recorded and transcribed in CHAT format (MacWhinney, 2000) for later analysis. Paris and Paris (2003) used a narrative retelling task, where the child is asked to tell the story without using the book. Instead, in the current study, we used a narrative production task, where the child tells the story using the book. Previous research by the first author showed that children produced very short retellings due to memory demands of the task, compared to a production task using the book (Author et al., 2014).

Picture viewing. The first part of the task was used to familiarise the child with the book and its plot, but was not coded for analysis. The child was not provided with any specific instruction about what to do with the book: s/he was simply told to look through the book from the beginning.

Narrative production. After the picture viewing, the child was asked to tell the story using the book. The examiner was instructed to provide general prompts and only if the child naturally stopped during the narration or had difficulties starting their narrative. The types of prompts allowed were initiation support (e.g., ‘Tell me what is happening here?’) or continuation prompts (e.g., Can you tell me more? Can you tell me about the rest of the story?). The structural coherence of the production was assessed by a rubric that evaluated the inclusion and elaboration of nine elements that are considered the main features of a well-structured story (Shapiro & Hudson, 1991): setting, characters, feelings, thoughts, dialogue, problem, and resolution; and also two elements of more elaborated stories, that is, prediction and theme. The rubric

instructions signalled that each transcribed narrative should first be read to identify the segments corresponding to the picture book. After that, the nine elements were scored as follows: One point was awarded for the identification of a particular element in the story (e.g., feelings) and an additional point for the elaboration of this element (e.g., the cause of the observed feeling). The theme of the story was not identified by any child participating in the study, therefore, it was excluded from the score calculation, and the maximum possible score was 16. Examples are provided in Table 1. Two independent coders were trained on the rubric, and 20% of the narrative scripts were double scored. Inter-rater reliability scores were good: all Cohen's kappa above .70. All discrepancies were resolved through discussions between the two coders.

Narrative comprehension. After the storytelling, each child was asked nine questions to tap his/her understanding of each of the nine elements that were assessed in the storytelling. The questions were those used by Paris and Paris (2003) and are provided in Appendix A. Questions were scored as follows: one point was awarded for the identification of the element (for instance, recognising an appropriate feeling), and an additional point for elaborating upon the identification answer (giving a cause or a consequence of the mentioned feeling). The question about theme was also at floor in comprehension, hence, it was not considered in the total sum, being 16 the maximum possible score. As above, two independent coders scored 20% of the responses. Reliability scores were good, all Cohen's kappa greater than .72. All discrepancies were resolved through discussion.

INSERT TABLE ONE AROUND HERE

Procedure

Each child was assessed in three separate sessions at Time One. In the first session, receptive vocabulary was assessed. In the second, the narrative task was administered. In the

final session, general cognitive ability and knowledge of grammar were tested. Each session lasted no longer than 15 minutes, and these were usually carried out on three consecutive days. The questionnaires were posted to parents by schools and returned to the first author in a prepaid envelope. The return rate was 72% (N=59). At Time Two, one session was carried out to test narrative skills.

Results

The results are presented in three sections: preliminary analyses; the interrelations between measures concurrently and longitudinally; and finally, the results of the hierarchical regression analyses to determine the relative contributions of lower-level oral language skills and the HLE to the prediction of narrative comprehension and production longitudinally.

Preliminary Analyses

Some children did not complete every task at each time point because consent forms were not returned, or because they moved away from the area. The data presented here include only those children for whom full data are available: Time 1, N = 82; Time 2, N = 69. No significant differences were found on Time One measures between children continuing at Time 2 and those who did not participate in the longitudinal follow-up.

First, the correlations between all variables for older and younger children were calculated separately and the strength of the correlations between each age group was compared. To do this, Fisher's r to z transformation was used, which makes the correlation distribution approximately normal allowing the comparison between two independent samples (Kenny, 1987). There were no significant differences between the two age groups in the relations displayed for any of the variables, thus, further analyses were conducted on the full sample, rather than for each age group separately.

The means, standard deviations, and range of scores for general cognitive ability, oral language, and narrative skills at Times 1 and 2 (collapsed over age group) are shown in Table 2. The scores indicate that general cognitive ability and receptive vocabulary were all within the normal range at each time point. In contrast, children obtained low scores on the assessment of knowledge of grammar at Time 1. None of the measures suffered from floor or ceiling effects (Zhu & González, 2017) and the range of scores for each measure was reasonable so all the subsequent analyses were conducted using the raw data. The difference between narrative comprehension and production across times was significant, $t(68) = -1.88, p = .032$, $t(68) = -4.94, p < .001$, and with a medium and large effect size, $\eta^2 p = .05$ and $.26$, respectively.

INSERT TABLE TWO AROUND HERE

The responses to the parental questionnaire are summarised in Table 3. The median and range are reported because they are regarded as the more illustrative indicators of these behaviours (see also, Sénéchal, 2006; Sénéchal, et al., 2008). In general, parents reported a high frequency of literacy activities in the home, and a sizeable number of children's books (mode = 61-80). Parents also reported reading to their children from a young age, around 7 months, and they regularly engaged in interactive reading and teaching practices.

INSERT TABLE THREE AROUND HERE

Data Reduction

To prepare the data for further analysis, the number of variables for the HLE measures was reduced using principal components analysis with oblique rotation. At Time 1, four factors emerged: Shared Reading (frequency of shared reading, library visits, and number of books in the home); Interactive Reading practices (frequency with which children asked questions during shared reading, children created their own stories, discussion about book content); Teaching (all

four questions relating teaching frequency loaded onto this factor); and Print Exposure (A-ART and C-TRT). Two variables (age at which parents started reading to their child and frequency with which the child reads on his/her own) were dropped from the analysis because of low sampling adequacy, as recommended by Field (2005). Standardised factor scores were obtained through the regression method for each component (Shared Reading, Interactive Reading, Teaching, and Print Exposure) and used in subsequent analyses. A summary of factor loadings is provided in Table 4. This solution fits the factors reported by Sénéchal (2006) using a similar range of HLE measures. In addition, all the questions related to quality of shared book reading loaded into a single factor, same as the findings of Umek et al. (2005).

INSERT TABLE FOUR AROUND HERE

Concurrent prediction of narrative skills

Correlations. The concurrent correlations for Time 1 are shown in the first nine columns of Table 5. The two narrative skills were positively correlated with each other but were not consistently related to the same language and HLE measures. Vocabulary was positively and significantly related to both narrative comprehension and production. Grammar knowledge was a strong and significant concurrent predictor of narrative comprehension, whilst its relation with narrative production was weaker and not significant. Regarding the HLE, Teaching practices at home were negatively and significantly related to both narrative skills; Interactive Reading practices, a proxy measure of quality of shared reading interactions, was positively related to narrative production. It was also negatively related to another aspect of the HLE: Teaching.

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What are the relative contributions of lower-level oral language and the HLE to the concurrent prediction of narrative skills?

The central aim of these analyses was to determine how comprehension and production of coherent narratives were related to lower-level oral language (vocabulary and grammar) and the HLE, over and above general cognitive ability at Time 1. As narrative is a higher-level oral language skill, the analysis will estimate the extent to which lower-level oral language contributes to the performance in comprehension and production. The role of different components of HLE will be assessed, looking at whether the practices developed at home imply an additional contribution, beyond lower-level oral language, to narrative skills.

Two sets of fixed-order hierarchical multiple regression analyses with bootstrapping were performed. In one set, narrative comprehension was the criterion; in the other, production was the criterion. In each analysis, age and nonverbal IQ were entered at the first step as control variables. Lower-level oral language skills (vocabulary and grammar) were entered at the second step, to see if they predicted unique variance over and above general cognitive ability; In the third and final step we included, in separate analyses, only the HLE variable that was significantly correlated to narrative skills at Time 1 (Teaching and Interactive Reading).

The two analyses carried out for the prediction of narrative comprehension showed that the first (control variables) and second model (lower-level language skills) were significant, $F(1,57) = 20.31, p < .001, R^2 = .26$, and $F(2,56) = 16.55, p < .001, R^2 = .37$, respectively. When Teaching was included in the third step, the last model was also significant, $F(3,55) = 15.83, p < .001, R^2 = .46$. When Interactive Reading was added in the third step, the final model remained significant, $F(3,55) = 8.92, p < .001, R^2 = .38$. Tables 6 and 7 show the associated R^2 change for each step.

For narrative production, the same analyses were performed. The first model, including control variables, and the second model, adding lower-level oral language skills, were

significant, $F(1,57) = 9.31, p = .003, R^2 = .14$ and $F(2,56) = 5.86, p = .005, R^2 = .17$, respectively. In one analysis, Teaching was added in the third step, yielding a significant model, $F(3,55) = 6.82, p < .001, R^2 = .27$. In a separate analysis, Interactive Reading was entered in the third step, and this final model was also significant, $F(3,55) = 8.68, p < .001, R^2 = .32$. R^2 change is shown in Tables 6 and 7 for each model.

Looking at individual predictors, within the control variables, age contributed to narrative skills, whereas, general cognitive ability was not a significant predictor of narrative comprehension and production. Surprisingly, vocabulary was significant for narrative comprehension only, and grammar was not significant for neither comprehension nor production. The HLE explained significant independent variance in both narrative comprehension and production at Time 1. However, the relevant predictors differed depending on the criterion variable. The Teaching factor was negatively related to concurrent narrative comprehension and production, whilst Interactive Reading was positively related to narrative production. Tables 6 and 7 present the most parsimonious models, including only the variables that were significant predictors of narrative skills.

For our models, a sensitivity power analysis was conducted using G*Power software (Faul et al., 2009). The output indicated that for our sample $N = 59$, considering $\alpha = .05$, and 80% of power, we could detect a medium effect size of $f^2 = .22$. Consistently, previous meta-analytic literature on the relation between HLE practices and children's language outcomes, has reported mainly moderate effect sizes (Dong et al., 2020; Mol et al. 2011).

INSERT TABLES SIX AND SEVEN AROUND HERE

Longitudinal prediction of narrative skills.

Correlations. The longitudinal correlations between all variables at Time 1 and narrative skills at Time 2 are presented in the last two columns of Table 5. Narrative comprehension at Time 1 was positively related to both narrative measures at Time 2. In contrast, narrative production at Time 1 predicted later narrative production, but not later narrative comprehension. Vocabulary at Time 1 was significantly related to both narrative comprehension and production at Time 2, whereas grammar knowledge was related significantly only to narrative comprehension. Of the indicators of the HLE, Print Exposure presented a significant and positive correlation to later narrative comprehension. The relation with Interactive Reading was positive and moderate, but did not reach statistical significance.

What are the relative contributions of lower-level oral language and the HLE to the longitudinal prediction of narrative skills?

The aim of these two sets of analyses was to determine which Time 1 skills explained narrative comprehension and production one year later. Separate hierarchical multiple regression analyses with bootstrapping were conducted for each outcome variable. In the first step, either narrative comprehension or production at Time 1 (the autoregressive effect of narrative comprehension and production respectively) was entered. The inclusion of the autoregressive effect first was necessary to determine the causal nature of any observed relation of the predictors with a dependent variable (Gollob & Reichardt, 1987). In the second step the control variables were introduced: Age and nonverbal IQ. In the third step, the lower-level oral language measures were added: vocabulary and grammar. In the final step, we entered only the HLE variable that was significantly correlated to narrative, which was Print Exposure.

The analysis carried out for the prediction of narrative comprehension showed that the first, second, and fourth model were significant, $F(1,50) = 7.35, p < .009, R^2 = .13, F(3,48) =$

3.92, $p < .014$, $R^2 = .18$, and $F(6,45) = 3.27$, $p < .009$, $R^2 = .30$, respectively. Hence, the third step, which included lower-level language skills alongside the autoregressor and control variables, did not yield a significant model, that is, the inclusion of vocabulary and grammar, did not improve the longitudinal prediction of narrative comprehension, over and above previous performance on narrative and control variables. Further, only the first model (including the autoregressor) and the final model (including Print exposure) showed a significant R^2 change (see Table 8).

For the prediction of narrative production, only the first model, including the autoregressor, was significant, $F(1,50) = 7.31$, $p < .011$, $R^2 = .12$.

Analyzing individual predictors, after the autoregressive effect was taken into account, Print Exposure at Time 1 made a significant contribution to children's narrative comprehension at Time 2. For the prediction of narrative production at Time 2, no other predictors explained variance in outcome, other than the variance associated with narrative production at Time 1. In an additional analysis, the autoregressor was entered last, to see if variability in narrative comprehension and production at Time 2 could be accounted for by abilities that were underlying narrative skills. The pattern of prediction was the same: none of the skills predicted narrative production across time even in the absence of the autoregressor. Table 8 presents the most parsimonious model, showing the contribution of Print Exposure over and above the autoregressor effect.

The sensitivity power analysis for the longitudinal regressions showed that our sample, $N = 52$ would be sensitive to detect an effect size of $f^2 = .27$ with 80% power, that is, the study would be able to reliably detect a medium effect size.

INSERT TABLE EIGHT AROUND HERE

Discussion

Narrative skills are a good predictor of concurrent and later reading comprehension skills and, therefore, are a useful proxy measure of the higher-level language skills required for successful reading comprehension (Kendeou et al., 2009). For that reason, it is important to know the factors that promote early narrative development in order to develop interventions to support later reading comprehension. The data presented here add to our knowledge about lower-level oral language skills, the home literacy environment, and their contribution to narrative skills in unique and important ways. First, the role of lower-level oral language skills on narrative is only moderate, once the contributions of age and general cognitive abilities are taken into account. Second, it was shown that different home literacy practices are related to different narrative skills. Third, lower-level oral language and home literacy make independent contributions to narrative skills. These findings and their implications for our understanding of narrative skills development are discussed below.

To date, there are a limited number of studies that have investigated the relation between narrative and lower-level oral language skills, and these generally have not addressed this issue as a main research aim. The current study expands our knowledge about their relation showing that the contributions made by vocabulary and grammar are moderate, and that neither exerts a unique additional influence on narrative skills over time. Specifically, it was found that vocabulary, but not grammar, predicts narrative skills and only concurrently. This finding is in line with our predictions, which were derived from previous research (e.g. Lynch et al., 2008), and suggest that vocabulary could play an enabling role for narrative skills, but that other abilities or knowledge are also required. This is in line with other research demonstrating that higher-level language skills are important for skilled text comprehension over and above lower-level oral

language skills (Kendeou et al., 2009; Author, 2012; Language and Reading Research Consortium & Logan, 2017). Together with previous research these data strongly suggest that additional knowledge is required to comprehend and produce a story, for example the ability to integrate the information, to make inferences between the events, and understand a character's goals and motivations (van den Broek, 1997).

The emerging evidence of the importance of higher-level language skills for comprehension supports a stronger focus on these skills in the preschool and elementary classroom (Hogan et al., 2011). It is not proposed that this should be at the neglect of teaching vocabulary and grammatical skills, because words and sentences are clearly the building blocks of narrative. Indeed, specifically for grammar, it could be speculated that a more bespoke measures that tapped, for example, knowledge of the linguistic markers that mark the coherence relations between events (e.g., causal and temporal connectives) and morphosyntax (Author, 2011; Sanders & Maat, 2006) may be more sensitive predictors of narrative skills than the assessment of morphosyntax used in this study. In addition, it would be hard to conceive effective language instruction that focused only on vocabulary, grammar and discourse in isolation because these skills are interdependent (e.g., Author, 2012; Florit, Roch, & Levorato, 2013).

The data obtained in this study support Sénéchal's findings (2006), but also suggest that a greater range of home literacy practices could be included when studying the effects of the HLE: it was found that different aspects of the HLE supported different narrative skills. Concurrently, when children were 4 to 6 years, the frequency with which parents taught basic literacy skills to their child was negatively related to narrative comprehension and production. This finding is not surprising, because the variables tapped by the teaching scores were mainly related to written,

but not oral, language for example teaching how to read and write words. In addition, it may be that parents who engage more often in teaching activities are doing so because their child has less developed language and literacy skills. These findings may indicate parental sensitivity to their child's developmental level. However, the finding that teaching was negatively (though not significantly) correlated with the other home literacy practices, might be indicative of different parental styles. Some parents might focus on formal teaching practices of teaching letters and sounds, whilst others focus on more informal literacy learning opportunities such as shared book reading. This variation is in line with observational studies of parent-child shared reading (Haden et al., 1996).

Narrative production was positively predicted by interactive reading concurrently, suggesting that, not only the frequency of shared reading, but also the quality might be important to develop narrative production skills. Interactive reading included activities in which children produce language (e.g., create his/her own stories). Thus, it is not surprising that more frequent interactive reading predicts narrative production abilities. This finding is in line with the intervention studies showing an effect of interactive reading styles on language gains (Aram et al., 2013; Zevenbergen et al., 2003) and more sophisticated vocabulary (Olszewsky & Hood, 2023). It is also consistent with Mol, Bus, and de Jong (2009), who showed in a meta-analysis that interactive reading has a positive impact on language skills. It should be noted though that the measure used in this study did not explain the development of narrative production over time, after earlier production skills had been controlled. Thus, it did not have an additional effect on development.

Consistent with recent work by Grolig et al. (2018), it was found that the early measure of children's print exposure predicted later narrative comprehension at Time 2, after controlling

for the autoregressor effect and the other variables. They used a measure of print exposure that tapped parent-child shared reading, although it is not clear whether that serves as a proxy indicator of quality, as well as frequency, of these activities. Together, these results strongly suggest that the HLE supports the development of narrative skills over time.

Two final points were striking when reviewing the pattern of relations between different variables for the two narrative tasks. First, lower-level oral language skills and the HLE each explained unique variance in narrative skills. This is in contrast to previous work (Sénéchal et al., 2008), which did not find a relation between HLE and narrative skills in preschoolers. However, the current study included indices of quality, in addition to frequency, which may be the more important aspect of the HLE in terms of narrative development. Second, it is important to highlight the fact that relations between lower-level oral language, the HLE, and narrative skills differ according to the type of narrative skill assessed. This finding indicates that production and comprehension tasks are not necessarily tapping the same range of skills, although related, different skills might underpin competence in each. The narrative comprehension and production task were not based on a read story, but on the child's skill to construct meaning from the wordless picture book. Hence, a detailed analysis of the different task demands of each, supported by further experimental work, would confirm specific competencies that impact on each, for example a greater role of memory required for planning of narrative production. However, we note that the oral language measures were measures of receptive vocabulary and grammar, and future work should include expressive measures as well to determine whether the language construct or measurement of that construct is driving these differential relations.

It is important to understand the skills and development of a child's ability to construct coherent and integrated sequences of events in a story because of the relation between narrative

skills and later reading comprehension. The reported findings suggest that, in addition to lower-level oral language skills, a literate environment and the quality of shared reading in the home might serve as an important scaffold on the development of both narrative production and comprehension.

Limitations

There are several limitations to this study that should be addressed in future research. The four most pertinent are mentioned here. First, as noted, the sample size was small due to attrition between Year 1 and 2 of the study. This resulted in reduced power for detecting small effects, but, as reported, there was sufficient power to find moderate and large effects.

Second, the range of the narrative measures was narrow and we used statistical corrections to address the limited range. In addition, growth over time was low, thus, and despite previous studies have found similar scores in narrative assessments, specially production, future work might need to revise measurements that allow for more variability and sensitivity to subtle developments and in young children's performance.

Third, the study had just one measure each for vocabulary and grammar, and both were receptive measures, as noted above. Future studies with a larger sample size and a greater number of indicators of critical constructs are required to replicate and extend these findings, and could model the data with latent constructs to minimise measurement error. Third, all participants were attending school, but the literacy practices in the classroom were not assessed. Teacher practice relates to children's vocabulary skills (Cabell, Justice, McGinty, DeCoster, & Forston, 2015; Grolig et al., 2018) and might also support higher-level skills (Walsh & Hodge, 2018). Hence, further research is needed to tap into teacher-child interaction that promotes narrative comprehension and production.

Finally, the quality of parent-child interactions was not measured directly, but relied on self-report. The self-report measure was clearly sensitive, differentially predicting different language skills. However, given the contribution of reported interactive reading on concurrent narrative production, future work should investigate the content of parent-child shared reading interactions directly, to assess how qualitative differences foster both narrative development and a range of reading and reading-related behaviours (see also Reese & Cox, 1999). The type of interaction during reading activities might help children to learn about story structure, to understand causal relations, or characters' mental states and, indeed, the use of questions promotes the coherence of narrative productions in beginner readers (Authors, 2017; Authors et al., 2014). It seems likely that narrative development benefits from scaffolded interactions, in the same way that vocabulary does (Sénéchal, Thomas, & Monker, 1995), but research with more sensitive measures of the content and quality of literacy interactions is needed to test this point. In sum, this study demonstrates that oral language skills and the HLE are related to young children's narrative comprehension and production. Of note, not only the frequency of shared reading, but also the extent to which parents engaged in an interactive reading style, predicted narrative production skills. The findings demonstrate the importance of young children's early literacy experiences to their broader oral language development.

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Appendix A

Narrative Comprehension Questions

1. Characters: Who are the characters in the story?
2. Setting: Where does this story happen?
- 3a. Dialogue (Identification): What do you think the woman / lady would be saying here?
- 3b. Dialogue (Elaboration): Why would you say that?
- 4a. Thoughts (Identification): What do you think the young boy is thinking here?
- 4b. Thoughts (Elaboration): Why would he think that?
- 5a. Problem (Identification): If you were telling your friend this story, what would you say is going on now?
- 5b. Problem (Elaboration): Why did this happen?
- 6a. Feelings (Identification): What do you think the frog is feeling here?
- 6b. Feelings (Elaboration): Why do you think so?
- 7a. Resolution (Identification): What happened here?
- 7b. Resolution (Elaboration): Why does this happen?
- 8a. Prediction (Identification): This is the last picture of the story. What do you think happens next?
- 8b. Prediction (Elaboration): Why do you think so?
- 9a. Theme (Identification): Think about everything that you learned from reading this book. What advice would you give to the boy or the frog so that the same thing doesn't happen again?
- 9b. Theme (Elaboration): Why would you say that?

Appendix B

Parents' Questionnaire: Reading in the home

1. How often do you, or other members of the family, read to your child in a typical week? ^a
2. During a typical week, how often does your child look at books on his/her own? ^a
3. How often does your child go to the library to get books? ^b
4. Please estimate the number of children's books that you have at home ^c:
5. How old was your child when you started reading picture books with him or her (in years and months)? _____
6. How often do you do the following *while you are reading to your child*? ^d
 - a) I let my child interrupt and ask me questions
 - b) I let my child create his / her own stories
 - c) I talk to him / her about the content of the book
7. Does your child have a favourite book? ___ Yes ___ No
If yes, What is it? _____
8. We would like to know about your own education. Which is the highest educational level you have completed?

Mother	Father	
_____	_____	O-levels or GSCEs
_____	_____	A Level or equivalent
_____	_____	Post A Level Qualification
_____	_____	University Degree

_____ Msc or Higher

9. How old is your child (in years and months) _____
10. How often do you do the following activities with your child *during a typical week?*^a
- a) I teach my child how to write words
 - b) I teach my child how to read words
 - c) I teach my child the letters of the alphabet
 - d) I teach my child to count

^a 6 - point scale: 1 (less than once a week), 2 (about once a week)... 6 (more than once a day). ^b

7- point scale: 1 (Never), 2 (has not been for over a year)... 7 (more than once a week). ^c 6 – point

scale: 1 (none), 2 (1-20), 3 (21-40), 4 (41- 60), 5 (61-80), 6 (more than 80). ^d 5 – point scale: 1

(rarely), 2 (sometimes), 3 (frequently), 4 (very frequently), 5 (always).

Appendix C

Children's titles and foils

Titles	Foil
The snail and the whale	The lazy dwarf
The gruffalo	Punky froggie
The bad tempered ladybird	Fingers out
Each peach pear plum	Keep your eyes closed
Giraffes can't dance	How to use the magic shoes
Elmer	Smelly Jellyfish
Charlie and the great glass elevator	The flea with tuxedo
One snowy night	Hanna and her apple's worm
Horrid Henry	The legend of Billy Martin
The owl who was afraid of the dark	Where my teeth go
We are going on a bear hunt	Butterboy
Where the wild things are	Finding an octopus
The tiger who came to tea	Skating on Saturn's ring
Charlie and Lola's things	Beetroot cheek
Mummy laid an egg	The yabaloo
A squash and squeeze	The snowman without nose
Aliens love underpants	The lizard is the wizard
Pippi Longstocking	The lucky spider
Green eggs and ham	The mighty turtle
Candyfloss	The lion's hairdresser

Appendix D

Adults' authors and foils

Authors	Foils
Robert Goddard	Russ Hulme
Jodi Picoult	Annabel Monk
Stephen King	Michelle Henderson
Ian Rankin	P.A. Cadogan
J.D. Salinger	Clive Wayland
Joanne Harris	Dorian Hutton
Cathy Kelly	Pete Bowen
John Grisham	Ashley Osbourne
Alexander McCall Smith	Nigel Alton
Mary Higgins Clark	Samantha Holdich
Jilly Cooper	Ryan T. Griffin
Patricia Cornwell	Ella Hobbs
Ken Follet	Siobhan Sable
R.J. Ellory	Eva Marie Greenberg
Claire Tomalin	Nicholas Graham
Michael Connely	Tanya Clayton
Khaled Hosseini	Simon Westwood
Dan Brown	Libby Carter
Maeve Binchy	Martin Pinfield
Sophie Kinsella	Keith Bloom

Conflict of interest statement

The authors declare that they have no conflict of interest.