

# Overlooked advantages of interactive book reading in early childhood? A systematic review and research agenda<sup>☆</sup>

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## ABSTRACT

Previous reviews of the nature and consequences of adult-child book reading have focused on seeking impacts of interactive reading on the acquisition of vocabulary and emergent literacy skills. In this systematic review we examined to what extent there has been systematic study of the effects of interactive reading on four less frequently studied developmental outcomes important to children's academic and life prospects: socio-emotional and socio-cognitive (SEL) skills, narrative skills, grammar, and world knowledge. We identified 67 studies of interactive reading that met the inclusion criteria and that examined the targeted outcomes, using either experimental, quasi-experimental, correlational, or single-group intervention methods. We found that studies of effects on grammar and world knowledge outcomes were very sparsely represented; though narrative was often studied as an outcome, the wide variation in conceptualizing and assessing the construct hampered any clear conclusion about book-reading effects. The most robust research strand focused on SEL skill outcomes, though here too the outcome assessments varied widely. We speculate that better instrumented approaches to assessing vocabulary and emergent literacy have led to the persistent emphasis on these domains, despite robust evidence of only modest associations, and argue that work to develop sound shared measures of narrative and SEL skills would enable cross-study comparison and the accumulation of findings. In addition, we note that the various studies implicated different explanatory principles for the value of reading with children: specific interactional features (open-ended questions, following the child's lead, expanding child utterances) or content features (emotion-enhanced books, talk about mental states, science topics), raising another topic for more focused study in the future.

## 1. Introduction

The field of research on the nature and consequences of adult-child book reading is well advanced, mirroring the ubiquity of reading books with young children in the Anglophone world and in Northern Europe, where the practice is supported by a generally shared belief that interactive book reading contributes to children's development. Caregivers who share a book with young children typically do not limit their interactions to the reading of the text; they also ask questions, refer to the pictures, and make connections to other texts and to the child's experiences. The developmental contributions of such interactive book

reading, an activity we define as an adult and a child or group of children sharing and discussing a text together, have been confirmed by dozens of studies using either correlational or experimental methods. The most frequently and widely evaluated outcome of this activity in systematic reviews has been children's receptive or expressive vocabulary (U.S. Department of Education, 2007, 2015; Dowdall et al., 2020; Fitton et al., 2018; Flack et al., 2018; Furenes et al., 2021; Law et al., 2018; Lonigan et al., 2010; Manz et al., 2010; Mol et al., 2008; Mol et al., 2009; Noble et al., 2019; Schickedanz & McGee, 2010; Wasik et al., 2016) or literacy-related skills (Bus et al., 1995; U.S. Department of Education, 2007, 2015; Lonigan et al., 2010; Manz et al., 2010; Mol et al., 2009;

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Noble et al., 2019; Scarborough & Dobrich, 1994; Schickedanz & McGee, 2010). Systematic reviews starting with Scarborough and Dobrich (1994) suggest, however, that the impact of interactive reading on these aspects of children's development is modest; in more rigorously designed studies with active control groups it is close to zero (Noble et al., 2019).

In this light, it is striking that no one has systematically reviewed potential outcomes of interactive book reading other than vocabulary and emergent literacy. Does this omission reflect developmentalists' prioritization of language and literacy outcomes, or failure to recognize the potential relevance of interactive reading to other outcomes? We undertook this review to explore to what extent research on effects of interactive book-reading with young children extends beyond the domain of vocabulary and early literacy. A few recent research studies of interactive reading do address outcomes not traditionally considered, including children's imagination and play quality (Kohm et al., 2016), communication skills (Cárdenas et al., 2020), moral learning (Breitfeld et al., 2021) and engagement (Son et al., 2023), suggesting the value of expanding the range of outcomes considered. We focus this review on four outcome domains plausibly influenced by interactive book reading: grammar skills, narrative skills, socio-emotional and socio-cognitive skills, and world knowledge. Exploring effects of interactive book-reading on this wider variety of outcomes is important because they are developmentally consequential and relate to longer term outcomes that have educational and life-course significance. Like vocabulary and emergent literacy skills, grammar (Hjetland et al., 2017; Lervåg et al., 2018), narrative skills (Oakhill & Cain, 2012; van Kleeck, 2008) and world knowledge (Connor et al., 2017; Kendeou et al., 2009) relate to later reading proficiency. Moreover, recent studies have demonstrated that perspective taking, a key socio-emotional and socio-cognitive skill, is directly related to reading comprehension (Diazgranados et al., 2016; Ebert, 2020; Kim et al., 2018; LaRusso et al., 2016).

Grammar may be supported through book-reading because the language structures in books are more complex than those in most talk directed to children (Cameron-Faulkner & Noble, 2013; Hsiao et al., 2023; Montag, 2019; Noble et al., 2018). Parent language that occurs during interactive book reading is syntactically more sophisticated than outside of book reading (Demir-Lira et al., 2019) and teachers who received an interactive reading intervention demonstrated more complex multi-clause utterances (Grøver et al., 2022).

Narrative is a likely domain of influence because most books shared with preschoolers are stories (Pentimonti et al., 2011). Thus recurrent interactive book-reading offers children many opportunities to experience well-structured narratives, with possible impacts on narrative comprehension and production skills.

Children's books often introduce issues of emotions, social understandings, and beliefs, for example when covering friendship and conflict, with references to the accompanying mental states (see f.ex. Dyer-Seymour et al., 2004). They offer opportunities to identify different perspectives on events, such as how the protagonist and other characters may feel or think, in particular when their feelings and thoughts may be based on misunderstandings, may be different from each other, or may be unlike the child's feeling and thinking in similar situations. It therefore seems likely that interactive book-reading would have effects on socio-emotional and socio-cognitive outcomes such as taking others' perspectives, cognitively or emotionally, or understanding others' emotions. In the context of book talk with young children, these outcomes may not be easily distinguishable, and in the following we refer to both of them using the abbreviation *SEL skills*.

Finally, though only a small number of books read to young children are informational (Duke, 2000), children's books typically present content of interest to young children (Horst & Houston-Price, 2015) and may thus also represent a source for children's learning about the world. We explore whether any studies have examined relations between interactive book reading and children's general world knowledge.

Perhaps because much of the published research on book-reading

outcomes has involved speakers of the major societal languages of the global north, the focus has been on vocabulary and emergent literacy – mirroring developmental researchers', educators' and also to some extent parents' pedagogical concerns in those societies. Studies of book-reading styles characterizing parents living in other cultures or in less privileged communities within the global north have identified more varied ways of reading books with young children and a focus on a wider array of outcomes. For example, Japanese mothers read books with their preschoolers in ways designed to promote children's empathy (Kato-Otani, 2003), a skill relevant to the SEL skills of perspective taking and understanding emotions. Dickinson and Smith (1994) described three distinct styles of story-book reading among teachers in classrooms serving low-income and minority children in the U.S.: co-constructive, didactic-interactive, and performance-oriented. Performance-oriented teachers used book-reading to provide a good model of the narrative, without interruptions from the children. Heath's (1982) seminal work on young children's bedtime routines in various communities in the U.S. differentiated parents in Maintown, who attended to the knowledge that could be derived from books and extended to the world outside of books, from parents in Roadville, who were concerned about the opportunities for development of SEL skills while reading stories about personal experiences.

In addition to the effects of adult interactive preferences, features of the texts read with children can influence their learning. ABC books, frequent in English-speaking homes, clearly facilitate emergent literacy skills, while documentation of the many ways in which language in narrative books differs from oral language (Levin et al., 1982) suggests that reading stories exposes children to written syntax. In diglossic situations reading books written in the 'higher' variety could provide access to grammatical and morphological forms not frequent in the vernacular form spoken in the home (Shendy, 2019). A systematic review of differences in book reading styles and affordances, however valuable, goes well beyond our purpose. Rather, we note the great range of parental goals for which book-reading interactions are undertaken as a counterpoint to the focus on vocabulary and literacy in past reviews of book-reading impacts. We argue that reviews of such effects should attend to the fuller range of interactive emphases that studies of cultural and social class differences in reading with young children have identified; acquisition of SEL and narrative skills, development of world knowledge and grammar are plausible domains in which book-reading experiences might promote child outcomes.

### 1.1. Theoretical framing of book-reading research: interactive features versus content features

Attention to book-reading falls squarely within the social-interactionist approach to child development; this approach emphasizes the role of the child's scaffolded interactions with more competent others in promoting language and cognitive development (Bruner, 1983; Vygotsky, 1978; see Fletcher & Reese, 2005). Early studies of book-reading undertaken within this theoretical perspective by Russ Whitehurst and colleagues evaluated the impact of an approach they called Dialogic Reading (DR; Whitehurst et al., 1988). DR showed significant effects on children's vocabulary and emergent literacy skills (Whitehurst, Arnold, et al., 1994a). Furthermore, parents, preschool teachers, and librarians could all be taught to implement DR procedures effectively (Lonigan et al., 1999; Lonigan & Whitehurst, 1998; Wasik & Bond, 2001; Whitehurst et al., 1988; Whitehurst, Arnold, et al., 1994a; Whitehurst, Epstein, et al., 1994b).

DR in effect translated social-interactionist thinking into guidelines for book reading: optimize joint attention (Tomasello & Farrar, 1986; for a recent review, see Anderson et al., 2021), engage children in active listening, and gradually shift responsibility for telling the story to the child. Central to social-interactionist approaches is also the importance of the larger cultural context in which adult-child interaction takes place: adult scaffolding of children's participation in zones of proximal

development is embedded in contexts that guide and offer significance to adult skill-promoting practices as well as to children's appropriation of these skills, which are initially displayed only in interaction but later appear autonomously.

Starting with DR, work analyzing interactive reading from a social-interactionist perspective has focused on the nature of the interaction engaged in, and the dimensions of analysis have generally replicated those used in studies of interaction during general adult-child activities: nature of questions posed, use of repetition or clarification and responsiveness to child comments (Rowe & Snow, 2020). Studies correlating parent talk features with child outcomes have helped in the identification of specific features of adult interaction that predict child outcomes such as encouraging child participation using questions, especially open-ended ones (Escobar et al., 2017; Kang et al., 2009; Kuchirko et al., 2016), following the child's lead and expanding on child utterances (Reese et al., 2010), offering linguistically more diverse talk than speech directed to children in other contexts (e.g. Crain-Thoreson et al., 2001).

Some studies, though, have pivoted implicitly or explicitly from this interactional focus to a focus on the *content* of the book and the talk that is supported from reading it, sometimes reflecting instructional goals (science, conflict resolution) and at other times simply exploiting the fact that some content available through book reading is unlikely to emerge in general conversation. Content areas appearing in children's books may relate to socio-emotional or socio-cognitive topics such as protagonists' emotions or mental states, friendships, and justice or to a range of science-related topics. In book-based conversations with young children extra-textual talk, explanatory talk (explaining relations between phenomena), and topics related to predictions and inferences extending the book topic may also serve as examples of a content focus during reading. Readers can attend to the book content irrespective of the specific genre the book represents; whether narrative or information-oriented (but for an analytic approach to reading content based on book genre, see Luo et al., 2019).

Although most analyses of adult-child book sharing practices fall somewhere on the continuum from purely interaction-focused to purely content-focused, we were interested to determine whether methods for analyzing book-reading activities within the four less examined outcome domains prioritized one or another focus and whether the hypothesized working predictors of child outcomes were interaction features, content features, or these features combined (for a similar distinction between content and interaction qualities in studies of reminiscing talk, see Leyva et al., 2021, and in studies of read-alouds, see Mascareno et al., 2017).

### 1.2. Beyond vocabulary and emergent literacy: rationale and objectives of the present study

Previous systematic reviews of the developmental effects of interactive book reading have focused on vocabulary and literacy outcomes. The purpose of the present study is a) to review whether relations between book-reading experiences in early childhood and the four identified areas of development (SEL and narrative skills, grammar skills and world knowledge) have been studied, b) to determine whether researchers have focused on the degree to which book-reading promotes interactivity versus content exposure or a combination thereof in their characterizations of the activity, and c) to identify gaps in the interactive book-reading research literature in domains studied and in explanatory mechanisms invoked, as a guide for more focused studies in the future. This is not an analysis of specific effects on the targeted outcomes because in most cases the number of studies is too limited to support such an effort. Rather, we prioritize including studies that have applied a range of methodological designs across a variety of cultural contexts and languages, attempting to investigate the distribution of developmentalists' concerns across these four outcome domains, and thus offer a pointer to potential neglected research domains. Accordingly, we first undertook a review of the literature to answer the following

research questions:

1. What methodological design features and sample features characterize studies of the four less frequently examined developmental outcomes?
2. What were the main findings in studies of interactive reading attending to the four developmental outcomes?
3. How do researchers characterize the 'active ingredient' in the book-reading activities they study, as interaction or content exposure or a combination thereof?

Second, we discuss implications for future research on interactive book-reading.

## 2. Method

### 2.1. Literature search

We performed systematic literature searches in the bibliographic databases Education Research Complete (EBSCO), ERIC (Ovid), and APA PsycInfo (Ovid) to identify references that combined interactive reading with one or more of the outcomes of interest: SEL skills, narrative, grammar, and world knowledge. Based on these we identified corresponding subject headings in the various databases. The searches consisted of a combination of subject headings and free text words searched in titles, abstracts, and author keywords. All search results were exported to EndNote and duplicates were removed. Initial searches were performed on March 4th, 2020, and resulted in 2116 hits, which were reduced to 1762 after deduplication. The searches were rerun on February 19th, 2021 with no limitations. Complete search strategies are presented in Appendix A. Results from the new search were imported into a separate group in an EndNote library that also contained results from the initial search. Duplicates, including duplicates of items from the first search, were removed. The first and second search combined generated 1858 unique articles. To reduce the risk of publication bias, the search included non-peer-reviewed grey literature such as unpublished PhD dissertations, conference abstracts, and handbooks.

Subsequent screening, undertaken by two coders, excluded studies in which book reading rather than book-reading interactions was studied, the book-reading was scripted and noninteractive, no outcome assessment outside the interactive session was available, book-reading was one inseparable component of a multi-component intervention for which the effect of book reading per se could not be identified, the interaction was digitally mediated, or all the child participants had developmental disabilities. For an overview of the screening process, see Fig. 1; for coder agreement in the search process, see Appendix B.

Ultimately we coded 67 studies that (for an extended list of inclusion and exclusion criteria, see Supplementary material):

- a) examined the effects of interactive reading of printed books on SEL skills, narrative skills, grammar, and world knowledge. A recent meta-analysis by Furenes et al. (2021) demonstrated that reading medium impacted potential advantages of interactive reading, and we thus limited the review to studies of reading on paper.
- b) described the interaction between an adult and one or more children in ways that demonstrated that adults were free to invite and include child responses in the reading.
- c) sampled children from birth through second grade.
- d) took place in any location and were reported in any language we could access.

Our final sample consisted of papers published in peer-reviewed journals (55), 11 dissertations, and one conference paper. Almost all were published in English, but we included papers published in Chinese (Chou & Chang, 2008; Yen & Tsai, 2016); Spanish (Borzone, 2005) and Portuguese (Dias-Correa et al., 2016). Schimago h-index (a measure of

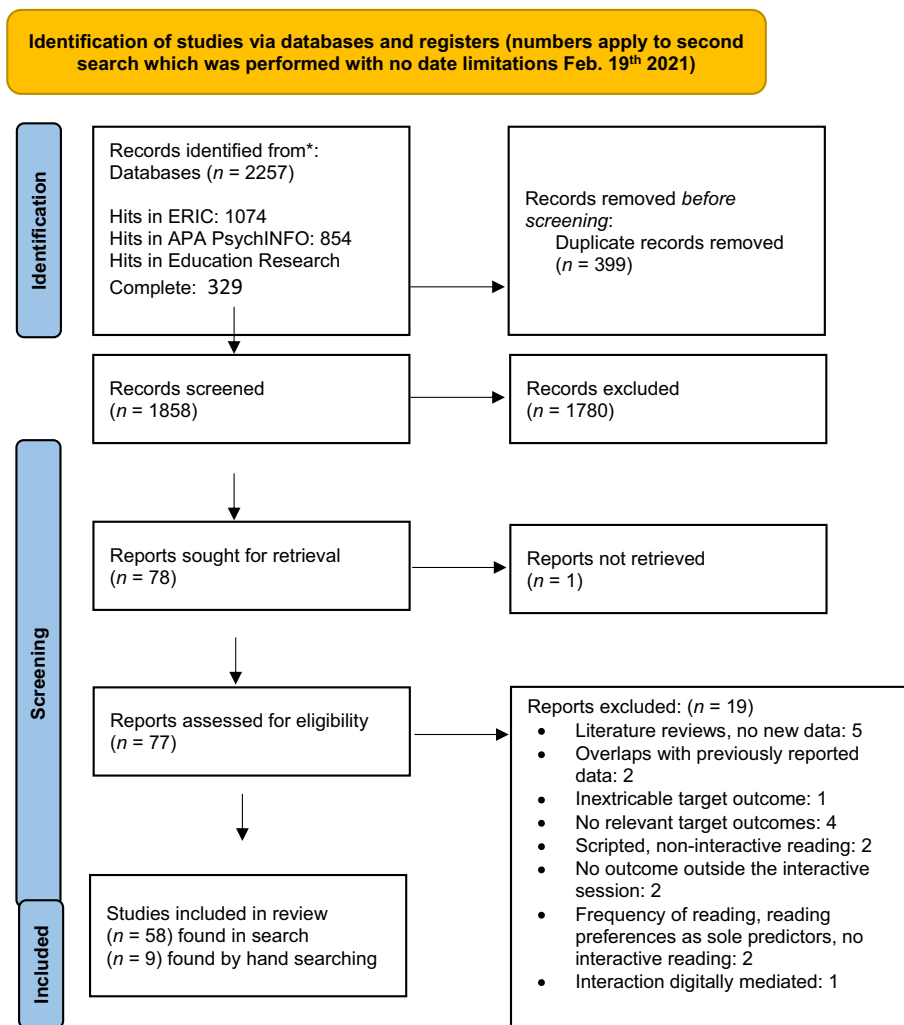


Fig. 1. Prisma 2020 flow diagram.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021; 372: n71. doi: <https://doi.org/10.1136/bmj.n71>.

journal quality) at the time of coding varied between 243 (Child Development) and 2 (Bulletin in Educational Psychology, published in Chinese), with a median of 68. Publication year varied between 1993 and 2021, with a median publication year of 2014. Fifty papers were published in or after 2010, 19 in or after 2018, demonstrating that this is a relatively young research area.

## 2.2. Identifying interactive book-reading and targeted outcome domains

Many terms are used recurrently to refer to the phenomenon of interest: *dialogic reading* (16 papers), *shared reading/book sharing* (16 papers), *interactive reading/joint reading/joint interactive reading* (12 papers) or just *book reading/storybook reading/picture book reading/read-alouds/reading* (17 papers). Other terms such as *critical literacy practices* (Salay, 2018), *comprehension strategy-based instruction* (Roberts, 2010), *language-focused instruction* (Nielsen et al., 2011), *mediated reading* (Dias-Correa et al., 2016), and *parent discussion or discourse* (Chou & Chang, 2008; Laible & Song, 2006) also appeared. We include in the category *interactive reading* all adult-child readings in which there is nonscripted talk by the adult that goes beyond the written text, and opportunities for child involvement. We use this term to emphasize the centrality of language interaction as a mechanism hypothesized to mediate impacts, irrespective of the specific term favored by the authors.

The four outcomes of interest are also variously referred to. SEL

includes ways in which children develop vital socio-cognitive and socio-emotional skills that prepare them for interpersonal interaction. SEL competencies support children in recognizing and comprehending their own emotions and internal states as well as others'. They include skills in taking the perspective of others, a developing capacity that in preschool-aged children has often been conceptualized and examined using the term theory-of-mind. For narrative outcomes we considered both comprehension and production skills, the latter assessed either as spontaneous production or in response to an invitation to retell. Growth in grammatical skills may be demonstrated as growth in syntax and/or morphology, both domains assessed either as comprehension of utterances in which syntactic and/or morphological skills are needed for a correct response or as production, for example by assessing children's mean length of utterance or use of specific morphemes. Finally, interactive reading can expose children to information about phenomena and relations among phenomena that is rare in natural conversation, such as flora, fauna, geographic features, foreign countries, cultural customs and so on. Such world knowledge (content knowledge/science knowledge, also termed background knowledge in the reading literature) is relevant to reading comprehension in the middle grades (e.g. Snow et al., 2005).

### 2.3. Coding

We coded each paper for the following study features:

1. Methodological design: correlational, experimental, quasi-experimental, single-group, or single-subject multiple baseline design.
2. Outcome domain: SEL, narrative, grammar, world knowledge, or any combination of these. Though the four outcomes addressed separate competence domains, they were not always fully distinguished in empirical investigations. Three studies (Isbell et al., 2004; Lake & Evangelou, 2019; Vaquero, 2014) measured growth in narrative skill using mean length of utterance as an indicator of narrative retelling or microstructural narrative skills. Though mean length of utterance is a common indicator of utterance complexity, we coded papers in accordance with the authors' coding and analysis; these papers were thus coded as narrative outcome studies.
3. Sample size.
4. Intervention features: frequency and duration of the treatment.
5. Demographics: family SES (low, middle or middle-to-high, mixed, not reported), country the study was located in, language status (monolingual, dual language learners, not reported), the adult reader (parent, teacher, parent and teacher, researcher/research assistant), and child age.

Finally, studies varied in the extent to which the features hypothesized to predict outcomes were interactivity per se, the content of the book talk, or a combination of these. For example, Arnold et al. (1994) studied potential effects on children's grammatical skills resulting from participating in picture-book reading in which parents were instructed to read in a dialogic way using open-ended questions and following the child's lead. This study was coded as focusing on interactional features. Conversely, the Chan et al. (2020) study was coded as a content-focused study, examining relations between parental mental state talk during interactive book-reading and children's SEL skills. The Murray et al. (2016) study may serve as an example of a combined interaction and content focus. The adult was instructed to follow the child's lead and encourage their active participation (interaction focus) combined with attention to the book's content features; the protagonist's actions and feelings. The two first authors coded each paper individually as interaction-focused, content-focused or both and solved the few instances of disagreement through discussion.

## 3. Results

### 3.1. What methodological design features and sample features characterized studies of the four less frequently examined developmental outcomes (RQ1)?

#### 3.1.1. Methodological features

Studies used a variety of methodological designs in studying the book-reading as related to SEL, narrative, grammatical, and world knowledge skills: correlational ( $n = 19$ ), experimental ( $n = 29$ ), quasi-experimental ( $n = 11$ ), single group ( $n = 7$ ) and single-case multiple baselines study ( $n = 1$ ) (see Appendix C). Across methodological approaches, samples varied in size, from two children (Huennekens & Xu, 2010) to 726 children (Piasta et al., 2020). Median size was 60 children, suggesting that many studies were based on small samples.

Although 46 of the studies included interventions, many of these were relatively brief and lacking in intensity (see Noble et al., 2019 for similar findings). The intervention studies had a mean of 36.2 reading sessions over a mean of 12.4 weeks (for the five studies for which number of reading sessions was represented as a range, the lowest number was used in the calculation; for coding of reading frequency and duration in individual papers, see Table 1 in Supplementary material). Some interventions were much longer (120 sessions: Rosenhouse et al.,

1997) or shorter (3 sessions: van der Wilt et al., 2019). Some interventions prescribed five readings per week (Box & Aldridge, 1993), others only one reading per week (Vaknin-Nusbaum & Nevo, 2017).

Studies mostly used narrative books (e.g. Lake & Evangelou, 2019; Mincic, 2009; Vaknin-Nusbaum & Nevo, 2017), some of which were identified as picture books (Gavazzi & Ornaghi, 2011; Hui et al., 2020; LaForge et al., 2018; van der Wilt et al., 2019) and some as wordless books or books with minimal text (Aarts et al., 2016; Bergman Deitcher et al., 2021; Grolig et al., 2020; Schick, 2015). A few studies included both expository and narrative books, in most cases with a preponderance of narratives (e.g. D. L. Baker et al., 2020; Gámez et al., 2017; Grøver et al., 2020; Neuman & Kaefer, 2018; Nevo & Vaknin-Nusbaum, 2018; Zevenbergen et al., 2003). Studies addressing effects of interactive reading on perspective-taking (SEL) typically selected books designed to invite discussions of contrasting perspectives or misunderstandings (e.g. Liu et al., 2016; Tompkins, 2015), several of them using *Frog where are you?* (Chan et al., 2020; Chou & Chang, 2008; Grøver et al., 2020; Kuchirko et al., 2016; Laible & Song, 2006).

#### 3.1.2. Sample features

Most experimental studies included adult readers who were teachers ( $n = 8$ ) or researchers ( $n = 9$ ), and most quasi-experimental studies also involved teachers ( $n = 9$ ). Fifteen of the 19 correlational studies, on the other hand, sampled parents as the adult reader, typically interacting with one child, whereas teachers and researchers typically interacted with children in groups or full classrooms.

The large majority of studies included children in the age span 3 to 6, two with children below three years (Arnold et al., 1994; Murray et al., 2016) and a few with kindergartners (e.g. Dias-Correa et al., 2016; Gámez et al., 2017) or first graders (e.g. D.L. Baker et al., 2020; S. K. Baker et al., 2013).

The studies were undertaken in 18 different countries across North America (the US and Canada), South America (Argentina, Brazil, Venezuela), Europe (Belgium, England, Germany, Italy, Norway, Slovenia, Spain, The Netherlands), Africa (South Africa, Uganda), and Asia and the Middle East (China, Israel, Taiwan), with about half of them taking place in the US (36 out of 67 studies). Families with low incomes were sampled in 34 out of the 57 studies for which we have SES information, most of the low-income samples ( $n = 25$ ) residing in the US. In 12 studies family SES was described as middle or middle-to-high, while in another 11 as mixed.

Most studies reported on children sharing books in their first, majority language, though a few classroom studies included or focused solely on bilingual children (D. L. Baker et al., 2020; Grolig et al., 2020; Grøver et al., 2020; Lever & Senechal, 2011; Neuman & Kaefer, 2018; O'Brien, 2014; Thomas et al., 2019), and some on sharing books in a mother tongue that was a minority language in the larger society (Escobar et al., 2017; Vaquero, 2014). Other studies, while offering no information on home language use, reported on sample demographics that suggested dual language learners participated, for example Piasta et al. (2020) who reported that 17 % of the sample was Hispanic.

In summary, in response to our first research question we found that studies of these less researched outcome domains represented a range of methodological designs with (quasi-) experimental designs representing the largest group and correlational the second largest. Though we found considerable variation in study demographics and country location, every third study recruited children from low SES backgrounds in the US. The studies sampled a variety of adult readers, with teachers as readers in approximately every third study ( $n = 23$ ), most of these (quasi)experimental studies, and another third, mostly correlational, with parents as readers ( $n = 24$ ). We were only able to identify seven studies that explicitly addressed bilingual samples, though this number may be an underestimate due to missing information on home languages in some studies.

### 3.2. What were the main findings in studies of interactive reading attending to the four developmental outcomes (RQ2)?

The largest category of studies addressed growth in SEL ( $n = 23$ ) or narrative skills ( $n = 26$ ); grammatical skills were examined in eight papers and acquisition of world knowledge in only four. In addition, six studies assessed multiple targeted outcomes (see Appendix C). No outcome domain was associated with a particular methodological approach.

#### 3.2.1. SEL outcomes

SEL outcomes were investigated with both correlational and (quasi) experimental approaches. Nine correlational studies, three single-group design studies, and 11 experimental or quasi-experimental studies measured SEL outcomes, while another three examined SEL skills as one of multiple intervention outcomes.

Experimental studies of book-reading effects on SEL outcomes examined a range of socio-emotional and socio-cognitive outcomes: skills in perspective taking, in identifying the book characters' beliefs when these differed from the child's (false belief in theory-of-mind tasks), and in understanding the emotions of characters. Despite diversity in ways of conceptualizing and assessing hypothesized SEL outcomes, the studies mostly suggested positive relationships with or effects of book reading. Experimental studies examining the effects of training the adult reader reported effects on children's social and emotional understanding (Bergman Deitcher et al., 2021; LaForge et al., 2018; Murray et al., 2016; Vajcner, 2015; Yen & Tsai, 2016), on children's focus on socio-cognitive themes (Aram et al., 2013), on their understanding of internal-state language (Gavazzi & Ornaghi, 2011) and on their perspective-taking skills (Grøver et al., 2020). Zevenbergen et al. (2003) and Lever and Senechal (2011) demonstrated that children who had received an interactive reading intervention more often referred to characters' internal states.

Experimental studies reporting limited or no effect on SEL outcomes were all unpublished dissertations, characterized by short interventions and small samples (Brockmeyer, 2009; Salay, 2018; Terry, 2011; Vajcner, 2015). The three single-group studies of interventions designed to support SEL skills all found significant effects (Chou & Chang, 2008; Dias-Correa et al., 2016; Goodman & Dent, 2019).

In contrast to the experimental/intervention studies of relationships between book reading and SEL outcomes, the correlational studies reported more mixed conclusions. Only two (Adrian et al., 2005; Symons et al., 2005) out of five correlational studies addressing theory-of-mind outcomes identified qualities of talk during reading that showed associations with growth in these skills. Other correlational studies on broader SEL outcomes also diverged, or reported effects limited to girls (Bailey et al., 2013). While Schapira and Aram (2020) concluded that parental socio-emotional utterances during interactive reading predicted children's understanding of causes of emotion, Laible and Song (2006) found no equivalent relationship. Levorato and Arfé (2006) demonstrated that children's conceptions of the author's mental processes and perspectives could be triggered through invitations to structured reflection already by age 5 or 6.

#### 3.2.2. Narrative outcomes

Narrative skill, assessed either as production or comprehension, was also a frequently addressed child outcome of book reading, in correlational ( $n = 8$ ), single-group design studies ( $n = 2$ ) and (quasi)experimental ( $n = 16$ ) studies. Another four studies examined narrative skills as one of several outcomes. Though the interventions typically used narrative books, it is not clear that narrative production or comprehension per se was foregrounded during the interventions. It was striking across the various studies looking at narrative outcomes how variable and difficult to compare the many outcomes reported were.

All the correlational studies (De Temple & Tabors, 1996; Escobar et al., 2017; Gámez et al., 2017; Kang et al., 2009; Kim et al., 2011;

Kuchirko et al., 2016; Marjanovič-Umek et al., 2019; Reese, 1995) except one (Schick, 2015) identified associations between interactive book-reading and child narrative outcomes, typically focusing on interactive qualities of adult talk, such as parental elaborations and questioning strategies.

Experimental studies, which have more power to detect outcome effects of interactive reading, showed inconsistent effects for narrative skill. While some identified effects of interactive book reading on narrative production (Aram et al., 2013; S. K. Baker et al., 2013; Lake & Evangelou, 2019; Lever & Senechal, 2011; Mulvey, 2014; Rosenhouse et al., 1997; Vaquero, 2014) and on narrative comprehension (Grolig et al., 2020; Nevo & Vaknin-Nusbaum, 2018; Sa, 2012; Vivas, 1996), others found no effects (D. L. Baker et al., 2020; Box & Aldridge, 1993; Grøver et al., 2020; Nielsen & Friesen, 2012; Piasta et al., 2020; Roberts, 2010; Thomas et al., 2019). Null effect studies differed both in the samples they addressed and in the way they assessed narrative skills. They included some of the larger samples (e.g. Grøver et al., 2020; Piasta et al., 2020) and offered medium- to high-dosage interventions. With one exception (Roberts, 2010), they assessed narrative production, either as spontaneous production or as retell. It is worth noting that a replication of the 2013 S. K. Baker et al. study, which reported effects on narrative retelling, found no such impacts (D. L. Baker et al., 2020). Though experimental studies mostly used narrative books, the adult partner was not always supported to use books to invite narratives. It may be that exposure to narrative books in and of itself is not sufficient and that adult training in promoting narratives, e.g. through invitations to extend the book theme and to relate it to the child's experiences, may be necessary for more robust experimental effects. Moreover, even though teachers can be trained in methods to support narrative, this may not result in measurable child outcomes (Piasta et al., 2020; Roberts, 2010). Experimental studies, in sum, offer some indication that book reading may have an effect on narrative comprehension and production, but the evidence is weak, in part because those constructs are variably defined and measured.

#### 3.2.3. Grammar outcomes

Thirteen studies sought interactive reading effects on grammar, eight (5 (quasi)experimental, 1 correlational, 1 single-group design study and 1 single-case multiple baseline design study) with grammar as the only targeted outcome and five more with grammar as one of multiple outcomes. Two of the studies included some morphological activities as part of the reading (Chow et al., 2008; Vaknin-Nusbaum & Nevo, 2017).

Most of the (quasi)experimental studies reported significant grammar findings, in spite of examining very different aspects of grammar (e.g. syntactic comprehension (Grøver et al., 2020), syntactic productive complexity (Hui et al., 2020; Vivas, 1996), morphosyntactic skills, production and comprehension (Thomas et al., 2020), or morphological awareness (Chow et al., 2008; Vaknin-Nusbaum & Nevo, 2017)), while the two correlational (Aarts et al., 2016; Marjanovič-Umek et al., 2019) and the one single-group intervention study (Holt & Asagbra, 2021) did not identify any such effects.

Studies of grammar outcomes mostly addressed child acquisition of non-English languages: Hebrew, Cantonese, French, Spanish, Slovenian and Norwegian. Moreover, among the few studies that hypothesized effects of interactive reading on English grammar, one examined acquisition of English as a second language by children speaking Cantonese as their first language (Hui et al., 2020).

#### 3.2.4. World knowledge

Four studies, three experimental and one single-group study, addressed the acquisition of world knowledge as an outcome of interactive reading (Driver, 2017; Neuman et al., 2016; Neuman & Kaefter, 2018; O'Brien, 2014). Neuman and Kaefter (2018), a follow-up to Neuman et al. (2016), showed stronger outcomes for English language learners and younger children. Although Neuman's work on science-targeted vocabulary and book-reading is an exception, in general

strikingly little attention has been given to the potential of book-reading interactions to build knowledge. While the Neuman et al. (2016) and Neuman and Kaefer (2018) studies that tested a reading-based program found some effects on world knowledge (science knowledge), these were strongest for children from low-income families. Two additional studies, both unpublished PhD dissertations with small samples and brief interventions, reported marginal or no effects (Driver, 2017; O'Brien, 2014).

### 3.2.5. Summarizing findings for less studied outcomes

In response to our second research question, the most robust finding was that interactive book-reading showed positive relationships to SEL outcomes, especially in experimental studies. Experiments addressing SEL skills were geographically dispersed, with studies undertaken in Italy, Taiwan, South Africa, Norway, Israel and the US. Single-group studies of SEL outcomes also included samples from Uganda, Taiwan, and Brazil. The interventions showing beneficial effects varied in duration and total exposure dosage, while SES-status (mostly low) and language-status (mostly language majority) showed less variation. Correlational studies of SEL skills, like those of other outcome domains, mostly sampled parents as adult readers while experimental studies typically sampled teachers or researchers; however, the limited number of eligible papers prevents detecting the specific effect of the reader.

Studies of narrative outcomes also reported variable effects. Correlational studies mostly identified associations between interactive book-reading and child narrative outcomes, while experimental studies had more inconsistent findings. The correlational studies were typically undertaken in dyadic settings with parents, allowing the adult to invite conversations that extended the child's experiences and perspectives, something that may be a less available strategy for a teacher reading with several children or a researcher/research assistant unfamiliar with the child. The features of parental talk observed in settings like book reading may also reflect features of talk to which children are exposed in other everyday contexts, making them potentially powerful predictors of narrative development, not because of the interactive reading per se, but because of their ubiquitous presence in the child's language environment. The correlational studies thus point to narrative-promoting qualities of adult talk that should be systematically examined in experimental studies.

The participants in studies of grammar effects were mostly non-English speaking children, including several samples of second-language speakers. Most of the five (quasi)experimental studies on grammar reported significant effects of book-reading. The lack of research-based knowledge about effects on grammar in English speakers is noteworthy.

Finally, though parents and teachers probably consider books a source of knowledge about the world and an opportunity to explain phenomena that are not likely to be introduced into conversation otherwise, we found only four studies that examined the conditions under which such knowledge develops. The search words we used to capture this quality were, in addition to *world knowledge*, *science knowledge* and *content knowledge*, terms relevant to capture the quality of general, non-disciplinary background knowledge identified in reading comprehension research. Though some studies of interactive reading with young children have examined how they acquire specific information components targeted in an intervention (see for example Khu et al., 2014), the potential to acquire world knowledge incidentally through rich exposure to and discussions of books, rather than from conceptually organized book sets, has not been studied.

### 3.3. How do researchers characterize the 'active ingredient' in the book-reading activities they study, as interaction or content exposure or a combination thereof (RQ3)?

In total 24 papers were coded as interaction-focused and 31 as content-focused. Twelve papers demonstrated a combined attention to

interaction and content (for coding results, see Appendix C).

Experimental studies involving parents (or parents in combination with teachers) more often focused on purely interactive features of book-sharing or focused on interactive features in combination with content than experimental studies involving teachers or researchers as adult readers. Of the 12 experimental studies that included parents ( $n = 7$ ) or parents and teachers ( $n = 5$ ), 6 had a purely interactional focus, and 5 more, while attending to qualities of interaction, included attention to content feature. Only one experimental study was coded as mostly content-oriented. Moreover, child age seemed to interact with hypothesized predictors. The two experimental studies addressing very young children focused on interaction (Arnold et al., 1994) or interaction in combination with content (Murray et al., 2016). Conversely, studies including older children more often analyzed the impact of talk content on outcomes (for coding of hypothesized predictors and outcome effects, see Appendix C).

Fifteen of the 23 SEL outcome studies were coded as content-focused and an additional 3 as combined content- and interaction-focused (excluding in the count six studies coded for multiple outcomes). Only five studies in the SEL domain were coded as interaction-focused. Features such as reading emotion-enhanced books (Brockmeyer, 2009; Gavazzi & Ornaghi, 2011; LaForge et al., 2018; Mincic, 2009; Yen & Tsai, 2016), discussing the perspectives or emotions that characters in the book expressed (Aram et al., 2013; Grøver et al., 2020; Lever & Senechal, 2011; Symons et al., 2005; Zevenbergen et al., 2003), identifying misunderstandings among characters (Adrian et al., 2005; Chou & Chang, 2008) or extending the book talk to the child's emotions or perspectives (Goodman & Dent, 2019; Murray et al., 2016) were reported to support SEL skills.

For the 26 studies of narrative outcomes, 11 were coded as content-focused, 3 more as combined content- and interaction-focused, and 12 as purely interaction-focused. Because narrative comprehension and production are so closely related to the content typical of books shared with young children, it is not surprising that relationships between the content of interactive reading and narrative skills outcomes emerged in some studies. The narrative outcome studies with an interaction focus typically attended to qualities of adult talk, such as parental elaborations and questioning strategies, as the crucial mediating elements of interaction promoting narrative skills.

The grammar outcome studies tended to focus on interaction per se as the hypothesized predictor; four of the eight grammar studies focused on interaction as the explanatory principle (Arnold et al., 1994; Holt & Asagbra, 2021; Huennekens & Xu, 2010; Thomas et al., 2020), and three more on interaction in combination with content (Chow et al., 2008; Hui et al., 2020; Vaknin-Nusbaum & Nevo, 2017). Only one grammar outcome study focused on content in itself (Aarts et al., 2016). The expectation seemed to be that grammar development may be less dependent on the specific content than on exposure to complex syntax and rich morphemic alternations no matter what the participants talked about.

The four studies examining world knowledge as the outcome demonstrated the opposite pattern; all of them focused solely on content features in reading. The six studies coded for multiple outcomes all included attention to the qualities of interaction, either as the only explanatory mechanism (Lever & Senechal, 2011; Marjanović-Umek et al., 2019; Vivas, 1996) or in combination with content (Aram et al., 2013; Grøver et al., 2020; Nevo & Vaknin-Nusbaum, 2018). Given the history of research on interactive reading, typically focusing on the effects of dialogic reading on vocabulary and emergent literacy, the number of studies addressing content features in these less researched areas was surprising.

## 4. Discussion and recommendation for future research

Our goal in this review was to complement the many studies that have investigated the impact of interactive reading on vocabulary and

literacy since Whitehurst et al.'s influential 1988 paper, by determining whether equivalent attention has been paid to other domains likely to be influenced by interactive reading, namely SEL, narrative, grammar, and world knowledge. The 67 studies we identified encompassed many different methodological approaches that addressed one or more of these outcomes. The most robust finding was that interactive book-reading showed a positive relationship to SEL outcomes, particularly in experimental studies. On the contrary, positive relationships between interactive book-reading and narrative outcomes were more likely to be found in correlational studies. A striking finding was the paucity of studies investigating grammar or world knowledge outcomes. In spite of the emphasis on interactional qualities in the early studies of interactive book-reading, we found that more than half of the studies, in particular those focused on SEL and world knowledge outcomes, addressed the *content* to which children were exposed.

#### 4.1. Methodological designs and outcome assessments

Though there seems to be some conceptual coherence in the child skills assessed within each domain, in fact the specifics of the tests used to assess those skills varied widely across studies, making it difficult to draw conclusions about the relationships tested. The range of methodological approaches and outcome assessments precludes disentangling effects of intervention dosage, duration and intensity, though we echo Noble et al.'s (2019) observation that most of the interventions were brief and of low intensity. The evidence regarding interactive reading effects on the targeted outcomes remains less than thoroughly convincing in part because of the enormous variability in the definition and operationalization of the important constructs of interest. First, we noted large variability across studies in intervention exposure, but the number of sampled studies was too low to allow an estimate of how exposure related to outcomes. Second, demographic diversity (SES, child age) and the effects of the specific context in which books were shared (parents or teachers/researchers in dyadic or multiparty settings) are topics that should be further examined once a richer research base is available. Marulis and Neuman (2010) found for example that treatments implemented by researchers had stronger effects than interventions undertaken by teachers or parents, perhaps due to greater treatment fidelity. Confirming this observation, seven out of the eight experimental studies reviewed that tested impacts statistically with a researcher or research assistant as the adult reader reported significant findings (interactive reading predicted either SEL or narrative skills). Third, there is little convergence on what we mean by SEL/perspective taking, on how we define or measure narrative skill, and even on the defining features of the construct "interactive reading." Experimental studies in particular show how much the construct of interactive reading diverges across participants and settings. While an image of one child sitting on one parent's lap and turning the pages of a book may represent the iconic book-reading interaction for some, in fact many other configurations are possible and are represented in these research studies. In preschool and kindergarten classrooms, children are often in small or even large groups during book-reading interactions, and interaction is also in some cases more scripted. Reading and discussing text with young children who are not independent readers is referred to with a variety of terms in the literature, but nowhere is it specified for example how much child talk is required for reading to be considered interactive or how much support adult readers should receive to be able to read more interactively; in different studies support ranges from explicit training to just handing the adults a book and asking them to share it. Fourth, we do not have sufficient basis for identifying how culturally specific ways of interacting with young children impact conclusions about the value of interactive reading (for discussion, see Escobar et al., 2017). For example, Chan et al. (2020) and Liu et al. (2016) found no relations between interactive book-reading features and SEL (theory-of-mind) skills in studies of Chinese family book-reading; they suggested that non-western ways of communicating with children, such as an

identified preference in Chinese parents for talking about external behavior rather than mental states, might explain why their findings diverged from those in other studies. Because both cultural context and child gender may influence adult attention to internal-states during book-reading, we need systematic cross-cultural studies of these phenomena. Fifth, there were too few eligible studies to examine professional development and implementation as qualities that might impact associations between interactive reading and targeted outcomes, though this should clearly be a focus of future studies.

Finally, the low-income background that characterized most samples in this review may have enhanced the developmental benefit to children of any interactive enrichment in small group settings. Associations between features of interactive talk and outcomes may thus reflect the extra resources and attention made available to children rather than the specific features of the book-sharing intervention (for discussion, see Goodman & Dent, 2019). This is a particular limitation in single-group studies, but also in experimental studies with a business-as-usual comparison group (Noble et al., 2019).

#### 4.2. Hypothesized mechanisms of action

A recurring question in research on book-reading is the mechanism by which it impacts developmental outcomes. In our third research question we asked how researchers have characterized the active ingredient in their studies of adult-child book reading, whether as features of the interaction that occurred or as exposure to specific content via talk about the text and pictures in the books. To be included in this review, studies had to report on reading that was interactive; we excluded studies with heavily scripted read-alouds. Still, in each of the four outcome domains some studies focused primarily on qualities of the interaction and others on the content of the talk. Studies on SEL skills and world knowledge resulting from interactive book reading focused mostly or fully on content issues. Studies on narrative outcomes were more evenly divided between a focus on the interactivity per se and the topic of the narratives. It may be that attention to narrative content rather than to narrative structure (macro- and micro-structure) will offer more insight into how interactive reading may promote narrative development. Narratives clearly have affordances for building knowledge about the world, wide historical fiction and biographies. Knowledge-building, though, may require more attention to content than to interaction style when designing narrative interventions, e.g., by training adult participants in book selection and in pedagogical content knowledge. The post-Vygotskian social-interactionist approaches that have offered theoretical grounding for most book-reading studies have emphasized cognitive and linguistic skill development resulting from children's scaffolded text-based interaction with more competent others. We suggest that closer attention to the *content* of reading, in addition to the interaction qualities characterizing the reading, may shed light on overlooked developmental outcomes of interactive reading.

It remains to be demonstrated whether interactive reading has specific unique qualities unavailable during other types of everyday interaction. Results from Isbell et al. (2004) and Reese et al. (2010) suggested that reminiscing may be a more efficient way of supporting narrative skills than book reading per se, and Laible and Song (2006) similarly concluded that reminiscing was more efficient than interactive reading in supporting emotional understanding. A recent study by Riordan et al. (2022), published after the literature search was completed, demonstrated the advantages of combining interactive reading with reminiscing for narrative comprehension. The generally stronger relationships between interactive reading and narrative outcomes found in correlational rather than experimental studies supports the hypothesis that general features of adult-child interaction—features that are seen during interactive reading but may not be specific to it—produced the observed effects. Noble et al. (2019) interpret their finding that effects of interactive reading on language outcomes are minimal when active control groups are used as supporting the claim of nonspecific



effects: engaging in any focused interaction with young children works as well as reading books with them. That hypothesis leads to the question whether book-reading can be effective as an intervention precisely because it promotes focused attention to and interaction with young children. In other words, any focused and extended conversation that engages children's attention may be equally effective, but such conversations may be more reliably sparked in the presence of a book than during other activities. We thus argue that one goal of future research should be to define the contexts in which the most productive forms of extended and engaging conversations with young children occur.

#### 4.3. Longer-term consequences of early book-reading interactions

The four outcomes on which we focus here are all predictors of longer-term academic success. SEL skills enable learners to thrive in the social environment of the school and to control their own attention and emotions, contributing to academic success (Durlak et al., 2022). Narrative skills prepare students for the genres in which they will most often be asked to read and to write during the primary school years. Grammar skills are crucial in navigating the more complex written language encountered in content area texts. World knowledge is a major predictor of success in later reading comprehension (Smith et al., 2021), and a learning objective that runs the risk of being overlooked in the early school years as instruction focuses on the basics of reading and math.

The importance of these domains for later functioning is underlined by the fact that educators serving preschool and primary grade children are adopting curricula and programs designed to support SEL skills (Jones et al., 2021). Furthermore, primary grade reading curricula have recently been placing increasing emphasis on knowledge as a predictor of success in reading (see, for example Core Knowledge Foundation, n.d.). Unfortunately we have only scattered information about how early book-reading can promote school-relevant SEL skills, and hardly any information on how acquiring world knowledge can be supported through interactive reading in early childhood.

#### 4.4. Strengths and limitations

We undertook this review in order to identify domains within research on interactive book reading that merited more systematic researcher attention. We prioritized including studies across a variety of cultural contexts and languages, irrespective of methodological designs and publication type. Thus we included studies published in languages other than English (Chinese, Spanish and Portuguese), dissertations and other unpublished sources, as well as research articles located via journal listings. These decisions led at the same time to some limitations. The heterogeneity of the papers that resulted from our inclusive strategy constrains our conclusions and poses challenges to the interpretability of our findings. Furthermore, our search for papers examining effects on the targeted outcomes cannot be considered fully inclusive given the range of possible skills involved in each domain. We often had limited information about the exact nature of the interventions being implemented, and we had to infer from coding schemes what the authors' primary hypothesized mechanism of action was. Sampling across such a wide range of countries reduces the comparability of categories like 'low SES' or 'mother tongue' or 'interactive reading.' Similarly, the exact tasks used by different researchers who purported to be studying SEL or narrative skills often varied enormously, leading to difficulties comparing their findings.

Of course the major limitation of this study is that we could not

## Appendix A. Search strategies

ERIC 1965 to January 2021 (Ovid)

provide a convergent statistical estimate of impacts in any of the four domains. In light of the heterogeneity of the study designs implemented and the outcome measures used we chose not to analyze impacts. Although a couple of dozen studies were available within the narrative and the SEL domains, they were so disparate in samples included, design, and, most importantly, in their operationalizations of the outcomes that we determined a statistical meta-analysis would be misleading. Nonetheless, a review of these papers offers tantalizing evidence that these less-studied outcome domains deserve attention in more systematic, more rigorously designed, and better instrumented research studies in the future.

## 5. Conclusions

The literature reviewed here offers a strong justification for launching more systematic research about the relationship of interactive reading to all four outcomes in focus: SEL, narrative, grammar, and world knowledge. Given the importance of SEL skills to children's academic and life outcomes, this area in particular deserves further attention to determine what forms of interaction and what book content generate the largest impacts. The less consistently confirmed effects on narrative skills suggest the need for widely shared measures of narrative skill and more emphasis on discussing features of the narrative in interventions offering story books. Grammar and world knowledge outcomes were so sparsely represented in the studies reviewed that it is difficult to draw any implications except that a richer research base is needed.

Moreover, the developmental impact of adult-child interaction involving a text should incorporate attention to the content that adults and children engage with during reading. Attention to content emerged as more salient for certain outcome domains, such as SEL and world knowledge, than for others, such as grammar. If narrative skills are about more than structural aspects (narrative macro and micro-structure), and if narrative is a way of representing knowledge for young children, future researchers should consider how the content children are exposed to during interactive reading is reflected in the way narrative skills and world knowledge are assessed.

We believe that this review has shed light on overlooked advantages of interactive reading that deserve a more systematic and focused examination in future research. Though this review was introduced with an interest in the variety of purposes for which adults read to children, and though the sampled studies were located in a number of countries, they still demonstrate a distinct demographic profile: half of them were undertaken in the US context, and these again particularly targeted low-income populations. The social-interactionist theoretical grounding of the studies we sampled helped identify qualities of reading that may support the targeted outcomes. Texts and talk about text are always about *something*, and future research might want to attend more closely to how the cultural context and the specific content to which participants in interactive reading are exposed help in generating the advantages that are widely expected from interactive reading.

### Declaration of competing interest

We have no known conflict of interest to disclose.

### Data availability

No data was used for the research described in the article.

APA PsycInfo 1806 to February Week 2 2021 (Ovid)

Date searched: 19 February 2021

Number of hits in ERIC: 1074

Number of hits in PsycINFO: 854

1	Reading aloud to others/ use eric	2728
2	("shared book reading*" or "shared reading*" or "joint book reading*" or "joint reading*" or "interactive book reading*" or "interactive reading*" or "storybook reading*" or "story reading*" or "parent-child reading*" or "teacher-child reading*" or "teacher-student reading*" or "dialogic book reading*" or "dialogic reading*" or "book talk*" or "extratextual talk*" or "read aloud*").tw.	7595
3	1 or 2	8954
4	exp grammar/	113,590
5	(Narratives/ or storytelling/) use psych	24,510
6	Story telling/ use eric	6012
7	(Role taking/ or theory of mind/or emotion recognition/) use psych	11,180
8	(Perspective taking/ or theory of mind/) use eric	3529
9	(grammar* or synta* or morpholog* or "mean length of utterance" or mlu or (narrative* or storytelling* or "story telling*") or ("theory of mind" or "mental state talk" or "emotion state talk" or "internal state talk" or "socio-cognitive" or "socio-emotion*" or "emotion comprehension" or "perspective taking" or "role taking") or ("world knowledge" or "science knowledge" or "content knowledge")).tw.	236,363
10	or/4-9	310,859
11	3 and 10	1928
12	11 use eric	1074
13	11 use psych	854

Education Research Complete (EBSCO) (no information about date of inception available)

Date searched: 19 February 2021

Number of hits: 329

S1	DE "SHARED reading" OR TI (("shared book reading*" OR "shared reading*" OR "joint book reading*" OR "joint reading*" OR "Interactive book reading*" OR "interactive reading*" OR "storybook reading*" OR "story reading*" OR "parent-child reading*" OR "teacher-child reading*" OR "teacher-student reading*" OR "dialogic book reading*" OR "dialogic reading*" OR "book talk*" OR "extratextual talk*" OR "read aloud*")) OR AB (("shared book reading*" OR "shared reading*" OR "joint book reading*" OR "joint reading*" OR "Interactive book reading*" OR "interactive reading*" OR "storybook reading*" OR "story reading*" OR "parent-child reading*" OR "teacher-child reading*" OR "teacher-student reading*" OR "dialogic book reading*" OR "dialogic reading*" OR "book talk*" OR "extratextual talk*" OR "read aloud*")) OR KW (("shared book reading*" OR "shared reading*" OR "joint book reading*" OR "joint reading*" OR "Interactive book reading*" OR "interactive reading*" OR "storybook reading*" OR "story reading*" OR "parent-child reading*" OR "teacher-child reading*" OR "teacher-student reading*" OR "dialogic book reading*" OR "dialogic reading*" OR "book talk*" OR "extratextual talk*" OR "read aloud*"))	3683
S2	(DE "SYNTAX (Grammar)" OR DE "CONNECTIVES (Linguistics)" OR DE "DEPENDENCY grammar" OR DE "TEMPORAL constructions (Grammar)" OR DE "MORPHOLOGY (Grammar)" OR DE "AUTOSEGMENTAL theory (Linguistics)") OR TI (((grammar* OR synta* OR morpholog* OR "mean length of utterance" OR mlu) OR (narrative* OR storytelling* OR "story telling*")) OR ("theory of mind" OR "mental state talk" OR "emotion state talk" OR "internal state talk" OR "socio-cognitive" OR "socio-emotion*" OR "emotion comprehension" OR "perspective taking" OR "role taking") OR ("world knowledge" OR "science knowledge" OR "content knowledge"))) OR AB (((grammar* OR synta* OR morpholog* OR "mean length of utterance" OR mlu) OR (narrative* OR storytelling* OR "story telling*")) OR ("theory of mind" OR "mental state talk" OR "emotion state talk" OR "internal state talk" OR "socio-cognitive" OR "socio-emotion*" OR "emotion comprehension" OR "perspective taking" OR "role taking") OR ("world knowledge" OR "science knowledge" OR "content knowledge"))) OR KW (((grammar* OR synta* OR morpholog* OR "mean length of utterance" OR mlu) OR (narrative* OR storytelling* OR "story telling*")) OR ("theory of mind" OR "mental state talk" OR "emotion state talk" OR "internal state talk" OR "socio-cognitive" OR "socio-emotion*" OR "emotion comprehension" OR "perspective taking" OR "role taking") OR ("world knowledge" OR "science knowledge" OR "content knowledge")))	84,130
S3	S1 AND S2	329

## Appendix B. Coder agreement

After the first search two coders independently undertook an abstract-based screening of all references, using the facilities of the Rayyan system (<https://www.rayyan.ai>) to code each paper by the categories 'include', 'exclude' or 'maybe'. This first screening process resulted in 1439 references being excluded by both coders (varying between 84.7 % and 87.9 % for the two coders). After the first abstract-based convergence conversation, focusing on include/exclude disagreements, in total 23 references were included in the sample. A second abstract-based convergence conversation focused on include/maybe disagreements as well as studies for which both coders had applied the 'maybe' category. This second convergence discussion resulted in the inclusion of 22 additional references. A third convergence conversation was based on an initial full-text reading of the remaining 203 references doubly scored as 'maybe' and 34 with conflicting ratings, resulting in a total of 71 references. We were unable to locate one paper published in Spanish (Vivas de Muñoz & Gorodeckis, 1980), leaving 70 references. After realizing how variable the forms of interaction actually implemented were, and how variable the contexts of assessment were, we reread all the papers to ensure compliance with our inclusion and exclusion criteria. This final full-text examination resulted in the exclusion of 19 originally included papers, leaving 51 papers (for exclusion criteria, see Fig. 1). Decisions about papers that surfaced in the second search process were made by the first author and resulted in the inclusion of 7 more papers. In addition to the systematic search in the bibliographic databases, we hand-searched relevant reference lists and systematic reviews, adding 9 more references, leaving us with a total of 67 papers for analysis (each marked with an asterisk in the reference list).

**Appendix C. Sampled studies, hypothesized predictors and outcomes, focus of reading, adult reader, country of study, and SES**

Sampled studies	Hypothesized predictors and outcomes	SEL	Narrative	Grammar	WK	Focus	Adult reader	Country	SES
Correlational studies									
Aarts et al. (2016)	Mothers'/teachers' production of academic features, lexical diversity, syntactic complexity, and abstractness predicting child performance on the TAK (sentence syntax measure) for monolinguals/bilinguals.			$r = 0.21-0.54$ ns		C	P, T	The Netherlands	Mixed
Adrian et al. (2005)	Mothers' production of mental state verbs predicting child false belief understanding.	$r = 0.30/0.36$				C	P	Spain	Mixed
Bailey et al. (2013)	Maternal questions during a wordless storybook predicting girls' (but not boys') emotion knowledge	<b>Adjusted R2 = 0.24</b>				I	P	USA	Middle
Chan et al. (2020)	Parental mental-state talk (MST) about own emotions (OE) and character emotion (CE) as well as child-directed mental state talk (CDMST) predict children's false-belief understanding (FBU)	<b>MST correlated positively and sign. with FBU, CDMST ns on FBU</b>				C	P	China/HK	Mixed
De Temple and Tabors (1996)	Mothers' use of nonimmediate talk in book reading (percent) predicting quality of child narrative retelling of the same book two years later.		$r = 0.28$			C	P	USA	Low
Escobar et al. (2017)	Mothers' embellished responses and embellished requests at child age 3 predicting child elaborative responses at 4		$r = 0.30-0.34$			I	P	USA	Low
Gámez et al. (2017)	Bilingual kindergarten teacher's use of gesture types/min predicted gains in narrative comprehension, and extratextual talk (ETT) predicted story structure in production.			<b>Gesture <math>f^2 = 0.066</math>; ETT <math>B = 0.21</math></b>		C	T	USA	Low
Kang et al. (2009)	Maternal encouragement of child participation in book-reading predicted various measures of children's story retelling skills.		$r = 0.07-0.59$ .			I	P	USA	Low
Kim et al. (2011)	Child spontaneous interpretations and repetitions during book reading predicted their retelling scores (total score, events recounted, microlinguistic features, story structure).		$r = 0.30-0.51$			I	P	USA	Low
Kuchirko et al. (2016)	Mothers' open-ended questions at age 3 predicted concurrent child narrative contributions. Their open-ended questions at age 3 predicted narrative contributions at age 4, without (WO) and with (W) control for concurrent child narrative skills. Mothers' open-ended questions at age 4 predicted child narrative contribution at age 5, without (WO) and with (W) control for concurrent child narrative skills.		<b>Concurrent at 3: <math>\beta = 0.24, p &lt; .01</math>; 3 to 4: WO: <math>\beta = 0.18, p &lt; .05</math>, W: ns. 4 to 5: WO: <math>\beta = 0.24, p &lt; .001</math>, W: ns</b>			I	P	USA	Low
Laible and Song (2006)	References to positive emotions during reminiscing (R) and interactive reading (IR) predicted 5 year olds' emotional understanding (EU) and understanding of social relationships (USR).	<b>EU from R: <math>p &lt; .01</math>, from IR: ns. USR from R: <math>p &lt; .01</math>, from IR: <math>p &lt; .01</math></b>				C	P	USA	Middle
Levorato and Arfé (2006)	A structured interview during an interactive story reading session predicted, depending on age, child awareness of authors' existence and mental processes.	<b>Age x author awareness <math>\chi^2 = 32.28, df = 6, p &lt; .001</math></b>				C	R	Italy	Middle

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Sampled studies	Hypothesized predictors and outcomes	SEL	Narrative	Grammar	WK	Focus	Adult reader	Country	SES
Liu et al. (2016)	Mothers' explanations about behaviors, not their mental state talk, predicted children's false belief understanding.	$\Delta r^2 = 5.6\%$				C	P	China	Mixed
Marjanovič-Umek et al. (2019)	Mothers' scores on the Scale for Observing Shared Reading predicting child coherence in story telling (STC) and in mean length of utterance (MLU)		STC: $r = 0.49, p < .05$	MLU: ns		I	P	Slovenia	Not reported
Reese (1995)	Mothers' predictions/inferences during book reading predicting children's story comprehension (SC) and story retelling (SR) scores.		SC: $\beta = 0.55, p < .10$ ; SR: $\beta = 0.53, p < .05$			C	P	USA	Middle
Schapira and Aram (2020)	Parental elaboration on characters and character activities and their socio-emotional utterances predicted children's empathy, prosocial attitudes, and coherence in social narratives	13–28 % of variance explained				C	P	Israel	Middle
Symons et al. (2005)	Mothers' mental state discourse about story characters during joint reading interactions predicting children's Theory of Mind.	$r = 0.37$				C	P	Canada	Mixed
Tompkins (2015)	Mothers' use of contrastives during cognitive state talk predicted child false belief understanding, controlling for baseline score, child age, and receptive vocabulary.	$p < .05$				C	P	USA	Mixed
Schick (2015)	Teachers' scaffolding style predicting children's story grammar scores.		$p = .08$			C/I	T	USA	Low
Quasi-experimental studies									
Hui et al. (2020)	Dialogic reading techniques applied on teacher-child reading of picture books selected for content (emotion, meaning, motivation etc) predicted syntactic complexity.			$\eta^2 = 0.058$		C/I	T	China/HK	Not reported
Mincic (2009)	Book reading dosage of emotion-enhanced storybooks predicted affective perspective taking scores	Adjusted $r-sq = 0.07$				C	T	USA	Low
Mulvey (2014)	Interactive reading with explicit story grammar instruction predicted narrative retell skills above interactive reading, immediately/3 weeks later		$d = 0.36$ / $d = 0.15$			C	T	USA	Mixed
Neuman et al. (2016)	A science-focused shared book-reading intervention with a curriculum organized around core themes predicted world knowledge (knowledge of core themes)				$d = 0.38$	C	T	USA	Low
Neuman and Kaefer (2018)	A science-focused shared book-reading intervention with a curriculum organized around core themes predicted knowledge of science-related concepts in ELLs/native speakers across pre-k through grade 1.				$d = 0.09$ ELLs > EOs	C	T	USA	Low
Nevo and Vaknin-Nusbaum (2018)	An interactive reading strategy (e.g. open-ended wh-questions) applied to informational science or narrative texts (two conditions) predicted children's story comprehension and morphology.		Time by condition: $\eta^2 = 0.072$	$\eta^2 = 0.007$		C/I	T	Israel	Middle

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Sampled studies	Hypothesized predictors and outcomes	SEL	Narrative	Grammar	WK	Focus	Adult reader	Country	SES
Nielsen and Friesen (2012)	Reading narrative books, with teachers focusing on story elements, story reenactment and story retell, predicted children's story retell skills.		ns			C	R	USA	Not reported
Thomas et al. (2019)	An interactive reading program in which teachers decided on books and reading strategies and were asked to adapt their reading to their classroom students predicted macrostructural narrative skills.		$\eta^2 = 0.004$			I	T	Belgium	Low
Thomas et al. (2020)	An interactive reading program in which teachers decided on books and reading strategies and were asked to adapt their reading to their classroom students predicted morphosyntactic skills.			$\eta^2 p = 0.019$		I	T	Belgium	Low
Yen and Tsai (2016)	Reading of emotion-laden books predicts children's emotion comprehension if parents receive training in dialogic reading techniques.	$F = 10.79, p < .01$				C/I	P	Taiwan	Not reported
Vaknin-Nusbaum and Nevo (2017)	An interactive reading strategy (open-ended wh-questions, encouragement to make inferences) with morphologically complex books and teachers highlighting morphology in their interaction, predicted morphological awareness.			$\eta^2 = 0.24$		C/I	T	Israel	Middle
Experimental studies									
Aram et al. (2013)	Parents trained in DR to address socio-cognitive themes in books about social situations and different viewpoints predicted children's references to socio-cognitive themes/ use of mental terms and book plot (story structure)	$\eta^2 = 0.23/\eta^2 = 0.08$	$\eta^2 = 0.25$ (book plot)			C/I	P	Israel	Low
Arnold et al. (1994)	Picture-book reading with parents who read in a dialogic way (open questions, follow child's lead, whether trained traditionally or via videotape) predicted children's grammatical skills (ITPA grammatical closure).			ns		I	P	USA	Middle
Baker et al. (2013)	Read-aloud intervention using narrative and expository texts and including comprehension teaching before, during and after reading predicted narrative retell.		$d = 0.42$			C	T	USA	Low
Baker et al. (2020)	Read-aloud intervention using narrative and expository texts and including comprehension teaching before, during and after reading predicted narrative retell (replication of Baker et al., 2013)		ns			C	T	USA	Low
Bergman Deitcher et al. (2021)	Effect of interactive reading with books rich in mental and emotion terms and with discussions of characters' thoughts and emotions on children's understanding of emotions (EU), use of emotional terms (ET) and of mental state terms (MS) compared to interactive reading focusing on	$ET, EU p < .001.$ Use of mental terms ns.				C	R	Israel	Low

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Sampled studies	Hypothesized predictors and outcomes	SEL	Narrative	Grammar	WK	Focus	Adult reader	Country	SES
Box and Aldridge (1993)	the books' plots, characters and actions. Shared reading activities (as opposed to other activities) predicted children's story structure.		$F = 0.53, p = .59$			I	T	USA	Low
Brockmeyer (2009)	Book reading during which teachers highlight mental states of story characters and ask questions to support storybook comprehension (in mental state versus non-mental state book types) predict theory-of-mind skills (deception skills)	$t(65) = 4.37, p < .001$ Book type, $p = .97$ .				C	R	USA	Low
Chow et al. (2008)	Standard dialogic reading techniques with morphology training (DR + MT) versus DR alone, typical reading (TR) or no-book control predicting growth in morphological awareness.			<b>DR + MT &gt; TR</b> $d = 0.69, p < .05$ , Others ns.		C/I	P, T	China/HK	Not reported
Gavazzi and Ornaghi (2011)	Participating in structured conversational games designed to elicit emotional and mental state terms after book reading predicts emotion comprehension.	$\eta_p^2 = 0.306$				C	R	Italy	Middle
Grolig et al. (2020)	A dialogic reading intervention with a narrative comprehension focus (story-specific questions designed to develop narrative comprehension) predicting inferential narrative comprehension (INC) and literal narrative comprehension (LNC) as well as inferential narrative production (INP) and literal narrative production (LNP)		<b>INC: <math>\Delta = 16\%</math>, <math>t = 4.14, p &lt; .001</math>; LNC <math>\Delta = 13\%</math>, <math>t = 3.69, p &lt; .001</math>; LNC, LNP ns</b>			C/I	T	Germany	Middle
Grøver et al. (2020)	Interactive reading during which teachers are asked to invite children to reason and identify perspectives and characters' emotions, predicts second language learners' perspective taking (PT), narrative skills and syntactic comprehension (SC).	<b>PT <math>d = 0.41, (p &lt; .001)</math></b>	ns	<b>SC <math>d = 0.31, (p = .007)</math></b>		C/I	P, T	Norway	Mixed
Isbell et al. (2004)	Storytelling and story reading predicts story comprehension differently. Story telling predicts child story retelling, story reading predicts child reading of a wordless book.		No stats			C	R	USA	Not reported
LaForge et al. (2018)	Shared reading of emotion-enhanced books compared to control predicting children's emotion comprehension (TEC)	<b>TEC for Tx group, <math>d = 1.12 (p = .01)</math>, ns for C</b>				C	R	Canada	Middle
Lake and Evangelou (2019)	Storybook reading with dialogic discussion followed by pretend play predicting children's narrative skills, assessed a) as MLU on the Bus Story, b) with other measures.		<b>Partial <math>\eta^2 = 0.04</math>. other measures ns</b>			I	R	England	Mixed
Lever and Senechal (2011)	Dialogic reading compared to control condition in predicting narrative skills: story grammar production (SGP) or retelling (SGR), language complexity (MLU), contextual knowledge (CK), cohesion (CO), internal thought and feeling reference in production (TFP) and in retelling (TFR)	<b>TFP: <math>d = 0.56, p = .05</math>; TFR: <math>d = 0.77, p = .009</math></b>	<b>SGP: <math>d = 0.38, p = .001</math>; SGR: <math>d = 0.28, p = .03</math></b>	MLU ns		I	R	Canada	Mixed
Murray et al. (2016)	Dialogic book sharing techniques combined with attention to book characters'	$d = 0.62, p < .05$				C/I	P	South Africa	Low

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Sampled studies	Hypothesized predictors and outcomes	SEL	Narrative	Grammar	WK	Focus	Adult reader	Country	SES
O'Brien (2014)	actions and feelings and book content's links to child experiences compared to no sharing control for effects on child socioemotional outcomes. Building conceptual knowledge within scaffolded discussions of narrative and expository texts (as opposed to expository texts only) predicted conceptual knowledge and science vocabulary.				ns	C	R	USA	Not reported
Piasta et al. (2020)	A shared book reading intervention with embedded language and literacy instruction predicting to teachers' meaning focused instruction (TM: mediator) and children's narrative skills		TM ( $p < .001$ ) child skills ns			C	T	USA	Low
Reese et al. (2010)	Dialogic reading (DR: open-ended questions, expanding on child utterances) compared to elaborative reminiscing (ER: same interactive techniques) in predicting narrative quality (NQ) and story comprehension (SC)		NQ: DR < ER, $\eta_p^2 = 0.57$ , SC: $\eta_p^2 = 0.24$			I	P	USA	Low
Roberts (2010)	Parents trained to infuse read-alouds with comprehension strategy instruction (retelling, attention to story structure, use of prior knowledge) predicting child narrative comprehension		ns			C	P	USA	Mixed
Rosenhouse et al. (1997)	Three interactive reading conditions (children listened to stories by different authors, stories by the same author, series of stories by the same author) were compared to nonreading controls in predicting story telling skills (SL: story length, SG: story grammar)		SL $F = 0.13$ , SG $F = 18.75$			C/I	T	Israel	Low
Sa (2012)	Children prompted to understand characters' perspectives (CP) vs to understand story structure (SS) predicting narrative inference making skills		CP > SS $d = 0.95$			C	R	USA	Low
Salay (2018)	Participants discussing key events and imagining themselves in situations that the characters were facing predicting empathy.	ns				C	T	USA	Low
Terry (2011)	Standard DR techniques combined with additional training in how to talk about emotions predicting emotion knowledge and perspective taking.	ns				C/I	P	USA	Low
Vajcner (2015)	Students receiving a six-week interactive reading intervention at home and school (HS), respectively in school only (SO), had higher emotion knowledge (EK) post- than pre-intervention. Dialogic reading at home and school compared to dialogic reading at school predicted increased child emotion knowledge and social competence	EK in HS: $p = .01$ EK in SO: $p = .03$ ; HS vs SO: ns				I	P, T	USA	Low
van der Wilt et al. (2019)	Traditional DR (open questions, inviting child participation) compared to DR with child attention focused through a question before reading and		ns			I	T	The Netherlands	Not reported

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Sampled studies	Hypothesized predictors and outcomes	SEL	Narrative	Grammar	WK	Focus	Adult reader	Country	SES
Vaquero (2014)	through constructing a mindmap in promoting narrative development. Effect of parent training in interactive reading with prompts and questions vs. usual read aloud practice on supporting narrative skills (story retelling MLU: RMLU, spontaneous story MLU: SMLU).		RMLU: $d = 0.26, p = .018$ SMLU: $d = 0.35, p = .008$			I	P	USA	Low
Vivas (1996)	Effect of participation in read-aloud interventions in one of two experimental groups (home reading HR or school reading SR) vs. no-intervention controls on story comprehension (SC) and syntactic production (SP), both immediately after intervention and delayed (9 months later)		Short term SC, HR > con: $U = 438, p < .02$ ; SR > con: $U = 382, p < .001$ ; Long term HR > con: $U = 349, p < .001$	Short term SP, HR > con: $U = 428, p < .01$ ; SR > con: $U = 452, p < .01$ ; Long term ns		I	P, T	Venezuela	Low
Zevenbergen et al. (2003)	Children participating in a dialogic reading intervention were more likely to include references to characters' internal states than children who did not participate	$d = 0.48, p < .05$				I	P, T	USA	Low
Single-group studies									
Borzone (2005)	Children who took part in a year-long interactive story-reading intervention program improved their narrative abilities (story structure, information organization, coherence).		No stats			I	T	Argentina	Low
Chou and Chang (2008)	Children with parents who invited more discussion of a character's misunderstanding while reading interactively with their child, supported the child's false belief skills (ToM).	$t = -4.911, p < .001$				I	P	Taiwan	Middle
Dias-Correa et al. (2016)	Effects of a story reading program using books with social content over time on social skills (SS) and emotion regulation (ER).	SS & ER: Post > pre, $p < .01$				C	T	Brazil	Not reported
Driver (2017)	Children who received repeated and interactive read-alouds of informational texts in a two-week intervention improved from reading 1 (R1) to reading 3 (R3) their world knowledge skills, assessed as acquisition and retention of science concepts in the texts.				R2 > R1: $p < .01$ , R3 > R2: $p < .01$	C	T	USA	Not reported
Goodman and Dent (2019)	Children who received story-reading followed by questions to invite reflection on the storyline (control group condition) improved their theory-of-mind skills over six months.	$p < .05$				I	R	Uganda	Low
Holt and Asagbra (2021)	Dialogic reading intervention showing effects on syntax production and mlU compared to control group.			ns		I	R	USA	Low
Nielsen et al. (2011)	Assignment to an interactive reading intervention (that also included enacting and retelling) predicting changes in children's narrative skills from pre to post test.		$t = 4.13 (1/21) p < .001$			I	T	USA	Low
Single subject design									
Huennekens and Xu (2010)	Spanish speaking ELLs' parents who were trained in dialogic reading using Spanish books at			No stats		I	P, T	USA	Low

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Sampled studies	Hypothesized predictors and outcomes	SEL	Narrative	Grammar	WK	Focus	Adult reader	Country	SES
	home had children who demonstrated increased MLU in English when observed in their Head Start classrooms.								

Note: numbers in bold mark significant findings. SEL = socio-emotional and socio-cognitive skills, WK = world knowledge, C = content focus, I = Interaction focus, C/I = combined content and interaction focus. Adult reader: P = parent, T = teacher, R = researcher. SES: middle = middle and middle-to-high. Outcome symbols:  $r$  = Pearson's correlation coefficient,  $f^2$  = Cohen's effect size, ns = non-significant,  $\beta$  = beta,  $d$  = Cohen's  $d$  (effect size),  $\eta_p^2$  = partial eta squared, no stats = no statistics.

## Appendix D. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.actpsy.2023.103997>.

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