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ORIGINAL PAPER

Books and Toddlers in Child Care: Under What Conditions are Children Most Engaged?

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Abstract
Background Although shared book reading is seen as an effective way to support children's early literacy and language development, less is known about the factors associated with toddlers' engagement with books.
Objective The goal of the current study was to examine younger and older toddlers' engagement with books during one-on-one reading with a teacher in an interactive versus non-interactive manner and during independent exploration.
Method Using single-case design, the study examined how engagement among toddlers ($N = 6$) in a childcare classroom varied under different book reading/exploration conditions.
Results Results indicated that overall engagement was greater when teachers read interactively compared to when children explored books on their own, with this effect differing for younger versus older toddlers.
Conclusions Understanding how teachers reading to younger and older toddlers is associated with children's engagement with books compared to children's engagement when exploring books on their own can inform early care and education reading practices with toddlers. Implications for book reading with toddlers in group childcare are discussed.

Keywords Developmentally appropriate · Engagement · Teacher-child interactions

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Introduction

There is abundant evidence to suggest that shared book reading is an important activity to support young children's development of language skills (e.g., Bojczyk et al. 2016; Dickinson et al. 2012; Hindman et al. 2008; Wasik et al. 2006) and emergent literacy skills (e.g., Hindman et al. 2014; Reese and Cox 1999; Whitehurst and Lonigan 1998). Yet not all shared book reading appears to be associated with children's growth and development; the quality of the shared book reading experiences matters (Scarborough and Dobrich 1994). Studies of preschoolers find that when teachers read interactively, by asking open-ended questions and responding to and expanding upon children's responses, children are more likely to benefit from the shared book reading experience than when teachers read books in a less interactive manner (e.g., Moschovaki et al. 2007; Wasik and Bond, 2001; Zucker et al. 2013). Children are also most likely to benefit from shared book reading when they are engaged with or focused on books (Crain-Thoreson and Dale 1992; Ortiz et al. 2001; Whitehurst and Lonigan 1998). Furthermore, the extent to which children are engaged during book reading may be a function of the strategies teachers use to engage children during book reading (Ponitz and Rimm-Kaufman 2011). Yet despite the implications of children's engagement for their developmental outcomes, very young children's engagement with books has received limited attention in the literature (Kaderavek and Justice 2002).

Engagement with books during toddlerhood may lay a foundation for the development of language, self-regulation, and phonological awareness that supports later reading achievement (Fernald and Weisleder 2011; Metsala 2011). Toddlers' behavioral engagement with books has been linked with their language ability and knowledge of print concepts as preschoolers (Crain-Thoreson and Dale 1992) and their later reading achievement (Connor et al. 2009), suggesting that toddlers' engagement with books may have implications for how well they are able to take advantage of book reading as an opportunity for language and literacy development and early learning. Despite this potential, however, the determinants of toddlers' engagement with books remain under-explored (Ortiz et al. 2001). While teachers' behaviors during book reading can predict preschoolers' engagement (Baroody and Diamond 2016; Ponitz and Rimm-Kaufman 2011), the extent to which teachers' behaviors predict toddlers' engagement, and how these behaviors may differ for younger and older toddlers, is less well understood. Given that young children vary by age in their ability to self-regulate and attend to structured tasks like book reading (Ruff and Rothbart 1996; Ruff and Capozzoli 2003) and in their language and communication skills (Hirsh-Pasek and Golinkoff 2012), considering the role of age among toddlers is important for understanding individual differences in young children's engagement with books.

The current study contributes to the literature by examining younger and older toddlers' engagement with books during one-on-one book reading with a teacher who is reading in either an interactive manner or non-interactive manner, compared to toddlers' engagement during independent book exploration. In group care settings, teachers of toddlers typically read books to children with varying degrees of interaction; some teachers read asking open-ended questions, allowing for children's comments or interjecting comments about the book, while other teachers read the text with minimal comments or animation (Honig and Shin 2001). In addition to reading to children, teachers also promote children's engagement with books by providing toddlers with opportunities to explore books independently by making books readily available and accessible (Lee 2011). Yet it is unclear

the extent to which these different ways that toddlers interact with books—either on their own or with a teacher reading interactively or not—is best associated with toddlers' engagement. By examining these different reading activities, we contribute an understanding of how the ways teachers read to younger and older toddlers are associated with children's engagement, which may be used to inform early care and education book reading practices with toddlers. Furthermore, if variations do exist between younger and older toddlers' engagement during shared book reading with teachers compared to independent book exploration, then teachers should understand at what age differences are likely to occur so that they can modify their reading strategies to enhance children's book experiences. To our knowledge, there are no studies that compare the engagement of younger and older toddlers in shared book reading to independent book exploration within group care classroom settings.

Conceptual Framework

The bioecological model of human development proposes that proximal processes are the primary mechanism of development (Bronfenbrenner and Morris 1998). The proximal processes that were the focus of this study were the experiences toddlers have with books while interacting with teachers and during independent exploration. Within this framework, the proximal processes that effectively influence development are those that occur on a fairly regular basis over time (Bronfenbrenner and Morris 2006). Thus, this study sought to advance understanding of the proximal processes that may promote engagement during book-related activities within a group care setting, a setting in which many toddlers spend a significant amount of time.

The sociocultural approach to cognitive development (Gauvain and Perez 2015) specifically considers how social (i.e., proximal) processes occur within a cultural context, using tools of the culture (e.g., books), to promote children's learning. The processes that will be most engaging, and thus more promotive of literacy development, are those that occur within the Zone of Proximal Development (ZPD); experiences outside the ZPD do not promote as much engagement, and thus learning, as they are either too familiar and less stimulating (when below the ZPD) or too complex (when above the ZPD) (Vygotsky 1978).

During interactions, a more skilled individual can promote learning within the ZPD by providing scaffolding, verbal and nonverbal behaviors that support the learner's engagement (van de Pol et al. 2010), such as when a teacher reading to a child promotes engagement by asking questions and using expansions and repetitions that are contingent on the child's behaviors, adjusting their scaffolding behaviors as a child's skills increase to further promote engagement and development. Moreover, the proposition of guided participation emphasizes the active role of the child (particularly by directing their sustained attention to an activity) in learning during activities characterized by more direct instruction as well as during informal activities (Rogoff 1990). Thus, more experienced individuals promote learning valued by the culture (e.g., literacy) via explicit verbal interactions, non-verbal behaviors, and the manner in which they arrange the environment in order to organize the child's interactions within it. Within the context of a group care environment, toddlers bring their own interests and skill levels and learn via interacting with teachers during explicit learning activities (e.g., experiencing scaffolding when being read to), participating in regularly occurring routines organized by the teachers (e.g., "story time"), and exploring the environment arranged by the teachers on their own.

Young Children's Engagement with Books

Much of the research on children's engagement with books has been with preschool children and finds that when adults adopt an interactive approach to book reading by asking children questions and responding to children's communicative attempts, children are more likely to actively participate in the story being read (e.g., Arnold et al. 1994; Crowe et al. 2004; Whitehurst et al. 1988). While engagement is rarely measured in these studies given their focus on investigating children's language skills, improvements in children's utterances and syntactic complexity during book reading may reflect increased engagement. For example, interventions with preschoolers that have trained teachers to use dialogic reading, an interactive style of reading that involves asking children open-ended questions and expanding on children's comments, have demonstrated increases in children's participation in terms of responses to teachers' questions compared to children exposed to non-interactive reading styles (e.g., Hargrave and Sénéchal 2000; Whitehurst et al. 1988). It is important to consider whether interactive book reading strategies would promote similar levels of engagement among toddlers who have more rudimentary language skills than preschoolers.

Few studies have looked at toddlers' engagement during shared reading with teachers in early care and education settings. These studies find that when teachers use interactive strategies (e.g., asking questions, responding to children's communicative attempts) with 2-year olds during book reading, children show more spontaneous language (e.g., Girolametto et al. 2000; Valdez-Menchaca and Whitehurst 1992). As with studies of preschoolers, these studies have not measured engagement directly, but instead considered whether greater levels of spontaneous language may indicate greater engagement. Yet a direct measurement of engagement that is not confounded with language would help to clarify toddlers' engagement levels during book reading experiences. Furthermore, as these studies have focused on 2-year olds, it is unclear how younger toddlers (i.e., 1-year olds) may engage during different book reading experiences.

Studies of mothers and toddlers suggest that interactive strategies during book reading may be more engaging to toddlers than verbatim reading (Fletcher and Finch 2015). In addition, when mothers are taught to read in responsive ways and provide scaffolding and verbal prompting to children during book reading, children's engagement in book reading improves over time (Landry et al. 2012). While some debate exists as to the specifics of what style of interactive reading is most engaging to children, scholars suggest that adult behaviors that encourage children to take an active role in book reading may be more effective than adults reading while children listen passively (Reese et al. 2003; Sénéchal et al. 1995).

Other studies have found no association between adult behaviors during reading and children's engagement (Crain-Thoreson and Dale 1992; Laakso et al. 1999). For example, Laakso et al. (1999) found that maternal behaviors during reading were uncorrelated with how interested or attentive children were during the reading session. These results suggest that children's engagement with books may be a function of individual differences that operate independently of adult behaviors (Crain-Thoreson and Dale 1992; Fletcher et al. 2005). Much of the attention in the literature, however, has been on the adult role in supporting children's engagement with books, and therefore little is known about the role of children's engagement with books on their own.

There is some evidence suggesting that children can benefit from engaging with books on their own, independently of shared book reading with an adult. For example,

Scarborough et al. (1991) found that the more frequently children engaged with books on their own as preschoolers, the more likely they were to become typical readers in elementary school, compared to children who less frequently engaged in solitary book exploration as preschoolers. Similarly, a study of Finnish 2-year olds found that children who "read" books to themselves were more likely to have stronger language skills than children who showed no interest in exploring books on their own (Lyytinen et al. 1998). It is less clear, however, the extent to which independent book exploration is more or less supportive of children's engagement with books compared to engagement during shared book reading, as there is limited evidence of whether it is children's individual interest in books or adult behaviors that support children's engagement with book reading.

In addition, there is also limited evidence regarding how age is associated with toddlers' engagement with books either during shared reading experiences or during independent book exploration. Children's abilities to engage in activities that require focused attention, such as book reading, develops rapidly during the early years as neurological maturation allows them to increasingly attend to objects and events in the environment (Ruff and Rothbart 1996). As toddlers' attention is driven over time by the social context, toddlers become better able to sustain attention and engage in activities (Ruff and Capozzoli 2003). Similarly, given the rapid growth in language skills during toddlerhood, older toddlers may also be better able to engage in book reading than younger toddlers due to their more advanced receptive and expressive language skills (Hirsh-Pasek and Golinkoff 2012), skills that can also influence their ability to self-regulate long enough to participate in learning activities like book reading (Vallotton and Ayoub 2011). Given these developmental differences, there may be differences in the extent to which younger and older toddlers engage with books both with teachers and on their own during independent book exploration. Yet, there is no known study that has compared younger and older toddlers' engagement during different book reading conditions.

The Current Study

The current study contributes to the literature by focusing on an underexplored topic: toddlers' engagement during book reading with teachers compared to independent book exploration. Engagement has often been examined with preschoolers, using language participation during book reading (e.g., Arnold et al. 1994; Whitehurst et al. 1988), observed dichotomous measures (i.e., engaged or disengaged) (e.g., Baroody and Diamond 2016; Ponitz and Rimm-Kaufman 2011), or global ratings (e.g., Kaderavek et al. 2014) as indicators of engagement. To move the literature forward, we used eye gaze as a discrete, direct measure of engagement among toddlers that does not rely on children's language or motor skills. Furthermore, by examining differences in younger and older toddlers, the study contributes to the literature that has focused on older toddlers (i.e., 2-year olds) to the exclusion of younger toddlers (i.e., 1-year olds) (e.g., Crain-Thoreson and Dale 1992; Fletcher and Finch 2015; Ortiz et al. 2001; Valdez-Menchaca and Whitehurst 1992). The current study used data collected within the context of a childcare classroom in the presence of other teachers and children to contribute to the literature on young children's engagement within a naturalistic childcare context to inform early care and education book reading practices.

Two research questions guided the current study. First, to what extent is book reading with a teacher, either interactively or non-interactively, associated with greater levels of toddler engagement compared to independent book reading in which children explore books on their own? Based on research showing the effects of adults' interactive reading

behaviors on children's engagement with books (Moschovaki et al. 2007; Ponitz andRimm-Kaufman 2011; Valdez-Menchaca and Whitehurst 1992; Whitehurst et al. 1988), we hypothesized that interactive reading would be associated with higher levels of engagement compared to children's independent book exploration. Second, to what extent are there differences by children's age in the association between the type of adult reading style and children's engagement? Based on evidence that children's language and attention skills improve with age (Hirsh-Pasek and Golinkoff 2012; Ruff and Rothbart 1996; Ruff and Capozzoli 2003), we hypothesized that older toddlers (25–36 months old) would demonstrate greater levels of engagement during either type of adult reading style than younger toddlers (13–24 months old).

Method

Participants

Participants were toddlers and lead early childhood teachers enrolled in a study examining the effectiveness of various classroom activities in early childhood settings. From the larger sample of 30 children and six teachers, six toddlers and four of their teachers who had participated in book reading activities were subsampled for the current study. Three of the toddlers were between 13 and 24 months old, and three were between 25 and 36 months at the start of the study. All were enrolled in one of four classrooms in a nationally accredited, full-day inclusive childcare program. Of the younger toddlers, all were females; one of the older toddlers was male. Children were from racially and ethnically diverse backgrounds (three Hispanic/Latinos, one European American, one African American, and one biracial). All Hispanic/Latino children came from Spanish-speaking families, with one of the Hispanic/Latino children coming from a Spanish–English bilingual family. The other children were from English-speaking families. Four of the six children were enrolled in the Early Head Start slots available in the childcare program, which meant their families met low-income criteria. Two of the mothers and one father had at least a 4-year college degree. On average, mothers were 31 years old (SD = 8.1), and fathers were 35 years old (SD = 10.0). Of the teachers, all had bachelors' degrees and coursework in early childhood education. Each was the primary teacher for the children with whom they interacted. Two of the teachers taught the younger toddlers and two taught the older toddlers. All teachers had five or more years of teaching experience and met criteria for highly qualified teachers according to Early Head Start standards.

Procedure

Testing of the different book reading conditions took place in three separate sessions on different days over the course of a week in a toddler childcare classroom setting. Each session consisted of: (1) interactive teacher-child book reading; (2) non-interactive teacher-child book reading; and (3) child independent book exploration without adult facilitation. The order of the activities was randomly assigned for each session using a computerized randomization program. Non-study children and other teaching staff were present in the classroom during the study activities. Sessions were videotaped and later coded by trained research assistants.

For each of the conditions, a teacher either spread 3–6 books in front of the child or showed the child a bin containing 3–6 books. Children were allowed to choose the book or books of interest. Books used in the study included both narrative and expository picture books with simple storylines, clear illustrations, and familiar concepts, many of which are typically available in childcare classrooms and with which many of the children were acquainted (see the appendix for a complete list of books used in the study).

Teacher-Child Book Reading Conditions

Teacher-child book reading consisted of one-on-one reading of a book chosen by the child.

Interactive book reading For the interactive book reading condition, teachers were instructed by research staff before the session to read interactively with the study child. This interactive reading included asking open-ended questions, providing any needed scaffolding, allowing conversational turn-taking, and responding to children's verbal and nonverbal cues.

Non-interactive book reading For the non-interactive reading condition, teachers were instructed to read the text straight through without asking the child questions or adding any embellishments to the story. Teachers were instructed to provide minimal responses to children's utterances or questions during the non-interactive book reading condition.

The duration of the activities was determined by children's interest as evident by behavioral cues for when the children were done participating (e.g., crawling/walking away from the book). Interactive reading sessions ranged in duration from about three to seven minutes, with an average of 4.3 minutes (SD = 1.8), and non-interactive reading sessions ranged from one to seven minutes, with an average of 3.0 minutes (SD = 2.3).

Independent Book Exploration Condition

In the independent book exploration condition, children were given a bin of picture books to explore and were allowed to engage with the books without adult interference. Researchers instructed teachers to minimize interaction with the child while the child was exploring the books independently. During this time, teachers typically pretended to be engaged in a managerial task within close physical proximity to the child. Independent book exploration ranged in duration from two to three mintues, with an average of 2.9 minutes (SD = .3).

Fidelity to the Study Protocol

To ensure fidelity of teacher implementation of the teacher-child book reading activities, teachers were provided with a written protocol, coached by a researcher in advance regarding the activity, and provided with opportunities to review the books and ask questions of the researcher before the sessions began. Review of the videotapes indicates that teachers maintained fidelity for the majority of the sessions. One teacher working with one child (Child A) deviated from the study protocol during two of the three non-interactive reading conditions (sessions 1 and 3) by making comments and asking the child questions during the non-interactive reading condition instead of reading through the book with minimal questions. Another teacher deviated when reading to Child F in session 3 by asking the child multiple questions during the non-interactive condition; this teacher

conducted sessions 1 and 2 with fidelity. All the interactive reading sessions and independent book exploration sessions were conducted with high fidelity.

Book Engagement

Children's eye gaze during the book reading was used as a behavioral indicator of engagement. Eye gaze is a measure of engagement that serves as a cue during social interactions as to an individual's attention (Langton et al. 2000) and has been used in previous studies as an indicator of engagement (e.g., McWilliam and Ware 1994; Powell et al. 2008; Roskos et al. 2012). For the current study, eye gaze was defined as the child looking at the teacher or books associated with the activity for at least two seconds. Trained research assistants observed and coded the presence of children's eye gaze from video recordings using the Observer Noldus software (Grieco et al. 2010). The duration of each occurrence of eye gaze during the session was recorded and summed for each book reading condition over the course of the three sessions. The proportion of the total time spent on eye gaze during a session was calculated for each condition (i.e., the time of all instances of on-task eye gaze were summed for each session and then divided by the total time of the session to calculate the proportion of eye gaze for that condition). Higher proportions of eye gaze during a condition were used to indicate greater engagement.

To determine inter-observer agreement, 25% of the videos were coded by two trained coders and calculated as a percentage of agreement on the occurrence of the behavior; inter-observer agreement was found to be 80%.

Single-Case Design (SCD)

A single-case, alternating treatment design was used in this study to compare the engagement of individual children in the teacher-child book reading conditions and in independent book exploration condition (Kazdin 2011). Single-case design is useful for investigating the effects of different reading styles on children's engagement as it allows for the rigorous evaluation of experimental conditions with a small number of cases (Kazdin 2011). In this design, samples of engagement were collected during the teacher-child book reading conditions (i.e., interactive and non-interactive) and contrasting condition (i.e., independent book exploration) across three data points. Three data points were chosen to meet the design standards for single case designs (Kratochwill et al. 2013). Data are usually displayed graphically and experimental control (which infers a causal relationship) is assumed when the participant's performances (in this case, engagement) are consistently and clearly different for the different experimental conditions (i.e., teacher-child book reading conditions and independent book exploration condition). Visual examination of the data was performed and a SCD statistical analysis, using the Tau-U calculator (see below), was conducted to determine whether there was a significant difference between the activities for individual participants.

Data Analytic Strategy

The Tau-U statistic (Parker et al. 2011) was used to analyze the set of single case designs. Since its publication in 2011, the Tau-U statistic has been used extensively to examine the effects of educational programs and interventions, including those designed for young children (Bryant et al. 2016; De Marco et al. 2015; Rahn et al. 2016). The Tau-U statistic is

one of a family of measures for the analysis of data yielded by single case design (i.e., interrupted time series analyses techniques) that is intended to complement the results yielded by visual analyses (Harrington and Velice 2015). The Tau-U statistic, derived from Kendall's Tau statistic of correlation (Kendall and Gibbons 1999) and the Mann–Whitney U statistic of overlap, is a recently developed non-overlap technique that is calculated by comparing all the unique pairs of data points between activities within a session. The online Tau-U calculator developed by Parker and his colleagues (Vannest et al. 2011) provides the Tau-U statistic and its associated standard deviation, confidence interval, z and p statistics for individual participants. Because both the Tau-U statistic and its associated variances are additive, the calculator also can provide pooled statistics for groups of participants. These pooled statistics can be weighted by the number of pairs for which data are available; weighted statistics are reported and interpreted throughout.

The Tau-U statistic offers an efficient way to characterize differences in the dispersion of data points between activities within each child. The first step in calculating the Tau-U statistic was to compare all the unique pairs of data points (representing proportion of on-task eye-gaze) between independent activity conditions and non-interactive reading conditions, and then between independent activity conditions and interactive reading conditions for each child. Although it is possible to control for trends in eye gaze across iterations of the independent activity conditions, it was not necessary in this case because no significant trend during independent activity was observed for any child. The second step was to pool the Tau-U statistics and their associated variances for each group of participants (i.e., young toddlers and older toddlers) while weighting these pooled statistics to accommodate the one missing data point (for the second session during independent reading for Child D). Tau-U provides information on the degree of overlap between clusters of data points that correspond to different phases of a procedure and whether the absence of overlap exceeds what would be expected for a given level of alpha.

Results

Book Selection by Book Related Activity

Table 1 contains a list of the books children selected for each of the book reading conditions across sessions. For the teacher-child conditions, children tended to focus on one book during each session with a teacher and with some variation in the books selected across sessions and conditions. This variation reflects the choice of some children for different books during different sessions and conditions (e.g., Child A and Child D during interactive reading) and the choice of other children for the same book for two of three sessions within a condition (e.g., Child B, Child E and Child F). During the independent book exploration condition, children chose to peruse multiple books and tended to look at the same books across sessions. There were no differences in book selection between younger and older toddlers.

Differences in Engagement by Book Related Activity

To test the hypothesis concerning the extent to which book reading with a teacher, either reading interactively or non-interactively, is more engaging than toddlers' independent book exploration, visual inspection of graphs of engagement by session across the different

Table 1 Children's book selection by session and book reading condition

Child	Session	Interactive reading	Non-interactive reading	Independent exploration
A	1	Brown Bear, Brown Bear	10 Little Rubber Ducks	My First Body Book Animals First 100 Words
	2	Cornelius P. Mud, Are You Ready for School?	Brown Bear, Brown Bear	My First Body Book Animals First 100 Words
	3	Libro! Book!	10 Little Rubber Ducks	My First Body Book Brown Bear, Brown Bear
B	1	Hand, Hand, Fingers, Thumb	Freight Train	Brown Bear, Brown Bear My First Body Book
	2	Freight Train	Hand, Hand, Fingers, Thumb	First 100 Words
	3	Hand, Hand, Fingers, Thumb	Freight Train	Brown Bear, Brown Bear
C	1	Hand, Hand, Fingers, Thumb	Brown Bear, Brown Bear	Animals First 100 Words My First Body Book
	2	Brown Bear, Brown Bear	Freight Train	First 100 Words Animals My First Body Book
	3	10 Little Rubber Ducks	Hand, Hand, Fingers, Thumb	First 100 Words Animals
D	1	Rhyming Dust Bunnies	Siesta	Brown Bear, Brown Bear 10 Little Rubber Ducks Freight Train Hand, Hand, Fingers, Thumb
	2	Little White Rabbit	Kitten's First Full Moon	Missing data
	3	Are You A Horse?	Kitten's First Full Moon	10 Little Rubber Ducks Freight Train
E	1	10 Little Rubber Ducks	Cornelius P. Mud, Are You Ready For School?	Brown Bear, Brown Bear My First Body Book
	2	Are You A Horse?	Rhyming Dust Bunnies	First 100 Words
	3	Are You A Horse?	Kitten's First Full Moon	Hand, Hand, Fingers, Thumb
F	1	Kitten's First Full Moon	Are You A Horse?	Little White Rabbit
	2	Kitten's First Full Moon	Are You A Horse?	Freight Train Animals Where's Spot?
	3	Are You A Horse?	Kitten's First Full Moon	Freight Train

conditions was conducted. Figure 1 shows that across all participants, mean levels of engagement were greater in the interactive reading condition compared to the independent book exploration condition across all three sessions. Similarly, participants also demonstrated greater engagement during the interactive reading condition than during the non-interactive condition. This difference was greatest during the first session and smaller during the second and third sessions. Figure 1 also shows that mean engagement was similar in both the non-interactive reading and independent exploration conditions in the

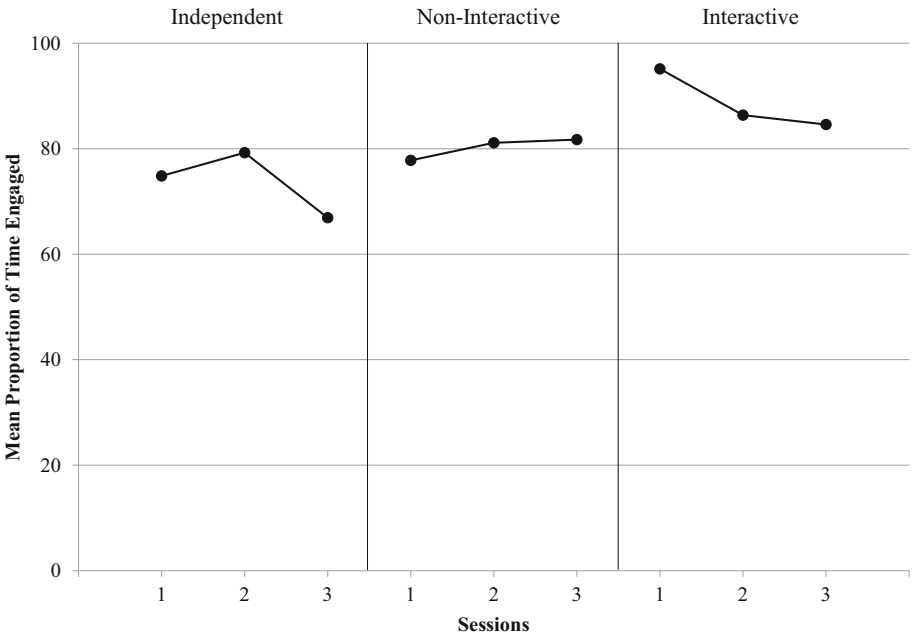

Fig. 1 Mean proportion of time engaged in book reading activities in each of the three sessions across all participants. Each activity was conducted in a single session. The order of activities within a session for each participant was determined randomly by a computerized program and varied by session

first two sessions, but that engagement was greater in the non-interactive reading than the independent exploration in the last session. Results from the Tau-U analyses of the total sample confirm that children's levels of engagement were significantly higher during the interactive reading session than during independent book exploration (Table 2). The Tau-U statistic shows that the levels of engagement during the non-interactive reading session were higher than during the independent exploration session at a rate approaching significance.

Comparing Younger and Older Toddlers

To address the extent to which there were age differences in children's engagement during teacher-child reading activities and independent book exploration, comparisons were made of the graphs of the level of engagement by younger and older toddlers. Figures 2 and 3, respectively, display the proportion of on-task engagement for each activity plotted against the successive sessions of those activities for younger and older toddlers. In Fig. 2, it is evident that while Child B exhibited more engagement during the non-interactive and interactive reading tasks compared to the independent book exploration, Child A and Child C showed different patterns of engagement. Child A shows no consistent engagement during the three book-related activities. For example, in session 1, Child A's engagement was highest during the interactive and independent book reading conditions and lowest during the non-interactive condition with the teacher. For session 2, Child A demonstrated greater engagement in the interactive reading condition, and lower engagement during the non-interactive and the independent exploration conditions, during which Child A showed

Table 2 Weighted Tau-U statistics for comparisons of engagement during book reading activities

	Non-interactive versus independent book exploration					Interactive reading versus independent book exploration				
	T	VAR_T	90% CI	*z*	*p*	*T*	VAR_T	90% CI	*z*	*p*
Total sample	.35	.21	0, .70	1.62	.10	.51*	.21	.16, .86	2.39	.02
By age										
12–24 Months	−.11	.29	−.60, .37	−.38	.71	.11	.29	−.37, .60	.38	.71
25–36 Months	.82**	.31	.32, 1.33	2.67	.008	.92**	.31	.42, 1.43	3.00	.003

All comparisons were between the teacher-child reading activity indicated and independent book exploration

T weighted Tau-U statistic, VAR_T variance of the Tau-U statistic, *90% CI* 90% confidence interval for the Tau-U statistic, *z* test statistic for Tau-U

* $p < .05$; ** $p < .01$

similar levels of engagement. For the third session, Child A's pattern changes, such that the lowest level of engagement is during the interactive condition, while engagement is higher during the non-interactive and independent conditions. A more consistent pattern is evident from Child C's data: across all three sessions, Child C shows more engagement with books during the independent exploration condition compared to the teacher-child reading conditions. In session 1, of the two teacher-child conditions, Child C was most engaged during the interactive reading condition, but for sessions 2 and 3, Child C's engagement was about the same for both teacher-child reading activities.

Among the older toddlers, the pattern of engagement is more consistent: all three children (Child D, Child E, and Child F) exhibited higher levels of engagement for each session of the non-interactive and interactive reading tasks than during any session of the independent book exploration. For Child D, engagement was greatest during the interactive reading condition across the three sessions, although the differences between the interactive and non-interactive conditions were small during sessions 1 and 3 and greatest during session 2. Similarly, Child E showed about the same level of engagement in sessions 1 and 2 for the interactive and non-interactive reading conditions, but showed greater engagement during the interactive condition than the non-interactive condition in session 3. Child F showed similarly high levels of engagement for the interactive and non-interactive conditions across the three sessions.

These visual results are confirmed by the Tau-U statistics presented in Table 2. As indicated, among younger toddlers the proportion of engagement was slightly lower across iterations of the non-interactive activity than during the independent book exploration (hence the negative value of Tau-U), though this difference was not statistically significant. Among younger toddlers, engagement was slightly higher during interactive reading than during independent book exploration, but again the difference was not significant. In contrast, among older toddlers, the proportion of engagement was higher during the non-interactive activity than during independent book exploration, and the difference between activities was statistically significant. Engagement was also higher during the interactive reading task than during the independent book reading among older toddlers, and again the difference was statistically significant.

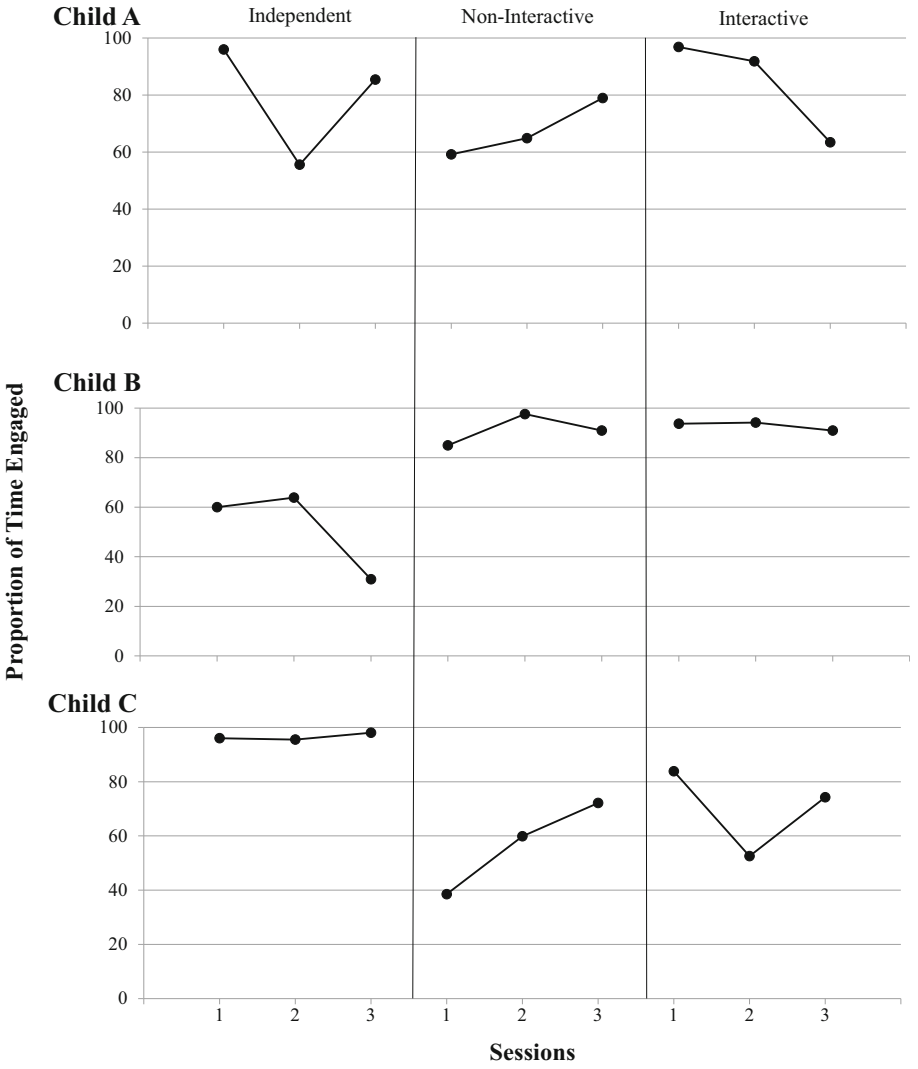

Fig. 2 Proportion of time within a session that younger toddlers (13–24 months) were engaged in independent book exploration, non-interactive reading with a teacher and interactive reading with a teacher across three sessions. Each panel reflects data from individual children. Each of the three activities was conducted within a session. The order of the activities within a session was determined randomly by a computerized program and varied by session

Discussion

The overall goal of the study was to investigate how the context of toddlers' experiences with books is associated with differences in children's engagement with books and to determine the extent to which younger and older toddlers differed in their engagement with books during different types of book-related activities. Many of the past studies have focused on teacher behaviors with preschoolers or maternal behaviors with toddlers during

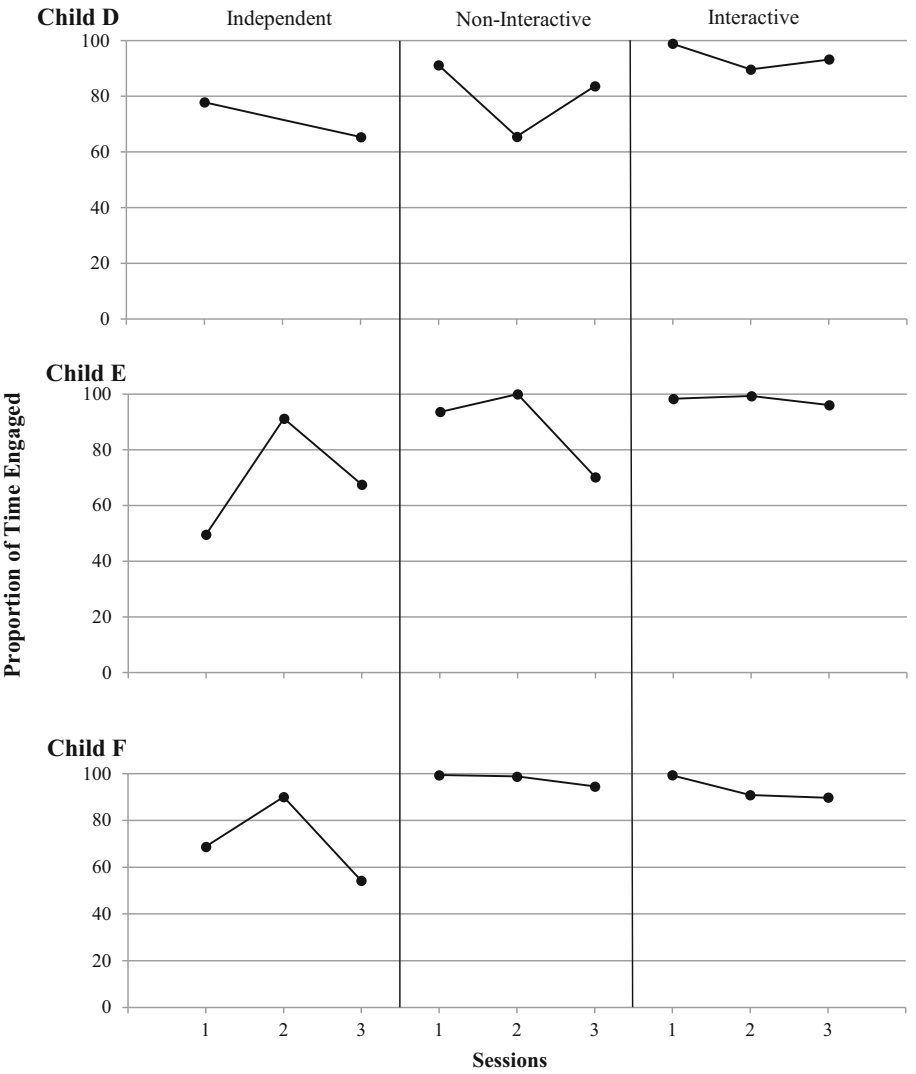

Fig. 3 Proportion of time within a session that older toddlers (25–36 months) were engaged in independent book exploration, non-interactive reading with a teacher and interactive reading with a teacher across three sessions. Each panel reflects data from individual children. Each of the three activities was conducted within a session, with the exception of Child D for whom data are missing for session two of the independent exploration. The order of the activities within a session was determined randomly by a computerized program and varied by session

shared book reading. As a result, less is known about toddlers' engagement with books during interactions with teachers in a group care setting. The current study contributes to the literature by focusing on teacher-child interactions with toddlers within a childcare classroom to examine how the different ways that teachers read to younger and older toddlers—interactively or not—are associated with children's engagement with books in comparison to children's engagement during independent book exploration. In doing so,

the study aimed to demonstrate the extent to which adult scaffolding of children's reading experiences was linked to greater engagement among young children with books, rather than individual differences in how children engage with books.

The results of the study provide support for the hypothesis that teacher-child shared book reading is associated with higher levels of child engagement compared to children's independent book exploration. Children' engagement was significantly higher for interactive teacher-child reading, while it approached significance for the non-interactive reading condition. This finding is consistent with the evidence showing that adult behaviors that involve questions, contingent responses, and animated voices can enhance the book reading experience for children, thus promoting children's active engagement with books (Ortiz et al. 2001; Valdez-Menchaca and Whitehurst 1992). Furthermore, this difference between adult interactive and non-interactive reading strategies in children's engagement is consistent with previous work that finds that children are more engaged with books when adults use interactive strategies compared to when they read books straight through (Fletcher and Finch 2015). The current study extends this line of work using a discrete measure of engagement (i.e., eye gaze), which is independent of children's language or motor skills. In doing so, this study provides evidence that children's displays of engagement as measured by eye gaze varies during teacher-child book reading activities for younger and older toddlers.

Age Differences

As previous studies have focused on shared book reading among preschoolers, findings from the current study add to the literature on the role of age differences concerning the extent to which children engage with books during teacher-child shared reading compared to independent exploration. Results from the study suggest that whether children are younger or older toddlers is an important factor when considering how book engagement may differ by the context of book reading. Consistent with our hypothesis about developmental differences by age, the study found that older toddlers were more likely to be engaged during the teacher-child reading than younger toddlers. As children become increasingly able to focus on structured tasks and develop stronger language skills with age, they may have a greater capacity to engage in a structured shared book reading activity with an adult. Support for this possibility comes from the finding that older toddlers spent a greater proportion of time engaged in both the interactive and non-interactive reading conditions than during their independent exploration with books compared to younger toddlers. For older toddlers, having an adult read through the story, whether in an interactive or non-interactive way, creates proximal processes that, coupled with their greater cognitive maturation, appear to allow for a more enriching experience than do solitary book activities. Examining the role that language and attention skills play in the extent to which younger and older toddlers engage with book reading activities may help elucidate the role of age in children's engagement with books.

Unlike older toddlers, the findings for younger toddlers were less consistent. This inconsistency may reflect individual differences in whether interactive versus non-interactive teacher-child reading was more engaging for children than their own exploration of books. While one child (Child A) showed no clear preference for any of the conditions in terms of how engaging they were to her, another child (Child B) showed more engagement with the teacher-child activities than the independent book exploration, similar to the older toddlers. A third child (Child C) showed the opposite pattern—more engagement during the independent reading activity than during shared reading with a teacher. This variability

in children's displays of engagement by book reading condition is consistent with other work with young toddlers that found variability in how children responded to an adult during book reading sessions (Fletcher et al. 2005). Additional research is needed to follow young toddlers over time and examine the extent to which children's engagement with books under different contexts changes as a function of individual differences.

Limitations and Future Directions

While this study contributes to the literature on how toddlers' experiences with books within a classroom setting are associated with children's engagement with books, there are limitations to consider. One limitation is that the study did not include examination of other factors that are likely to contribute to the extent to which children engage during book reading experiences. As children may respond to books differently based on their gender, cultural background, socioeconomic status, and family experiences (Smith et al. 2014), as well as their exposure to book reading and language and attention skills (Fletcher and Reese, 2005), further work is needed to better understand how children's backgrounds and characteristics are associated with their level of engagement with books. Given that there is evidence of individual differences in children's book engagement among the younger toddlers, further work is also needed to examine the role played by children's characteristics, such as gender and temperament, as well as parental experiences and socioeconomic background. Future studies examining engagement with books by children's backgrounds and characteristics may inform understanding about the book reading activities that are most likely to engage children's interests.

A second limitation is that two teachers deviated from the study protocol with two children (Child A and Child F) by being interactive through questions and comments during the non-interactive conditions. For Child A this meant that she received five interactive conditions and one non-interactive condition, instead of three conditions each of interactive and non-interactive reading. Nonetheless, Child A showed a preference for the interactive condition in sessions one and two, suggesting that the teacher's reading behavior in the conditions may be associated with different engagement for Child A. For Child F, the teacher's use of questions during the non-interactive session meant that child received four interactive conditions and two non-interactive conditions. Nevertheless, Child F showed similarly high levels of engagement during both the non-interactive and interactive conditions, which may suggest that book reading with a teacher would be more engaging for this child than independent book exploration regardless of how interactively the teacher reads. Additional research examining how slight variations in teachers' interactive reading behaviors may be associated with different levels of engagement by children might inform how teachers may tailor their reading styles to adapt to children's individual needs for book engagement.

Another limitation is that the study represents a cross-section in time of children's engagement with books. While the study did look at multiple time points over the course of a week, the study did not follow children over a longer period of time to assess changes in their engagement as a function of development. The differences found between younger and older toddlers suggest that developmental mechanisms may be at play as to how children engage with books across contexts. Further research exploring changes in children's engagement over a longer period of time may help clarify potential mechanisms.

Implications

This study provides evidence that interactive book reading experiences are more likely to engage toddlers in center-based childcare classrooms, while non-interactive teacher-child shared reading activities may be no different in terms of engendering children's engagement than independent book exploration. For younger toddlers, it appears that there is greater variance in how engaged children are with book reading, either with a teacher or on their own.

Relying on children's eye gaze as an indicator of engagement is a readily available cue that teachers may use for gauging children's interest during book reading activities. Teachers' focus on the activities that are most likely to sustain young children's engagement may provide children with the optimal experiences needed for making the most of experiences with books for learning and language development. This possibility is particularly crucial for children who are at risk of not acquiring the foundational skills needed to make the most of learning experiences due to factors associated with poverty or socioeconomic disadvantage (Evans and Rosenbaum 2008).

Examining the characteristics of the book-related activities that are most likely associated with children's engagement can provide insight into what aspects of activities are most relevant for fostering children's interest in books. One characteristic common across teacher-child book reading activities was the rich language input by teachers. This language input included questions, comments, and verbal labeling of objects and actions. Previous research has found that the quality of language input in the form of teachers' comments and questions can help children sustain attention (e.g., Gianvecchio and French 2002).

The current study contributes to the understanding of how book related activities—both teacher-led and child-directed—are differently associated with children's book engagement among toddlers in a childcare setting. While children can benefit from independent exploration, they may also benefit from engaging in one-on-one shared reading with a teacher, a possibility that may be most feasible in settings with low adult-child ratios. In addition, teachers may need support in the form of professional development opportunities to identify ways that they can intentionally interact with young children in book reading activities and provide opportunities for independent book exploration that will support children's engagement with books. In providing children with experiences that are geared toward maximizing their engagement during activities, teachers can promote children's early capacity to regulate their attention and thus, foster in children the skills needed for later school readiness and success.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Appendix

Books Used in the Study.

Author and publication year	Title and publisher
Eric Carle (2005)	*10 Little Rubber Ducks*. HarperCollins Publishers
Donald Crews (1978)	*Freight Train.* Greenwillow Books
DK Publishing (2004)	*My First Body Board Book.* DK Publishing
Kristine O'Connell George & Maggie Smith (2001)	*¡Libro! Book!* Houghton Mifflin Harcourt Publishing
Ginger Fogleson Guy & René King Moreno (1996)	*¡Fiesta!* Greenwillow Books
Ginger Fogleson Guy & René King Moreno (2005)	*Siesta.* Greenwillow Books
Victoria Harvey & Dawn Sirett (2008)	*Animals.* DK Publishing
Kevin Henkes (2004)	*Kitten's First Full Moon*. Greenwillow Books
Kevin Henkes (2011)	*Little White Rabbit.* Greenwillow Books
Eric Hill (1980)	*Where's Spot?* G.P. Putnam's Sons
Bill Martin Jr. & Eric Carle (1967)	*Brown Bear, Brown Bear, What Do You See?* Henry Holt and Company
Al Perkins & Eric Gurney (1969)	*Hand, Hand, Fingers, Thumb*. Random House
Roger Priddy (2005)	*First 100 Words.* Priddy Books
Andy Rash (2009)	*Are You a Horse?* Arthur A. Levine Books
Barney Saltzberg (2007)	*Cornelius P. Mud, Are You Ready For School?* Candlewick Press
Jan Thomas (2009)	*Rhyming Dust Bunnies*. Beach Lane Books

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