

‘What happened next?’: Developmental changes in mothers’ questions to children

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Abstract

Developmental changes in the questions mothers asked during book-sharing interactions with their preschool children and associations between mothers’ questions and children’s narrative contributions were examined. Children and mothers from ethnically diverse backgrounds (African American, Dominican and Mexican) were video-recorded sharing the wordless book ‘Frog, Where are You?’ when children were three, four and five years of age. Mothers’ questions were coded as *referential* (e.g. ‘What’s that?’), *story-specific* (e.g. ‘Where is the boy looking for the frog?’) and *open-ended* (e.g. ‘What will happen next?’). Mothers decreased their use of *referential* questions between the child ages of four and five in both frequency and proportion. *Story-specific* questions increased in frequency and proportion with increasing child age. *Open-ended* questions decreased in frequency between the child ages of four and five and did not change in proportion over time. Mothers’ question types related to children’s narrative contributions concurrently and over time.

Keywords

Early childhood, parent–child interactions, story-book sharing, language, literacy practices

Narrative exchanges during book-sharing promote children’s language and cognitive skills (Arnold et al., 1994; Bus, 2003; Cristofaro and Tamis-LeMonda, 2012; Curenton, 2011; Fiorentino and Howe, 2004; Griffin et al., 2004; Pelletier and Astington, 2004; Raikes et al., 2006;

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Schick and Melzi, 2010; Tamis-LeMonda et al., 2012). In particular, 'dialogic reading', in which parents use evocative techniques and informative feedback to engage their children in the co-construction of narratives, is especially beneficial to children (Arnold et al., 1994; Bus, 2003; Reese and Cox, 1999). A core characteristic of dialogic reading is parents' use of questions, particularly 'wh-' questions that move beyond soliciting 'yes-no' responses. Previous literature has documented associations between maternal questions and children's language skills within and across developmental time (Melzi et al., 2011; Reese and Newcombe, 2007; Sénéchal, 1997; Whitehurst et al., 1994, 1988). Specifically, mothers' use of 'wh-' questions in book-sharing and other settings predicts children's independent story-telling skills, emergent literacy, vocabulary growth, print awareness and memory (Fiorentino and Howe, 2004; Griffin et al., 2004; Kang et al., 2009; Schick and Melzi, 2010).

Different types of questions are structurally and functionally unique in the cognitive demands they place on children, and therefore may be more or less effective in eliciting children's participation in book-sharing interactions (Blewitt et al., 2009; Danis et al., 2000; Lee and Kinzie, 2012; Zucker et al., 2010). For example, closed-ended questions (e.g. 'Is he sad?') are likely to elicit yes or no responses, whereas open-ended questions (e.g. 'Why is he sad?') are likely to elicit more elaborate responses. A useful framework for conceptualizing the cognitive demands of different maternal questions is that of *Psychological Distancing Theory* (PDT; Sigel, 2002), which uses the spatial metaphor of psychological 'distance' to characterize cognitive complexity. This theory characterizes communications between parents and children at different cognitive levels. Certain questions or statements made by parents are direct and provide children with limited choices or options in how to respond. Others are more 'open', offering children the opportunity to respond in a variety of ways. Thus the representational requirements for these different levels of communication range from more concrete (close) to abstract (distant). PDT can be applied to book-sharing interactions by considering how mothers ask different questions to elicit answers that range in difficulty. For example, when mothers ask about objects on a page (e.g. 'What's that?'), the 'psychological distance' is low. Children do not need to extrapolate meaning about the storyline to answer such questions successfully (Blank et al., 1978; van Kleeck et al., 1997), although such questions might help young children follow the storyline.

In contrast, medium-level questions (e.g. 'Where is the frog going?') are those in which answers are not necessarily available; children must infer

something about the storyline in order to provide a response. These types of questions may feed into later school-related expectations around story comprehension. Finally, high-level questions (e.g. 'What will happen next?') place the greatest cognitive demands on children, who must mentally represent, manipulate, evaluate, predict or interpret aspects of the storyline, thereby distancing themselves from what is readily perceived (Danis et al., 2000; McGinty et al., 2012). Such questions require children to bring prior knowledge to the task and use their knowledge to draw inferences.

There is some evidence that high-level questions elicit more sophisticated responses from children than do low-level questions. For example, in one study teachers' questions to four-year-old children were categorized into four levels of cognitive abstraction, ranging from matching of perception (low level, e.g. reading text on the page) to reasoning about perception (high level, e.g. evaluate events depicted in the book). The cognitive demand level of teachers' questions related to the level of children's contributions (Zucker et al., 2010). Additionally, preschoolers' reply to open-ended compared to closed-ended questions with more diverse vocabulary and longer and more complex sentences (De Rivera et al., 2005; Lee and Kinzie, 2012).

However, from a developmental perspective, different types of questions might be more or less prevalent and/or effective at different child ages, in line with Vygotsky's (1978) notion of the 'Zone of Proximal Development' (ZPD). According to ZPD, mothers scaffold children's abilities by asking questions that are slightly beyond their children's actual language and cognitive skills (Lee and Kinzie, 2012; van de Pol et al., 2010). There is some evidence that mothers match their questions to align with their children's ability (e.g. Pellegrini et al., 1985; van Kleeck and Beckley-McCall, 2002). For instance, mothers' use of questions that require verbal responses from children increases as children advance in their language skills from infancy to preschool age (Sénéchal et al., 1995). To date, however, few studies have examined the associations between different types of maternal questions and child contributions over developmental time.

Ethnic variation in mothers' questions

The majority of studies on mothers' question use focus on European-American, middle-class families, overlooking unique cultural emphases that may characterize mother-child book-sharing in different ethnic/racial groups. Latino mothers (Peruvian, Dominican, Mexican) often encourage children to take on the role of 'audience', adopting a 'storyteller' style,

whereas European-American mothers encourage their children to participate in the co-construction of narratives, thereby adopting a 'story-building' style (Casper, 2009; Melzi and Casper, 2005; Melzi et al., 2011; Rodríguez et al., 2009). Latino and African-American mothers from low- and middle-income backgrounds ask fewer questions during book-sharing than do European-American mothers (Anderson-Yockel and Haynes, 1994; Hammer, 2001). In turn, cultural differences in mothers' book-sharing styles and question use relate to children's narrative contributions. For example, Hispanic children contribute less information to conversations than do European-American children (Leyva et al., 2009).

Notably, despite these differences, associations between mothers' question use and children's narrative contributions generalize across groups. Indeed, mothers' questions to children promote children's narrative skills in families from White, Latino and Chinese backgrounds (Chang, 2003; Kang et al., 2009; Leichtman et al., 2000; Leyva et al., 2009; Reese and Newcombe, 2007). In the aforementioned study of Latino mothers, mothers who adopted a 'story-building' style contributed more information to book-sharing interactions than did children of 'storyteller' mothers (Casper, 2009; Melzi and Casper, 2005; Melzi et al., 2011).

Current study

We examined different types of mothers' questions longitudinally during book-sharing interactions with their three-, four- and five-year-olds. Mothers' questions were coded at different levels of cognitive demand and children's contributions were coded at each age. We included mothers and children from different ethnic/racial backgrounds (i.e. Mexican and Dominican immigrants and African-American participants) in order to document differences and similarities in mothers' questions across cultural communities. Thus, our approach moves beyond the largely cross-sectional analyses of prior studies, which have, to date, precluded a developmental analysis of how mothers engage children in book-sharing through questions. It also extends enquiry to populations that are rarely included in the study of parent-child literacy interactions.

We first asked whether mothers shift in the types of questions they ask their children across child age, and whether maternal question use is similar or different across cultural communities. In line with PDT (Sigel, 2002), we hypothesized that mothers would increase their use of mid-level (e.g. 'What is the frog doing?') and high-level questions (e.g. 'What do you

think will happen next?') and decrease low-level questions (e.g. 'What is this?') across the three child ages. This pattern would also be reflected in the proportions of total questions mothers asked. We hypothesized that Mexican and Dominican mothers would ask fewer questions than African-American mothers, in line with the finding that Latino mothers tend to adopt a story-telling style. However, we expected patterns of developmental change to generalize across the three groups.

Second, we examined associations between mothers' questions and children's contributions to book-sharing. How do different types of maternal questions relate to children's contributions within and across ages? We hypothesized that mothers' use of questions would relate to children's contributions, although associations were expected to be age-specific. Low-level questions were expected to elicit child contributions at age three when children were less proficient at co-constructing a story and responding to more advanced questions. Mid-level questions were expected to relate to child contributions at four and five years, as children gained in their ability to follow a storyline. Finally, high-level questions, which place the most demands on children, were expected to relate to child contributions at age five when children were better able to draw inferences about the story.

We addressed these questions among a sample of low-income mothers and children. We focused on low-income families, because children living in poverty are at risk of delays, and these risks are largely explained by disparities in their learning environments (Evans et al., 1999; Hart and Risley, 1995; Hoff, 2003). During book-sharing interactions, mothers from low-income backgrounds provide fewer complex concepts (Eisenberg, 2002), elicit fewer words (Ninio, 1980), place less emphasis on story content and meaning (Elliot and Hewison, 1994), use more directives (Hammer, 2001) and provide fewer elaborations and less varied language (De Mendoza, 1995; Raikes et al., 2006; Rowe et al., 2005; Yarosz and Barnett, 2001) than do mothers from higher socioeconomic backgrounds. Nonetheless, there exist variations in the frequencies of mothers' questions within low-income samples, and these differences relate to children's contributions in similar ways (Cristofaro and Tamis-LeMonda, 2012; Luo et al., 2014).

Methods

Participants

Mothers and children were participants in a larger longitudinal study of ethnically diverse, low-income mothers and their children who were followed

from children's birth until first grade. Two hundred and fourteen Dominican, African-American and Mexican mothers were recruited from hospital maternity wards shortly after giving birth to the focal child. To be eligible for the study, mothers had to be: at least 18 years of age; reside in one of the five boroughs of New York City (excluding shelters); have given birth to a healthy, full-term infant; and self-identify as Mexican, Dominican or U.S.-born African American.

The current sample included 76 Dominican, 70 African-American and 68 Mexican participants (110 boys and 104 girls overall). Eighteen per cent of dyads in the sample had data for only one time point, 17 per cent of dyads had data for two time points, and 63 per cent of the sample had data for all three time points. Data for the current study included mother-child book-sharing interactions when children were three years of age ($M = 36$ months, $SD = 1.06$), four years of age ($M = 50.01$ months, $SD = 1.77$) and five years of age ($M = 61.38$ months, $SD = 1.45$). Mothers were reimbursed \$75 for age-3 visits and \$100 for age-4 and -5 visits. Mothers of the three ethnicities differed in their educational background, $F(2,207) = 51.64$, $p < .000$. African-American ($M = 11.93$, $SD = 1.56$) and Dominican ($M = 12.22$, $SD = 1.95$) mothers had more years of education than Mexican mothers ($M = 8.40$, $SD = 3.48$). Preschool enrolment indicated 83 per cent of the sample at age four and 79 per cent of the sample at age five.

Procedures

At each of the three ages, mother-child dyads visited the laboratory where they participated in video-recorded book-sharing interactions with the wordless picture book, 'Frog, Where are You?' (Mayer, 1969). The book tells, in picture, a story about a boy and his dog embarking on a search for their missing pet frog. After several encounters with various forest animals who interfere with the search, the boy and the dog eventually find the frog behind a log with a mate and baby frogs. The story ends with the boy and the dog taking one of the baby frogs and saying goodbye to the frog family. The book was chosen for its storyline, and as it has no words it provides mothers with the flexibility to share the book as they wish and, potentially, to ask a variety of questions at different levels of cognitive demand. The book has been used extensively in cross-linguistic work (Berman and Slobin, 1994), cross-cultural work (Melzi and Caspe, 2005) and with typically and atypically developing populations (Tager-Flusberg, 1995). The repeated use of the same book

offered a consistent context for examining changes in mothers' questions across time.

The examiner introduced the book by saying: 'Here is a book with no words. Please share this book with your child as you normally would; you can take as much time as you need.' Dyads were allotted as much time as they needed to finish the book. However, if they appeared to finish before three minutes, they were told, 'Please continue for a bit longer.' Book-sharing sessions were conducted in the primary language of the participants. Video recordings were transcribed and verified using the Child Language Data Exchange System (CHILDES, MacWhinney, 2000) by native English and Spanish speakers.

Maternal questions. Verified transcripts were coded for the frequencies of maternal question types. The coding scheme for maternal questions was a modified version of the levels of abstraction coding scheme (Kleeck et al., 1997). The original coding scheme identified five levels of abstraction, ranging from Level 1 utterances that asked the child to locate, label or notice perceptually present concrete objects on the page to Level 5 utterances that required the child to draw inferences and make predictions about the storyline. We modified this coding scheme by only considering maternal questions (as opposed to statements and/or questions) and coded three levels of abstraction instead of five due to the low frequency of higher-level questions seen in our sample. In the final coding scheme, we categorized each mother question as *referential*, *story specific* or *open-ended* (see Table 1). Questions outside the scope of the book-sharing interaction were not coded (e.g. 'What's the matter?', 'Do you want to read the book?').

Referential questions are prompts that ask the child to describe or label what is perceptually visible on the page (e.g. 'What is this?', 'What colour is that?'). These questions involve low-level distancing, since the child can respond based on what explicitly appears on the page.

Story-specific questions are prompts that channel the child's attention to specific aspects of the storyline (e.g. 'What is the boy looking for?'). These questions limit children's focus to the storyline elements and place greater cognitive demands on children's responses than referential questions.

Open-ended questions are broad prompts that ask the child to provide most if not all of the narrative information in their response ('What is happening?') or to make inferences, evaluations, explanations or predictions about actions and events that are beyond what is directly available on the page (e.g. 'Why do you think the boy did that?', 'What do you think is going to happen?'). *Open-ended questions* are higher-level distancing prompts than *referential* and

Table 1. Description and examples of maternal question types.

Question type	Definition	Example
Referential	Prompts that ask the child to describe or label what is perceptually visible on the page	What is that? What is this/that called? What colour is this?
Story specific	Prompts that channel the child's attention to specific aspects of the storyline	What is the boy/dog looking/calling for? What's the boy doing at the window? The dog is searching for the frog under what? What does the dog have on his head? What happened to the jar? What did the deer do with the boy? Where does the deer throw the boy? What is the boy listening for? What does the boy tell the dog? What did the boy say to the frog family?
Story general	Broad prompts that ask the child to provide most if not all of the narrative information in their response or to make inferences, evaluations, explanations or predictions about actions and events that are beyond what is directly available on the page	Why do you think the bees are chasing the dog? Why do you think the boy is going into the forest? Why do you think the frog left? What happens when you bother a bee? What is the boy going to do now? What do you think is going to happen next? Who do you think is going to be in there? What are they going to do to him? What is happening on this page?

story-specific questions because of the cognitive demands placed on the child, sometimes requiring him/her to capture narrative elements across multiple pages.

Child narrative contribution. A measure of children's narrative contributions was adapted from the framework of story grammar (Stein and Glenn, 1979). Specifically, the story of 'Frog, Where are You?' contains a setting (time, place and characters), an initial 'problem' (i.e. a frog escapes from a jar and is lost) and internal responses and plans that are triggered by the problem (e.g. the boy and dog realize that their frog has gone). The story also includes a series of attempts to solve the problem: six failed and one was successful (i.e. the boy and his dog went to different places to search for the frog and finally found it), consequences and reactions that result from their attempts (e.g. the

boy and dog encounter different animals while looking for the frog) and a resolution (i.e. they find the frog and take it home). Based on this framework, we identified 48 story components, each of which fell into one of the seven story-grammar categories. Given that children from different ethnic backgrounds might interpret or talk about story-grammar elements in various ways, we adopted a bottom-up approach by exploring 20 per cent of the transcripts and modifying our coding scheme to reflect what mothers and children of the three ethnicities actually said.

Children were credited with a narrative contribution if they responded to mothers' questions (e.g. 'The boy is looking for the frog' after the mother asks 'What is the boy looking for?') or provided a contribution in the absence of the mother's prompting ('The boy is looking for the frog!'). The scores for child contributions ranged from 0 to 48 corresponding to the 48 narrative elements of the storyline.

To establish reliability, English- and Spanish-speaking research assistants coded reliability dyads within and across languages. Kappas for referential questions ranged from .75 to .97, story-specific .80 to .95, and open-ended .86 to .93. Kappas for child narrative contributions ranged from .81 to .89.

Results

Prior to analyses, missing values were imputed using a multiple imputation method (Schafer, 1997). Results of the five imputed data sets generally did not differ from analyses based on original data. Thus, findings are reported on the full sample ($N=214$) with imputed values.

General linear models examined mothers' question types across the three ages and ethnic groups. Significant main effects were followed up with univariate tests or Bonferroni post hoc tests for within-subject factors, between-subject factors and interactions. Concurrent and lagged associations between mothers' questions and children's narrative contributions were examined at the bivariate level and with hierarchical regressions. Because gender effects were not significant, both separately and in interaction with ethnicity ($p > .05$), analyses were collapsed across child gender; exceptions were seen for children's narrative contributions at ages three and four, which are reported.

Maternal questions: Developmental change and ethnic variation

Table 2 provides descriptive data on maternal question types across the three ages for mothers of the three ethnicities. Developmental changes in mothers'

Table 2. Descriptive statistics on maternal questions.

Types of questions	Age 3	Mean (SD)	Age 4	Mean (SD)	Age 5	Mean (SD)
Total questions	20.63	(17.63)	21.12	(18.57)	13.57	(11.89)
Referential	13.25	(12.71)	12.81	(13.45)	6.17	(7.31)
Story-specific	2.30	(3.82)	2.42	(3.97)	2.54	(3.30)
Open-ended	5.08	(6.22)	5.89	(6.78)	4.86	(6.13)

questions were assessed in 3 (Question type) \times 3 (Age) \times 3 (Ethnicity) Repeated Measures MANCOVAs, with ethnicity as the between-subjects factor and maternal education as a covariate. A main effect of question type, $F(2, 4,686) = 65.66$, $p < .001$, indicated that mothers asked significantly more referential questions ($M = 10.81$, $SD = .54$) than open-ended ($M = 5.27$, $SD = .31$) and story-specific questions ($M = 2.50$, $SD = .19$) at all ages ($ps < .001$). Open-ended and story-specific questions also differed ($p < .001$), with mothers asking open-ended questions more frequently than story-specific questions to all ages. Mothers did not change in their overall questions from age 3 ($M = 7.07$, $SD = .41$) to age 4 ($M = 6.79$, $SD = .39$), but decreased questions between child ages 4 and 5 ($M = 4.66$, $SD = .28$, $p < .001$), which was supported by a main effect of child age, $F(2, 364) = 5.79$, $p < .001$ (See Figure 1).

Analyses revealed a developmental change in mothers' question types, as indicated by a question type \times age interaction, $F(2, 329) = 9.96$, $p < .001$. Story-specific and open-ended questions remained unchanged across the three ages, whereas referential questions decreased from child ages 4 to 5 $ps < .001$ (see Table 2 for descriptives). As a consequence, when mother question types were analysed as proportions, a question type \times age interaction, $F(4, 760) = 3.10$, $p < .05$, indicated that the relative use of referential questions decreased between ages 4 ($M = .62$, $SD = .02$) and 5 ($M = .48$, $SD = .03$), $p < .001$, and the relative use of story-specific questions increased from age 3 ($M = .08$, $SD = .14$) to age 4 ($M = .12$, $SD = .17$), and from age 4 to 5 ($M = .20$, $SD = .02$), $ps < .05$. The proportion of open-ended questions increased from age 4 ($M = .26$, $SD = .02$) to 5 ($M = .32$, $SD = .02$), $p < .05$.

Ethnic differences were seen in mothers' question types, as indicated by an ethnicity \times question type interaction, $F(4, 1,778) = 16.52$, $p < .001$ (See Figure 2). Post hoc analyses indicated a greater balance among the types of questions asked by African-American mothers compared to Mexican and Dominican mothers (see Figure 3). Although mothers from all ethnicities asked more referential questions than open-ended and story-specific questions ($ps < .01$), Mexican and Dominican mothers asked more referential questions

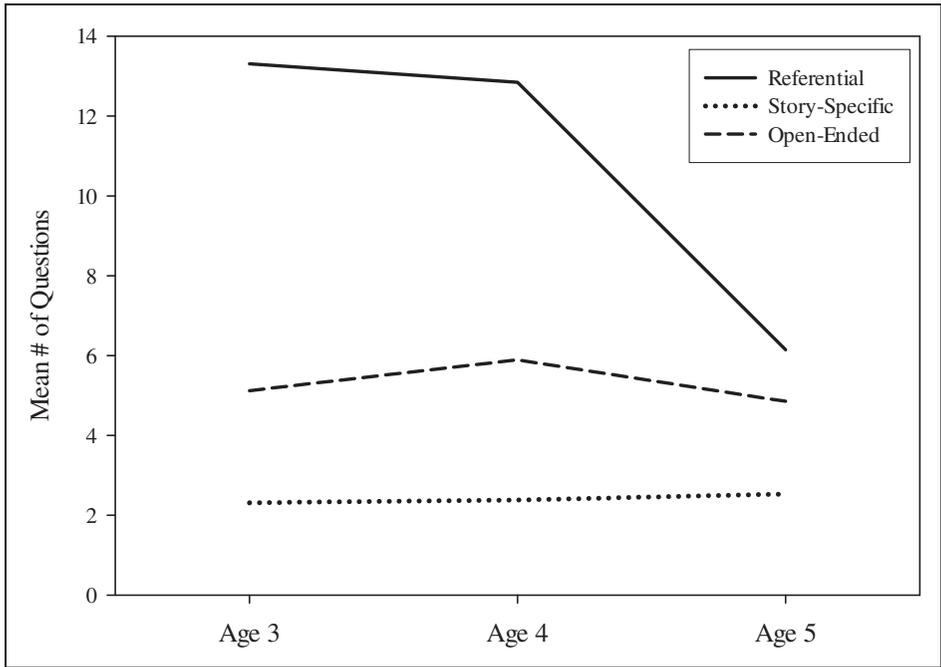


Figure 1. Changes in maternal question types across children's development.

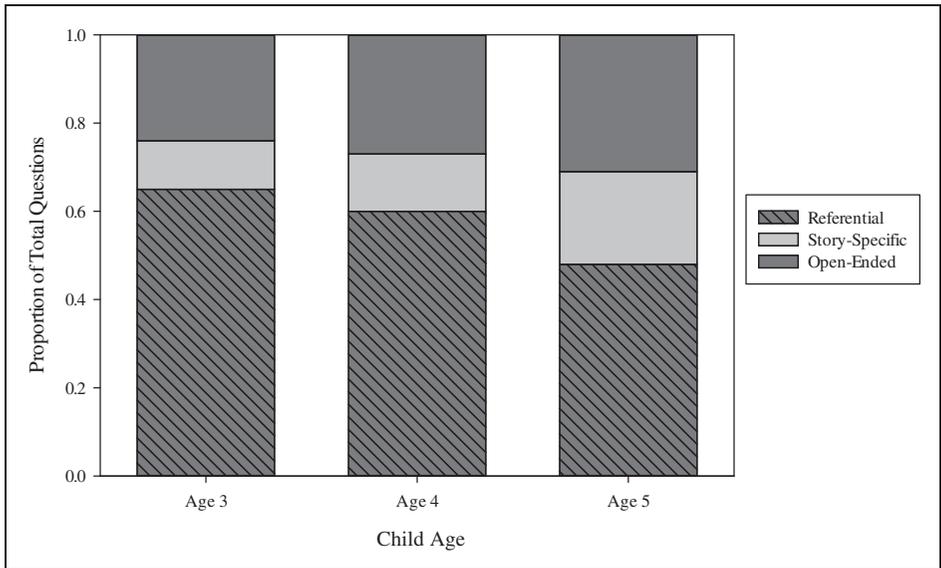


Figure 2. Changes in proportions of maternal question types across children's development.

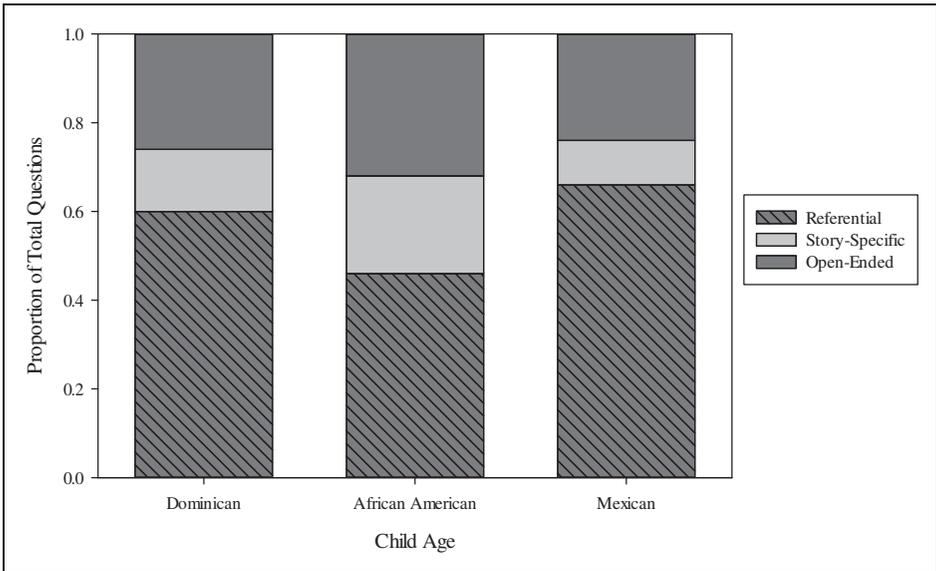


Figure 3. Ethnic variation in proportions of maternal question types.

than did African-American mothers ($ps < .05$). In contrast, African-American mothers asked more *story-specific* questions than did Mexican and Dominican mothers ($ps < .05$). Consequently, when question types were analysed as proportions, Dominican and Mexican mothers had higher proportions of *referential* to total questions than did African-American mothers ($ps < .05$), who had higher proportions of *story-specific* and *open-ended* questions to total questions than did Dominican and Mexican mothers ($ps < .05$).

Associations between maternal questions and child narrative contributions

Our second aim was to document associations between maternal question types and children's narrative contributions. As a first step, we examined children's narrative contributions in a 3 (age) \times 3 (ethnic group) \times 2 (child sex) repeated measures ANOVA. A main effect of age $F(2, 268) = 77.69, p < .001$ indicated that children grew in their narrative contributions from age 3 ($M = .79, SD = 1.22$) to age 4 ($M = 6.31, SD = 5.65$), and then levelled off between the ages of 4 and 5 years ($M = 6.21, SD = 6.74$). An age \times ethnicity interaction $F(4, 720) = 3.17, p < .05$ indicated that children of all ethnicities grew in their narrative contributions between ages 3 and 4 ($ps < .001$), but the decline in children's narrative contributions from 4 to 5 years was explained by an

unexpected decline in Mexican children's contributions from age 4 ($M = 6.48$, $SD = 4.91$), $ps < .05$, to age 5 ($M = 4.33$, $SD = 4.94$). At ages 3 and 4, girls provided more narrative contributions than did boys ($ps < .01$) as indicated by a gender main effect, $F(1,134) = 4.67$, $p < .05$.

Concurrent associations

We next examined the concurrent associations between maternal questions and children's narrative contributions. Concurrent associations were tested at the bivariate level and then in three hierarchical multiple regressions, one for each of the three ages. For each regression, predictors of child narrative contributions were entered in two steps. In step 1, the duration of a book-sharing session was entered, since the time spent in book-sharing was related to the numbers of questions mothers asked (rs ranging from .23 to .39); maternal years of education were also entered in this step since mother's education has been found to relate to maternal input (Kuo et al., 2004). Dummy variables were also entered for Dominican and Mexican backgrounds with African-American participants serving as the referent group, as well as for child sex (with male being the referent group) and enrolment in preschool at ages 4 and 5. In step 2, mothers' question types (*referential*, *story-specific*, *open-ended*) were entered as a block.

Patterns of associations between maternal questions and children's narrative contributions were similar at each age. At child age 3, mothers' *referential*, *story-specific* and *open-ended* questions were associated with children's narrative contributions at the bivariate level (r 's = .36, .28 and .43, respectively, $ps < .001$). The three question types were then examined together using a hierarchical regression, also controlling for key demographics (see Table 3). At age 3, a Mexican background was associated with narrative contributions ($\beta = .15$, $p < .05$) such that Mexican children contributed more than did Dominican and African-American children. Mothers' *open-ended* questions ($\beta = .24$, $p < .01$) uniquely related to children's contributions. Children contributed more if mothers asked more *open-ended* questions.

At child age 4, mothers' *referential*, *story-specific* and *open-ended* questions were once again associated with children's narrative contributions at the bivariate level (r 's = .35, .24 and .43, respectively, $ps < .001$). When examining these associations in a regression, analyses indicated that mothers' *referential* ($\beta = .19$, $p < .01$) and *open-ended* ($\beta = .31$, $p < .01$) questions predicted children's narrative contributions. Mothers' *story-specific* questions were marginally predictive of children's contributions ($\beta = .12$, $p = .08$).

Table 3. Summary of hierarchical regression analysis for variables concurrently predicting child narrative contribution.

Variable	Age 3			Age 4			Age 5		
	B	SE	β	B	SE	β	B	SE	β
Dominican	0.19	0.17	0.08	0.04	0.86	0.00	-1.08	0.94	-0.08
Mexican	0.36*	0.18*	0.15*	-0.32	0.91	-0.03	-1.90	0.99	-0.14
Female	0.23	0.13	0.10	1.77	0.66	0.16	2.29	0.76	0.18
Maternal education	0.06	0.09	0.04	0.05	0.44	0.01	1.05	0.49	0.13
Duration of book-sharing	0.12**	0.03**	0.24**	0.11	0.13	0.06	-0.64	0.22	-0.20
Preschool/school	-	-	-	1.38	0.72	0.12	-0.09	0.96	-0.01
Referential	0.01	0.01	0.11	0.08**	0.03**	0.20*	0.18**	0.05**	0.21**
Story-specific	0.02	0.02	0.07	0.16	0.09	0.12	-0.08	0.13	-0.04
Open-ended	0.04**	0.01**	0.24**	0.26**	0.06**	0.31**	0.54**	0.08**	0.51**
R^2	.29			.28			.32		
F for change in R^2	9.96**			16.80**			26.20**		

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

Table 3 presents Model 2 only.

At age 5, mothers' referential, story-specific and open-ended questions continued to relate to children's narrative contributions at the bivariate level (r 's = .26, .24 and .48, respectively, $ps < .001$). Mothers' referential ($\beta = .23$, $p < .05$) and open-ended ($\beta = .51$, $p < .01$) questions related to children's narrative contributions when controlling for demographic variables.

Lagged associations

We next examined lagged associations between maternal questions and children's narrative contributions, testing children's prior narrative contribution as a mediator in each model. First, we conducted bivariate correlations between maternal questions and children's narrative contribution at age 3 with that at age 4, and correlations between ages 4 and 5. In the final set of analyses, we ran two hierarchical regressions predicting children's narrative contributions over time. Step 1 of both regressions contained the same demographic variables as the models conducted for concurrent associations. In step 2, mothers' question types were entered as a block. In step 3, we entered children's prior narrative contribution to test for attenuation in the relation between maternal questions

Table 4. Summary of hierarchical regression analysis for maternal questions at age 3 predicting children's narrative contribution at age 4.

	Model 1			Model 2			Model 3		
	B	SE	β	B	SE	β	B	SE	β
Dominican	0.77	0.89	0.07	0.64	0.90	0.06	0.60	0.90	0.05
Mexican	-0.08	0.90	-0.01	-0.57	0.93	-0.05	-0.88	0.94	-0.08
Female	1.07	0.71	0.10	1.08	0.70	0.10	0.95	0.70	0.09
Maternal education	0.58	0.46	0.09	0.49	0.45	0.07	0.43	0.45	0.07
Duration of book-sharing	0.41**	0.12**	0.24**	0.38**	0.12**	0.22**	0.39**	0.12**	0.23**
Preschool at age 4	1.65*	0.74*	0.15*	1.68*	0.73*	0.15*	1.69*	0.73*	0.15*
Referential				0.04	0.03	0.10	0.03	0.03	0.07
Story-specific				-0.07	0.10	-0.05	-0.09	0.10	-0.07
Open-ended				0.16*	0.07*	0.18*	0.11	0.07	0.13
Children's narrative contribution at age 3							0.67*	0.35*	0.15*
R ²		.09			.14			.15	
F for change in R ²		3.51**			3.43**			3.66**	

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

at a prior age with children's narrative contribution at a later age. Attenuation of this relation would suggest mediation, such that mothers' questions at time 1 would relate to children's narrative contribution at time 1. Consequently, children's narrative contribution at time 1 would then predict their narrative contribution at time 2 (Baron and Kenny, 1986).

At the bivariate level, mothers' *referential*, *story-specific* and *open-ended* questions at age 3 were related to children's narrative contribution at age 4 (r 's = .15, .15 and .17, respectively, p s < .05). Children's narrative contributions at ages 3 and 4 were correlated ($r = .20$, $p < .01$), demonstrating stability in children's contribution to the narrative over time. As shown in Model 2 (Table 4), children's enrolment in preschool at age 4 related to their narrative contribution ($\beta = .15$, $p < .05$). Mothers' *open-ended* questions at age 3 were significantly related to children's narrative contribution at age 4 ($\beta = .18$, $p < .05$). In Model 3, once controlled for children's narrative contribution at age 3, mothers' *open-ended* questions at age 3 were no longer significantly related to children's narrative contribution at age 4. Children's narrative contribution at age 3 predicted their contribution at age 4 ($\beta = .15$, $p = .05$). This finding suggests that children's narrative contribution at age 3 partially mediated the relation between mothers' questions at age 3 and children's narrative contribution at age 4.

Table 5. Summary of hierarchical regression analysis for maternal questions at age 4 predicting children's narrative contribution at age 5.

	Model 1			Model 2			Model 3		
	B	SE	β	B	SE	β	B	SE	β
Dominican	-0.63	1.05	-0.05	-0.39	1.03	-0.03	-0.40	0.96	-0.03
Mexican	-2.36*	1.13*	-0.18*	-1.57	1.19	-0.12	-1.63	1.11	-0.12
Female	1.56	0.86	0.12	1.37	0.83	0.11	0.96	0.78	0.08
Maternal education	1.03	0.56	0.13	0.88	0.55	0.11	0.81	0.51	0.10
Duration of book-sharing	0.16	0.21	0.05	0.04	0.21	0.01	0.21	0.20	0.07
Preschool at age 5	0.64	1.07	0.04	0.58	1.05	0.04	0.61	0.99	0.04
Referential				0.00	0.04	0.00	-0.05	0.03	-0.10
Story-specific				0.15	0.12	0.09	0.04	0.11	0.03
Open-ended				0.23**	0.08**	0.24**	0.13	0.07	0.13
Children's narrative contribution at age 4							0.46**	0.08**	0.39**
R ²		.06			.14			.25	
F for change in R ²		2.19*			6.30**			30.433**	

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

The same set of analyses was conducted to examine whether mothers' questions at age 4 would relate to children's narrative contribution at age 5. At the bivariate level, mothers' *story-specific* and *open-ended* questions at age 4 were related to children's narrative contribution at age 5 (r 's = .25 and .32, respectively, $ps < .001$). Children's narrative contributions at ages 4 and 5 were correlated ($r = .48$, $p < .01$), indicating stability over time. In Model 2 (Table 5), mothers' *open-ended* questions at age 4 were significantly related to children's narrative contribution at age 5 ($\beta = .24$, $p < .001$). In Model 3, once controlling for children's narrative contribution at age 4, mothers' *open-ended* questions at age 4 were no longer significantly related to children's narrative contribution at age 5. Children's narrative contribution at age 4 continued to predict their narrative contribution at age 5 ($\beta = .39$, $p = .001$), suggesting mediation was present in the relation between mothers' questions at age 3 and children's narrative contribution at age 4.

Discussion

Children's contributions to shared narratives predict their independent skills in narrating stories, emergent literacy and school-readiness skills (Cristofaro

and Tamis-LeMonda, 2012; Curenton, 2004, 2011). For this reason, research on the ways in which parents support children's gains in narrative skills lies at the forefront of literacy research (McCabe et al., 2008). This body of work has highlighted the importance of mothers' questions for children's narrative contributions: Questions offer young children invaluable opportunities to practise oral language and develop skills that support school readiness. Our findings advance this research by conducting a longitudinal examination of the types of questions that mothers from ethnically diverse backgrounds ask their children, and how those questions relate to children's ongoing contributions to the storyline.

Our first aim was to examine maternal questions across children's development. Mothers decreased in the overall number of questions between the child ages of four and five years, which aligns with prior literature suggesting that mothers adapt their language as children become skilled at contributing to the storyline (Moerk, 1974; van Kleeck and Beckley-McCall, 2002). Specifically, children displayed gains in their narrative contributions between three and four years, and mothers in turn decreased their questions a year later when children were five years old. This pattern indicates that children's gains in narrative contributions developmentally foreshadow mothers' subsequent interactions with children.

Hypotheses regarding developmental change in mothers' use of low-, medium- and high-level questions were partially supported. As expected, mothers decreased in their use of *referential* questions from child ages four to five years. The tapering off of these low-demand questions suggests that mothers are sensitive to their children's growing skills and may believe that their children require fewer such prompts to keep them engaged with the story. Moreover, although mothers did not increase in their frequency of *story-specific* questions, the use of this form of question increased proportionately. However, contrary to expectations, the use of *open-ended* questions decreased in frequency between child ages four and five and this did not change in proportion over time. Mothers might use *open-ended* questions as a rhetorical way of engaging their children broadly in interaction, rather than using such questions to challenge children's cognitive reasoning. Together, the findings indicate developmental attunement by mothers when examining changes to low- and medium-level questions (i.e. referential to story-specific). This attunement is a strength that these low-income mothers bring to book-sharing interactions and challenges extant deficit assumptions.

Our second aim was to examine concurrent and lagged associations between maternal questions and children's narrative contributions.

Unexpectedly, *referential* questions related concurrently to children's narrative contributions at ages four and five. Perhaps these relatively straightforward questions functioned to elicit children's references to basic elements of the storyline and engage children in the construction of the story. However, *referential* questions were not related to children's later narrative contributions, suggesting that these questions might be effective in the moment, but do not necessarily build enduring skills in children's co-constructing of narratives. Nonetheless, although *referential* questions are relatively less challenging than *story-specific* and *open-ended* questions, they might serve the important function of bolstering children's vocabulary.

Story-specific questions related marginally to children's narrative contributions at age four specifically. Perhaps at age three, these questions were still above children's level of skill, as they probed for specific storyline information. However, by four years of age, as children develop in their narrative skills, they are more able to respond to these thematically targeted questions. It remains unclear why these types of questions were no longer related to children's narrative contributions at age five. Perhaps, questions requiring higher level inference, such as *open-ended* questions, are more effective at scaffolding children's narratives by the later age. Therefore, if mothers are 'stepping back' to grant a narrator role to their children, they might ask more *open-ended* questions to engage and scaffold their children, rather than ask questions that specifically target certain narrative elements. Alternatively, *story-specific* questions might be further divided into subcategories, such as questions that probe for characters' intentions or ask about the reasons for protagonist actions; these sub-types might yield associations that were not captured by the categories examined here. Unfortunately, the relatively low frequency of *story-specific* questions precluded further breakdown of mothers' questions.

Open-ended questions concurrently related to children's narrative contributions at all three ages. These questions are hypothesized to be the highest in terms of psychological distancing. Regardless of children's ability, mothers may use *open-ended* questions as a technique to pull children into the narrative. In fact, *open-ended* questions were significantly related to children's later narrative contribution but were mediated by children's narrative contribution at a younger age. Thus, the questions mothers ask elicit children's narrative contribution within time, which in turn predicts children's narrative contribution at a later age. Overall, this finding suggests that the relations between maternal questions and children's narrative contributions may shed light onto the types of questions that are effective at eliciting children's contributions to the storyline within and across ages.

The diverse nature of our sample enabled us to examine whether developmental changes and patterns of association generalize to mother–child dyads from Mexican-immigrant, Dominican-immigrant and African-American backgrounds. As hypothesized, changes in mothers' questions over time were largely consistent across the three ethnicities and there was a lack of ethnicity by question type or by age interactions.

Notably, however, there existed ethnic differences in the distribution of question types across the three ethnicities. African-American mothers were more balanced across the question types and asked proportionately more *story-specific* questions than the two groups of Latino mothers who asked proportionately more *referential* questions. Perhaps, Latino mothers regard book-sharing as an opportunity to teach vocabulary to their children, whereas African-American mothers regard book-sharing as an opportunity to get their children to reflect on and embellish the story.

Limitations and conclusions

Several limitations of this study should be considered. First, we observed mother–child book-sharing in the laboratory, with researchers present, a context that may have influenced mothers' and children's behaviours. However, these mothers and children had participated in a larger longitudinal study since the children were born, and thus were familiar with the examiners and the experimental setup. Many mothers knew the examiners who conducted the study, since they had interacted with them in the past. Moreover, mothers appeared to be quite comfortable sharing a wordless book with their children, a type of interaction that was not foreign to them. Indeed, when we interviewed mothers about their literacy practices, over 80 per cent reported having read to their child several times a week to daily.

Second, we focused specifically on mothers' questions during book-sharing, rather than other aspects of mother–child book-sharing interactions, such as statements about the story, connections of the story content to daily life, teaching concepts that extend beyond the storyline and the use of language to direct children's behaviours (e.g. Kang et al., 2009; Melzi and Caspe, 2005). Therefore, we do not know if mothers who ask fewer questions are those who tell more elaborate stories (Caspe, 2009; Melzi and Caspe, 2005; Melzi et al., 2011). However, this appears not to be the case. At all three ages, mothers who asked more questions also told longer stories based on their total number of utterances (all p 's < .001). Future studies should build on previous literature by examining maternal questions in conjunction with narrative

statements to understand if mothers shift their style of book-sharing across children's development, as well as experimentally examine whether certain styles of book-sharing are more beneficial to the development of children's narrative skills.

Our study has implications for interventions targeting practices that promote children's language skills. Although the frequency of book-sharing matters for children's narrative development, mothers would benefit from knowing more about different ways to engage children in book-sharing beyond vocabulary building. Relatedly, programmes that encourage mothers to engage in dialogic reading and ask questions of their children should help mothers understand the opportunities afforded by different types of questions. Different genres of books might also elicit different types of questions and child contributions. For instance, a book containing shapes and colours might promote more referential questions and descriptions. In contrast, books that contain a clear storyline might trigger more open-ended or story-related prompts. Reading and literacy interventions should include different book genres so as to provide opportunities to talk about different things. These implications also extend to teacher training and the classroom context. Teachers scaffold children's development in the context of book-sharing interactions and should be mindful of the different levels of complexity different types of questions contain.

In closing, our current study sheds light on the ways that mothers use questions to engage children in a narrative task. Mothers change the frequency and proportion of the types of questions they ask their children over the course of children's development, and specific types of questions promote children's narrative contributions at specific child ages.

Conflict of interest

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