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Profiles of teacher & child talk during early childhood classroom shared book reading

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ABSTRACT

Although shared book reading is an extensively studied activity with young children, limited research has focused on typical, holistic patterns of teacher–child interactions during this routine classroom activity. This study sought to describe profiles of teacher talk during shared book reading in 98 pre-kindergarten and kindergarten classrooms. We also considered how identified profiles predicted a subset of students' (n = 300) end-of-year language and literacy performance. Video recordings of teacher–child interactions during reading of a narrative text were transcribed and analyzed for the timing, content, and form of utterances. Results of latent profile analysis revealed three distinct teacher profiles of talk during book reading that we termed: Moderate Comprehenders (MC, 68% of sample), Discuss & Reflect Comprehenders (DRC, 19%), and Preview & Discuss Comprehenders (PDC, 12%). These profiles differed most in the timing (e.g., before versus after reading for PDC and DRC, respectively) and content of talk (e.g., low- versus high-cognitive demand topics for MC vs. PDC/DRC). The less common DRC and PDC teacher profiles were associated with higher amounts of child talk and more elaborate child utterances within the reading session. However, no teacher profiles or features of teacher/child utterances during this one reading session predicted children's gains in language and literacy skills across the school year. Notably, the first profile in the present study differed from a past, seminal study of shared reading; however, the other two profiles were similar to earlier work on holistic styles of shared reading.

1. Introduction

Whole-class shared book reading, or "read-alouds" are a daily activity in most early childhood classrooms that include the teacher reading a story aloud and discussion of the text. Sharing books with young children efficacious for increasing children's oral language and early literacy skills (for reviews see Mol, Bus, & De Jong, 2009; National Early Literacy Panel [NELP], 2008). In the late 1990's, many researchers studied shared book reading styles noting that "teachers naturally adopt one of a relatively small set of approaches to reading with children, but they tend not to be aware of these patterns." (Dickinson & Smith, 1994, p.118; see also Snow & Ninio, 1986; Van Kleeck, 2003). Many recent observational studies of shared book reading have dropped a focus on holistic styles of before, during, and after reading patterns, instead focusing on micro-variables. This study examines holistic styles because, if teachers are cognizant of typical read-aloud styles, they may adopt effective approaches. Guidance for teachers often implies that some styles are superior via lists of read-aloud do's and don'ts, such as: (1) before reading always recite the title/author/illustrator and discuss the cover illustrations; (2) during reading do not avoid answering children's questions; and (3) after reading always allow time for discussion, but do not turn discussions into a quiz (Trelease, 2013).

The first purpose of this study is to describe patterns and variability in teachers' read-aloud approaches within a large sample of early childhood classrooms where teachers were not trained to use a specific intervention or curricular approach. As part of this, we compare identified profiles in this study to styles identified over 20 years ago in a seminal study by Dickinson and Smith (1994). Our second goal is to explore if any naturalistic approaches to sharing books in the Fall relate to child talk during the reading session or improved child outcomes in the Spring of the school year. This

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study also advances earlier work on classroom shared reading by using methods that do not confounded text and genre effects with holistic styles because we controlled the stimulus text rather than letting teachers select their own titles.

1.1. Why should we study profiles of teacher talk during shared book reading?

A considerable number of studies have examined the influence of classroom book sharing approaches on preschool and kindergarten children's language and literacy outcomes. Some early studies qualitatively identified holistic styles (e.g., Elster & Walker, 1992; Teale & Martinez, 1996), but most recent studies use quantitative analysis of micro-level utterances (e.g., Bustamante, Hindman, Champagne, & Wasik, 2018; Gianvecchio & French, 2002; Hindman, Wasik, & Erhart, 2012; van Kleeck, Gillam, Hamilton, & McGrath, 1997). We use the term shared reading *profiles* to refer to holistic approaches or styles of read-alouds that consider how the book sharing experience unfolds before, during, and after reading the text. In contrast to this holistic view, we also refer to discrete shared-reading behaviors as *utterances*, representing extratextual talk beyond text reading. In parent–child shared reading studies, researchers have considered naturalistic profiles (Haden, Reese, & Fivush, 1996; Hammett, van Kleeck, & Huberty, 2003), but only one classroom-based study examined holistic, untrained styles.

More than 20 years ago, one seminal preschool study by Dickinson and Smith (1994) put forward a provocative hypothesis that there are recurring patterns of book sharing in U.S. schools; this study has been cited more than a thousand times and guided several later lines of research. Dickinson's team identified three distinct, holistic profiles of shared book reading, some of which predicted child outcomes. They also identified micro-level utterances that predicted child outcomes. Although much research has replicated Dickinson and colleagues' utterance-level findings (e.g., Gerde & Powell, 2009; Wasik & Hindman, 2014; Zucker, Justice, Piasta, & Kaderavek, 2010), researchers have focused little on holistic profiles of classroom shared reading. Yet early childhood educators and curriculum or professional development providers would benefit from understanding reading styles in today's U.S. classrooms.

There are various efficacious styles of shared reading experimentally tested in early childhood (see Wasik, Bond, & Hindman, 2006). Some styles rely heavily on after reading discussion with substantial efforts to review vocabulary cards or introduce props and extension activities after reading (e.g., Gonzalez et al., 2014; Wasik et al., 2006). Other intervention approaches frontload learning by pre-teaching focal vocabulary, stopping only at selected points during reading, and focusing on challenging questions after reading (e.g., Neuman & Kaefer, 2018; Zucker et al., 2019). Yet other interventions utilize a print-referencing style of shared reading (e.g., Justice, Kaderavek, Fan, Sofka, & Hunt, 2009). There are also implicit shared reading styles present within widely-used core curricula. For example, building on extensively studied dialogic reading principles (What Works Clearinghouse, 2007), Houghton Mifflin's Big Day for Pre-K (2018) introduces "story words" before reading and pauses often during reading to ask students increasingly complex questions. The Creative Curriculum for Preschool (2016) suggests consistently more talking points during reading than before or after reading. In this study, we asked if a sample of early childhood teachers in the U.S. – who were *not* using researcher- or curriculum-provided lessons – tend to frontload their extratextual talk before reading, concentrate discussion during reading, or discuss more extensively after reading. We expected this study could reveal multiple combinations of strategies that support young children's learning (cf. McGinty, Breit-Smith, Fan, Justice, & Kaderavek, 2011).

1.1.1. Past styles of classroom reading

As mentioned, there is only one known study of classroom shared reading profiles. Within a larger early 1990's study (see Dickinson & Tabors, 2001) Home-School Language and Literacy Development), a team of researchers collected data on over 80 low-income children's home and classroom experiences at ages three, four, and five years. Age four, pre-kindergarten (pre-k) classroom observations of shared book reading qualities predicted children's later kindergarten (n = 74) and Grade 4 outcomes (n = 57) on vocabulary, comprehension, and literacy measures (see Dickinson & Porche, 2011; Dickinson & Smith, 1994). These children's 25 pre-k teachers read books of their own choice, selecting various genres. All utterances during the reading session were coded for content and *timing of extratextual talk* – this is before, during, or after reading talk beyond reading of the text itself.

Using a combination of cluster analysis and qualitative approaches, they identified three distinct holistic patterns (Dickinson & Smith, 1994). First, ten teachers (40%) used a "didactic-interactional" style that engaged in limited overall talk. A second cluster of ten teachers (40%) used a "performance-oriented" approach with little talk during reading – like an uninterrupted performance – with extended conversations before or after reading. A smaller group with five teachers (20%) used a "co-constructive" style with conversations mostly during text reading. These styles also differed in the content of talk. The didactic style focused on simple recall questions, whereas the co-constructive and performance-oriented read-alouds focused on challenging analysis of the text (e.g., reasons for text events, meanings of words).

Another finding was that teachers and children distributed their amount and timing of talk in similarly; for example, if teachers talk more before reading, children mirror this discourse pattern. The challenging performance-oriented style predicted greater kindergarten receptive vocabulary when compared to the less demanding didactic style; there were no significant differences between the other profiles. When they tested utterance-level variables, challenging, analytic talk predicted children's later vocabulary scores; no significant relations were found with later listening comprehension and literacy skills (Dickinson & Smith, 1994). Later, Dickinson and Porche (2011) used only the micro utterance-level data to demonstrate that analytic talk during pre-k shared reading related to children's Grade 4 vocabulary.

Although this study does not directly replicate the procedures of this earlier study, it builds on this work and tests the rigor of the underlying hypothesis (Makel, Plucker, & Hegarty, 2012). Our first procedural change was to seek a larger population of teachers from two states and to ask them to read a common, narrative text. This removes potential confounds in the original study attributed to the use of different stimulus texts. For example, several teachers in the Dickinson and Smith (1994) sample chose texts with repeated phrases that may have produced a unique set of simple, choral reading behaviors in the didactic group. Second, our analytic approach used a more robust latent profile analysis (McLachlan & Peel, 2000) to identify profiles of adult and child talk. Third, our coding of utterances retained codes for complexity and timing of talk (before, during, after reading). But we added literacy-related codes and coded questions based on more recent findings (e.g., Justice et al., 2009; Mol et al., 2009).

1.2. Shared reading framework and evidence guiding this study

Established frameworks of shared book reading recognize it is a socially-constructed, activity whereby three elements shape the experience – adult talk, child talk, and the text itself (Van

Kleeck, 2003). This framework – along with cognitive processing and sociolinguistic theories – guided this research. Cognitive processing models suggest the mechanisms for learning require active processing and that teachers gradually increase the complexity of instructional content (Sigel, 2002). Sociolinguistic theories further suggest adults can use specific strategies, such as questioning, to responsively guide learning and gradually scaffold text comprehension (Vygotsky, 1986). Because the present study used a researcher-created narrative, this controls one of three elements know to shape shared reading experiences – the text itself – and isolates effects of adult and child talk (Van Kleeck, 2003). We designed the narrative to include several sophisticated words and concepts to elicit high-demand talk found beneficial in the earlier Dickinson and Smith (1994) study. We also included print-salient features that can elicit references to print (e.g., Justice et al., 2009; Zucker, Justice, & Piasta, 2009). The next sections explain malleable factors within shared reading that informed our analytical approach.

1.2.1. Timing of talk

It is theoretically plausible that the timing of talk – before, during, or after reading a picture book – could matter, particularly for children with limited initial language who may benefit from adult interruptions during reading to scaffold learning (Gathercole & Baddeley, 2014; Reese & Cox, 1999). Before reading includes discussion at the cover and title page(s); during reading includes the story pages; after reading includes at the end pages, back cover, or when the book is closed but discussion is text-related. A past study manipulated reading styles with elementary children (Grades 1 and 3) listening to informational narrative texts (Greene Brabham & Lynch-Brown, 2002). This included three conditions with equivalent level and quantity of comments and questions: (1) minimal extratextual talk, (2) an after reading performance style, and (3) a during reading interactive style. Results showed the smallest gains in vocabulary for minimal extratextual talk and larger gains for the latter conditions, regardless of timing. In another study on timing, both preschoolers as well as elementary students benefited more from causal questioning techniques during reading as compared to after reading, perhaps because of reduced working memory demands (van den Broek, Kendeou, Lousberg, & Visser, 2011). Yet another correlational study (Gonzalez et al., 2014) found discussions after reading benefited vocabulary learning; the authors hypothesized after reading talk built stronger connections between words and text concepts. Finally, an experiment with dual language learners (DLL) speaking Spanish at home, examined questions during or after reading (Walsh, Sánchez, & Burnham, 2016). This study found no effects of timing, but effects for the level of challenge in questions. In sum, findings on the importance of timing of talk are mixed.

1.2.2. Content of talk

Researchers tend to consider the instructional content of talk during shared reading across two broad domains: (1) meaning-related talk that supports comprehension of the text, and (2) literacy-related talk that supports understanding of book and print conventions. *Meaning-related talk* varies on a continuum of cognitive demand required from simple or low cognitive demand topics to challenging, high cognitive demand topics (e.g., Hindman et al., 2012; Zucker et al., 2010). *Low-demand talk* addresses literal recall of text events, description of characters or illustrations as well as comparison on perceptual qualities (e.g., big/small, red or pink). At the other end of the continuum, *high-demand talk* includes analysis of non-perceptual qualities and includes: inferencing about character's emotions, desires, perspectives, or cognition; causal reasoning; or elaborating on vocabulary meanings. Researchers also use other terms used to describe this low- versus high-demand continuum such as literal/inferential talk, or perceptual/non-perceptual talk, or contextualized/decontextualized.

Several past experimental studies manipulated the cognitive demand of talk during shared book reading. Based partly on the findings of the original Dickinson and Smith (1994) study, an experiment by Reese and Cox (1999) examined the complexity of talk during shared reading of 36 books with 4-year-olds. Children were assigned to one of three conditions: (1) Describer: low-demand topics with during reading timing of talk; (2) Comprehender: high-demand topics during reading (inferences, reasoning); and (3) Performance: high-demand topics discussed after reading (inferences, evaluations). Findings suggested differential effects based on children's initial skill level. For example, children with low initial language skills made the greatest gains on a distal vocabulary measure with the low-demand, describer style; however, children with higher initial language skills benefited more from the high-demand, performance style. Another experiment found that DLLs benefited more from high-demand questions (Walsh et al., 2016). Preschoolers with language impairment benefited from an intervention that combined both high- and low-demand questions during shared reading (Van Kleeck, Vander Woude, & Hammett, 2006).

Literacy-related talk can elucidate topics that support young children's later decoding, such as understanding how books and print are organized, that words carry meaning, and that letters and words in the text can be identified (Gettinger & Stoiber, 2014; Justice et al., 2009; Piasta, Justice, McGinty, & Kaderavek, 2012). Young children naturally have questions about print conventions (Yaden, Smolkin, & Conlon, 1989) and many books for young children contain salient print and sound features, such as rhyming structure or words within illustrations, that facilitate literacy talk (Dynia, Justice, Pentimonti, Piasta, & Kaderavek, 2013; Stadler & McEvoy, 2003; Zucker et al., 2009). Thus, both meaning- and literacy-related content are important considerations in shared reading sessions.

1.2.3. Form of utterances

Turning to the form of talk, utterances that use an interrogative or question form can be a particularly important feature within book reading. Experimental studies show that more interactive approaches that use questioning during shared reading (rather than passively listening) are beneficial for vocabulary development (Blewitt, Rump, Shealy, & Cook, 2009; Hargrave & Sénéchal, 2000). Although comments are valuable (e.g., Ard & Beverly, 2004; Barnes, Dickinson, & Grifenhagen, 2017), questions warrant particular attention because they are designed to elicit a verbal response that engages others in text analysis (e.g., Blewitt et al., 2009; Van Kleeck et al., 2006; Wasik et al., 2006). Effective book reading interventions craft questions adults pose during reading (e.g., Gonzalez et al., 2010; Whitehurst et al., 1994). Yet, a recent review of questioning within shared reading (Walsh & Hodge, 2016) concludes that most early childhood teachers do not question children in ways that best support language. For example, prediction questions may not support comprehension as effectively as questions about causal relationships, or character goals and problems in the text (Strasser, Larraín, & Lissi, 2013). Children spontaneously ask their own questions during shared reading (Moschovaki & Meadows, 2005; Yaden et al., 1989). Thus, this study considers both teacher and child questioning during read-alouds.

The present study also describes whether children use short or more elaborated forms of utterances within reading sessions. Specifically, we examined if children used mostly short, one-word utterances or longer, multiword utterances. Although classroom-based read alouds are a largely teacher-directed activity (e.g., Vitiello, Booren, Downer, & Williford, 2012), children may be able to actively shape conversations during shared reading if they are given opportunities to insert more elaborate, multiword utterances. Similar to the relations identified in the original Dickinson

and Smith (1994) study, a growing number of shared book reading studies have used sequential analysis to show how precisely children's talk tends to mirror the content of adults' immediately contingent utterances (e.g., Justice, Weber, Ezell, & Bakeman, 2002; Deshmukh et al., 2019; Zucker et al., 2009). Yet children are not passive listeners. The nature of book reading is reciprocal in that both children and adults adjust the level of conversational topics to match the topic expressed by the speaker in the contingent utterance (Danis, Bernard, & Leproux, 2000; Van Kleeck, 2003). Some styles of classroom read-alouds may invite elaborated child utterances by inviting children to dramatize events or critique the text (Sipe, 2002). Thus, we captured a blunt measure of the length of child utterances as single versus multiword.

1.3. Research Questions & Hypotheses

In the present study, we used a latent profile analysis with a large sample of teachers and children enrolled in 98 early childhood classrooms to identify profiles of talk during shared book reading. Our research questions about the nature of pre-k and kindergarten shared book reading were threefold: (1) What shared reading profiles are identified when considering content, timing, and form of teacher talk within a Fall shared reading session? (2) Do profiles of teacher talk relate to the amount and type of child talk during these shared reading sessions? (3) How do identified holistic shared reading profiles and utterance-level variables relate to children's performance on standardized language and literacy measures in the Spring?

Based on profiles observed by researchers more than 20 years ago (Dickinson & Smith, 1994), we hypothesized that teacher talk would reveal reliable profiles that varied in the level of cognitive demand and the timing of talk. Yet we were uncertain how many profiles we would identify because this study's standardized text approach did not have the potential confounding text effects that may have increased variability in the original study. For the second research question, we expected children's talk during reading would relate to teacher profiles. Finally, we expected that, after controlling for children's initial vocabulary levels, read-aloud profiles in this sample could predict children's language and literacy skills at the end of the year. The present study is a shorter duration than the Dickinson and colleagues' longitudinal study; therefore, we expected attenuated relations between shared reading behaviors and child outcomes.

2. Method

Important differences for the reader to consider between the Dickinson et al. study and the current study are that the original study included less diverse child participants (64% White), but a higher-poverty sample in which the highest level of maternal education was high school. Online supplementary Appendix B1 further compares the methods and sample within the original Dickinson et al. study and the current study.

2.1. Participants

As part of a larger classroom observation study (Author, 2019), classrooms were recruited from a South Central state and a Midwest state in the U.S. Pre-k 4-year-old classrooms and kindergarten classrooms were eligible for the study if: (a) most children were between the ages 3 years, 0 months to 5 years, 6 months in the Fall of the school year, and (b) teachers used English as the predominant (>90%) language of classroom instruction. The vast majority of classrooms were full-day programs, although 21.8% were half-day programs. For half-day programs, only one section (AM or PM) was randomly enrolled.

A sample of 98 pre-k teachers and kindergarten (K) teachers were enrolled in this study (n = 82 pre-k, n = 16 K). The pattern of results for all analyses as well as the scientific conclusions based on only the pre-k classrooms were identical to those including both pre-k and K classrooms, so we report only results from the larger sample. This sample included mostly female teachers (98.9%). In terms of educational background, 23.4% (n = 23) of teachers held a Master's degrees or higher, 34.7% (n = 34) held a Bachelor's degrees or one year of coursework beyond a Bachelor's degree, and 31.5% (n = 31) held a 2-year Associates' degrees or less. Teachers in the sample had a range of years of teaching experience; 33.3% (n = 29) had 2 or less years of experience, 13.3% (n = 13) had 3–4 years of experience, 17.3% (n = 17) had 5–10 years of experience, and 28.6% (n = 28) had 11 or more years of experience. Teacher race included: Caucasian (63.64%), African American (28.41%), American Indian/Alaska Native (2.27%), Asian (1.14%), 3.41% reported their ethnicity as "Other", and data was missing for 1.13%. For ethnicity, 24.71% of the sample identified as Latino. The average class size was 17 (range 7–28 children). On average, teachers reported 16.2% of their students had diagnosed special needs.

Two to four children per classroom were enrolled in the study (n = 300). Amongst children with parental consent, a subset were randomly selected. Children were 55% female and an average of 4 years, 3 months in the Fall of their pre-k year or 5 years, 6 months for the kindergarten sample. About half of children's caregivers (48.4%) reported an annual income of $40,000 or less, 15% reported an income between $40,000–70,000, and 36.6% reported income of $70,000 or higher. Children's race/ethnicities included: Caucasian (46.0%), African American (33.3%), Latino (23.7%), American Indian/Alaska Native (0.7%), Asian (5.0%), and 0.7% reported their ethnicity as "Other." A majority of children's caregivers reported that English was the primary language spoken at home (92.0%), whereas 5.3% reported Spanish as the primary language spoken at home, with 2.7% of caregivers not reporting primary home language.

2.2. Participant enrollment

This study enrolled two consecutive cohorts of classrooms. Cohort 1 participated in the 2015–16 school year and Cohort 2 participated in the 2016–17 school year. In the Fall of each school year, researchers used emails, phone calls, and flyers to recruit participants. Researchers obtained district and school directors' permission for the study, followed by teacher consent. During the consent process, teachers received a summary and sample pages of the narrative text researchers would bring to read aloud on the day of the observation. Teachers sent parent information letters and consent forms via "backpack mail." This explained study procedures and that all children's images would be video recorded, unless they requested an "opt out" to seat their child outside camera's lens during observations. Parents were invited to provide written consent for their child to participate in language and literacy assessments on the same day as classroom observations. Participating teachers received a set of classroom books and participating children received a single book as gifts for completing the study activities.

2.2.1. Child inclusionary/exclusionary criteria

Focal children were required to meet the following eligibility criteria: (a) generally typical development (i.e., no known diagnosis of moderate/severe cognitive impairment); (b) hearing and vision within normal limits; and (c) adequate English to complete the assessment battery. We operationalized this final criterion using two measures: (1) the parent reported that the child speaks at least "some" English within the home on a demographic questionnaire, and (2) the child scored above -2 *SD* the age-based mean on a

Table 1
Demographic information for participating children.

	N	Percentage
Ethnicity		
African–American/Black	100	33%
Caucasian	138	46%
Asian	15	5%
Native American Indian	2	0.5%
Other	2	0.5%
Not reported	43	14%
Race		
Hispanic/Latino	71	23%
Not Hispanic/Latino	185	62%
Not reported	44	15%
Primary home language		
English	277	92%
Spanish	16	5%
Not reported	7	3%
Level of maternal education		
High school or less	50	16%
Some college, no degree	61	20%
Associate's degree	26	9%
Bachelors' degree	68	23%
Master's degree	44	15%
PhD or terminal degree	21	7%

standardized English vocabulary measure (i.e., the CELF Expressive Vocabulary subtest, described below). Focal children's demographics are detailed in Table 1.

2.3. Classroom observation procedures

This study replicated many of the classroom observation procedures of the earlier, seminal Dickinson and Smith (1994) study by examining normal classroom routines during large-group book sharing. Procedural differences are detailed in Online Supplement B1; primary changes include the use of a standardized text rather than books of teacher's own choice and shorter period between the two measurement time points (baseline/posttest). All participating teachers in the present study were videotaped at their convenience between September and January of the school year. Children were assessed on the observation day (September–January) then again at a second visit about 3–6 months later (February–May). Observations were typically in the morning. To ensure the text was unfamiliar to all participants, teachers did not have access to the text to plan for the observation. Teachers were provided with the text to read aloud about 5 min before the videotaping; thus, all teachers had equal, limited time to review before reading. Research staff explained "We are interested in observing the ways you and your students share books. Please share the book as you normally would." Researchers used high-definition digital video cameras with an external microphone and a tripod to record. Videos included all students, but the camera focused on the teacher/text. No microphones were attached to children, so we could not differentiate focal students' talk from peers'.

2.3.1. Read-aloud text

Teachers read aloud an unfamiliar narrative text called *Kingdom of Friends* that was developed by the authors for this study and is not commercially available. This 25-page text describes two best friends – Petunia and Diego – who get into a fight during play time at school, but learn important lessons as they solve their problem. Text characters exhibit a range of human emotions (e.g., fear, anger, trust, joy) across prototypical narrative episodes including: character development, rising action, climax, falling action, and resolution. To elicit a range of low- and high-demand talk, we developed the text to include challenging vocabulary (e.g., *cooperate, protected, destroyed, imagination, proclaimed*) and components that required inferential reasoning. Text characteristics include: 762 words, 72 sentences, *M* = 9.41 words per sentence (*SD* = 4.70), type-token ratio = 0.34, lexical diversity = 84.06, Coh-Metrix readability = 24.64. Digital copies of the text are available from the first author upon request. Online Appendix B2 explains the plot structure with sample pages and the stimulus book.

2.4. Transcription procedures

Overall, similar codes were used across the original and current study with expanded codes in the present study based on more recent research findings (e.g., add literacy-related coded based on print referencing studies) or the nature of talk within the present focal text (e.g., references to imaginative play). Online Supplementary Appendix B3 compares details of the transcription and coding procedures across studies. Videotaped shared reading observations were transcribed using a media player and Microsoft Excel software. Each utterance was transcribed in a separate Excel row marked for the speaker: teacher reading the text [R], teacher extratextual talk beyond the text [T], single child [C], or multiple children [Cs]. We segmented speech into Communication Units, meaning a main clause with its dependent clauses (C-Units; see Miller, Andriacchi, & Nockerts, 2015).

The start of transcription for the book reading session was the moment when the teacher draws children's attention to the text. The end of the transcription was signaled when the book was no longer the focus of attention. Transcriptionists reviewed a manual and then attended a 1-h training that included group transcription practice and discussion of disagreements. Then staff transcribed two classroom book reading videos independently. The words within practice transcripts were compared to a master transcript with disagreements marked as errors (e.g., missing words, unintelligible). Average agreement with the master coder was 94.48% for teacher talk; however, agreement of child words was lower, averaging 84.09%. Considering the difficulty hearing child talk (as children often had their backs to the camera/microphone), this lower agreement rate for child talk was deemed acceptable. After demonstrating reliability, transcribers worked independently but resolved any difficult utterances via consensus.

2.5. Coding procedures

The coding system characterized the: (a) timing of talk during the reading session, (b) form of utterance, and (c) content of conversations. The same codes were applied to extratexual teacher and child talk. The coding system was adapted with permission from the Systematic Assessment of Book Reading (Justice, Zucker, & Sofka, 2007) that shows evidence of reliability and validity (Pentimonti et al., 2012). Transcripts of reading sessions were coded using Microsoft Excel software with coding variables in columns and each utterance in a separate row using customized data validation rules to reduce potential errors. The first author used videoconferences to train 10 coders from two research sites during two 4-h trainings that included practice coding activities and a final quiz. Then, each staff coded two reliability transcripts using the codes defined in Appendix A1 and explained below. We calculated interrater reliability as the proportion of times a coder marked an item as occurring conditional on the other rater marking the item as occurring, accumulated over both coders. This approach ignored agreements in which both coders indicated an item did not occur, as the probability of an item occurring during any particular utterance was low, which would artificially increase interrater agreement but lead to artificially low values of standard measures of interrater reliability such as Kappa (Feinstein & Cicchetti, 1990). Coders were required to demonstrate >0.85 reliability. Good interrater reliability was achieved on reliability transcripts with an average reliability

of 0.858. We monitored coders drift for every 10 videos submitted; supervisors checked agreement for a sample of two coded transcripts. Agreement was high across drift checks M = 0.988. Any disagreements between the coder and supervisor were discussed and resolved.

2.5.1. Timing of talk codes

The first coding dimension captured timing of talk by counting the utterances across the reading session, including, before, during or after reading. Before reading included talk at the front cover or title page. During reading was coded for all extratextual talk at the first page through reading of the final page of text. After reading talk occurred at the end pages/back cover or when the book was closed but still the topic of discussion. Timing codes were mutually exclusive; timing codes co-occurred with the subsequent content and form codes.

2.5.2. Content codes

The second coding dimension used frequency counts to capture the content of conversations, detailing the presence or absence of instructional content within each utterance. To describe content, all utterances were coded for the general topic including: (a) 12 meaning-related talk codes addressing text comprehension, (b) six literacy-related talk codes on how books and print work, or (c) a behavior-related talk code that addressed rules/procedures (e.g., *T: Raise your hand.*). Behavior-related talk was excluded from further analysis.

We categorized meaning-related talk into low-demand topics versus high-demand topics. Low-demand talk required more simple thinking about perceptual topics including: (1) character reference, (2) event reference, (3) describing a sequence of events or temporal relations, (4) describing with comparison, and (5) predictive references to future events. In contrast, high-demand talk addressed non-perceptual topics including: (6) cognition references, (7) emotion references, (8) desire or preference references, (9) judgment and perspective taking references, (10) defining word meanings, (11) pretend play or imaginative references, and (12) causality references. Our data showed a paucity of strong predictions, thus it was low demand. Most predictive utterances were vague references to future text events - perhaps to refocus children's attention on text (e.g., *Let's see what happens next.* or *Let's see what's gonna happen.*). Other studies indicate predictions can be weak and superficial (Wolf, Crosson, & Resnick, 2005).

The literacy-related content codes are also defined in Appendix A1 and included: (1) print meaning references, (2) author and illustrator roles, (3) book and print conventions, (4) letter references, (5) word references, and (6) writing references. Meaning- and literacy-related codes were mutually exclusive; however, low- and high-demand meaning codes could co-occur.

2.5.3. Form/length of utterance codes

The second coding dimension used frequency counts to consider the form of utterance speakers used, with a focus on identifying questions that elicit conversation around the text. To identify questions, we coded all utterances as either: (1) question, (2) comment, or (3) exclude. Questions included interrogative sentence forms, including more rhetorical tag questions. Comments included all declarative and imperative sentence forms. Some talk was *excluded* from further analysis at this step including: (a) inaudible utterances, laughter, or filler words (e.g., *Um, Er, Oh*); (b) simple conversational turn-taking or repair utterances (e.g., *What did you say? Thank you; You're welcome*), and (c) all simple yes/no response, or other derivatives (e.g., *I think so.* When meaning yes). This set of codes was mutually exclusive and exhaustive in that all extratextual talk received one of these three forms of utterance codes with the goal of identifying the presence or absence of questions.

The form of all child utterances was further coded for length in a dichotomous method of single or multiword utterance. Single word utterances included one word or a simple noun phrase (i.e., article + noun; *A dragon.*), whereas multiword utterances included more than one word (e.g., *I see a dragon*; *All night.*). To summarize, each utterance received a series of codes. For example, this teacher utterance – *Who decides what you're going to do?* – was coded as: (a) timing – during, (b) judgments – high-demand inference about who's perspective matters most, and (d) form – question. Or this child utterance – *It means he also wants to be in make believe.* – was coded as: (a) timing – during, (b) desires – high-demand code for the volition term "want," (c) act out/pretend play – high-demand code for reference to make-believe, and (d) form-multiword comment. We used the same definitions to code content of both teacher and child talk as detailed in Appendix A1. However, we did not code child talk for two codes that were very low occurrence in earlier phases of pilot coding (e.g., sequence/temporal, compare/contrast).

2.6. Child outcome measures

In the Fall and Spring of each Cohort, participating children were administered a battery of direct assessments by trained research staff. The *Peabody Picture Vocabulary Test – Fourth Edition* (PPVT IV; Dunn & Dunn, 2007) measured vocabulary. In this measure children identify the picture of a target word given four possible choices. The PPVT has an internal consistency of 0.94 and test–retest reliability of 0.92. As detailed in Online Appendix B1, the PPVT was the only measure from the original study with a current form available. Therefore, the remaining measures used current tools assessing similar constructs. Children's oral language skills were measured using the *Clinical Evaluation of Language Fundamentals Preschool-2* (CELF-P2; (Wiig, Secord, & Semel, 2004). This included three subtests – Sentence Structure, Word Structure, and Expressive Vocabulary. The Sentence Structure subtest measures children's ability to understand spoken sentences of increasing complexity, including but not limited to prepositional phrases, verb tense, relative clauses, etc. The Word Structure subtest measures children's ability to apply morphological rules to mark inflections and derivations and to use subjective, objective and reflexive pronouns, when presented with pictures. The Expressive Vocabulary subtest measures children's ability to label pictures of objects and actions. CELF-P2 demonstrates high reliability (alphas range 0.78–0.83). Children's early literacy knowledge was measured with the Print Knowledge subtest of the *Test of Preschool Early Literacy* (TOPEL; (Lonigan, Wagner, Torgesen, & Rashotte, 2007). This 36 item subtest measures letter discrimination, word discrimination, letter-name identification and letter sound identification. The internal consistency for this subtest of the TOPEL is 0.95, test retest reliability is 0.89 and interrater agreement is 0.96.

3. Results

In this section, we first provide descriptive information and then address the three research questions; we explain analytic techniques used before reporting results of each research question. Our initial data included almost 30,000 utterances including: 3162 text reading utterances; 17,597 teacher utterances, and 9177 utterances by children. Excluded talk included: (a) 1633 simple yes/no utterances for children and 1575 for teachers; and (b) 2242 filler/conversational repair/inaudible utterances for children and 1064 for teachers; and (c) 412 behavior-related utterances for children and 2780 for teachers.

Table 2 provides detailed descriptive statistics for all remaining coded content of interest. As shown, there was wide variability across classrooms (with zero codeable content in some classes),

Table 2
Descriptive frequencies of teacher and child talk (n = 98 classrooms).

Domain and modifier codes	Teacher talk				Child talk			
	M	*SD*	Min	Max	*M*	*SD*	Min	Max
Literacy-related talk	17.42	13.19	0.00	67.00	3.45	3.66	0.00	19.00
Print meaning	2.88	3.26	0.00	18.00	0.53	1.05	0.00	6.00
Author/illustrator	4.62	4.87	0.00	25.00	0.94	1.55	0.00	7.00
Book & print conventions	7.83	7.57	0.00	39.00	1.44	2.20	0.00	12.00
Letters	0.33	0.81	0.00	5.00	0.12	0.44	0.00	3.00
Words	2.12	2.54	0.00	15.00	0.34	0.79	0.00	5.00
Writing	1.03	1.40	0.00	7.00	0.36	0.76	0.00	3.00
Low-demand meaning-related	32.88	24.31	0.00	113.00	8.57	7.04	0.00	36.00
Character reference	9.61	9.28	0.00	40.00	1.81	2.18	0.00	12.00
Event reference	13.29	13.89	0.00	74.00	3.72	4.73	0.00	29.00
Sequence or temporal	0.96	1.25	0.00	6.00	—	—	—	—
Compare and contrast	0.47	0.80	0.00	3.00	—	—	—	—
Predictions/forecasts	6.39	7.10	0.00	36.00	2.05	3.30	0.00	15.00
High-demand meaning-related	57.32	42.12	0.00	186.00	16.15	12.91	0.00	59.00
Cognition	16.37	14.82	0.00	92.00	1.73	3.08	0.00	18.00
Feelings/emotions	11.17	8.50	0.00	54.00	4.30	4.60	0.00	27.00
Desires/preferences	9.15	9.52	0.00	53.00	2.51	3.25	0.00	18.00
Judgments & perspectives	20.41	17.64	0.00	89.00	5.82	5.11	0.00	22.00
Define word meanings	4.56	6.40	0.00	26.00	1.28	2.47	0.00	13.00
Pretend play/imagination	5.07	8.99	0.00	60.00	1.16	2.88	0.00	24.00
Causal reasoning & problem/solution	7.13	6.96	0.00	28.00	2.46	3.33	0.00	16.00
Question utterances	57.69	36.74	0.00	186.00	2.78	3.34	0.00	19.00
Child utterances					51.55	37.70	0.00	192.00
Single word	—	—	—	—	19.70	20.51	0.00	115.00
Multiword	—	—	—	—	31.85	22.40	0.00	121.00

Note. The codes cannot be summed because they can co-occur with an utterance; for example, an utterance can contain two modifier literacy codes (e.g., *You can write the letter B*).

but teachers consistently said many more utterances than children during the reading session. Noteworthy descriptives for teachers include the large number of high-demand utterances (*M* = 57.32, *SD* = 42.12) and questions (*M* = 57.69, *SD* = 36.74). One teacher asked 186 questions in a single reading session. The lowest frequencies observed for teachers were sequence/temporal and comparative language (*M* = 0.47–0.96) and vocabulary elaborations (*M* = 4.56). For children, talk was much more limited than teachers; yet, the most prominent types of utterances included judgements, emotions, and event references (*M* = 3.72–5.82). Children averaged three questions per reading. Despite the capacity of 4-year-olds to produce elaborate utterances, many were single words (*M* = 19.70) but more were multiword (*M* = 31.85).

3.1. Profiles of teacher talk during shared reading

To address the first research question seeking to identify potential profiles of teacher talk during shared book reading, we conducted a latent profile analysis with 12 items of teacher extratextual utterances: low-demand versus high-demand meaning-related, literacy-related, and question form of utterance, each observed before, during, and after the book reading. We ran the analysis in Mplus (Muthén & Muthén, 1998-2018) using 200 random sets of starting values, determining the number of classes based on fit (AIC, BIC, bootstrapped likelihood ratio test [BLRT]; McLachlan & Peel, 2000; Nylund, Asparouhov, & Muthén, 2007), interpretability of the latent profiles, and size of the latent classes. A 4-class solution (AIC = 8252, BIC = 8415) fit better than the 3-class solution (AIC = 8343, BIC = 8472, BLRT = 117, df = 13, $p < 0.001$), which in turn fit better than the 2-class solution (AIC = 8465, BIC = 8561, BLRT = 148, df = 13, $p < 0.001$). However, the 4-class solution included a class of negligible size (n = 4) and the profiles were not interpretable. Thus, we concluded that the 3-class solution best described the pattern of teacher utterances. Entropy for the 3-class solution was 0.96. The profiles are illustrated in Fig. 1 and average frequencies of profiles are detailed in Table 3. In selecting labels for profiles, we did not use the term "Describer" from past research (Reese & Cox, 1999) because no current profiles focused predominantly on lower demand talk. We also did not use the term "Performer" from past studies because there were no profiles where conversation was mostly delayed until after reading (cf. Dickinson & Smith, 1994). All identified profiles showed relatively high amounts of meaning-related talk during reading so we used the term "Comprehender" for all profiles (cf. Reese & Cox, 1999).

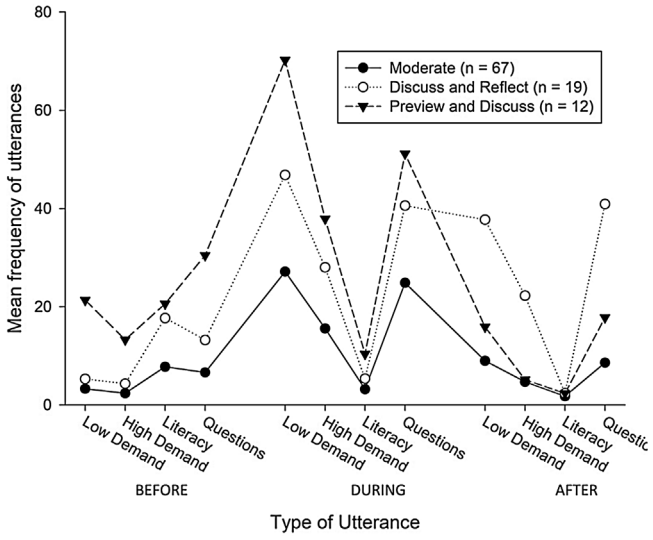

Fig. 1. Identified profiles of teacher talk before, during, and after reading.

3.1.1. Profile 1

The first profile consisted of the majority of teachers (*n* = 67, 68.37%). We called this profile *Moderate Comprehender* (MC)

Table 3
Average frequencies of 12 teacher talk variables by profiles.

		Teacher comprehender (C) profiles		
Timing	Content/form	1-Moderate (MC)	2-Discuss & reflect (DRC)	3-Preview & discuss (PDC)
Before	1. Low-demand	3.28	5.27	21.34
	2. High-demand	2.37	4.31	13.26
	3. Literacy	7.77	17.68	20.58
	4. Questions	6.60	13.20	30.45
During	5. Low-demand	27.13	46.83	70.22
	6. High-demand	15.54	27.99	37.90
	7. Literacy	3.19	5.33	10.37
	8. Questions	24.86	40.58	51.15
After	9. Low-demand	8.97	37.71	15.88
	10. High-demand	4.69	22.24	5.11
	11. Literacy	1.75	2.37	2.32
	12. Questions	8.59	40.89	17.78

because these teachers offered a moderate quantity of total utterances compared to the other profiles, but this was far from minimal extratextual talk. Specifically, this profile was characterized by: (1) *before* reading, a limited number of teacher utterances, most of which addressed literacy topics (e.g., title, parts of the book, author/illustrator role); (2) *during* reading, a moderate number of meaning-related teacher utterances, the majority of which were low-demand meaning-related talk; (3) *after* reading, limited teacher talk, almost all of which focused on meaning-related topics; and (4) relatively fewer total *questions* than other profiles (M = 40.04).

Excerpts of conversation transcripts from teachers in each profile were randomly selected and summarized in Appendix Table A2 shows how the MC profile of teacher typically began the reading session with naming the title, the role of the author/illustrator, and parts of the book. Naming parts of the book appeared to be a rote exercise for most teachers often featuring singing songs about book parts. During reading, teachers within this profile asked about text events using both low- and high-demand talk that included several inferences and judgments. Some teachers in this profile discussed sophisticated word meanings (e.g., *cooperate, knight, destroyed, imagination*) during reading. After reading teachers asked children if they liked the book or encouraged children to recall major text events.

3.1.2. Profile 2

The second teacher profile (n = 19, 19.39%) included a large overall volume of teacher talk that mostly occurred during and after reading. We named the second profile *Discuss & Reflect Comprehender* (DRC) because this profile devoted more time to reflecting on the text after reading and involved deep discussion of both low- and high-demand topics during reading. Characteristics of this profile were: (1) *before* reading, a moderate amount of teacher talk, most of which addressed literacy topics (e.g., title, author/illustrator role); (2) *during* reading, a large number of meaning-related utterances that focused on understanding both low- and high-demand aspects of the text; (3) *after* reading, a large amount of teacher talk mostly focused on high-demand talk to reflect on the text; and (4) a large number of *questions* (M = 94.67) to encourage conversation, mostly during and after reading.

Excerpts of transcripts in Appendix Table A3 illustrate patterns observed in the DRC profile. After reading, this profile featured a substantial amount of teacher talk about the text; reflection after reading was a distinguishing feature of the DRC profile. Before reading, these teachers also addressed a similar rote review of book and print conventions as the first profile. These teachers addressed some meaning-related topics before reading such as setting, but spent relatively less time on before reading talk than the final profile. During reading, teachers in this profile often discussed characters' emotions and made simple predictions about what might happen next. A few teachers asked after reading questions that encouraged children to think about the larger morale of the story. Most teachers used several comments and questions to review text events. After reading, teachers in this profile often considered how events unfolded sequentially, asking questions about the beginning and end of the story and how the characters changed. Other teachers in this profile spent a relatively large amount of time after reading discussing text events or word meanings where children appeared to have misconceptions.

3.1.3. Profile 3

The third profile (n = 12, 12.25%) included the smallest number of teachers, but they used the highest total amounts of talk. We termed this profile *Preview & Discuss Comprehender* (PDC) because these teachers spent more time before reading making predictions or previewing topics such as friendship that were indicated by the title and cover of the text. The PDC teachers then encouraged higher-level understanding of the text during reading. This profile of teachers was characterized by: (1) *before* reading, a higher amount of teacher talk, most of which addressed meaning-related topics or made predictions about the text, but also noted the common literacy topics of title and author; (2) *during* reading, this profile had the highest number of meaning-related utterances. A substantial number were low-demand, but the majority of talk addressed high-demand level text comprehension; (3) *after* reading, only a moderate amount of teacher talk, most of which addressed higher-level topics; and (4) a large number of *questions* (M = 99.38) designed to elicit conversation mostly before and during reading.

Appendix Table A4 includes transcript segments that illustrate patterns observed in the PDC profile. Similar to other profiles, PDC teachers referenced book and print organization before reading (i.e., named title, author, book parts), but a distinguishing feature of this profile was that teachers spent more time before reading previewing meaning-related topics, such as who can be friends, naming some of the children's own friends, and making many predictions based on the cover and title "Kingdom of Friends." A few teachers in this profile later checked the accuracy of their predictions during reading. This seemed to be an important step as many predictions were quite inaccurate based on the cover alone. For example, many children believed a pictured dragon on the cover would be a main character, but this was simply a toy within the two main characters' play. During reading conversation often addressed characters' emotions and judgments about their behaviors. As problems within the narrative built and approached the climax, these teachers encouraged children to make judgments about text events. After reading, these teachers reviewed the text with questions about the characters emotions and choices. But

Table 4
Relations between teacher talk profiles and child utterances during reading.

		Length of child utterances		Content of child utterances		
	Total	Single word	Multiword	High-demand	Low-demand	Literacy
Child talk overall						
Mean MC	41.19	15.04	26.15	12.50	6.69	2.51
Mean DRC	70.74	29.42	41.32	25.58	13.53	5.32
Mean PDC	79.00	30.33	48.67	21.50	11.25	5.75
F (2,95)	9.62	6.04	8.35	10.45	9.34	8.07
p	0.0002	0.0034	0.0005	<0.0001	0.0002	0.0006
Child talk by timing						
Before reading						
Mean MC	6.67	2.68	4.77	1.67	1.07	1.48
Mean DRC	6.26	4.15	5.11	0.63	1.21	3.84
Mean PDC	24.42	9.00	17.64	4.09	4.27	3.00
F (2,95)	23.38	15.21	26.52	14.14	9.07	6.80
p	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	0.0018
During reading						
Mean MC	26.60	10.04	16.55	8.84	4.33	0.70
Mean DRC	36.21	16.32	19.89	14.63	5.95	0.79
Mean PDC	42.92	16.75	26.17	14.92	5.50	2.50
F (2,95)	2.47	1.94	2.04	3.94	1.07	9.8
p	0.09	0.15	0.14	0.022	0.35	0.0001
After reading						
Mean MC	7.93	5.33	6.33	3.00	1.59	0.54
Mean DRC	25.16	2.95	6.05	10.32	6.37	0.68
Mean PDC	11.67	8.89	16.26	2.83	1.83	0.50
F (2,95)	20.84	13.05	13.29	15.38	20.21	0.18
p	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.83

there was less talk after reading for this profile than DRC, perhaps due to children's waning attention span after the sheer volume of talk before and during reading. For example, some PDC teachers' reading session ended with a class vote (thumbs up/down) on if they liked the book.

3.2. Relationship between teacher profiles & children's talk during reading

We next addressed the second research question on whether teacher profiles of talk relate to the amount and types of child talk observed during reading. We used the teacher profiles to predict the amount and features of child talk during the book reading using a series of ANOVAs with Tukey post-hoc tests.[1] Results are in the upper panel of Table 4. Teacher profile membership was associated with total child utterances during the book reading, $F(2,95) = 9.62$, $p < 0.001$, $w^2 = 0.15$; the MC profile was associated with fewer child utterances ($M = 41.19$) than either the DRC ($M = 70.74$) or PDC ($M = 79.00$) profiles, which were not significantly different from each other. Beyond total child utterances, we examined how teacher profiles related to length of children's productions (i.e., single versus multiword child utterances) and content of children's utterances (i.e., high-demand meaning, low-demand meaning, and literacy-related utterances). The same pattern was identified for all forms of utterances: the MC profile was associated with fewer child utterances of all types than either the DRC or PDC profiles, which were not significantly different from each other. The only exception was low-demand utterances, for which the MC and PDC profiles were not significantly different from each other, although the pattern of means was identical.

Next we divided child talk into before, during, and after segments of the reading session to explore how teacher profiles predicted timing of child talk. We also considered timing by length and content of utterances (i.e., single-word, multiword; low-demand meaning related, high-demand meaning related, literacy-related). Results showed the timing of child talk reflected the patterns of teacher talk timing. Omega-squared is reported to indicate the magnitude of the effect in terms of variance explained. Profiles were associated with differences in child talk *before* book reading, $F(2,95) = 23.38$, $p < 0.001$, $w^2 = 0.31$, with the PDC profile associated with more total child utterances before book reading ($M = 24.42$) than either the MC ($M = 6.67$) or DRC profiles ($M = 9.26$), which were not significantly different from each other. This pattern was similar regardless of the type of child outcome (see lower panels of Table 4). Similarly, *after* book reading, child utterances differed across profiles, $F(2,95) = 20.84$, $p < 0.001$, $w^2 = 0.29$, with the DRC profile ($M = 25.16$) associated with more total child utterances after book reading than either the MC ($M = 7.93$) or PDC ($M = 11.67$) profiles, which did not differ significantly from each other. This pattern was repeated for all types of child utterances with the exception of literacy-related utterances, which did not differ significantly across profiles. Finally, there were no significant differences in total child utterances *during* book reading across teacher profiles, $F(2,95) = 2.47$, $p = 0.09$, $w^2 = 0.03$ (MC $M = 26.60$; PDC $M = 36.21$; DRC $M = 42.92$). Breaking down child utterances during book reading, profiles differed on both high-demand child utterances and multiword child utterances. However, there were no significant pairwise differences among the profiles based on the post-hoc tests. Literacy-related utterances were an exception to this pattern: the PDC profile was associated with more child literacy-related utterances ($M = 2.50$) than either the MC ($M = 0.70$) or DRC ($M = 0.79$) profiles, which did not differ from each other, $F(2.95) = 9.80$, $p < 0.001$, $w^2 = 0.13$. However, it is important to note that the mean literacy-related child utterances during reading was quite low regardless of profile.

3.3. Relations between profiles and end-of-year child outcomes

Finally, we considered the third research question on relations between the teacher profiles and child outcomes in the Spring of

[1] Before this step, we use latent profile analysis to consider whether child talk demonstrated predictable profiles; however, the best solution included two classes that only differed in sheer volume of talk (e.g., higher vs. lower amounts of child talk). Thus, we used the total amount of child talk as the dependent variable in these next analyses.

Table 5
Prediction of child outcomes from teacher profiles.

	Mean z-score			p-Value	p-Value
Outcome	MC	DRC	PDC	Profile	PPVT
TOPEL	0.020	−0.053	−0.029	0.60	<0.0001
CELF expressive vocab	0.025	−0.142	0.071	0.89	<0.0001
CELF sentence structure	0.033	−0.151	0.045	0.72	<0.0001
CELF word structure	0.085	−0.286	−0.047	0.31	<0.0001
PPVT	0.039	−0.111	−0.036	0.60	<0.0001

the school year. We used a multilevel regression approach with children nested within teacher and profile as a categorical level 2 predictor. We controlled for Fall PPVT scores as a proxy for initial level of language; results were the same when we alternatively controlled for initial levels of the outcome (i.e., autoregression). All analyses were completed using PROC MIXED in SAS. Detailed results are presented in Table 5. After controlling for PPVT scores, profiles were not related to phonological awareness (p = 0.60), expressive vocabulary (p = 0.89), receptive vocabulary (p = 0.60), sentence structure (p = 0.72), or word structure (p = 0.31) knowledge/skills. In light of some research suggesting that the profile may differential impact child outcomes depending on initial child skills (e.g., Reese & Cox, 1999), we reran the analyses including the interaction between Fall PPVT scores and profile; neither the interaction nor the main effect of profile was a significant predictor of any outcomes.

3.3.1. Relations between utterance-level variables and outcomes

As a follow-up analysis, we repeated the analyses using classroom level of child utterances as the level 2 predictor instead of the profiles; classroom levels of child utterances were also not related to any Spring child outcomes. Last, we predicted child outcomes directly from the teacher utterance-level variables to consider whether null results were due to collapsing information into teacher profiles. Out of 60 analyses (12 teacher utterance variables × five child outcomes), only 1 was statistically significant relation was found using an unadjusted alpha of 0.05. That one relation was that high-demand talk before reading predicted children's TOPEL scores. Given the number of separate tests, this could be a spurious finding.

4. Discussion

This study investigated profiles of teacher talk during shared book reading in early childhood classrooms and examined relations between read-aloud profiles and child outcomes. The most important finding of this study is that, across 98 teachers, we identified three distinguishable profiles of teacher talk during reading of an unfamiliar narrative text. This accumulates evidence in an understudied area of holistic profiles of classroom read-alouds. An earlier, widely-cited study by Dickinson and Smith (1994) also identified three distinct approaches to shared reading. We replicated some descriptive findings of this earlier study, but failed to replicate findings that shared reading approaches predicted children's outcomes. We describe how the current study findings compare to this original study and how this improves our understanding of a core instructional activity in early childhood classrooms.

4.1. How current profiles relate to past research

Despite the prevalence of classroom shared book reading research (see Mol et al., 2009; Swanson et al., 2011), surprisingly few recent studies have used latent profile analysis or related approaches to identify holistic styles of reading. This study built on a seminal study by Dickinson and colleagues that collected data in the early 1990's on pre-k shared book reading. The original and current study were equivalent in using utterance-level coding of teacher and child talk to derive holistic profiles of early childhood, whole-class read-alouds. Both studies also used the PPVT vocabulary measure and comparable measures of language comprehension and literacy constructs. Yet when comparing these 2015–2017 observations to the original study, note that we investigated the same hypothesis with three methodological differences (Appendix B1). First, whereas the original study focused on a primarily White, very low-income sample, this sample included a larger, more diverse child participants whose mother's had higher levels of education. Second, the previous study allowed teachers to read a book of their choice, whereas the current study required teachers to read an unfamiliar narrative text with challenging content embedded. Third, Dickinson et al.'s original research considered how pre-k classroom discourse related to children's outcomes one year and four years later, whereas this study had a much shorter duration, measuring outcomes up to six months later. Online Table B4 compares findings of the two studies: (a) two descriptive findings were replicated, (b) the holistic profiles identified indicated some similarities and differences, and (c) predictive relations were not replicated.

4.1.1. Descriptive findings

We found teachers and children distribute the timing of their talk in similar ways before, during, or after reading. This is consistent with other research findings that children's talk mirrors adults' talk (e.g., Justice et al., 2002; Zucker et al., 2009). Like past research (e.g., Vitiello et al., 2012), these read-alouds of an experimental text appeared to be a largely teacher-directed activity, but children responded contingently in terms of timing of talk and total amount of talk mirroring their teacher. In classrooms with more total talk, there was also more high-demand talk; this is consistent with past research (Dickinson & Smith, 1994). For example, the Moderate Comprehender profile featured less total talk and only about 20 high-demand utterances, whereas other profiles included over 50 high-demand utterances. When reading complex narratives like the one in this study, the profiles featuring more high-demand talk also had larger sheer volumes of talk.

Our descriptive findings are consistent with other literature that shows young children can readily synchronize the timing and content of their talk with the teacher's talk (e.g., Danis et al., 2000; Deshmukh et al., 2019). Our findings align with past findings that adults overwhelming focus on meaning-related, rather than literacy-related talk during book reading (Hindman, Connor, Jewkes, & Morrison, 2008). Yet this study does not describe how discourse changes over of the school year. Other descriptive studies show high-demand talk tends to increase by Spring of the school year in early childhood classrooms (Hindman et al., 2012).

4.1.2. Holistic profiles

Both the current study and the one earlier classroom study on holistic styles (Dickinson & Smith, 1994) identified three patterns. This is consistent with claims that teachers use relatively small number of shared reading styles (Dickinson & Smith, p. 118). The

distinguishing features of the present profiles were the amounts of challenging discourse and the timing of talk before, during, or after reading. The most prominent style of read-alouds in 68% of the present classrooms was the Moderate Comprehender profile. This profile featured mostly during reading talk and limited talk before or after reading. This finding is of significance to curriculum developers and professional development providers because it suggests that teachers are already facilitating a substantial amount of talk during reading. Therefore, it may take some time to adjust to intervention approaches that rely on pre-teaching before reading (e.g., Neuman & Kaefer, 2018; Zucker et al., 2019) or after reading discussion (e.g., Gonzalez et al., 2011; Wasik et al., 2006). Alternatively, it could suggest that teachers simply reflect the during reading style implicit within widely used curricula (e.g., Creative Curriculum, 2016; Houghton Mifflin, 2018). Although this study did not "break the tie" in the inconsistent literature on optimal timing and content of extratextual talk, our findings are consistent with the extant literature that suggests there are multiple promising approaches (cf. McGinty et al., 2011).

Even though other shared reading studies with teachers and parents report shared reading styles that feature minimal extratextual talk (e.g., Greene Brabham & Lynch-Brown, 2002; Haden et al., 1996; Hammett et al., 2003), all profiles in this study used substantial total talk. We found no evidence of a low-demand, minimal talk profile identified in 20% of classrooms by Dickinson and Smith (1994; i.e., "didactic-interactional" style). Specifically, the current profile with less talk than others – the Moderate Comprehender (MC) style used in 68% of classrooms –averaged more than 100 book-related utterances during reading. Given that Dickinson and Smith (1994) found classrooms with a minimal talk scored significantly worse on the PPVT, this could indicate teachers in current classrooms were intentionally using more beneficial approaches. This is a key finding because no profiles of current teachers expected children to listen silently during read alouds; shared book reading in these classrooms was an interactive activity.

Turning to the two higher-demand profiles in this sample, 19% of classrooms used a style we named Discuss and Reflect Comprehender (DRC) because it featured more talk/reflection after reading. Perhaps teachers who used the DRC approach felt that conversations after reading provided a rich context to improve comprehension and vocabulary. Indeed, intervention approaches that feature substantial after reading talk about sophisticated text genres are effective (e.g., Gonzalez et al., 2014). Likewise, the after reading style was most beneficial in the earlier Dickinson and Smith (1994) study. Yet, we did not replicate a true "performance" approach as found by Dickinson's team as the current profiles all featured large amounts of during reading talk. The present study's third profile – Preview and Discuss Comprehenders (PDC) – previewed the text before reading but concentrated most back-and-forth discussion during reading. Some research suggests that considerable extratextual talk during reading is beneficial (e.g., van den Broek et al., 2011) because it provides immediate scaffolds for children's comprehension and reduces potential working memory or linguistic demands associated with conversations after reading. The PDC profile was somewhat similar to "co-constructive" style identified by Dickinson and Smith (1994), but unlike the earlier study we could not conclude that any of the identified profiles were linked to enhanced child outcomes.

We call for other researchers to consider if naturalistic read-aloud styles exist. A single replication cannot make definitive statements about profiles or comparisons to the earlier findings. Yet we can theorize about possible reasons we "failed" to replicate some findings. Perhaps we found no evidence of a minimal talk/didactic style because teachers in our sample were aware that interactive read-aloud approaches are more effective than simply listening (e.g., Greene Brabham & Lynch-Brown, 2002; NELP, 2008). It is also possible that we failed to identify a lower demand, didactic style because of text effects. Recall that teachers in the original study chose their own texts, some of which contained repetitive text where children were encouraged to chorally read or participate in low-demand, rote tasks like counting. In the current study, teachers were provided with a standardized narrative containing sophisticated vocabulary and topics. Thus, we cannot rule out the possibility that this finding is simply an artifact of the standardized text used. In other words, when we used a standardized, high-quality text to eliminate confounding text effects, this may have reduced variance of the predictor variables, contributing to the null findings. If teachers were allowed to select books or read multiple genres there may have been more variability in talk, as there is considerable heterogeneity in the quality and genres of books early childhood teachers read aloud (Pentimonti, Zucker, & Justice, 2011).

The fact that reliable profiles were identified is relevant to researchers and professional development providers interested adaptive interventions, modified to fit teachers' reading styles. For example, adapting the timing of talk in a vocabulary intervention to fit a teacher's preferred style may improve quality of implementation. If a teacher's typical profile is to preview before reading, she/he may better implement a shared reading program if the intervention pre-teaches vocabulary, rather than reflecting on words after reading. Aligning professional development to teacher's profiles could improve uptake of evidence-based practices like vocabulary instruction that are often inadequate in pre-k classrooms (Wright & Neuman, 2014).

4.1.3. Relations to child outcomes

No holistic teacher profiles related to children's end of year outcomes in this study. Like Dickinson & Smith (1994), Dickinson and Porche (2011), we also tested micro, utterance-level teacher talk, but in the present study we found no predictive relations with child outcomes. It is important to consider reasons why none of the three Fall profiles related to children's Spring outcomes. The first possible explanation is that the current study was constrained by a timeline that measured children's growth up to six months later, whereas the earlier study followed children for several years to allow for more maturation on the PPVT and other outcomes. Second, our language comprehension measure may have been a more distal, standardized measure than the researcher-developed comprehension test Dickinson and Smith created using a tradebook called *The Snowy Day*. Third, perhaps these observations do not reflect as stable traits of teachers' book reading approaches because we only observed read-alouds of an experimental text rather than read-alouds of some teacher-selected texts. Nonetheless observing at least one read-aloud of a controlled stimulus text better allowed us to test the underlying hypothesis that holistic styles of teacher talk are important facilitators of child outcomes, as theoretical frameworks recognize substantial variation in shared reading quality is linked to the text itself (Van Kleeck, 2003). Beyond teacher talk, the amount and content of child talk during reading also did not relate to Spring outcomes. To see growth on distal language and literacy measures, a longer longitudinal study would likely be necessary. These null findings differ from other observational studies in the U.S. that show meaningful relations between teacher strategies and child outcomes (e.g., Gerde and Powell, 2009; Hindman et al., 2008; Zucker et al., 2010). Recent studies in other countries also shows the demand of teacher-talk during shared book reading predicts young children's outcomes (e.g., Sun, Toh, & Steinkrauss, 2020)

4.2. Implications for practice

The descriptive aims of this multisite study improve understanding of a key instructional activity within early childhood

classrooms. One of the most important findings of the present study is that more teacher talk did not appear to stifle child talk. Although, children spoke substantially less than teachers overall, the two profiles with more teacher talk (DRC and PDC) were associated with greater amounts of child talk during read-alouds relative to the other MC profile. This may be due to the large number of questions DRC and PDC teachers asked, averaging over 50 questions (range 0–186). These profiles with more teacher talk also featured more elaborate, multiword child utterances and more high-demand child talk than the MC style. More elaborate classroom discourse and children's linguistic productivity are theoretically linked to language development (e.g., Dickinson & Porche, 2011; Piasta, Justice, Cabell et al., 2012). Although it is promising that the current teachers' naturalistic approach to shared reading was interactive in these ways, elsewhere we examine the quality of these teachers questions (Author, 2019) and conclude that the teachers were not asking enough challenging questions. Indeed, many researchers conclude that teachers need support to ask effective questions during shared reading (Blewitt et al., 2009; Mol et al., 2009; Walsh & Hodge, 2016).

We can extrapolate from the larger shared reading literature that other evidence-based practices could have been enhanced in the observed read-alouds. For example, teachers only referenced a narrow range of print targets than are used in effective interventions (Justice et al., 2009; Piasta, Justice, Cabell et al., 2012). Likewise, teachers only elaborated on the meaning of a small number of vocabulary words compared to effective interventions (e.g., Beck & McKeown, 2007; Coyne, McCoach, & Kapp, 2007). In sum, our findings suggest that popular lists of teacher read-aloud do's and don'ts mentioned in the first paragraph (Trelease, 2013), could be modified for our sample as follows: (1) before reading – consider less rote ways to discuss book and print features; (2) during reading – ask intentional questions and explicitly define sophisticated vocabulary; and (3) after reading – leave time for sophisticated questions and meaningful discussion.

4.3. Limitations & future research

Unfortunately, the question of whether these teacher profiles are stable, meaningful patterns is an area that requires further investigation, as this study did not replicate all findings of the original study and did not identify any profile that was more beneficial for child outcomes. A key limitation of this study was its short duration; longitudinal datasets are needed that capture change in shared book reading approaches over time and across diverse types of texts. Such data could help researchers and practitioners understand how many robust profiles exist in the general population. Another limitation of this study was that it included only two sites and there could be important regional variations across the U.S. For example, although it demonstrated stable statistical properties, the PDC profile had a small number of classrooms within it; thus, it may not be a profile that will be reproduced in future studies. This study may not have sufficient statistical power with only 98 classrooms to detect small, albeit potentially meaningful, child effect sizes; thus, more work is needed with larger samples. Future naturalistic and experimental studies should continue to minimize confounding text effects when identifying holistic patterns as well as micro-level variables within the timing and content of talk that are effective. Future studies could also examine focal children's talk specifically (e.g., in small-group shared reading) to understand approaches with differential benefits for specific learner profiles, such as children with weak language or attentional skills who may require specific teacher supports.

found not only in the Dickinson and Smith (1994) study many other utterance-level studies (e.g., e.g., Gerde & Powell, 2009; Wasik & Hindman, 2014; Zucker et al., 2010), this requires some theorizing about the source of that irreproducibility. Although we believe the model of shared reading (e.g., Van Kleeck, 2003) and theoretical frameworks (Siegel, 2002; Vygotsky, 1986) remain appropriate, we expect the short time period between baseline and posttest in this study is a likely explanation for null findings. Another explanation is that our recruitment allowed study enrollment in the Fall *or* Winter, meaning some students had experienced an entire semester of read-alouds before their b̈aselinem̈easures. Longer duration investigations that begin early in the school year are needed to establish reproducibility of holistic profiles observed in by Dickinson and Smith (1994).

5. Conclusion

When sharing an unfamiliar narrative text with pre-k and kindergarten children, we identified three holistic profiles teachers used to promote children's understanding of the meaning- and literacy-related aspects of the text. Like an earlier, seminal read-aloud study by Dickinson and Smith (1994) we too identified three profiles of teacher talk, but the present profiles differ somewhat from the original study. A promising finding was that no classrooms featured the less effective didactic-interactional style with minimal, low-demand talk that was observed in a handful of classrooms 20 years ago. In fact, present teachers overwhelmingly used interactive approaches that evidence shows are more effective than passive listening (NELP, 2008). Unexpectedly, these profiles were not related to children's language and literacy outcomes; therefore, future research is needed to understand whether there are superior holistic read-aloud profiles or if micro variables are the key determinants of shared reading effectiveness.

CRediT authorship contribution statement

Tricia A. Zucker: Conceptualization, Writing - original draft, Writing - review & editing, Supervision, Methodology, Investigation, Funding acquisition. **Ryan Bowles:** Data curation, Formal analysis, Methodology, Funding acquisition, Writing - original draft, Writing - review & editing. **Jill Pentimonti:** Investigation, Methodology, Data curation, Project administration, Funding acquisition. **Sherine Tambyraja:** Investigation, Methodology, Supervision.

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Appendix C. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ecresq.2021.02.006.

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