Teachers' Use of Low-Level and Rhetorical Questions as Interactional Scaffolding in Informational Read Alouds

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Teachers’ Use of Low-level and Rhetorical Questions as Interactional Scaffolding in Informational Read Alouds

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A Thesis Presented to the Faculty of the Graduate School of Education of Harvard University in Partial Fulfillment of Requirements for the Degree of Doctor of Education

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To Xavier Ludwig Rozas

For seeing me through this journey
This dedication is for your dedication
To me
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Abstract

Teachers’ questions in informational read alouds create opportunities for young students to engage in meaningful discussions with complex texts. While research has established high-level questions as important scaffolding mechanisms in read alouds, there have been few studies that examine how low-level and rhetorical questions might also contribute to student learning and engagement. The purpose of this mixed-method study was to examine the spontaneous questions teachers asked in the context of a script-supported informational read aloud, with an in-depth focus on how low-level and rhetorical questions provide different types and levels of scaffolding for student learning and engagement.

Transcript data comes from a predetermined subsample of 34 third-grade teachers that was part of a large-scale longitudinal intervention study designed to enhance student engagement with reading during the summer months. I used discourse and content analysis to determine 14 categories that reflect specific scaffolding functions of teachers’ questions. I used correlational analysis to examine associations between the types of low-level questions teachers asked and frequency of spontaneous high-level questions as well as amount of student talk. Results reveal that low-level and rhetorical questions serve a variety of scaffolding functions for content learning, critical thinking, and motivation. There was also a strong correlation between the numbers of spontaneous low- and high-level questions teachers asked ($r=0.54, p<0.005$) and moderately strong associations between two of types of low-level questions and resulting student talk. While the predominance of low-level questioning patterns continues to be a challenge in many elementary classrooms, findings from this study suggest some low-level and rhetorical questions play important, complementary functions in text discussions, particularly with informational text. As such, this study presents a detailed taxonomy for viewing the multiple ways low-level and rhetorical questions can contribute to engaged content learning and critical thinking in informational read alouds.
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CHAPTER 1: INTRODUCTION

The read aloud is a commonly used and longstanding literacy activity in elementary classroom instruction. Reading aloud is arguably one of the most important vehicles for engaging elementary students with text in meaningful and authentic ways since young children’s oral comprehension tends to be more advanced than their independent comprehension of texts (Sticht, 1973; Snow, 2002). Teachers play an important scaffolding role in an interactive read aloud in that, as expert readers, they can provide strategic support such that students experience high challenge thinking and discussion (Mercer, 1994). This concept of teacher questions as a scaffolding mechanism is situated within Vygotsky’s theory of instruction (1978), which emphasizes guided assistance as a way for children to take part in and develop skills that are above their independent use. Through strategically asked questions tailored to both group and individual skill sets, an interactive read aloud can provide the optimal “zone of proximal development” whereby students can participate in more complex comprehension processes than they would on their own (Duke & Pearson, 2008; Vygotsky, 1978).

Particularly in the elementary grades, when students are new to critical thinking about texts and elaborating ideas, teachers’ questions can play a critical role in scaffolding the kinds of talk students do and the kinds of cognitive processes they experience during a read aloud (Shanahan et al., 2010). Reading research highlights the difference between planned scaffolding and contingent scaffolding with planned scaffolding reflecting tools, curricula, and teaching strategies developed before learning time begins and interactional scaffolding reflecting in-the-moment support that is responsive to learners’ needs (Hammond & Gibbons, 2005). While planned scaffolding, either from a curriculum or from teacher
planning, can contribute to the quality of an interactive read aloud, interactional scaffolding is essential to the very nature of this instructional activity (Gambrell, Malloy, & Mazzoni, 2011). The Institute of Education Sciences (IES) practice guide highlights this essential role of responsive, interactional scaffolding in text discussions stating that, even when using questions directed by a curriculum, teachers should also “respond to the students’ answers in a way that leads them to think about and elaborate on their answers and the meaning of the text” (Shanahan et. al, 2010, p. 26).

Given the prevalence of districts and classrooms that use structured reading programs or curricula (Market Research Group, 2017), it is important to understand not just how teachers are using provided resources but how teachers complement such supports with effective in-the-moment interactional scaffolding so that read alouds can become optimal instructional tools for teaching and learning. Research on scripted curriculum has largely focused on fidelity of implementation and whether teachers adhere to prescribed interventions (Neugebauer, Coyne, McCaoch & Ware, 2017). Numerous studies on classroom read alouds have also examined the kinds of questions teachers ask, either on their own or as a result of professional development on classroom discussion. Less prevalent is research that examines the more dynamic space that reflects both the teacher and the planned scaffolding, how teachers both prioritize provided resources and subsidize provided resources based on knowledge of literacy practices and their students (Snow, 2015). To date, there is little to no research investigating the questions teachers ask on their own initiative within a script-supported informational read aloud and how they function as interactional scaffolds.
The present study aims to address this gap in the literature by examining how teachers use questions as interactional scaffolding in the context of a script-supported informational read aloud. The question of how to scaffold student understanding and thinking about informational texts, which the Common Core State Standards defines as texts about history, social studies, science or other content disciplines (Shanahan et al., 2010) is arguably more important than ever given recent explicit emphasis on increasing all students’ experiences with complex texts (Reynolds & Goodwin, 2016). Informational read alouds provide an optimal learning environment for teachers to offer young children rigorous and challenging experiences. Critical to creating a space where high levels of challenge lead to student engagement and learning, however, is providing equally high levels of support (Mariani, 1997).

There is already extensive research that describes how teachers can use high-level questions as interactional scaffolding to support critical thinking, content learning and elaborated student talk with informational read alouds. Therefore this study focuses on two types questions that teachers frequently ask but have receive far less attention in how they might contribute to interactional scaffolding in this same context: low-level questions and rhetorical questions. Low-level questions, also known as recall or lower-cognitive questions, are text-related comprehension questions that ask students to remember factual knowledge or information such as, “What is the name of the smallest owl?” Recalling information can involve remembering information from a class, a text, or from one’s prior knowledge. Rhetorical questions are interrogative in form but are often defined as neither seeking not eliciting an answer (Blosser, 1973; Rohde, 2006). Examples of rhetorical questions include, “So that owl is flying to his nest, isn’t he?” or “Who wouldn’t want to be called wise as an
owl?” Their function is often associated with providing or emphasizing information rather than requesting it (Armburster, 1991).

Compared to high-level questions that tend to encourage longer student responses and more interpretive, analytical thinking (Duke & Pearson, 2008; Durkin, 1978), such as “Why do you think owls hunt at night?” low-level questions tend to be viewed as limiting or even undermining student thinking and production of student talk (Hamaker, 1986; Chin & Brown, 2002). While taxonomies of high-level questions reflect an enormous variation of functions within this one category, low-level questions rarely are examined with the same detailed attention. By understanding the range of specific low-level questions, and how they differ, teachers can be more purposeful in asking low-level questions that effectively support literal comprehension of information and scaffolding for high-level thinking. This study examines teachers’ spontaneous questions in a script-supported informational read aloud with an in-depth focus on how low-level and rhetorical questions provide scaffolding for students’ content knowledge, critical thinking and motivation. The following research questions guided this study:

**Research Question 1:** How many spontaneous low-level, high-level and rhetorical text-related questions do teachers ask, on average, during a script-supported informational read aloud?

**Research Question 2:** What are the different scaffolding functions of teachers’ spontaneous low-level comprehension questions?

**Research Question 3:** What are the different scaffolding functions of teachers’ spontaneous rhetorical questions?

**Research Question 4:** What associations exist, if any, between the number of high-level comprehension questions teachers ask and the number and type of spontaneous low-level comprehension questions?
Research Question 5: What association exists, if any, between types of spontaneous low-level questions asked and resulting student talk?
CHAPTER 2: LITERATURE REVIEW

The Informational Read Aloud

One important reason to examine teacher questioning in the context of the read aloud is that young children’s listening comprehension is more developed than their independent reading comprehension (Sticht, 1973; Snow, 2002). As students develop as independent readers, their abilities to comprehend text through listening and reading independently become more comparable (Biemiller, 2003). As such, the read aloud provides a unique context in the early grades whereby students, with the support of scaffolding by the teacher as a facilitator, can process more complex ideas using only oral language without the prerequisite of decoding (Duke & Pearson, 2008).

The Common Core State Standards (2010) and IES practice guide (Shanahan et. al, 2010) place a strong emphasis on students in every grade being exposed to and working with informational texts. Although there have been differing interpretations of what constitutes an informational text, the Common Core includes a number of non-fiction genre within this larger category including historical and scientific texts, Biography, argumentative essays, and information in chart form (Aspen Institute, 2012). In previous years, the presence of narrative text far outnumbered informational text in elementary classrooms. In her research of first grade classrooms, Nell Duke (2000), for example, found that instructional time spent on informational text averaged 3.6 minutes a day. She also found that low socio-economic status (SES) classrooms spent even less time per day, with some classroom spending no time at all with this genre. Since the majority of reading students do in middle school, high school and college is informational, it is critical for students to have positive and engaging academic experiences with this genre of text as early and as often as possible (Duke, 2004).
Even by sixth grade, it is estimated that 75% of the text students read for school is non-narrative (Moss, 2005).

While increasing the number of informational books that are read in elementary classrooms is an important step, what arguably matters more for student learning is how students are exposed to these texts (Pappas, Varelas, Barry, & Rife, 2002). One study by Purcell-Gates, Duke, and Martineau (2007) found that second graders’ proficiency with informational text was strongly associated not with the number of informational texts in the classroom but with the amount of experiences teachers provided in which students could authentically engage with this genre. Since reading aloud allows young children to access texts far more than reading independently, the informational read aloud offers one of the best opportunities for teachers to encourage meaningful and engaging experiences with this genre in addition to expanding students’ content learning.

Many studies have examined the types of questions elementary teachers ask during read alouds. Most, however, have done so in the context of narrative read alouds (Duke, 2000) since stories have far outnumbered informational texts in elementary classrooms, both read alouds and independent reading (Duke, 2000; Yopp & Yopp, 2006, 2012). While some research on narrative read alouds offer findings that are applicable to read alouds in general, informational texts have unique features and purposes that can lead to inherent differences in the questions teachers ask about a text and thus necessitate separate examination (May & Bingham, 2015; Donovan & Smolkin, 2001; Yopp and Yopp, 2006).

Informational texts, for example, tend to be more lexically dense than stories and require more domain-specific knowledge of particular content topics for optimal comprehension (Gardner, 2004; Hirsch, 2003; Nation & Waring, 1997). Informational texts tend to be more abstract in nature compared to stories since they are often removed from
children’s everyday experiences (Graesser, McNamara & Louwerse, 2003). Another difference between narrative and informational text is the structure that each genre typically follows and students’ familiarity with those structures. From a very young age, children are exposed to the arc of a story, which provides a familiar foundation on which to take in unfolding events during a narrative read aloud (Kucan & Beck, 1996). So even when stories contain new characters, settings, or information, children have solid schemas of story lines, plot development, and character interactions (Best, Floyd, & McNamara, 2008).

Informational texts, on the other hand, do not usually follow a story arc and so, in addition to content-specific vocabulary, place greater demands on children’s working memory, background knowledge, and academic language (Best et al., 2008; Snow, 2002; Uccelli, Phillips Galloway, Barr, Meneses, & Dobbs, 2015).

Because of these characteristics, children generally comprehend narrative text better than informational text of the same Lexile level when reading independently (Best et al., 2008; Armbruster et al., 1991). Differences in the amount of effort required to read or comprehend informational text compared to stories may contribute to the sometimes erroneous perception that students prefer stories over informational texts (Duke & Bennett-Armistead, 2003). Differences in complexity between narrative and informational texts may also contribute to teachers’ preference for reading stories in addition to teachers’ lack of familiarity in navigating conversations with this genre of text. In one study, even teachers who were considered highly skilled reported conducting read aloud discussions with an informational text more challenging than with a narrative text (Hoffman, Collins & Schickedanz, 2015).

Informational read alouds in elementary classrooms are important vehicles for
building students’ content knowledge, that is facts, concepts, principles and theories related to domain-specific topics such as science and social studies, as opposed to more general skills such as reading, writing that can be used across content areas (Glossary of Education Reform, 2016). Content knowledge plays a vital role in reading comprehension, particularly with informational text. The accumulation of knowledge about the natural and scientific world, sometimes referred to as concept development (Medin & Smith, 1984), entails incorporating new information about features and attributes of a concept or object into existing mental representations. Integration of prior knowledge with new information is an important if not essential aspect of students’ conceptual knowledge development (Kintsch, 1988). Importantly, development of content knowledge occurs not in accumulating isolated facts but developing a schema of interrelated sets of information or concept networks (Fitzgerald, Elmore, Kung & Stenner, 2017). In Kintsch’s (1988) theory of construction-integration, a reader uses their prior knowledge in combination with new text to create a “situation model”, new knowledge that reflects a fusing of these two sources. Therefore the more prior knowledge a reader brings to a text, the fuller the situation model will be (Taboada & Guthrie, 2006).

How much a student already knows about a topic has implications for how they interact with subsequent informational texts. More specifically, domain knowledge of a topic can increase student fluency and comprehension of new text because it affords the reader an important foundational schema that provides a framework for organizing concepts and increases the likelihood students are familiar with related vocabulary (Hirsch, 2003; Pearson, Hansen & Gordon, 1979). The stronger the schema, the “more likely concepts are to be classified and available for subsequent retrieval from long-term memory” (Pearson et al., 1979, p. 202). Less time spent on deciphering unfamiliar vocabulary also decreases the
cognitive load of comprehension, which increases the likelihood that a reader will more fully and deeply process what is read or heard (Kintsch, 1988). In a review of 183 studies or articles on the role of prior knowledge in comprehension of information texts, Dochy, Segers and Buehl (1999) found that, while studies varied greatly in design, most indicated a positive relationship between a person’s prior content knowledge and reading performance. Content knowledge not only supports literal understanding of text but also creates a more solid foundation on which inferential thinking about that information can stand (Perfetti, Landi & Oakhill, 2005; Recht & Leslie, 1988).

Addressing content learning in the elementary years is seen as particularly important since gaps in background knowledge can be further exacerbated in middle and high school where students will encounter significantly more informational text with less teacher guidance (Moss, 2005; Stanovich, 1986). Socioeconomic differences can also contribute to gaps in young children’s content knowledge in ways that go beyond differences in literacy and vocabulary exposure (Neuman, 2006). Alexander, Entwisle, and Olson (2007), for example, point to out-of-school experiences higher income families can afford, such as summer camps, private tutoring, and higher quality day care or afterschool programs, as contributing to the knowledge gap.

Planned and Interactional Scaffolding

Scaffolding is generally understood as the concept of providing temporary structures and supports that allow a learner to progress toward independence (Mariani, 1997). First used in relation to teaching strategies by Wood, Bruner & Ross (1976), this term is often associated with Vygotsky’s (1978) zone of proximal development, which describes the supportive interaction between teacher and student as a critical factor contributing to a learner’s progress towards independence. How teachers scaffold learning in the classroom is
particularly important today in light of an increased emphasis, most notably in the Common Core State Standards, on students reading grade-level and complex texts (2010). Without high levels of support for students, particularly those who read below grade-level, high challenge tasks will less likely lead to positive or successful learning experiences (Mariani, 1997). Standard 10 in the State Standards explicitly states, “students who struggle greatly to read texts within (or even below) their text complexity grade band must be given the support needed to enable them to read at a grade-appropriate level of complexity” (NGACBP & CCSSO, 2010, p.9)

Due to the general, metaphoric definition of scaffolding, there are varying opinions about what it precisely means or looks like in the classroom (Reynolds & Daniel, 2017). Many researchers currently distinguish between planned scaffolding, that is, supports that are designed prior to learning time, and interactional scaffolding, which reflects supports that are responsive to students’ needs as they occur (Hammond & Gibbons, 2005). Planned scaffolding can take many forms, from teacher- or district-designed materials to published curricula. One of the most commonly used forms of planned scaffolding for teaching reading is the use of core reading programs, sometimes referred to as basal reading programs, which are defined as a “set of instructional practices and materials informed by scientifically-based reading research” (Walpole & McKenna, 2009, p. 5) According to the Market Research Group (2017), 65% of American schools surveyed stated they either use a core reading program or use one selectively. Although this figure is down slightly since 2014, use of core reading programs has been pronounced since the 2001 No Child Left Behind (NCLB) Act, part of the Reading First initiative that required schools to use reading programs based on “scientifically-based reading research.”
Most core reading programs have responded to calls for teachers to ask more high-level questions in read alouds and for students to be exposed to more informational text (Moss, 2005; Risner & Nicholson, 1996). In their curriculum analysis of the top five selling core reading programs (McGraw-Hill Reading, SRA Open Court, Harcourt Trophies, Houghton Mifflin Reading, and Scott Foresman Reading), Dewitz, Jones and Leahy (2009) found that all five reading programs provided directions and questions related to either a short read aloud or a text selection which students read independently. In analyzing the prescribed instructional moves in the teacher manuals of these programs, researchers found that, for four of the five programs, asking questions was the predominant activity, as much as 56%.

An effective interactive read aloud, however, can never be fully planned since it also requires teachers to listen and respond to students’ genuine comments and questions (Gambrell, Malloy, & Mazzoni, 2011). Interactional scaffolding reflects the other half of the scaffolding equation, that is while some scaffolding can come from advanced teacher planning, or in the case of scripted curricula, from researcher designed materials, interactional scaffolding reflects teacher support in response to students’ unique abilities and in-the-moment needs. Reynolds & Daniel (2017) emphasize the importance of not relying on planned scaffolding such as standardized curricula due to the important value of interactional scaffolding and teachers’ ability to respond flexibly to students during instruction time.

In previous years, implementation of reading programs focused primarily on fidelity of implementation, that is, how much teachers adhere to the developed script or structured guidelines (Neugebauer et al., 2017). One reason for this emphasis, particularly since NCLB
and its focus on reading programs based on scientifically based research, fidelity allows researchers to better determine the effects of a particular reading program on student outcomes. Given concerns about the limitations of scripted reading programs, there is a growing emphasis on the importance of interactional scaffolding in these contexts, for teachers to go beyond scripts so they can respond thoughtfully to the unique abilities of their students (Neugebauer et al., 2017). While reading programs often give directions for teachers to have guided discussions, the guidance is general such as “direct(ing) teachers to use hints, prompts, or suggestions of how to understand a passage” (Dewitz et al., 2009).

Van de Pol, Volman and Beishuizen (2012, 2010) suggest three characteristics that further define scaffolding strategies and thus distinguish them from the general concept of support: contingency on learners’ needs, transfer of responsibility, and a fading of support. Wood, Wood & Middleton (1978) further operationalize contingency as changing the degree of support or control in reaction to students’ performance: decreasing support in reaction to success and increasing support in reaction to continued difficulty. David Wood (2003) has also offered three aspects of teacher decision-making in relation to contingent teaching: temporal contingency, when to offer support, instructional contingency, how much support to offer, and domain contingency, the content of the support being offered. While all three aspects of decision-making play a role in interactional scaffolding, Rodgers, D'Agostino, Harmey, Kelly & Brownfield (2016) found that only domain contingency predicted student outcomes, pointing to the importance of teacher knowledge in providing effective interactional scaffolding.

Recent research has further separated the concept of instructional scaffolding into “literacy scaffolding” versus “motivational scaffolding.” Literacy scaffolding reflects responsive teacher supports that target academic, literacy-specific skills, ranging from fluency
and decoding to comprehension skills, development of content knowledge and processes related to disciplinary literacy. Specific examples of literacy scaffolding for vocabulary include providing or asking for definitions, encouraging use of morphological analysis, encouraging student to use context clues (Reynolds and Goodwin, 2016) and recasting students’ words into more elevated academic language (Hammond & Gibbons, 2005). Athanases and Oliveira (2014) caution against an over focus on scaffolding that supports only discrete tasks such as vocabulary and mechanics of language, particularly with minority students and English learners. Such a caution speaks to the importance of creating a space of high challenge/high support and providing literacy scaffolding for a wide range of skills for all students, not just those who show advanced ability for their grade (Mariani, 1997).

Motivational scaffolding reflects the fact that student motivation and engagement, while not literacy skills per se, play an important role in students’ experience in literacy tasks and thus their overall literacy development (Lutz, Guthrie, & Davis, 2006; Margolis & McCabe, 2006; Reynolds & Goodwin, 2016). Despite varying opinions of how to best measure student motivation, there is a general agreement that a dynamic, albeit complex, relationship exits between reading motivation and achievement in reading (Wigfield & Guthrie, 2000). While the delivery of any scaffolding has implications for student motivation, the term motivational scaffolding refers to the fact that the value of some teacher interactions, such as praise, lies not in providing high challenge tasks but in tapping into the affective side of learning, which, in turn, supports continued persistence and participation in high challenge tasks (Lutz et al., 2006).

Motivational scaffolding has been given particular attention in relation to one-on-one tutoring. Examples of motivational scaffolding identified in this context include, in addition to praise, using games, time limits, competitions, humor, acknowledgment of challenge,
positive feedback and repeating a student’s correct response (Boyer, Phillips, Wallis, Vouk &
Lester, 2008; Reynolds & Goodwin, 2016; Thompson, 2009). In a recent study of tutors’
motivational scaffolding strategies in writing centers at the college level, (Mackiewicz &
Thompson, 2013) researchers identified four specific types of motivational scaffolding:
encouraging optimism about students’ success, demonstrating concern for students,
expressing sympathy or empathy, and reinforcing students’ feelings of ownership and
control.

Margolis and McCabe (2004) identify motivational scaffolding such as positive
feedback and reinforcing effort and persistence as important contributors to feelings of self-
efficacy. While impacting how students perceive their own abilities is an important concept
in its own right, it also has repercussion for performance. In their study of tutors’ use of
interactional scaffolding strategies with young adolescents, for example, Reynolds and
Goodwin (2016) found that it was spontaneous use of motivational scaffolding strategies,
and not literacy scaffolding, that led to reading comprehension growth for low-performing
students. This interrelation between self-efficacy and performance aligns with Eccles et al.
(1983) expectancy-value theory, which posits that a person’s value of a task and perception
of their ability on a task will motivate persistence and thus performance on the task.

The read aloud provides an ideal context for both literacy and motivational
scaffolding because it provides a highly social, interactive space in which children can
participate in increasingly sophisticated ways around a wide range of literacy skills
(Pentimonti & Justice, 2010). Because informational text creates particular and more
complex motivational challenges compared to narrative texts, it is important to understand
how to apply motivational scaffolding in addition to literacy scaffolding for this genre (Ho &
Guthrie, 2013). Numerous researchers emphasize that scaffolding does not have to be
classified as “motivational scaffolding” to impact student engagement and motivation. That is, even when the function of a scaffolding strategy is not solely for affective reasons, as in the case of praise or positive feedback, it can still contribute to the students’ motivational development (Guthrie, Wigfield & Perencevich, 2004).

Examining interactional scaffolding in the specific context of script-supported read aloud discussions is also important to examine for social justice reasons. High-poverty schools are more likely to adopt highly structured commercial reading programs than their low-poverty counterparts (Fang, Fu & Lamme, 2004). While commercial reading programs may draw heavily on current research regarding phonics and comprehension strategy instruction, very few give as much attention to research on classroom discourse (Fang et al., 2004). Students in high-poverty schools also tend to have fewer experiences reading and talking about informational texts (Duke, 2000), more teacher-directed discourse and a greater focus on behavioral procedures (Diamond, 2007; Fenning & Rose, 2007). Further compounding this issue is the fact that there tends to be more students in urban and high-poverty districts who need more targeted support with vocabulary and academic language in English (Chall & Jacobs, 1983; Farkas & Beron, 2004; Hart & Risley, 1995; Purcell-Gates, McIntyre & Freppon, 1995; Snow 1999) although there is still substantial variability within this population (Rowe, Pan & Ayoub, 2005). While there is a growing acknowledgement that it is important to examine not just fidelity of implementation of reading programs, but also how teachers move beyond scripts to respond to unique needs of their students, Neugebauer et al. (2017) offers the question of “whether the delicate balance between intervention routines and adaptive instruction may play out differently in urban schools with consequences for student outcomes” (p. 545).

*Teacher Questions in Interactive Read Alouds*
The term interactive read aloud is meant to differentiate between a more teacher-controlled read aloud and a read aloud in which teachers encourage student participation by “posing questions throughout the reading that enhance meaning construction and also show how one makes sense of text” (Barrentine, 1996, p. 36). Students in an interactive read aloud are encouraged to ask questions and make spontaneous comments (Barrentine, 1996). As such, interactive read alouds allow teachers to make visible the different reading comprehension processes that occur as one makes meaning of text but they also offer a window into how children are processing texts themselves (Wiseman, 2011).

One of the most widely-used and most encouraged mechanisms for scaffolding during interactive read alouds of any genre, especially with young children, is teacher questioning. Comprehension questions provided by curricular materials, which represents planned scaffolding, can create an important starting point for encouraging student thinking and offer teachers a model for the kinds of questions that are worth asking. The spontaneous questions a teacher asks, however, play a crucial role in providing needed interactional scaffolding since only the teacher can ask questions and respond to students’ in-the-moment responses with a unique understanding of their collective and individual abilities and needs (Allington, 2002). Van de Pol et al. (2012) identify questions as an essential tool for teachers to check or diagnose student understanding, an important first step if support is to be contingent. Teachers’ spontaneous questions, therefore, provide a true zone of proximal development (Vygotsky, 1978) in a way that no prewritten comprehension question can.

During an interactive read aloud, teachers’ questions can serve a variety of purposes and functions from modeling comprehension strategies through think-alouds, asking for
clarification or additional student responses, to encouraging student thinking in response to the text. The form and content of teachers’ text-related comprehension questions can directly impact students’ thought processes and thinking about the text (Cotton, 2001; Wilen, 1987). Many studies that examine teacher questioning in classrooms discriminate between low- and high-level questions. While this binary categorization does not capture all aspects and nuances of questions, it does create an important distinction between questions that ask students to repeat or retrieve information stated in the text versus questions that require students to think inferentially.

In the revised Bloom’s Taxonomy (Anderson & Krathwohl, 2001), a low-level question, also referred to as a constrained or closed question, aligns with the cognitive category of “recalling and remembering information.” This type of question is most often used when the purpose is for students to repeat or remember information that is stated directly in the text. Coding for low-level questions tends to be similar across studies since such questions are narrowly defined as requiring only recall of information. Because low-level recall questions tend to have a predetermined answer in the text, these questions tend to also be display or recitation style questions, which are defined as questions to which the answer is already known with the purpose of checking for literal comprehension and to determine if the student can “display” knowledge of factual content (College English, 2014). These questions are associated with supporting “textbase understanding” described in Van Dijk and Kintsch’s situation model (1983). In this theory of reading comprehension, the reader extracts meaning from the text itself at the textbase level before they integrate it with their own prior knowledge to form a coherent mental representation.

While there is substantial research on teachers’ use of low-level questions in practice, there are few that examine the different functions of low-level questions. In their analysis of
teachers’ follow-up questions within the context of one-on-one conferences about student’s independent reading of narrative or informational text, Gilson, Little, Ruegg, and Bruce-Davis (2014) identified seven types of low-level follow-up questions that supported student thinking about a text: background knowledge, student elaboration, elaboration of a personal connection with a related fact, identification of story elements, explanation of story elements, text support for response, and vocabulary definitions. Of these seven types of low-level follow-up questions that teachers asked about students’ self-selected books, researchers found identification and retelling of story elements were the most commonly asked type of low-level questions (Gilson et al., 2014).

Coding of high-level questions, when compared to coding for low-level questions, is far more diverse in the research, consisting of numerous categories and levels of abstraction across studies. High-level questions themselves are often further broken down into questions that require low-level versus high-level inferential thinking. Low-level inference questions are ones that require minimal input on the part of the student to draw a conclusion but have an answer that is not directly stated in the text (Applegate, Quinn & Applegate, 2002) such as, “Why did the owl grab the mouse?” High-level inference questions, on the other hand, require the student to go from a propositional level to an interpretive one in order to answer the question and require greater levels of analytical thinking (Cotton 2001; Parker & Hurry, 2007) such as “Why do you think owls hunt in the night instead of the day?”

The range of thinking that high-level questions encourage is tremendously varied and complex. As such researchers often go beyond discriminating between high- and low-level inferential questions and code teachers’ high-level questions in a more categorical fashion as
a way to capture the specific types of thinking. Some researchers use codes based on the revised Bloom’s taxonomy, which designates four types of higher-order thinking: apply, analyze, evaluate and create (Anderson, Krathwohl & Bloom, 2001). Classroom studies also use more specific subcategories of Bloom’s taxonomy such as predicting, speculating, or making connections between different texts (Armbruster et al., 1991; Moschovaki & Meadows, 2005; Nystrand, Gamoran, Zeiser, & Long, 2003; Soter et al., 2008).

There is a general acknowledgement that teachers’ questions in interactive read alouds are meant to reflect a range of questions and so should include both low- and high-level comprehension questions. There is a far more explicit emphasis, however, both in initiatives focused on reading and in curricular materials, on the importance of teachers ask high-level questions. Asking high-level questions has been shown to be an important variable in elementary students’ literacy and reading comprehension growth (Knapp, Shields & Turnbull, 1995; Taylor, Pearson, Peterson & Rodriguez, 2003) as well as a defining characteristic of effective teachers (Taylor, Pearson, Clark & Walpole, 2000). The Institute of Education Sciences (IES) specifically emphasizes the importance of primary and elementary teachers not just asking “surface-level questions” during narrative and informational read alouds, but also asking questions that support students’ higher-order thinking (Shanahan et al., 2010).

Although asking a high-level question does not guarantee an immediate high-level student response, numerous researchers have found high-level questions can have a positive effect on student achievement and critical thinking when it is the predominant classroom discourse (Duke & Pearson, 2008; Redfield & Rousseau, 1981). Even within content subjects open-ended high-level questions are generally seen as more desirable because, rather than
focus on retrieval of facts, they require students to connect greater quantity of text in a more cognitively complex fashion (Aguiar, Mortimer, & Scott, 2010; Cerdán, Vidal-Abarca, Martinez, Gilabert, and Gil, 2009; Chin & Brown, 2002). Student outcomes reported to have a positive association with high-level teacher questioning in interactive read alouds include length and complexity of student responses, reading achievement gains, and engagement with reading, especially in high-poverty classrooms (Applebee, Langer, Nystrand & Gamoran, 2003; Beck & McKeown, 2001; Boyd & Markian; 2011; Cazden, 2001; Gall, 1970; Gambrell, 1996; Knapp et al., 1995; Michaels & O’Connor, 2015; O’Connor, Michaels & Chapin, 2015). In comparison, most reading research points to the limitations of low-level questions in their ability to elevate students’ thinking. While recall of information may support factual learning, they do not directly support inferential reasoning skills that are important aspect of developing students’ critical thinking skills (Fenesi, Sana & Kim, 2014; Hamaker, 1986).

A second reason for the more pronounced emphasis on high-level questions is because research has documented that teachers already ask many low-level questions. Studies that examine teacher questioning in practice indicate that teachers still have a pronounced tendency to ask primarily low-level questions in which students are asked to recall facts or information from the text (Armbruster et al., 1991; Boyd and Markarian, 2011; Cazden, 2001; Christoph & Nystrand, 2001; Myhill, 2006; Parker & Hurry, 2007; Pentimonti & Justice, 2010; Tharp & Gallimore, 1989; Zucker, Justice, Piasta, & Kaderavek, 2009). While most reading research does not suggest teachers abstain from asking low-level questions, they do point to the predominance of low-level questioning and stress that, when the primary emphasis during a read aloud is on literal recall, children inevitably have fewer opportunities to take part in discussing ideas that require and thus develop higher-order
thinking (Applegate, Quinn & Applegate, 2002).

Research on teacher questioning in the classroom reflects the fact that there are numerous characteristics of questions one can analyze beyond the binary abstraction levels of low- and high-level questions. Many studies have analyzed specific types of thinking or abstraction required to answer each question such as predicting or evaluating. Other dimensions of teachers’ questions studies have examined include naming the topic of the question or the source of a question’s answer (Chin, Anderson & Waggoner, 2001; Parker & Hurry, 2007). Still other studies have analyzed the form of a question, that is the type of response a question encourages such as a yes/no answer, a specific answer from the text (closed question) or a more elaborate response to which there is no one particular answer (open-ended question). Numerous studies have found associations between the form of a question and resulting student talk and the types of thinking required to answer each type of question. Cazden (2001) points out that answers to closed questions can often be stated in single words or short phrases (Cazden, 2001) whereas open, more authentic questions invite metacognitive processing and prompt longer and more complex resources.

Teacher questions have also been analyzed for their role in getting students to participate in conversations. Michaels & O’Connor (2015) use the term “talk moves” to describe this student-focused rather than abstraction-focused function of some questions. Given the importance of including students’ ideas into text conversations and using questions as a scaffolding mechanism for student thinking, many studies have examined the particular role and purpose of follow-up questions, that is questions that are asked in direct response to a student response and thus reflect contingent scaffolding. Chin (2006) describes follow-up questions in science classes as teacher questions that “stimulate further productive
thought, based on their evaluations of students’ previous responses” (p. 1316). Therefore, follow-up questions can be analyzed not just for the type of thinking they produce but how they support student participation in discussions, such as whether they probe for additional information or reasoning (follow-up) or extend on a previous student’s response (uptake) (Beck & McKeown, 2001; Gilson et al., 2014).

While by no means an exhaustive list, Table 1 presents the different aspects of questions that are commonly examined by classroom researchers.

<table>
<thead>
<tr>
<th>Codes that capture:</th>
<th>Definition</th>
<th>Examples of coding categories</th>
<th>Related Research</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Question Form</strong></td>
<td>How is the question written? What type of response does the question encourage?</td>
<td>Fill-in-the blank questions, Yes/no questions versus closed and open-ended</td>
<td>Almasi, 1996; Cazden, 2001</td>
</tr>
<tr>
<td><strong>Questions Topic</strong></td>
<td>What topic does the question relate to or address?</td>
<td>Vocabulary, story element, or text feature questions; text-based versus non-text based questions</td>
<td>Chin, Anderson &amp; Waggoner, 2001</td>
</tr>
<tr>
<td><strong>Questions Function</strong></td>
<td>What type or level of cognitive demand is required to answer the question?</td>
<td>Low versus high-level questions; recall versus inferential thinking; display versus authentic questions</td>
<td>Applegate, Quinn &amp; Applegate, 2002; Boyd &amp; Rubin, 2006; Parker &amp; Hurry, 2007</td>
</tr>
<tr>
<td><strong>Question Purpose</strong></td>
<td>What is the purpose of the question? What is the role of the question within the discussion?</td>
<td>Initiating versus follow-up questions; questions as discussion moves such as uptake and revoicing.</td>
<td>Boyd &amp; Markarian, 2001; Beck &amp; McKeown, 2001; Soter et al. 2008; Nystrand, 1997; Michaels &amp; O’Connor, 2015</td>
</tr>
</tbody>
</table>

**Rhetorical Questions**

The use of rhetorical questions, questions that are interrogative in form but not necessarily function, as persuasive devices in oral or written speech is well documented by linguists (Frank, 1990) and has been a topic of study in a variety of languages. While there is
a general agreement that one overall function of rhetorical questions is to convey information rather than request information, the disconnect between their form and function reflects the complexity involved in defining their functions more precisely (Frank, 1990). In contrast to dialectic language, which involves logical and straightforward language, rhetorical questions align with rhetoric that “frequently appeals to emotion and employs stylistic devices aimed at persuasion” (Moshavi, 2015). Because meaning is often implied and not direct, there is also often a subjective interpretation of the speaker’s intent. Ilie (1994) points out one complexity of rhetorical questions is that their shared characteristics with both statements and questions makes it possible for the person being addressed to choose whether to acknowledge either the force of the question form or the rhetorical function.

Another study of rhetorical questions (Blanchette, 2001) identified an additional function of rhetorical questions, which is softening the challenge of direct statements to avoid direct challenge. In this case, rhetorical questions were compared to hypothetical statements. For example, rather than say, “You should include more evidence in your argument” teacher might instead ask the question, “Don’t you think you should include more evidence in your argument?” In both cases there is a clear message of more evidence being needed, with the former taking the imperative form and the second taking the interrogative, which gives at least the appearance of inviting the addressee into the thought process even if there is an obvious answer. Although not an exhaustive list, Table 2 describes functions of rhetorical questions that have been identified by linguists.
Table 2. Descriptions of Functions of Rhetorical Questions

<table>
<thead>
<tr>
<th>Type of Rhetorical Question</th>
<th>Identified Function</th>
<th>Example</th>
<th>Related Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proverbial Rhetorical Question; Rhetorical Interrogative; Rhetorical Retorts</td>
<td>Implies an obvious yes or no answer using humor or sarcasm</td>
<td>“Is the Pope Catholic?”</td>
<td>Bardarneh; 2016; Mieder, 2000; Doyle, 2008; Schaffer, 2005.</td>
</tr>
<tr>
<td>Reversed Polarity Questions; Positive and Negative Interrogatives</td>
<td>Conveys a polar opposite assertion: a positive assertion and vice-versa</td>
<td>“Who knows where he is?” (Nobody knows)</td>
<td>(Koshik, 2002, 2003; Quirk et al, 1985)</td>
</tr>
<tr>
<td>Persuasive Assertions</td>
<td>Asserts a statement that includes implied agreement.</td>
<td>“So that's why we have to keep our eyes open, isn't it?”</td>
<td>Frank, 1990</td>
</tr>
<tr>
<td>Alternative to Challenge</td>
<td>Softens a direct challenge or suggestion.</td>
<td>“So do you think you should include more evidence?”</td>
<td>Blanchette, 2001</td>
</tr>
</tbody>
</table>

Although most research that examines the function of rhetorical questions does so through a linguistic perspective, there have been some studies that examined rhetorical questions in the classroom context. In 1973, Blosser, for example, included rhetorical questions as one of four main types of questions in his classification system of teacher questions, in addition to Managerial questions, Closed question and Open questions. Blosser operated on a similar definition used by linguists, a question whose form belies its function in that it is not meant to encourage or elicit a response. Like most classroom studies that identified rhetorical questions, there was no exploration in the study as to the specific function rhetorical questions might play in teaching and learning. One exception is the Armbruster et al. (1991) study on teacher questions in content lessons. Observations that a significant number of teachers’ questions were rhetorical led to a separate analysis as to their differing functions. The following categories of rhetorical questions emerged from their analysis: Providing or Emphasizing information, Inviting Reflections on Personal Experiences, Stimulating Prior content knowledge, Focusing Attention, Setting a Purpose.
for Reading, and Repeating information. Table 3 presents descriptions and examples of the different functions of rhetorical questions as identified by Armbruster et al. (1991). Despite describing different ways rhetorical questions appeared to connect to desired reading behaviors, such as accessing prior knowledge or setting a purpose for reading, Armbruster et al. (1991) concluded that, because they are not intended to be answered, the question form likely confuses students.

Table 3. Functions of Rhetorical Questions as Described in Armbruster et al. (1991)

<table>
<thead>
<tr>
<th>Rhetorical Question Category</th>
<th>Question Function</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing or Emphasizing Information</td>
<td>Making a statement or calling attention to a fact.</td>
<td>“Does that follow with the theory? Yes.”</td>
</tr>
<tr>
<td>Inviting Reflections on Personal Experiences</td>
<td>Encouraging students to reflect on specific personal experiences.</td>
<td>“If you had something at home and your brother comes in and takes it, you’d probably hit him, don’t you?” (sic)</td>
</tr>
<tr>
<td>Accessing Prior Content Knowledge</td>
<td>Reminding students about, or reviewing, previously studied information</td>
<td>“Remember we talked about the different minerals?”</td>
</tr>
<tr>
<td>Focusing Attention</td>
<td>Directing students to a task</td>
<td>“Can you find the Prime Meridian on your globe?”</td>
</tr>
<tr>
<td>Setting a Purpose for Reading</td>
<td>Setting a purpose of orienting students to the reading</td>
<td>“Have you ever wondered how people or ships keep from getting lost?”</td>
</tr>
<tr>
<td>Repeating Information</td>
<td>Repeating information in order to clarify or reiterate a point so all could hear</td>
<td>“On the farms? I would disagree.” “And no waves caused by volcanoes erupting under the sea, right?”</td>
</tr>
</tbody>
</table>

One study that examined discursive talk patterns in high school science classes (Anderson, Zuiker, Taasoobshirazi & Hickey, 2007) highlighted the effects of rhetorical questions when they became a pattern of questioning, such as when one Astronomy teacher frequently used rhetorical questions to imply a correct answer or make a point disguised as a question such as, “So does that brightness and distance kind of have some sort of relationship?” Anderson et al. (2007) concluded that when rhetorical questions were used
with substantial frequency, they “prompted (a) shift to a conceptual focus (knowing the ‘right’ answer) from the discursive participatory context (students) had been engaging (exploring articulated understandings)” (2007, p. 1735). Interestingly, researchers made a connection between this style of questioning and a teacher’s intent, concluding that using many rhetorical questions reflected a desire to control the content rather than a desire to listen, engage with, and respond to students’ contributions. As such, rhetorical questions were seen as working against, not supporting, interactional scaffolding.

**Student Talk in Interactive Read Alouds**

Reading an informational text out loud can be a beneficial literacy activity, but it is the interactive aspect that allows students to meaningfully and cognitively engage with ideas in the text. As Maloch and Bomer (2013) point out, “engag(ing) students through interactive read-alouds and discussion” is an essential practice in the elementary grades to increase proficiency with this genre (p. 442). These findings parallel research on read alouds in general which indicates it is the talk surrounding the read alouds, and not simply the reading of the text itself, that is responsible for developing students’ ability to think critically about ideas in the text (Beck & McKeown, 2001; Dickinson & Tabors, 2001). The interactive aspect of a read aloud is also what impacts student motivation and engagement since it encourages active processing of ideas rather than a passive listening of a text (Lutz, Guthrie, & Davis, 2006). As such, researchers have attempted to qualify teacher questions and types of discourse in read aloud discussions by examining resulting student talk.

One way student talk is measured is by assessing the amount of and type of talk children do during text discussions. Production of speech is cognitively more demanding, and so talking about one’s ideas, as opposed to just thinking or listening, can result in deeper
and more active processing of information (Cazden, 2001). How much children talk about a text compared to the teacher then can be a strong indicator of how actively students are processing ideas about a text, which, in turn, has repercussions for student engagement and motivation (Guthrie, 2011). Actively contributing to literature discussions can also stimulate students’ background knowledge and expressive vocabulary (Michaels, O’Connor & Resnick, 2008; Vasilyeva, M. & Waterfall, 2011).

Some studies examine the proportion of talk teachers do compared to students, since in a more dialogic discussion students will take a greater part in asking questions themselves and making sense of text. Other researchers measure the average length of students’ responses, often referred to as mean length of turn (MLT), as a proxy for quality of student talk since the length of students’ responses can be indicative of the amount and complexity of thinking needed to answer a text-related question. Answers to questions that ask for recall of information, for example, can often be stated in single words or short phrases (Cazden, 2001). In comparison, authentic, open-ended questions, to which there is often no one right answer, tend to invite metacognitive processing and more complex ideas which then require more speech to express those ideas (Cazden, 2001).

Another way researchers have examined teacher questioning in interactive read alouds is to consider them within a greater context of discourse patterns of questioning events or episodes, which take into account the relationship between teachers’ questions and surrounding student language. One of the more commonly recognized patterns of classroom discourse is the traditional Initiate-Respond-Evaluate (IRE) discourse in which the teacher asks a question, a student gives an answer to that particular question, and then the teacher evaluates the response (Applebee et al., 2003; Cazden, 2001). Despite a general consensus that this pattern of talk is limiting in its support of students’ engagement with and
critical thinking about a text, it is still one of the most dominant forms of talk in today’s classrooms (Cazden 2001; Michaels & O’Connor, 2015; Applebee et. al, 2003). This type of questioning pattern, which centers on display questions, questions with known answers that the teacher can assess, is often criticized since it is seen as highly teacher controlled and thus discouraging of elaborated student talk and student involvement (Cullen, 2002). In comparison, dialogically oriented discussions encourage student input of ideas and questions because meaning making is seen as a collaborative process between teacher and students (Christoph & Nystrand, 2001).

Some researchers have challenged the idea that display or assessment style questions are limiting to productive student talk. Boyd and Rubin (2006), for example, examined text discussions run by exemplary teachers and found that high levels of display questions were not necessarily associated with low levels of student talk. In their analysis of extended student talk in fourth and fifth grade English language learner classrooms, Boyd and Rubin (2006) point out that text-based display questions, which align with low-level questions in that they ask students to recite known information and typically are used to “assess whether students have absorbed content matter”, are often seen as limiting to student talk (p. 143).

An unexpected finding of their study, however, was that a teacher whose students tended to produce more dialogic utterances than traditional talk was found to ask a considerable number of display questions. Of the 35 questions that were coded as display questions, 88% were in response to a student’s prior utterance. As such, Boyd and Rubin (2006) found that it was not the form or surface level of the question that led to dialogic production of student talk but rather the amount of contingency questions reflected. The researchers found that display questions played an important role in the discussion in that they “enable(d) teachers to scaffold a more elaborated student response than might
otherwise be the case” (Boyd & Rubin, 2006, p. 161). This study then offers a counter-narrative to the traditional view of assessment and display questions as discouraging and limiting to elaborative student talk. Such findings also reflect the idea that there is a tendency to describe read aloud discussions as either dialogic or not, effective or ineffective, while in reality the variability is far more complex (O’Connor & Michaels, 2007).

In a study of a teacher’s use of press moves, follow-up probes that press for more student contribution, McElhone (2013) found a similarly unexpected value in questions that are normally seen as limiting to student talk. In a previous quantitative study McElhone (2012) found that teachers who used more reducing press move, that is a follow-up probe that reduces the cognitive load of a question such as changing an open-response questions to yes or no or multiple choice question, limited elaborative student talk because it “funneled” students’ thinking toward a display question with a known answer. In a follow-up study that consisted of qualitatively examining a teacher’s press moves, however, McElhone (2013) found that reducing press moves often performed a function that was in service of high-level questions, that is they served as a “springboard” for high-level thinking rather than a funnel.

In the following description, McElhone (2013) explains how this unexpected value reflects the integral and symbiotic relationship between different levels of thinking:

The findings presented here suggest that teachers need not pepper students with high press questions to spur elaborated talk. When teachers are committed to helping students deepen and expand their own ideas, rather than to funneling students toward predetermined responses, they can use reducing press questions to help students construct a foundation from which they can effectively address high press questions. The findings also suggest that high press questions alone cannot
construct dialogic interactions. (p. 13)

Similar to Boyd and Rubin (2006), questions that are seen in isolation as limiting student talk or thinking, can play a role in the flow of a conversation that is overall dialogic, particularly when other aspects of dialogic conversations are present.

Scott, Mortimer and Aguiar (2006) also discuss the natural and important variety of discourse that makes up effective science discussions and content learning. In their examination of discursive high school science lessons, the researchers identified a natural, and in fact, valuable exchange between dialogic and authoritative discourse, discourse that reflects an imparting of scientific knowledge or information from the teacher to the student. They state that, “the fact of the matter is that science is an authoritative discourse which offers a structured view of the world and it is not possible to appropriate the tools of scientific reasoning without guidance and assistance” (2006, p. 622). Such a statement is not a condoning of authoritative discourse as a goal or overall characteristic of a discussion, rather they argue that, in order for students to both learn accurate scientific knowledge and to engage in meaningful ways with that knowledge, both types of discourse need to be present. Therefore, when used effectively the relationship between these seemingly opposing ideologies is one that is complementary, not adversarial. Such findings support the idea that questions or discourse which, at the surface level, may be seen as limiting, can play a role in supporting discussion more representative of a dialogic nature if it is one part of the conversation (O’Connor & Michaels, 2007).

In interactive read alouds, low-level and rhetorical questions tend to occupy a similar space in that their value is often seen as opposing to rather than complementary to high-level counterparts. There is a clear consensus that a text discussion dominated by low-level
questions prioritizes assessment and limits student learning and engagement. Likewise, text discussions dominated by rhetorical questions in which the teacher is primarily imparting information reflects a discussion that is devoid of valuing student ideas or contributions. The studies mentioned above, however, point to the importance of understanding that, in order for a conversation or text discussion to be effective or dialogic, not every comment and question has to be dialogic. Furthermore, these researchers argue, different types of questions have different functions and that high-level, exploratory thinking cannot exist in isolation.

Examining the scaffolding functions of low-level questions in read alouds is particularly important with informational texts since there is a dual instructional purpose of developing content learning and reading comprehension skills. Coté, Goldman and Saul (1998) argue that because informational text tends to be more lexically and syntactically dense, there are even more challenges in reader’s constructing a textbase compared to narrative texts. Given the essential role the textbase plays in reading comprehension, then, attention to how questions can support literal understanding of text is not trivial. While there is a general understanding that questions encouraging recall and assessment of content knowledge should not be a dominant characteristic of text discussions, it is important to examine how they might contribute to overall goals of learning and engagement in interactive informational read alouds.
CHAPTER 3: METHODS

Participants

This study uses a subset of data from Year 2 of the READS for Summer Learning (READS) project, an evidence-based summer reading program and intervention study aimed at enhancing engagement with summer reading in high-poverty elementary schools (Kim & White, 2011; White, Kim, Kingston, & Foster, 2014). Participating students received 10 interest- and ability-matched books during the summer along with pre- and post-reading activities called “tri-folds” designed to scaffold comprehension (See Appendix A for an example of a trifold used for informational text.) Once participating schools were determined, teachers and students within each school were randomly assigned to either treatment or control conditions. Figure 1 shows the hierarchy structure of the data.

![Diagram of data structure]

Figure 1: Participant data structure

Most students participating in the study came from low-to-middle socioeconomic status (SES) families with school-level percentages of free and reduced lunch ranging from a
low of 61% to a high of 100%. Of the final sample, 55% of students were Black, 30% were Latino, 14% were White, and less than 1% were either Multiracial or Unidentified. The sample mean of baseline scores on the Iowa Test of Basic Skills comprehension test ($M = 37$ percentile rank, $SD = 26$) was below the national norm.

Teachers in the treatment group received explicit instruction and scripted materials for six READS reading comprehension lessons designed to support students’ independent use of the tri-folds they would receive over the summer. Each teacher assigned to the treatment condition taught six READS lessons at the end of the school year, three related to narrative text and three related to informational text. Each lesson used a read aloud as a way for students to practice using the trifolds. Each lesson was designed to last 60 minutes and teachers were required to follow the READS script in its entirety, including the provided comprehension questions for each read aloud. Teachers in the control condition also received prewritten lessons and similar amounts of professional development but in math.

Data Sources

As part of the data collection for Year 2 of the READS intervention study, each teacher in the sample (n=37) had two of their six reading comprehension lessons audio-recorded, one narrative lesson and one informational lesson. Of the recordings of informational text lessons, 3 were not viable, which led to a total of 34 recordings of READS lessons that used an informational text. Audiotapes were then transcribed by VerbaLink and posted on a READS password-protected Onehub.com site with access provided exclusively to the research team. The present study uses the read aloud portion from the transcribed informational lessons of this subsample. Therefore each the 34 lessons used in this study represents a unique teacher. Figure 2 illustrates the structure of subsample data sources.
The read alouds designated for the three informational lessons were *Owls* by Gail Gibbons, *Tornado Alert* by Franklyn M. Branley and *A Picture Book of Helen Keller* by David A. Adler which reflect three common subcategories of informational text: animals, nature, and biography (Yopp & Yopp, 2012). Table 4 describes the main characteristics of each read aloud text. Read alouds in each lesson were designed to be interactive and last approximately 20 minutes. Each teacher in the treatment group received copies of the read alouds along with a script for each lesson, which included 5-7 comprehension questions to be asked with each read aloud.

Table 4. Descriptions of READS informational read aloud texts for Lessons 4-6

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Book</th>
<th>Type of Informational Text</th>
<th>Lexile</th>
<th>Guided Reading level¹</th>
<th>Word Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td><em>Owls</em> by Gail Gibbons</td>
<td>Animals</td>
<td>760L</td>
<td>N</td>
<td>32 pages</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1315 words</td>
</tr>
</tbody>
</table>

¹ Guided Reading level N and M approximate a 3.4 read level or Lexile level of 510.
For all read alouds, comprehension questions were visually organized according to the three categories of comprehension designated by the 2009-2013 National Assessment for Educational Progress (NAEP): “locate and recall”, “integrate and interpret”, “evaluate and critique.” Locate and recall are low-level assessment questions that ask students to “focus on small amounts of texts” such as identifying a clearly stated main idea or supporting detail (p. 36). Integrate and Interpret are high-level questions that require students to move beyond recall of discrete information and “make connections that draw on larger sections of text, often at an abstract level” (2009, p. 37). Examples of integrate and interpret questions include comparing characters, interpreting a character’s motivation and interpreting an author’s implied message. Critique and Evaluate questions are also high-level but require “readers to stand back from what they read and view the text objectively,” such as asking about an author’s language choices or the effectiveness of a text feature or argument (2009, p. 38). (See Appendix B for a full description of the NAEP categories of comprehension).

In their 2010 Practice Guide, the IES recommends using these three categories, also referred to as “cognitive targets”, as a guide to “frame discussion about text, believing that high-quality discussion should address all three categories.” (Shanahan et al., 2010, p. 24). Table 5 illustrates how provided comprehension questions that accompanied the text Owls by Gail Gibbons appeared in the READS script. Page numbers indicate when teachers are supposed to ask each provided question. The READS script also offered additional
guidelines to support an interactive read aloud, such as reminding teachers to “point out text features throughout book and read the captions and text interspersed on the pages. Point out a cover, title page, table of contents, index, diagrams, etc.”

Table 5. READS Comprehension Questions for Lessons 4-6

<table>
<thead>
<tr>
<th>Owls by Gail Gibbons</th>
<th>Locate and Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What are raptors? Page 5</td>
</tr>
<tr>
<td></td>
<td>What are talons and how are they used? Page 5</td>
</tr>
<tr>
<td>Integrate and Interpret Knowledge and Ideas</td>
<td></td>
</tr>
<tr>
<td>Are all owls the same? Pages 8-9</td>
<td></td>
</tr>
<tr>
<td>What are some differences among owls? Pages 8-9</td>
<td></td>
</tr>
<tr>
<td>How do their strong senses help them? Pages 12-13</td>
<td></td>
</tr>
<tr>
<td>Critique and Evaluate</td>
<td></td>
</tr>
<tr>
<td>What steps do you think should be taken to protect owls?</td>
<td></td>
</tr>
<tr>
<td>What are some of the most important things we learned from this book?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tornado Alert by Franklyn M. Branley</th>
<th>Locate and Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What are tornadoes? Page 3</td>
</tr>
<tr>
<td></td>
<td>Why do tornado funnels have different colors? Page 7</td>
</tr>
<tr>
<td>Integrate and Interpret Knowledge and Ideas</td>
<td></td>
</tr>
<tr>
<td>Why do most tornadoes occur during April, May, and June? Page 10</td>
<td></td>
</tr>
<tr>
<td>Why can tornadoes cause so much damage? Pages 18-19</td>
<td></td>
</tr>
<tr>
<td>What are some safe places during a tornado? Why? Page 27</td>
<td></td>
</tr>
<tr>
<td>Critique and Evaluate</td>
<td></td>
</tr>
<tr>
<td>What steps do you think should be taken to prepare for a tornado? Pages 24-32</td>
<td></td>
</tr>
<tr>
<td>What are some of the most important things we learned from this book?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A Picture Book of Helen Keller by David A. Adler</th>
<th>Locate and Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Was Helen Keller born deaf and blind? Page 2</td>
</tr>
<tr>
<td>Integrate and Interpret Knowledge and Ideas</td>
<td></td>
</tr>
<tr>
<td>Why do you think Helen was angry and frustrated? Page 8</td>
<td></td>
</tr>
<tr>
<td>Why did Helen call the day she met Anne Sullivan her “soul’s birthday”? Page 16</td>
<td></td>
</tr>
<tr>
<td>Critique and Evaluate</td>
<td></td>
</tr>
<tr>
<td>If you could only share one fact with a friend about Helen Keller from this book, which would you share? Why?</td>
<td></td>
</tr>
<tr>
<td>What is one lesson Helen Keller’s life story might teach us today?</td>
<td></td>
</tr>
</tbody>
</table>

READS Transcripts

Read aloud transcripts were retranscribed to be compatible with the CLAN data analysis program, made available online through the Child Language Data Exchange System.
(CHILDES). Any spoken reading of the text by the teacher was excluded at this stage. Measurements generated through CLAN included total word (token) counts for the teacher and students, as a collective, in each lesson.

Data Coding

Spontaneous teacher questions for this study were defined as teacher-generated questions, as opposed to script-provided questions, that were interrogative in form. While some teacher statements could be interrogative in function, such as “So, you’re saying that owls are a type of bird,” or “Tell what you think about tornado warnings,” this study’s coding focused only on teacher sentences that were in the interrogative form and ended with a question mark. The decision to choose the form of question as criteria for examination aligns with directives that are given to teachers on how to lift up the quality of text conversations. Research on read alouds frequently emphasizes the importance of asking questions, a directive that implies using the interrogative form. An additional reason to focus on the interrogative form rather than function was that it allowed for analysis of rhetorical questions, which a common form of questioning with some teachers in the sample.

All spontaneous teacher questions were assigned one of five codes: Low-level comprehension, High-level comprehension, Rhetorical, Participation, and Management questions. Participation questions were questions that encouraged students to offer ideas but did not contain content of an actual question, such as “Child H?” or “Any other ideas?” The fifth category, Management Questions, reflected spontaneous teacher questions that were not text related but related to procedural or management aspects of the read aloud. Any comprehension question that was repeated or closely paraphrased received an additional code of “Repetition” but was not included in the initial count or analysis of questions.
Table 6 presents descriptions and examples for all five categories of teachers’ spontaneous questions.

Table 6. Coding Categories for Teachers’ Spontaneous Questions

<table>
<thead>
<tr>
<th>QUESTION TYPE</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-level</td>
<td>Questions that ask students to recall information</td>
<td>What was the smallest owl called?</td>
</tr>
<tr>
<td>High-level</td>
<td>Questions that require students to think inferentially</td>
<td>How would having ears in different places help the owls?</td>
</tr>
<tr>
<td>Rhetorical</td>
<td>Questions that are interrogative in form but emphasize information rather than prompt a response</td>
<td>Because that harmed the owls, right?</td>
</tr>
<tr>
<td>Participation</td>
<td>Questions that encourage participation or additional responses from students</td>
<td>Does anyone else have an idea?</td>
</tr>
<tr>
<td>Management</td>
<td>Non text-related teacher questions (i.e. management, procedure)</td>
<td>Who else needs a pencil?</td>
</tr>
</tbody>
</table>

To determine categories that reflected the different functions of teachers’ low-level and rhetorical questions I used a combination of inductive and deductive coding. For low-level questions three general categories were identified: Recall questions, which are questions that ask students to remember information from the text; Prior Knowledge questions, which ask students to recall information from their own background knowledge; and Text Feature questions, which ask students to garner information from a text feature in the text (Armbruster et al., 1991). A text feature could be either a visual such as a photograph or illustration or one that used both visuals and text such as a diagram, glossary or chart (Kelley & Clausen-Grace, 2010). Because of the variation that existed within the Recall question category, four sub-codes of Recall questions were identified to reflect differences in timing of the question and type of answer expected. The four subcategories of recall questions are
Immediate Verbatim Recall, Immediate Information Recall, Delayed Verbatim Recall, and Delayed Information Recall.

Since the form of a question has been shown to impact the level of thinking required on the part of students (Cazden, 2001), all low-level questions were also coded for form, that is whether a question was an open-ended question, to which there was no one right answer, a closed question, to which there was a specific answer, or a yes/no question which requires students to answer either yes or no. Table 7 provides a complete list of all codes for teachers’ spontaneous low-level questions, including descriptions and examples.

Table 7: *Coding Categories for Functions of Teachers’ Spontaneous Low-level Questions*

<table>
<thead>
<tr>
<th>QUESTION FUNCTION</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Knowledge Questions</td>
<td>Questions that ask about a personal experience or prior knowledge not stated in the text</td>
<td>What does nocturnal mean?</td>
</tr>
<tr>
<td>Text Feature Questions</td>
<td>Questions asked to check understanding or draw attention to visuals such as pictures, photographs, charts, diagrams, captions or bold text. text features.</td>
<td>What do you see on his claws there? Which owl is the biggest one?</td>
</tr>
<tr>
<td>Recall Questions</td>
<td>Question that ask students to recall information from the text</td>
<td></td>
</tr>
<tr>
<td>Verbatim Recall</td>
<td>Questions that ask students to recall a specific word or phrase recently stated in the text</td>
<td>So what's the name of the smallest owl?</td>
</tr>
<tr>
<td>Information Recall</td>
<td>Questions that ask students to recall information or an idea covered recently in the text</td>
<td>Do owls have sharp senses?</td>
</tr>
<tr>
<td>Delayed Verbatim Recall</td>
<td>Questions that ask students to recall a specific word or phrase covered in a previously read section of text</td>
<td>Who remembers what predator means?</td>
</tr>
<tr>
<td>Delayed Information Recall</td>
<td>Questions that ask students to recall information or idea covered in a previously read section of text</td>
<td>What do you remember about an owl’s eyesight?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUESTION FORM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No</td>
<td>The question encourages a yes or no response</td>
</tr>
</tbody>
</table>
The question has one specific answer.

What does an owl use to grab its prey?

The question has a number of possible answers.

What do you remember about an owl’s senses?

In order to capture how teachers’ low-level questions provided interactional scaffolding for high-level questions, I first determined topical episodes of questioning drawing from Boyd and Rubin’s (2006) definition of “all turns of talk or utterances lying between topic shifts” (p. 151). In this study, the beginning boundary of episodes was a teacher’s text-related question, either scripted or spontaneous, and the ending boundary was the last utterance, either by student or teacher, related to that topic. Any spontaneous low-level question that was housed in the same questioning episode as a high-level question, either scripted or spontaneous, received a “low-high relationship” code. Three low-high relationship categories were identified: Elaboration questions, Platform questions and Launching questions.

The first category, Elaboration questions, borrows from a Gilson et al. (2014) study on teachers’ low- and high-level follow-up questions during reading conferences, in which teachers “encourage(d) readers to provide elaboration about the factual information from their texts such as character, plot, and setting” (p. 118). In this study, Elaboration questions referred to low-level questions that followed a high-level question and encouraged students to either add more information to their answer or be more precise in their answer. These questions are also similar to McElhone’s (2012) description of a high press move in which a teacher “respond(s) to a student contribution with a request for clarification, elaboration, evidence, or examples” (p. 5).
Because of the dearth of research on how low- and high-level questions operate together, I used grounded theory to determine additional ways low-level questions provided scaffolding for high-level questions, which led to the second and third categories: Platform questions and Launching questions. Platform questions I define as questions that provide a factual platform to create a more solid footing on which high-level thinking can stand. After asking a high-level question to which students either do not give a response or give an erroneous response, a platform question allows the teacher to take a step back from the original question in order to provide a platform for students’ thinking by reinforcing or attending to related literal comprehension of information. In offering this term, I am aiming to label a specific move that can be used in read alouds that, while reflective of interactional scaffolding, is more specific, and therefore more transferable in the classroom. Table 8 presents the three categories of spontaneous low-level questions housed in a low-high questioning episode including descriptions and examples.

Table 8: Coding Categories of Low-level Questions asked in Low-High Questioning Episode

<table>
<thead>
<tr>
<th>QUESTION RELATIONSHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Launching</td>
</tr>
<tr>
<td>Platform</td>
</tr>
<tr>
<td>Elaboration</td>
</tr>
</tbody>
</table>

Similar to the Armbruster et al.’s study (1991) on teachers’ questions in content lessons, I observed a number of teachers’ spontaneous questions that were rhetorical, that is they did not seem to encourage or request an actual response and so conducted a separate
analysis to determine the different functions of teachers’ rhetorical questions. Although there were instances when a rhetorical question was followed by a student comment, a response was not actually requested. There were also times when a text-related question seemed to encourage a yes or no response and was perhaps met with a headshake or nod, which the audio recording would not have captured. In such cases I deferred to similar examples from Armbruster et al. (1991) and other examples by linguists that were still coded as rhetorical such as, "If you had something at home and your brother comes in and takes it, you'd probably hit him, don't you? All right. If the colonists come in ..."(p. 10). In total, five categories of rhetorical questions were identified: Providing Information, Extending a Student’s Response, Attending to Text Features, Encouraging Personal Reflection, and Stimulating Prior Knowledge. Table 9 offers descriptions and examples of the five different functions of teachers’ rhetorical questions followed by a more in-depth description of each category.

Table 9. *Categories of Teachers’ Text-Related Rhetorical Questions*

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providing Information</td>
<td>Provides or emphasizes information.</td>
<td>You know there’s some people who race tornadoes and drive beside ‘em and stuff like that?</td>
</tr>
<tr>
<td>Extending a Student Response</td>
<td>Adds information to a student’s response.</td>
<td>Teacher: What steps do you think should be taken to protect owls? Child: Put it against the law. Teacher: If we put against the law that we do not kill the owls then maybe we’ll keep more, right?</td>
</tr>
<tr>
<td>Attending to Text Features</td>
<td>Directs students’ attention to a visual text feature</td>
<td>You see him shredding his food?</td>
</tr>
<tr>
<td>Encouraging Personal Reflections</td>
<td>Models or encourages students’ to reflect on a personal connection, reaction or experience related to the text</td>
<td>Can you imagine how hard that would be losing just like losing your sight and hearing after you’ve had it? Isn’t that funny, as tiny as they are they can swallow their food whole?</td>
</tr>
<tr>
<td>Stimulating Prior Knowledge</td>
<td>Reminds students to a shared prior experience</td>
<td><em>We looked at owl pellets. Remember last year?</em></td>
</tr>
</tbody>
</table>

The category of Providing Information questions borrows from the Armbruster et al. (1991) study and describes questions that have an interrogative form but have the purpose of contributing or emphasizing information, either in response to text just read or in response to a students’ comment or question. Extending a Student Response draws from a study on teacher responses in interactive read alouds (Wiseman, 2011) that identified instances when a teacher provided additional ideas or information in response to or after repeating a student’s answer. This subcategory differs slightly from “Providing Information” in that there is first an uptake of a student response.

Attending to Text Features is similar to Armbruster et al.’s (1991) category of “Focusing Attention” which is defined as “speech acts to direct students to some task” (1991, p. 11), but takes into account the genre-specific act captured in the data of directing students attention to a text feature. Similar to low-level Text Feature questions, Attending to Text Feature questions directed students’ attention to a text feature except rather than ask students to garner information from a visual or answer a content-related question about a visual these questions simply directed students’ attention to a particular aspect of the text feature. Encouraging Personal Reflections questions, “encouraged students to reflect on specific personal experiences” (Armbruster et al., 1991, p. 10). Unlike a personal connection comprehension question, which in this study was coded as a high-level question, Encouraging Personal Reflection rhetorical questions did not encourage or elicit an actual response. Stimulating Prior Knowledge rhetorical questions encouraged students to recall or reflect on a prior experience related to the text. Unlike low-level Prior Knowledge
comprehension questions, which ask students to recall a fact or concept from their prior knowledge, the function of these questions was primarily to “remind students about, or to review, previously studied information” (Armbruster, 1991, p.11). Stimulating Prior Knowledge questions could also remind students about other shared experiences outside of school such as weather events.

A research assistant was trained on the complete coding scheme. A random sub-sample of transcripts consisting of 18% of the sample was double-coded by the research assistant and myself using the coding schemes for question type, function of low-level question, function of low-level question in a low-high questioning episode, question form, and function of rhetorical questions. Initial coding discrepancies were discussed until consensus was reached, which included revising several category descriptions. Inter-rater agreement was calculated with an average of 87.8 percent agreement across all codes (Kappa = 0.837).

Data Analysis

To answer my first research question about how many spontaneous, text-related low-level, high-level, and rhetorical questions teachers asked during the informational read aloud, total frequencies and means were calculated across lessons. To answer my second research question about the scaffolding functions of teachers’ spontaneous low-level questions, I calculated total frequencies and means per lesson for each of the six identified categories of low-level questions: Immediate Verbatim recall, Immediate Information recall, Delayed Verbatim recall, Delayed Information recall, Prior Knowledge, and Text Feature questions. In order to describe the scaffolding functions of each type of question, I drew from the literature on interactional scaffolding, both literacy and motivational. I also drew from
literature that described strategies for knowledge acquisition in content classes and literature on how certain types of questions can impact students’ self-efficacy or motivation.

To answer my research question about functions of teachers’ rhetorical questions, I calculated total frequencies and means per lesson for each of the five categories of rhetorical questions: Providing Information, Extending Student Response, Attending to Text Features, Encouraging Personal Reflections, and Accessing Prior Knowledge. In order to describe the scaffolding functions of each type of question, I drew on similar literature used to identify the scaffolding functions of low-level questions: studies that had a particular focus on interactional scaffolding, motivation research and research related to teacher questioning in content topics. I also drew on linguistics literature that examined the roles of rhetorical functions in speech.

In order to answer my fourth research question about whether teachers who asked many of their own high-level questions tended to ask certain types of spontaneous low-level questions, I performed a preliminary analysis by running a pairwise correlation in Stata between the total number of teachers’ spontaneous high-level questions and the total number of teachers’ spontaneous low-level questions. I then ran pairwise correlations between the number of teachers’ spontaneous high-level questions and each of the six categories of low-level questions. I also ran pairwise correlations between number of high-level questions and the three categories of low-level questions that provided scaffolding for high-level questions: Launching, Platform and Elaboration questions.

In order to answer my fifth research question about possible correlations between specific types of low-level questions and total amount of child talk in the read aloud discussions, I ran pairwise correlations between the six types of low-level questions and the total amount of child words as measured in CLAN. Since high-level questions have been
found to be more predictive of length of student talk than low-level questions, I included number of spontaneous high-level questions in the correlation matrix. Table 10 presents the methods and related data collection used to answer each of my five research questions.

Table 10: Mixed Methods used to Align Research Questions, Measures, Data Collection and Analyses

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Measure(s)</th>
<th>Data Collection</th>
<th>Analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research Question 1</strong>: How many spontaneous low-level, high-level, and rhetorical questions do teachers ask, on average, during a script-supported informational read aloud?</td>
<td>Number and means of low- and high-level spontaneous teacher questions</td>
<td>1. Recordings and transcripts of READS lessons 4, 5 and 6</td>
<td>Total frequencies and means</td>
</tr>
<tr>
<td><strong>Research Question 2</strong>: What are the different scaffolding functions of teachers’ spontaneous low-level comprehension questions?</td>
<td>Coding of teachers’ spontaneous low-level questions</td>
<td>2. Recordings and transcripts of READS lessons 4, 5 and 6</td>
<td>Total frequencies and means of low-level questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inductive and deductive coding</td>
</tr>
<tr>
<td><strong>Research Question 3</strong>: What are the different scaffolding functions of teachers’ spontaneous text-related rhetorical questions?</td>
<td>Coding of teachers’ rhetorical questions</td>
<td>Recordings and transcripts of READS lessons 4, 5 and 6</td>
<td>Total frequencies and means of rhetorical questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inductive and deductive coding</td>
</tr>
<tr>
<td><strong>Research Question 4</strong>: What associations exist, if any, between the number of spontaneous high-level comprehension questions and the number and type of spontaneous low-level comprehension questions?</td>
<td>Coding of teachers’ spontaneous low-level questions</td>
<td>Recordings and transcripts of READS lessons 4, 5 and 6</td>
<td>Pairwise Correlations (type of low-level question by number of high-level questions)</td>
</tr>
<tr>
<td></td>
<td>Total count of teachers’ spontaneous high-level questions</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Research Question 5</strong>: What association exists, if any, between types of spontaneous low-level questions asked and resulting student talk?</td>
<td>Coding of teachers’ spontaneous low-level questions</td>
<td>Recordings and transcripts of READS lessons 4, 5 and 6</td>
<td>Pairwise Correlations (Type of low-level question by total words spoken by children collectively)</td>
</tr>
<tr>
<td></td>
<td>Total words spoken by child (CLAN)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 4: RESULTS

The purpose of this study was to examine the spontaneous text-related questions teachers asked in a script-supported informational read aloud. Analysis began by assessing the number of spontaneous low-level comprehension questions and text-related rhetorical questions teachers asked compared to spontaneous high-level comprehension, followed by an in-depth examination of the scaffolding functions of teachers’ low-level and rhetorical questions. Additional analysis of teachers’ low-level questions included examining associations between type of low-level question and number of spontaneous high-level questions asked as well as associations between type of low-level question and amount of student talk. Findings for each research question are presented below.

*Teachers’ Spontaneous Text-Related Low-level, High-Level and Rhetorical Questions*

Table 11 presents the number of spontaneous text-related low-level, high-level and rhetorical questions teachers asked during a READS informational read aloud. Since each teacher in the subsample had one informational lesson recorded, each read aloud reflects a unique teacher. N refers to the number of teachers in the sample who asked the designated question category. The mean refers to the average number of that question category asked per read aloud and was calculated using all 34 lessons in the denominator. The Min and Max refer to the lowest and highest number of the identified question category asked per read aloud in the sample. The Mode refers to the number of each question category that was asked most often.

Almost all of the 34 teachers in the sample asked both low- and high-level spontaneous comprehension questions during their read alouds although there was tremendous variation in how many of each question type teachers asked. Teachers asked an average of 5.6 low-level comprehension questions per read aloud with some teachers asking
none of their own low-level questions while other teachers asked as many as 21. This data is skewed to the right with only 4 teachers in the sample asking 14 or more low-level questions and the majority of teachers asking 1-10 low-level questions. Given the research on teacher implementation and the large variation of teacher read-aloud styles (Martinez & Teale, 1993) such a large variation is unsurprising.

Table 11. Descriptive Statistics for Teachers’ Spontaneous Low- and High-level Comprehension Questions

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
<th>Mode</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-level</td>
<td>32</td>
<td>5.6</td>
<td>0</td>
<td>21</td>
<td>2</td>
<td>189</td>
</tr>
<tr>
<td>High-Level</td>
<td>29</td>
<td>3.6</td>
<td>1</td>
<td>13</td>
<td>1</td>
<td>122</td>
</tr>
<tr>
<td>Rhetorical</td>
<td>21</td>
<td>5.2</td>
<td>0</td>
<td>24</td>
<td>0</td>
<td>178</td>
</tr>
<tr>
<td>Total text-related Questions</td>
<td>34</td>
<td>14.4</td>
<td>2</td>
<td>56</td>
<td>489</td>
<td></td>
</tr>
</tbody>
</table>

The number of spontaneous high-level questions teachers asked also varied although not as much as spontaneous low-level questions. Teachers asked an average of 3.6 spontaneous high-level questions, with a range of 0 to 13 and a median number of 2. Rhetorical questions had the most variation, both in number and the number of teachers who asked this type of question. 13 teachers in the sample asked no rhetorical questions at all. Those who did ask rhetorical questions varied greatly in the number they asked, which ranged from 1 to 24.

When looking at the ratio of low- to high-level spontaneous questions, teachers on average asked more low-level questions than high-level questions. Given the research on teachers’ tendency to ask low-level questions, a ratio that favors low-level questions was expected. Of note, the READS comprehension questions, which are based on the NAEP
guidelines, reflect a different ratio in that there are approximately twice as many high-level questions provided as low-level questions.

*Scaffolding Functions of Teachers’ Spontaneous Low-Level Comprehension Questions*

All the spontaneous, low-level comprehension questions teachers asked during the read aloud asked students to recall or garner literal information. The following sections present findings related to the in-depth analysis on the scaffolding functions of teachers’ spontaneous low-level questions. The first section discusses the scaffolding functions of the six categories of low-level questions identified in this study: Immediate Verbatim Recall, Immediate Information recall, Delayed Verbatim Recall, Delayed Information Recall, Prior Knowledge Recall, and Text Features questions. A subsequent section discusses low-level questions that were housed in questioning episodes with high-level questions and thus served a secondary literacy scaffolding function of providing support for high-level thinking.

Table 12 presents descriptive statistics for each of the six categories of low-level questions. The first column (N) represents the number of teachers who asked at least one of the indicated question type. Max, Min, Mode and Mean refer to the number of questions asked in each read aloud. The mean was calculated using all 34 lessons in the denominator.

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
<th>Mode</th>
<th>Total</th>
</tr>
</thead>
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Recall questions were the most commonly asked category of low-level questions. The most common subcategories of recall questions were Immediate Verbatim and Delayed Verbatim recall questions with teachers asking twice as many Verbatim questions as Information recall questions. Because recall questions focus on retrieving facts and information, the primary function of all recall categories reflected scaffolding for content knowledge. The amount and particular way each type of low-level recall question provided interactional scaffolding is presented below. In all excerpts, words read aloud from the text are italicized.

**Immediate Verbatim Recall Question**

Immediate Verbatim recall questions were questions that asked students to recall verbatim a recently read word or phrase from the text.

**Teacher:** “...These are its claws called talons.” (text)

**Teacher:** They’re called what?

**Child:** Talons.

**Teacher:** Talons and they are like eagles.

**Teacher:** Excellent. (19203982)

Some immediate verbatim recall questions asked students to repeat a longer phrase such as in the following example:

**Teacher:** During the second World War Helen Keller visited injured soldiers in hospitals. Her visits meant a lot to the soldiers. Many of them had been blinded or had lost their hearing in the fighting. Helen Keller brought them hope. They would try to lead useful lives despite their handicaps just like Helen Keller.

**Teacher:** How did the soldiers that she’s visiting lose their sight or hearing, child A?

**Child:** They were in a fight.

**Teacher:** Right from the war. They were fighting. (26801202)
This category of recall questions appeared to be the least reflective of interactional scaffolding, both because of the lack of contingency and because of cognitive task involved in answering the question. As illustrated by the above examples, the majority of Immediate Verbatim recall questions were embedded in the traditional Initiate–Respond-Evaluate (IRE) format in which a teacher ends the exchange with an evaluation of a student’s answer. Because recall questions ask students to repeat verbatim what is in the text they have a defined right or wrong answer and so are more likely to encourage this kind of evaluative response.

One teacher’s comment to her students suggests an additional function of this type of recall question was to assess whether students were paying attention:

**Teacher:** Remember I ask you questions to check your listening skills, and so far some of you have shown me you’re not listening as well so I need you to get your ears turned on and listen better for the rest of the story ‘cause I’m gonna be asking you questions all throughout. (22001005).

**Immediate Information Recall Questions**

Immediate Information recall questions ask students to recall facts or information shortly after they were read in the text but without restating a particular word or phrase. Similar to Immediate Verbatim questions, these questions were most often asked in reaction to information in the text rather than in reaction to a student’s response. These types of questions tended to offer more scaffolding for content learning than Immediate Verbatim recall questions, however, because rather than encourage repetition of words they require students to synthesize information before expressing it in their own words. Another difference between these two types of recall questions is that, while Verbatim recall
questions were inherently closed questions, Information recall questions reflected a variety of forms, including yes/no, closed, and open-ended. Yes/no immediate information questions provided the least amount of scaffolding for content learning because the question form created a more passive thinking experience on the part of the student, such as in the following example from *Tornado Alert*.

**Teacher:** *When there's a tornado there is also thunder and lightning so keep away from metal things and from anything that uses electricity. Lightning can travel along metal pipes and also along electric telephone wires.*

**Teacher:** “So should you talk on the phone while there's a tornado?”

The yes/no format limits answers to one of two possible choices. Given that the two answers are diametrically opposed, these kinds of questions tend to have an obvious correct answer. Therefore, even though the teacher is not asking students to simply repeat a word or phrase, the form of the question creates a situation where most of the thinking is being done by the teacher, not the student, and thus provides little scaffolding for content learning.

Information questions that were open-ended, on the other hand, provided more interactional scaffolding for content knowledge acquisition because the form of the question encouraged more student participation in processing of information. Oftentimes open-ended Information questions asked students to paraphrase a large section of information that was just read, such as in the following example from *Owls*:

**Teacher:** *When the young owls are about five months old they are able to live on their own. Years ago there were many more owls in the world than there are today. People killed owls to protect the smaller livestock. Farmers and others used chemicals to protect the crops plants and trees from insects. Also the natural habitats were destroyed as people moved into the wilderness areas.*

**Teacher:** “So what’s happened to owls?”

**Child:** They got killed of the people. (26401442)
Paraphrasing of text fragments offers more interactional scaffolding for content knowledge acquisition because students are not just repeating information but also manipulating it, even if on a literal level. This addition of manipulation of information is a key distinction between short-term and working memory. With short-term memory reflects the storage of information while working memory reflects both the storage or and manipulation of information (Baddeley, 1983). Importantly, working memory, because there is active processing as opposed to just temporary storage of information, has a stronger connection to long-term memory.

*Delayed Verbatim Recall Questions*

Delayed Verbatim recall questions ask students to recall a particular word or phrase stated in the text but from an earlier passage. Similar to Immediate Verbatim questions, most Delayed Verbatim questions were phrased as closed-ended questions and asked students to respond with a one-word or one-phrase answer such as in the following example from *Helen Keller*.

**Teacher:** Ann Sullivan taught Helen to read by feeling patterns of raised dots on paper.

**Teacher:** What did we say that was?

**Children (multiple):** Braille. (21803982).

Although this type of recall question was comparable to Immediate recall questions in the type of answer it encouraged, the delayed timing of these questions provide a greater degree of scaffolding for content knowledge acquisition because they require a more active retrieval of information on the part of the student. In their model of human memory, Atkinson & Schiffrin (1971) describe the limitations of short-term memory and working memory as holding no more than 7 items and lasting approximately 15 to 30 seconds.

Delayed Verbatim questions were asked approximately 2 to 10 minutes after the answer was
read in the text so students need to use retrieval cues for information already stored in what Ericsson and Kintsch (1995) refer to as long-term working memory, an intermediary connection between short- and long-term memory. Importantly, vocabulary is not stored as isolated words but rather as part of a three-dimensional conceptual representation network (Fitzgerald et al., 2017). Therefore, asking students to recall the word “braille” several pages later might produce the same amount of child talk as an Immediate Verbatim question, but stimulates different levels of thinking.

**Delayed Information Recall Questions**

Delayed Information recall questions, similar to Immediate Information questions, ask students to recall information with a time delay but do not request a particular word or phrase from the text. This category of recall questions, because it is delayed, encourages retrieval from recall stored (long-term working) memory rather than short-term memory. But because it is not a Verbatim recall question, it also encourages students to manipulate information in order to answer it. For example, toward the end of one Owls read aloud when a teacher had asked students to review some of the important information they learned, she asked them, “How do they eat?” which had been described many pages earlier. A student responded, “like they eat it head first and then if it’s too big like to eat they shred it.” (21201528). Similar to Immediate Information questions, the form of these questions played a role in the level of active processing a question encouraged.

**Prior Knowledge Low-Level Questions**

Some teachers, less than half the sample, asked spontaneous Prior Knowledge questions, questions that required students to recall facts from their own background knowledge rather than from the text. Many prior knowledge questions related to definitions of vocabulary words that were in the text but not explicitly defined. Some vocabulary
questions were central to the topic of the read aloud such as with Owls, “What does nocturnal mean?” (27102106). Other vocabulary questions were less specific to the book’s topic. For example, in Helen Keller the author describes Helen locking her teacher in a pantry, and one teacher asked, “Who knows what a pantry is?” (21803982). The latter example supports comprehension only in relation to that particular passage and the word is not strongly related to content knowledge. In comparison, the word nocturnal strongly related to the domain-specific topic of owls. Therefore, while both questions can be seen as reinforcing vocabulary knowledge, the example from Owls more strongly reflects scaffolding for content knowledge related to the read aloud.

Sometimes Prior Knowledge questions were asked as a way to connect information from the text with related subjects or shared experiences. For example, after one teacher read that owls “have thick eyelids called nictitating membranes that protects them from and keeps their eyes clean” she asked her students, “Who can think of another animal that has those eyelids that go over?” to which one child responded “Alligators” and another child responded “Snakes.” (27102106). Some Prior Knowledge questions made connections between more distant topics. After reading, “The Barn owl may weigh only three-quarters of an ounce,” for example, another teacher asked her students, “Anybody remember how much we said a paperclip may weigh?” (19801151).

In both examples the teacher is scaffolding students’ development of content knowledge in two ways. First, these questions support comprehension of the topic at hand by highlighting connections within content networks. By asking the Prior Knowledge question about the weight of a paperclip, the teacher draws on a more familiar reference and its weight, one they have supposedly actually held, to help them understand just how little an owl can weigh. By making these connections between the known and unknown, in terms of
personal experience, she is supporting not just content-specific knowledge about owl characteristics, but also strengthening the three-dimensional concept network of weight and measurement.

The second way these questions provide scaffolding for content knowledge acquisition, and reading comprehension in general, is by the act of modeling these connections. Making connections between one’s prior knowledge and new information is an essential and well-documented aspect of the reading comprehension process of good readers. This type of question reinforces the fact that content learning is not a unidirectional process in which knowledge is transmitted from the text to the student, but rather a co-construction of meaning and understanding (Spires & Donley, 1998). By asking Prior Knowledge questions, the teacher not only makes explicit and visible this desired act of making content connections, but the interrogative form invites students to participate in that thinking.

Some Prior Knowledge questions asked students to recall a personal experience rather than a fact or information. For example, in Tornado Alert, after the text describes places people should go to be safe during a tornado, one teacher asked, “Where have some of you guys been to be safe?” (22501104). Similar to the examples above, these questions make a connection between information in the text and background knowledge, in this case knowledge rooted in experience. Researchers have highlighted the unique contributions students’ personal experiences have toward student comprehension and engagement of reading in addition to prior knowledge that is domain specific (Marzano, 2004; Spires & Donley, 1998).

Although Prior Knowledge questions do not reflect the typical definition of motivational scaffolding, these questions do carry an affective element in terms of creating
relevance. Relevance is a construct associated with intrinsic motivation because it “enable(s) students to see the connection between school reading and ‘real life’ out of school” (Guthrie, McRae, & Klauda, 2007). Spires and Donley (1998) describe attending to relevance as particularly motivating with informational texts since “view(ing) information reading through the lens of personal experience and exploration may help students construct a more lively and engaging relationship with the text, which in turn may help them attend to and possibly persist with the reading task” (p. 250).

*Text Feature Questions*

Text Feature questions were ones that asked students to name or garner information from a visual text feature such as a photograph, illustration or diagram. With some types of Text Feature questions the text feature itself was the primary purpose of the question. Since these were low-level questions, this type of Text Feature question primarily asked students to recognize or define a text feature such as when the teacher pointed to a timeline and asked, “Anybody know what this is?” At times, these identification questions, as will be discussed in a later section, served as a stepping stone for higher-level questions that asked students about the purpose and function of text features.

Some Text Feature questions were similar to Prior Knowledge questions in that, while the photograph or visual was the source of the information, they also required students to call on their background knowledge of concepts. The following exchange about *Owls* illustrates both types of Text Feature questions: the first question asks students to use their background knowledge to identify the animal the owl is holding in the picture while the second question asks students to recall a vocabulary word read earlier in the book.

**Teacher:** What are these?
**Child:** Snakes.
**Teacher:** He’s got a snake.
Teacher: What’s he holding them in?
Child: His talons.
Teacher: Talons, yeah. (22401635)

One of the reasons Text Feature questions provide scaffolding for content knowledge is that they combine content information with a visual. The question, “What’s he holding them in?” encourages recall of a domain-specific vocabulary word, but by using an image to spark the retrieval of this word the teacher is creating a more three-dimensional experience of the vocabulary word. In contrast to Prior Knowledge questions that supported horizontal connections across topics, that is the expansion of concept networks, Text Feature questions can be seen as supporting vertical depth of a concept by enhancing the three-dimensional representation of a singular topic or fact.

In addition to providing scaffolding for understanding particular content topics or facts, Text Feature questions also model and get students to participate in this important behavior of garnering information from a visual to complement reading of the text. The inclusion of multiple sources of information is one of the prominent features of information text. Learning how to use both sources of information is an important reading behavior to reinforce through read alouds (Fisher, Frey, & Lapp, 2008).

Scaffolding for High-Level Questions

Some low-level questions were part of a questioning episode that included a high-level question, either scripted or spontaneous, and had a secondary scaffolding function of providing support for high-level thinking. Three categories of relationship functions with high-level questions were identified: Launching, Platform and Elaboration. Table 13 presents descriptive statistics for each type of question.
Table 13. Descriptive Statistics for Categories of Low-Level Questions in a Low-High Questioning Episode

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**Launching Questions**

Launching questions were questions asked before a high-level comprehension question and related to that question in content. In the following example from an *Owls* read aloud a teacher asked students to recall the different senses owls have before asking the scripted high-level question, “How do owls’ strong senses help them?”

**Teacher:** What are those senses, Child C, that we’ve talked about so far?

**Child:** How they hear.

**Teacher:** Their hearing and what else?

**Child:** How they see.

**Teacher:** I wanna know how their senses help them?

The question, “What are those senses?” which is a Delayed Verbatim recall question, already serves a content knowledge scaffolding function by getting students to retrieve information from their working long-term memory. This retrieval of information, however, also serves a scaffolding function for the upcoming high-level question. By first asking student to name the senses, students have retrieved their networks related to this topic before she asks the scripted high-level “How” question. Therefore, Launching questions can be seen as asking about the “what” before the “how” or “why”, solidifying the foundation on which a high-level question can stand.

The following excerpt includes a Launching question that was asked before a spontaneous rather than scripted high-level question.

**Teacher:** Does anybody recall what these words right beside the illustration are called Child E?
Child: Captions.

Teacher: Captions. Very good.

Teacher: What does a caption do when you’re reading a story? How does it help you to learn more about what you’re reading about, Child M?

While the low-level before high-level questioning pattern is the same, it is beyond the data to know whether the teacher was intentional about this sequential order or whether asking a follow-up high-level question occurred to her in the moment.

Platform Questions

Platform questions were also asked in low-high questioning episodes but they came after, not before, a high-level question. Platform questions were the most commonly asked low-high question with 62% of the sample asking at least one platform question during their read aloud and some teachers asking as many as seven. Platform questions also most strongly exemplified the contingency aspect of scaffolding, because they were follow-up questions asked in direct response to a student’s comment or question or lack thereof (Wood et al., 1978). Platform questions, because they reflect a reduction in cognitive load and a review of literal information, reflect scaffolding as increased support.

The scaffolding function of some Platform questions was to provide support for the previously asked high-level question by reinforcing related literal information. One excerpt from a Helen Keller read aloud discussion demonstrates the function of this type of scaffolding platform question in the context of math.

Teacher So how old was Helen?

Teacher Do you remember when she was born?

Child: 1880.

Teacher: '80. And if it's 1887 how old was she?

Child: Seven.

Teacher Seven, all right. (23203445)
The teacher’s original question, “How old was Helen?” is a high-level one in that it requires students to think beyond the stated facts of the text, which had only given the date she was born and the current year of 1887. When there was no response, the teacher asked a low-level recall question, “Do you remember when she was born?” to reinforce the literal fact this inferential question is based on. She then did what a number of teachers did when asking a Platform question, she pushed the student’s thinking back up by repeating the original high-level question, “So how old was she?”

This same type of Platform question occurred in a number of Helen Keller read alouds when students had difficulty answering the scripted high-level question, “Why do you think Helen Keller called the day she met Ann Sullivan her soul’s birthday?” Several teachers responded to students’ incorrect or lack of an answer with a supportive low-level platform question, as in the following example.

**Teacher:** So why do you think Helen Keller called this day her soul birthday? Why do you think she said that Child E?

**Child:** Cause.

**Teacher:** Well what happened on that day? She got a new what? Child N?

**Child:** Teacher.

**Teacher:** She got a new teacher and the teacher helped her do what?

**Child:** Taught her to spell.

**Teacher:** Spell words where?

**Child:** In her hand. I think reading [indistinguishable talk].

**Teacher:** Okay, that could be possible. Child A, why do you think she called it her soul birthday?

**Child:** Because she was going to see again and she was going to learn how to talk, like language.

(26301444)

Similar to the math example above, this teacher’s Platform questions get students to revisit the literal events in a text to provide more solid ground on which to think inferentially.
Occasionally a Platform question was asked after a high-level question but did not as
strongly reflect the quality of contingency since it was not asked in response to a student’s
answer or apparent need for support. The following exchange with the same scripted high-
level question from Helen Keller exemplifies a Platform question that is asked preemptively
rather than in direct response to a student’s answer.

**Teacher:** Why did Helen call the day that she met Anne Sullivan her soul’s birthday?
**Teacher:** Who was Anne Sullivan, child T?
**Child:** The person she knew.
**Teacher:** Who is she to her though?
**Child:** Teacher.
**Teacher:** Okay so why does she call the day she met her teacher her soul’s birthday, child Y?
**Child:** Because Anne Sullivan knows how to talk when you’re deaf and knows how to talk when
you’re blind. (26801202)

Some Platform questions, rather than providing direct support for the thinking
involved in answering a high-level question, served the function of strengthening content
knowledge related to a high-level question. In the following exchange from an Owls read
aloud, the teacher follows up a spontaneous high-level question with the Prior Knowledge
low-level question.

**Teacher:** I wonder why (owls) don’t live in Antarctica?
**Child:** It’s cold.
**Teacher:** It’s too cold.
**Teacher:** What kind of birds do we know live there?
**Child:** Penguins.
**Teacher:** Yeah. They’re so different from owls. (19203982)

The Prior Knowledge follow up question, “What kind of birds do we know live
there?” arguably does not provide scaffolding for the previously asked high-level question
because understanding of one question does not support the other. By asking students to
name types of birds that do live in Antarctica, however, the teacher is creating a compare/contrast example that supports the domain knowledge of habitats. Therefore, while this question may not support specific understanding of owls, it does support and reinforce the multi-layered and extended network of complex science concepts (Fitzgerald et al., 2017).

*Elaboration Questions*

Elaboration questions had similar characteristics of contingency as Platform questions in that they were asked in direct response to students’ answers. Rather than review related literal information, however, these questions encouraged students to give a more specific or complete response. For example, in a discussion about *Owls*, a student responded to the scripted high-level comprehension question, “What steps do you think should be taken to protect owls?” by saying, “keep them in a safe place,” and the teacher responded with the question, “A safe place like what?” The following exchange shows a teacher using Elaboration questions to encourage both greater specificity and additional information.

**Teacher:** And so child A why can tornados do so much damage?

**Child:** That's easy. I think it's because they can't control their selves?

**Teacher:** Well yeah no one knows where they're really going to go ....

**Teacher:** …Child V?

**Child:** Because they're the most powerful storms.

**Teacher:** They are very powerful storms and do you remember how fast some of the winds can go?

**Child:** 200.

**Teacher:** Up to 300 miles per hour. (20303983)

The answer “they’re powerful storms” is an accurate, albeit not detailed, answer to the scripted high-level question, “Why can tornadoes cause so much damage?” By following
up this response with a Delayed Verbatim question about the speed of the tornado, the teacher helps the student to recall a fact that shows just how powerful the winds can be. The scaffolding function of this question then lies in getting the student to not just retrieve information but to use it as a detail that exemplifies the more general statement. “Powerful” is a large and abstract term whereas 300 miles an hour, even if the teacher needed to correct the student’s original answer, leaves students with a better and more specific visual image to which they can attach their memory of just how powerful a tornado can be. A less frequent type of Elaboration question was one that was open-ended such as when a teacher asked at the end of an Owls read aloud, “Can you give more details about their hearing, child M?” Rather than asking a question that narrows the response to a few words or a phrase, this Elaboration question encouraged students to simply offer more ideas.

**Teachers’ Rhetorical Questions**

Similar to previous research that examined teacher questioning, rhetorical questions were defined as questions that were interrogative in form and related to the text but did not seem to genuinely request or elicit a response. Five functions of rhetorical questions were identified from the data: Providing Information, Extending Students’ Responses, Attending to Text Features, Encouraging Personal Reflections, and Stimulating Prior Knowledge.

Table 14 presents descriptive statistics for teachers’ rhetorical questions followed by a more in-depth description of the scaffolding function of each question category. Table 14 is followed by a more in-depth description of the scaffolding functions of each type of rhetorical question. The Mode, which is not presented in this table, was zero for each question category.
Table 14. Descriptive Statistics of Teachers’ Rhetorical Questions

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<tr>
<td>Stimulating Prior Knowledge</td>
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<td>0</td>
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<tr>
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<td>21</td>
<td>5.2</td>
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<td>24</td>
<td>178</td>
</tr>
</tbody>
</table>

Rhetorical questions were seen in only a portion of the sample, with 13 teachers asking no rhetorical questions at all. Of the 21 teachers who did ask rhetorical questions, the most frequently asked types of rhetorical questions were Attending to Text Features, which served the purpose of directing students’ attention to a visual feature of the text such as a photograph or diagram, and Providing Information questions, which emphasized or provided information. Also notable was the variety of rhetorical questions these teachers asked. That is, teachers who did ask rhetorical questions tended to ask a number of different types of rhetorical questions throughout the read aloud. Additional analysis examined the different scaffolding functions of each type of rhetorical question as identified in the study. The amount and particular way each type of rhetorical question provided interactional scaffolding is presented below.

Providing Information

Providing Information questions provided a minimal amount of scaffolding, literacy or motivational, since they were primarily statements masked as questions with the apparent purpose of providing or emphasizing information. Some Providing Information questions functioned as a way for the teacher to provide the actual correct answer as in the following...
example from Owls when the teacher is reviewing information students learned from the book.

**Teacher:** They all have toes. What kind of toes?
**Child:** Like sharp.
**Teacher:** Yeah. They’re called talons, right? (22401635)

Even though the child’s answer is correct, in that an owl’s toes are sharp, her feedback in the form of a rhetorical question reflects the fact that she was looking for the more precise vocabulary word “talons” instead of claws. Rather than returning the thinking to the student by asking a recall question such as, “And what are those sharp claws called?” the teacher simply gives the information. Many Providing Information questions, such as the one above, often ended with phrases such as “...right?” or “…doesn’t it?” which give an implicit suggestion of agreeing with the speaker. By housing the information in a question ending in “right?” the teacher can emphasize a fact or term students should know while remaining in control of the conversation. This type of Providing Information does have an element of contingency, since it is said in reaction to a student’s answer. What is lacking, however, in terms of interactional scaffolding is a level of support since the rhetorical question is used as a way to simply provide the more precise.

Sometimes a Providing Information question was asked in response to text read as a way to condense information or make a comment about what was read, such as in the following example from a Tornado Alert read aloud:

**Teacher:** “If you are out in the country in the car don’t try to race a tornado. Get out and find a ditch to lie in.”
**Teacher:** You know there's some people who race tornadoes and drive beside 'em and stuff like that? (25501104)

Offering related or interesting information during a read aloud is one way teachers contribute to read alouds discussions. Reynolds and Goodwin (2016), in fact, point to
providing relevant background as a type of comprehension scaffolding because it can support student’s understanding of a text.

*Extending Student Responses*

Extending Student Responses questions were rhetorical questions that were asked as a way of extending a student’s original answer. These questions had a similar characteristic as Providing Information questions of offering or emphasizing information except there was an explicit connection to or elaboration of a student’s contribution. For example, at the end of an *Owls* read aloud when students are responding to the scripted high-level question, “What steps do you think should be taken to protect owls?” one child says, “Put it against the law,” to which the teacher responds, “If we put against the law that we do not kill the owls then maybe we’ll keep more, right?” (21001104). In this example the teacher repeats the student’s response and then adds information related to the originally asked question.

This question functions as a type of literacy scaffolding because the teacher’s response elevates or adds to a student’s answer or comment, either by using more academic language or by more fully explaining an idea. Because an Extending question incorporates the student’s originally stated response, there is an additional element of motivational scaffolding. Boyd and Rubin (2006) identify repeating and extending a student’s ideas as reflective of an ethos of involvement and respect because it acknowledges the significance of the student’s contribution. Additionally because these questions are comprised of both student and teacher ideas, they can be seen as reflecting one of the purposes of read alouds which is the co-construction of meaning.

*Attending to Text Features*

Attending to Text Features questions were rhetorical questions that directed students’ attention to a visual text feature such as an illustration or diagram. For example, in
a Tornado Alert read aloud a teacher asked, “So do you see where the cold air meets the warm air?” referring to a diagram of how a tornado is created (25501104). This category of rhetorical question provided literacy scaffolding for both content learning and for reading informational text in general. The first function of supporting content learning relates to Van Dijk and Kintsch’s (1983) situation model of reading, which reflects the idea that optimal comprehension exists when there is a mental representation of information. In the above example the teacher makes an explicit connection between the information that describes the formation of a tornado and the related visual in which this same information is illustrated. As such, even though this question does not elicit or encourage an actual answer, it uses both the oral and visual information provided by the text to enhance a mental representation.

This Attending to Text Features question exemplifies a secondary scaffolding function of modeling the desired reading behavior of attending to text features. Calling on both pictures and words helps readers to better comprehend, organize, store and remember that information (Duke & Pearson, 2008). In their description of effective read aloud practices, Fisher, Frey & Lapp (2008) emphasize the importance of teachers modeling attempts to access supportive information through the visuals that are provided by a text. Although low-level Text Feature questions also model attention to text features, the rhetorical nature of Attending to Text Features has the added element of including students in the reader experience. Rather than asking a comprehension question about a text feature, the above question can be seen as mimicking the internal speech affiliated with this desired behavior of attending to text features while reading.
Encouraging Personal Reflections

Encouraging Personal Reflections questions were rhetorical questions that modeled or encouraged students to reflect on a personal connection, reaction or experience related to the text. In an *Owls* read aloud, for example, after a teacher read a passage about how an owl’s hearing is so strong it can hear a mouse, a teacher asked, “How many of you can hear the footsteps of a mouse?” (27801884), which carries an implied statement that an owl’s hearing is much stronger than a human’s. This question sets up a compare and contrast scenario between the students themselves and owls. Although this question can be seen as supporting content knowledge by heightening students’ understanding of how sensitive an owl’s hearing is, the greater scaffolding function lies in its motivational aspect. Goldenberg (1993) points out the role conversational language can play in relation to student engagement and motivation in read alouds when balanced with more intentional academic guidance: “On the one hand, (read alouds) are instructional in intent, that is they are designed to promote learning...(but also) conversational in quality—they appear to be natural and spontaneous interactions, free from didactic characteristics normally associated with formal teaching” (p. 319).

Sometimes the personal experience this type of rhetorical question encouraged was hypothetical in nature. In a *Helen Keller* read aloud, for example, a teacher asked her students, “Can you imagine how hard that would be losing, just like losing your sight and hearing after you’ve had it?” (22301154), while a different teacher with the same book asked her students, “what if you were around someone who all day long didn't understand a thing you said?” (23203445). These questions encourage students to put themselves in the position of Helen Keller which can be seen as scaffolding students’ perspective taking, that is the ability to consider information or experience from another’s point of view. Perspective taking has
been found to positively contribute to student performance on reading comprehension measures (Gardner & Smith, 1987; LaRusso et al., 2016). Given the shared characteristic of having a protagonist, Biography texts are a more natural context in which to do this perspective taking, however, students benefit from purposeful perspective taking with scientific texts as well.

A second type of Encouraging Personal Reflections question that was identified from the data was a question in which teachers demonstrated their own personal reaction to the text, such as when a teacher read a passage about owlets swallowing food whole at only two weeks old and asks, “Isn’t that funny, as tiny as they are they can swallow their food whole?” (22401635). This type of rhetorical question is similar to a think-aloud technique in which a teacher makes visible the thoughts that occur to her as she reads (Harvey & Goudvis, 2007; McKeown & Gentilucci, 2007). In this example, the teacher is modeling a desired reading behavior of being aware of one’s own personal reactions to information as one reads.

**Stimulating Prior Knowledge**

Stimulating Prior Knowledge questions were ones that reminded students about a previous experience related to the read aloud. For example, in an *Owls* read aloud when a teacher is reading a passage that describes how an owl eats and what an owl pellet is, she says, “We looked at owl pellets. Remember last year?” (22401635). Most often these questions related to class experiences so the teacher knew these were part of children’s schema. Rather than ask students to think about a time they saw owl pellets, she simply reminds them that they did.

Sometimes a Stimulating Prior Knowledge question related to commonly shared experiences that were outside classroom or school experiences. In the following exchange,
for example, a teacher just finished reading a passage about tornado warnings that inform people to get to a safe place.

**Teacher:** Where have some of you guys, we've had tornado watches and warnings, right? Where have some of you guys been to be safe? Quiet. Here Child N, where did you go?

**Child:** I go to my grandma's basement 'cause my grandma, she has a basement like that and the there's one for a tornado so it goes all way the down. (22501104).

The teacher first uses a rhetorical question to remind students that they have had tornado watches and warnings before actually asking students a personal connection question about where they have gone to be safe. So first she establishes the fact that students have the prior experience mentioned in the text and then asks a comprehension question related to that experience.

Stimulating Prior Knowledge questions align with Wood’s (2003) description of “reminding” as a scaffolding function. Reminding, he states, helps “children to develop a strategy of reasoning by analogy from past experience and to appreciate that they have relevant knowledge” (p. 11). Although his description relates to supporting young students with early reading skills in a one-on-one tutoring context, his description of how reminding provides a type of scaffolding is applicable to the Stimulating Prior Knowledge questions above. Reynolds and Goodwin (2016) also point to “activating background knowledge” as a type of literacy scaffolding, which further corroborates the idea that even though the form of the question is rhetorical, it can still provide a scaffolding function, particularly in the context of informational text where background knowledge is a critical factor in comprehension.

Stimulating Prior Knowledge questions also reflect a motivational aspect. When readers make connections between their own lives and concepts or ideas in the text, they are more likely to be engaged readers (Deci, 1992; Gambrell, 2011; Guthrie et al., 2007). Therefore, even when a question is not interrogative in function, it can still create personal
connections and relevance for students. Since informational texts tend to be more removed from students' everyday life compared to narrative text (Graesser, McNamara & Louwerse, 2003), this function of creating relevance is particularly important with this genre.

**Associations between Numbers of Spontaneous Low- and High-level Questions**

As mentioned previously, preliminary analysis that examined the association between the frequency of teachers’ spontaneous low-level and high-level questions indicated a strong relationship \((r=0.55 \ p<0.005)\) between these two categories of questions. So teachers who asked many of their own high-level comprehension questions during the read aloud also tended to ask many of their own low-level questions. Conversely, teachers who asked fewer spontaneous high-level questions tended to ask fewer spontaneous low-level questions.

A second analysis examined whether there was any association between frequency of asking spontaneous high-level questions and frequency of asking certain types of low-level questions. Since asking spontaneous high-level questions is a desirable trait in read alouds, did teachers who ask more high-level questions ask particular types of low-level questions? One hypothesis was that there would be a stronger association between frequency of high-level questions and frequency of low-level questions that exhibited more evident characteristics of interactional scaffolding.

As shown in Table 15, there was a moderately strong, positive correlation between number of high-level questions and four categories of low-level questions: Delayed Information Recall questions \((r=0.50, \ p<0.005)\), Prior Knowledge questions \((r=0.46, \ p<0.005)\), Text Feature questions \((r=0.63, \ p<0.005)\) and Platform Questions \((r=0.55, \ p<0.005)\). The correlation matrix in Table 15 presents means, standard deviations, and correlation coefficients between the nine categories of low-level questions and frequency of high-level questions.
Table 15. *Correlation Matrix showing Pearson’s r between Total Number of Teachers’ Spontaneous Low- and High-level Questions*

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<th>10.</th>
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<tbody>
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<td>1. High-level Questions</td>
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<td>2. Immediate Verbatim</td>
<td>-0.29</td>
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<tr>
<td>3. Immediate Information</td>
<td></td>
<td>0.52*</td>
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<tr>
<td>4. Delayed Verbatim</td>
<td>0.32</td>
<td>0.07</td>
<td>0.09</td>
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<tr>
<td>5. Delayed Information</td>
<td>0.50**</td>
<td>-0.16</td>
<td>-0.26</td>
<td>0.34</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Prior Knowledge</td>
<td>0.46**</td>
<td>-0.10</td>
<td>0.15</td>
<td>0.26</td>
<td>0.24</td>
<td></td>
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<tr>
<td>7. Text Feature</td>
<td>0.63**</td>
<td>-0.10</td>
<td>-0.08</td>
<td>0.15</td>
<td>0.47</td>
<td>0.63*</td>
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<tr>
<td>8. Launching</td>
<td>0.14</td>
<td>0.35*</td>
<td>0.30</td>
<td>0.78*</td>
<td>0.08</td>
<td>0.42*</td>
<td>0.19</td>
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<tr>
<td>9. Platform</td>
<td>0.55**</td>
<td>-0.03</td>
<td>-0.13</td>
<td>0.41*</td>
<td>0.82*</td>
<td>0.14</td>
<td>0.29</td>
<td>0.06</td>
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<tr>
<td>10. Elaboration</td>
<td>0.16</td>
<td>0.41*</td>
<td>0.07</td>
<td>0.23</td>
<td>0.25</td>
<td>-0.05</td>
<td>0.36*</td>
<td>0.28</td>
<td>0.24</td>
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* = (p<0.05), ** = (p<0.005)

**Associations between Amount of Child Talk and Teachers’ Spontaneous Low-level Questions**

Examining associations between type of low-level question and resulting student talk stems from classroom discourse research, which indicates the amount and type of student talk questions produce is an important feature of their value (Cazden, 2001). Because talking is an active form of processing ideas, it has repercussions for cognition, engagement and motivation (Guthrie, 2011; Kucan & Beck, 2003; Lutz, Guthrie, & Davis, 2006). Although there is consensus that high-level questions tend to produce longer and more complex student utterances than low-level questions, this study examined whether the variation that existed within the category of low-level questions might impact resulting student talk. Since the scaffolding function of low-level questions was focused on content knowledge acquisition and not necessarily promoting elaborated student talk, one hypothesis was that
any affect on resulting student talk would be negligible. Preliminary qualitative observations of the data, however, indicated that Verbatim recall questions often led to shorter responses than Information recall questions that encouraged student to paraphrase ideas in their own words. As described previously, the form of a question appeared to also strongly affect the length of students’ responses, suggesting the form of the question might also be a factor in the relationship between type of low-level question and amount of student talk.

Table 16 presents the correlation matrix for associations between type of low-level question and child talk as measured by total amount of words spoken by children collectively. I also examined associations between frequency of high-level questions and total comprehension questions (high and low together) against child talk. Previously identified correlations between variables are presented above in Table 15.

Table 16. Correlations Showing Pearson’s r between Words by Child and Types of Low-level Questions

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<tbody>
<tr>
<td></td>
<td>0.28</td>
<td>0.09</td>
<td>-0.04</td>
<td>0.03</td>
<td>0.30</td>
<td>0.38*</td>
<td>0.40*</td>
<td>0.42*</td>
</tr>
</tbody>
</table>

* = (p<0.05), **=(p<0.005)

Results of pairwise correlations showed significant, moderately strong positive correlations between child talk and Prior Knowledge questions (r=0.38, p<0.05) as well as Text Feature questions (r=0.40, p<0.05). Surprisingly, these correlations were larger than the correlation between number of spontaneous high-level questions asked and resulting child talk (r=0.28) since high-level questions have typically been associated with longer student responses than low-level questions. Table 17 offers an additional view of the data in relation to student talk by presenting three different teacher responses to the same scripted high-level question from the Owls read aloud.

Table 17. Excerpts of Transcripts with the Same READS Comprehension Question
In the first example, which engendered the least amount of child talk, the teacher followed up students’ responses with only low-level questions. In the second example, the teacher followed up with Participation questions, questions that encouraged additional responses. In the final example, which produced the most student talk, with 51 words, the teacher asked a high-level open-ended question in addition to a Participation question. Although Participation Questions, which encouraged students to say more or encouraged multiple ideas, were not included in the main analysis of this study, the above examples highlight their role in encouraging student talk in addition to the type and form of question.
CHAPTER 5: DISCUSSION AND EDUCATIONAL IMPLICATIONS

With the recent emphasis on elementary students reading more informational and grade-level text, an important question educators are asking is how can we support students in comprehending complex texts? While planned scaffolding such as provided comprehension questions may offer support for teachers in asking questions that reflect a range of cognitive levels, teachers’ responsive interactional scaffolding is an essential aspect of an interactive read aloud (Gambrell et al., 2011). By better understanding the scaffolding functions of questions not normally considered to be high-value in read alouds, this study aims to contribute to this conversation of how teachers can support comprehension and engagement with informational text.

Findings from this study present a detailed taxonomy for teachers’ text-related low-level and rhetorical questions in order to better understand their differing functions in interactive read alouds. This study also importantly highlights the supportive role some low-level questions can play in relation to high-level comprehension questions. Findings also point to possible relationships between the tendency to ask certain types of low-level questions, the tendency to ask high-level questions and the amount of talk children do in read alouds, although such results are preliminary.

In this discussion, I describe the implications of this study’s findings. First I discuss the ratio of low-level to high-level questions found in the data, arguing why this ratio may be different in the context of interactional scaffolding compared to planned scaffolding, particularly with informational texts. Second, I describe the scaffolding functions of teachers’ spontaneous low-level questions through the lens of Wood’s (2003) characteristics of contingency: domain, temporal, and instructional contingency, including how decision-making within these contexts can affect content knowledge acquisition, high-level thinking,
and student motivation. I also discuss a gap between the value placed on content learning as an essential aspect of reading comprehension and the examination of question functions for this skill in read alouds. Third, I describe the different scaffolding functions of rhetorical questions in read alouds, particularly how their unique characteristics allow teachers to model desired reading skills and increase engagement with texts. Fourth, I discuss how the moderately strong correlation between teachers’ spontaneous low- and high-level questions reflects the dynamic relationship between literal and inferential comprehension that is stated in theories of reading comprehension. I also describe why there might be correlations between the number of spontaneous high-level questions asked and some types of spontaneous low-level questions but not others. Finally, I address the finding related to associations between Prior Knowledge and Text Feature low-level question and resulting student talk.

Findings on the number of low- versus high-level questions from this study align with previous research which points to teachers’ tendency to ask more assessment and recall style questions than ones that support higher-level thinking. Examining teachers’ questions in the context of a script-supported read aloud offers a juxtaposition between the ratio of questions suggested by research and the ratio of questions teachers ask on their own. While there are valid reasons why researchers point to a dominance of low-level questions as limiting to student thinking, there are also reasons to reexamine why low-level questions, particularly those that are spontaneous, may be more asked more frequently compared to those provided by reading programs, especially in relation to informational text.

The comprehension questions provided by the READS script were designed to align with the three NAEP cognitive targets cited in the 2010 NAEP Practice Guide: locate and recall, integrate and interpret, and critique and evaluate. This ratio of two categories of high-
level questions for every one category of low-level questions does not necessarily specify teachers should be asking a specific 2 to 1 ratio of low-to-high questions, but there is a clear emphasis on asking more high-level questions than low-level questions. One reason is that, since planned scaffolding reflects tools and curricula that are predetermined before a lesson begins, this is the time when teachers can be most thoughtful about the high challenge aspect of the high challenge/high support balance (Reynolds & Goodwin, 2016). While teachers should also be thoughtful about how they might support students in reaching those challenges, before the read aloud is when teachers can be most reflective about the tasks they want their students to experience.

Interactional scaffolding, on the other hand, more strongly reflects the reactionary support: teachers offer more or less support contingent on the students’ performance (Van de Pol et al., 2011). These differences in planned versus interactional scaffolding suggest that, although a dominance of low-level questions is not desirable in either context, that the ratio of low-to-high may be inherently different when teachers are actively supporting students. As Hammond and Gibbons (2005) state, “it is this combination of the pre-planned and the contingent that enables teachers to provide new learning challenges for their students, while at the same time providing necessary support for meeting those challenges” (p. 11).

An additional characteristic to consider in examining the ratio of teachers’ low- to high-level questions in interactive read alouds is the genre of text. While literal comprehension plays an important role with any genre of text, attention to students’ learning of information presented in the read aloud is more important with informational texts. First, with information texts, facts and information make up a larger portion of the landscape on which to comprehend the text, both literally and inferentially (Cote et al., 1998). Also, as
stated previously, the information that is presented in informational texts tends to be more abstract in presentation and not often grounded through characters or a story arc.

Second, the acquisition of factual information is arguably more important with informational texts than it is with narrative texts. With narrative texts, for example, while it may be important that inferential thinking such as theories or predictions about characters are based on literal information presented in the story, the acquisition of this information is not a primary outcome. With an informational read aloud, however, the learning of content-related facts and information is an important outcome. Understanding how certain types of low-level questions support content learning, then, is important. Classifications of questions types that are effective for a particular genre lead to more specific descriptions of questioning choices and more useful application with a specific type of text (Gall, 1970).

Contingency of Low-level Questions

Findings from this study emphasize that, within the larger category of low-level questions exist important, even if subtle, differences in the types of thinking questions can afford. The variation identified in teachers’ spontaneous low-level questions reflects the different characteristics of contingency described by Wood (2003): domain contingency (the topic or subject matter of scaffolding), temporal contingency (the timing of scaffolding), and instructional contingency (the amount or level of scaffolding).

From a domain perspective, the advantage of low-level questions is that they allow teachers to focus on discrete amounts of information at a time. Recall questions allow for a concentrated reinforcement of information in a way that is not possible when students are asked to simultaneously think at high levels. Prior Knowledge questions, for example, focus students’ attention on their own knowledge before connecting it to information in the text while Text Features questions allowed teachers to focus on literal comprehension of
information presented in visuals. Prior Knowledge asked students about information that was related to the topic of the text and so supported “understanding of the knowledge domain as a whole rather than the particular text just read” (McNamara, Kintsch, Songer, & Kintsch, 1996, p. 4).

One tension that arose from the data in relation to domain contingency was the focus on the text versus the student. Some questions, particularly Immediate Verbatim recall questions, focused on students knowing the words in the text versus understanding the meaning and ideas of the text, or what Beck & McKeown (2007) call being faithful to the text versus faithful to the student. While the text may be the vehicle for instruction, Beck and McKeown (2007) argue that for optimal and engaged learning to take place teachers’ interactions should be directed to the students and their meaning-making experiences rather than the retrieval of information.

From a temporal contingency perspective, that is the decision of when to provide scaffolding, findings from this study highlight the role timing of low-level questions play in the differing amount of active processing low-level questions encouraged. As discussed previously, Delayed recall questions rely on retrieval cues and thus strengthen previously constructed mental representations of information (Zwaan & Radvansky, 1998). Whether a delayed question was Verbatim or Information appeared to matter less since they both share the inherent cognitive benefit of retrieval.

A third characteristic of Wood’s (2003) description of contingency, in terms of teacher decision-making, is instructional contingency, how much to scaffold. This aspect reflects that concept that scaffolding is meant to be responsive to the child’s needs, that is it should be increased or decreased depending on the response or performance of a student or students (Wood et al., 1978). One of the most evident examples of instructional
contingency was the use of a Platform question, a low-level question that reviewed literal information related to a previously asked high-level question. Most of these questions followed students exhibiting difficulty responding to a high-level question. When this happened, different teachers made different decisions about how much scaffolding to offer students. Some teachers changed the amount of scaffolding only slightly by simply rephrasing the high-level question. There were also instances when a teacher provided no additional scaffolding, in that she just asked another student the same question. The Platform question, then, represents a teacher’s decision to offer a high degree of support by side-stepping the more challenging question to review related, foundational information. As mentioned previously, what further defined whether the low-level question was truly in service of a high-level thinking is whether or not the teacher returned to the originally asked high-level question.

There is clear need for teachers to understand the importance and priority of asking questions that are analytical in nature during read alouds and cause students to be reflective (Beck & McKeown, 2001). But if the informational read aloud is meant to be a vehicle for developing students’ content knowledge, in addition to comprehension skills, then best practices and examination of informational read practices should draw from and focus on content knowledge acquisition research as much elementary literacy.

**Scaffolding for Motivation**

In addition to encouraging differing amounts and types of support for content learning and high-level questions, the different types of low-level questions identified also varied in the amount of motivational scaffolding they provided. Although previous research has identified “motivational scaffolding” as being specific to strategies and interactions that are primarily non-literacy, such as games, praise, and positive feedback (Reynolds &
Goodwin, 2016), findings from this study highlight the dynamic and inseparable relationship between question asking, cognition, and motivation. Understanding how certain types of low-level and rhetorical questions tap into the affective side of learning is particularly important in light of current attention on students reading grade-level, complex texts as part of reading instruction.

Some low-level questions appear to impact motivation by creating opportunities for students to be successful. Launching questions, low-level questions that addressed literal information related to an upcoming high-level question, provided motivational scaffolding by creating experiences of success before challenging students’ thinking. This type of scaffolding reflects a questioning strategy proposed by Taba (1964) of starting with literal recall and then getting students to think in more increasingly complex ways (Taba, 1964; Volger, 2005; Wilen, 2001). Margolis and McCabe (2004) identify this sequencing of tasks from easy to challenging as one way teachers can strengthen students’ self-efficacy. As such, this type of question relates to Eccles’ et al. (1983) expectancy-value theory and how the perception of one’s ability can impact student persistence and motivation. Especially for students who may not have strong academic self-concepts, successfully answering an easier question can create a condition in which they might be more likely to attempt thinking about and answering a subsequent high-level question.

A second way questions in this study appeared to affect student motivation and engagement had to do with the personal characteristics of some questions. Ryan and Deci’s (2000) self-determination theory describes a continuum from extrinsic to intrinsic that reflects the non-static nature of motivation. Importantly, from an education perspective, they emphasize that there can be movement within this continuum depending on students’ experiences. Personal value is a characteristic that is both a reflection of intrinsic motivation
but also a “perceived locus of causality” from extrinsic to intrinsic. Guthrie et al. (2007) also identify a connection between personal relevance and intrinsic motivation, both as a characteristic of intrinsically motivated readers and as a construct that can be purposefully addressed.

Encouraging Personal Reflection rhetorical questions, because they make connections between the text and students themselves, can be seen as aligning with the construct of relevance and personal value. Low-level Prior Knowledge, especially those rooted in experience rather than knowledge, as well as Stimulating Prior Knowledge questions, also align with this construct of relevance. Whether a teacher asks about or reminds students about a connection between their lives and information in the text, this connection can support relevance. Accessing relevant background knowledge is also one way to promote interest, an additional construct aligned with intrinsic motivation (Schraw, Flowerday & Lehman, 2001). Given that informational text, especially scientific text, can appear more removed from students' everyday lives, it is particularly important to understand how teachers' interactions, big and small, can help students to understand the relevance of content knowledge in relation to their own lives.

While there may be a consistent view in the motivation research that the term engagement reflects an affective, student-centered concept, as does the present study, it is important to acknowledge that many teachers may operate, perhaps with good intentions, on a different definition of engagement. The teacher who described asking questions to keep her students paying attention, for example, can be seen as operating out of a surface level of engagement that relates more to engagement as time on task, concentration and paying attention (Dolezal, Welsh, Pressley, & Vincent, 2003), characteristics that are associated with traditional classroom management.
Reynolds & Goodwin (2016), in their description of motivational scaffolding, do point to the relevance of including strategies that reflect extrinsic rather than intrinsic motivation such as races, competition and time limits. As such, asking spontaneous assessment questions can be seen as types of external reinforcements that, “while not a substitute of long-term motivation…are appropriate ways to build and maintain moment-to-moment engagement” (p. 4). Reynolds and Goodwin (2016) emphasize, however, that this type of scaffolding may not be as relevant for readers who are already intrinsically motivated to read complex texts and, importantly, that this extrinsic type of engagement is meant to complement, not replace, scaffolding reflective of more authentic engagement and intrinsic motivation.

Rhetorical Questions and Stages of Contingency

Unlike Armbruster et al. (1991) who found rhetorical questions to be more confusing than beneficial, findings from this study suggest that rhetorical questions can be an effective way to add variety to the ways teacher support content, literacy learning and motivation in read alouds. Similar to teachers’ low-level questions, rhetorical questions reflected a range of literacy and motivational scaffolding functions. Except for Providing Information questions, which had the least amount of literacy or motivational scaffolding, each type of rhetorical question reflected the modeling of a reading behavior and encouraged student engagement. While the engagement these questions encouraged was less cognitively demanding than comprehension questions, especially high-level questions, their value came from their ability to simultaneously model desired reading behaviors and create a conversational tone about a text.

As examples, two rhetorical question categories, Stimulating Prior Knowledge and Attending to Text Features were similar to their low-level counterparts in domain
contingency, what they focused on, but differed in their instructional contingency, how much scaffolding they provided. For example, whereas low-level questions asked for a direct response about a visual, such as “What is the owl holding in its talons?” the rhetorical question was less formal and conversational in tone, such as “See that owl holding the snake in its talons?” Goldenberg (1993) emphasizes the implications this conversational tone has on the dynamic of a conversation. In the latter example the teacher may not be offering a high challenge task, but does create a situation in which the teacher is talking to students as a fellow reader. While teachers should provide facilitation in read alouds, particularly with young children (Barrentine, 1996), acting as a fellow reader in this way supports engagement by drawing in students into the observation process through authentic and social interaction (Gambrell, 1996).

Attending to Text Features also serves as a way to model a desired reading behavior, in this case of garnering information from multiple sources. Especially in the context of core reading programs, it is important for teachers to go beyond questioning to also provide additional ways for students to interact with texts such as modeling and other guided practice (Dewitz et al., 2009). Bandura (1986) presents four processes involved in effective modeling: attention, retention, production and motivation. The initial stage of attention reflects the basic idea that unless one is attending to the task or act being modeled, there will less likely be a transfer of learning.

**Relationships between High-level and Low-level Questions**

Reflected in current reading research and initiatives is a clear consensus that elementary teachers should be asking students high-level comprehension questions that push and challenge their thinking about texts during interactive read alouds. Findings from this study that show a strong correlation between frequency of teachers’ spontaneous low-level
and high-level comprehension questions \( r=0.55 \ p<0.005 \) corroborates the previously emphasized relationship between literal and inferential comprehension. High-level thinking in not done in the abstract but is based on requisite knowledge (Cain, Oakhill, Barnes & Bryant, 2001). In presenting the process of inferential comprehension, Kintsch and Van Dijk (1978) describe the inherent role of factual understanding:

Language users are able to provide, during comprehension, the missing links of a sequence on the basis of their general or contextual knowledge of the facts. In other words, the facts, as known, allow them to make inferences about possible, likely, or necessary other facts and to interpolate missing propositions that may make the sequence coherent. (p. 365)

This description of reading reflects the constant interdependence of inferential comprehension and literal understanding of facts in reading comprehension (Anderson & Pearson, 1984). Platform questions were perhaps the strongest examples of this literal-inferential interdependence since teachers made an explicit movement from one level of abstraction to support the other. Findings from this study also reiterate previous research (Boyd & Rubin, 2006; Christoph & Nystrand, 2001, McElhone, 2013) that emphasizes the nature of text discussions is influenced less by the number of assessment style questions a teacher asks and more by the quality or contingency of such questions in addition to this type of question being one aspect of, and not representative of, a teacher’s questioning style.

The strong, positive associations between the frequency of teachers’ spontaneous high-level questions and specific types of low-level questions suggest a possible relationship between how a teacher views his or her role in a read aloud and the tendency to ask certain types of questions. This theory aligns with the distinction Beck and McKeown (2007) make between being faithful to the text versus faithful to the reader. High-level questions
represent being faithful to the reader because it encourages a more personal and engaged interaction with the text (Chin & Brown, 2002): the focus is on the student’s thinking while the text is a vehicle for that thinking.

This same characteristic of being faithful to the text can be seen, albeit at a lesser degree, in the types of questions that were highly correlated with asking high-level questions: both types of delayed recall questions, Delayed Verbatim \((r=0.32, p<0.06)\) and Delayed Information question \((r=0.49, p<0.003)\), Prior Knowledge questions \((r=0.46, p=0.007)\) and Text Feature questions \((r=0.63, p=0.0001)\). Each of these question categories, as previously described, encourage some type of participation or engagement of students. Both types of Immediate recall questions, on the other hand, which were negatively associated with frequency of high-level questions \((r=-0.29\) and \(r=-0.21)\), although not significantly so, are arguably more representative of being faithful to the text. Even though Immediate Information questions support active student thinking more than Immediate Verbatim, the primary focus is still on comprehension and recall of text just read.

*Associations between Low-level Questions and Student Talk*

The primary reason for examining associations between types of low-level questions, as identified in this study, and amount of student talk reflects the importance placed on production of student talk in read alouds and its role in student learning and engagement (Kucan & Beck, 2003; Guthrie, 2011). One surprising finding was the correlations between Prior Knowledge and Text Feature questions and child talk appeared stronger than the correlation between number of high-level questions and child talk. One possibility is that teachers who tended to ask more Prior Knowledge and Text Feature questions tended to ask certain types of high-level questions that encouraged more elaborated student talk.
Another aspect of interactive read alouds that is not addressed in this study is teachers’ listening stance and perception of student contributions. McElhone’s (2013) emphasis on positioning theory offers a framework for understanding why relationships between question form and resulting student talk may be different in different classrooms. McElhone (2013) argues that teachers whose interactions, both language and actions, reflect a valuing and encouragement of student’s ideas in general, will engender responses to particular types of questions differently than a teacher who operates from a deficit model view. Boyd and Rubin (2006) also emphasize that the form of a question can sometimes be misleading since language is influenced by more intangible factors such as tone of voice, teacher-student relationships as well as the feedback or response a teacher offers before or after the question.

**Additional Implications for Research and Practice**

There is no question that teachers need to ask high-level questions if students are to take part in the high challenge of critical thinking with texts. But the dynamic of high challenge/high support cannot exist with high-level alone. If reading theorists acknowledge an integral, symbiotic relationship between fact-based and inferential thinking (Perfetti et al., 2005) then it is important for examination of teacher questioning to follow suit. The downfall of asking too many low-level questions in classrooms has already been well established. As the findings from this study show, the presence of low-level questions in read alouds is not necessarily indicative of an assessment-driven discussion, but depends on the type and amount of low-level questions asked and whether high-level questions were also part of the discussion. Importantly some low-level questions played valuable scaffolding roles in supporting students’ content learning and responding to high-level questions, which
are particularly important roles in the current atmosphere of high challenge/high support reading.

In particular this study points to the importance of understanding how the two categories of low- and high-level questions, which are often compared to one another, in practice can work together. How a teacher uses a low-level question, for example, matters greatly. “Do owls have wings?” for example is a yes/no, low-level question, which, in isolation, is not overtly supportive of student thinking. One teacher, however, may simply wait for a yes response and continue reading while a different teacher might use it as a springboard to encourage students to question why we don’t often see them fly at night (Day, R., & Jeong-suk, 2007). As an additional example, asking an Immediate Verbatim question to extrinsically support engagement, in and of itself is not unfavorable, especially with students who may not be as intrinsically motivated to read informational texts. What arguably matters much more is whether or not this type of question represents a pattern of question asking or whether it represents a small portion of a teacher’s questioning that, as a whole, is focused on impacting students’ authentic engagement with texts. As such, future research may consider variety of questioning as an additional aspect of interactive read alouds to examine.

How low-level questions are portrayed in the research can and does have an impact on the messages practitioners receive. Boyd and Rubin (2006), for example, point out that most literature on teaching methods, for both native speakers of English and English learners, “indicates that teachers are enjoined to avoid closed-ended questioning and encouraged to pose questions that allow students to infer, predict, hypothesize and evaluate” (p. 143). This study also highlights the importance of going beyond fidelity of
implementation with core reading programs to examine and support teachers’ ability to provide effective and sufficient interactional scaffolding.

In light of varying opinion as to the benefits versus limitations of scripted reading programs (Valencia, Place, Martin, & Grossman, 2006), Neugebauer et al. (2017) point out “these differing positions on the role of scripted literacy programs reveal the delicate balancing act teachers are charged with between implementing intervention routines with fidelity while still anticipating and attending to students’ needs in a flexible way” (Neugebauer et al., 2017). Even when planned scaffolding is provided, it is essential for teachers to also receive support in the interactional scaffolding that is such a critical aspect of engaging and productive teaching, both in the specific types of scaffolding they can offer and in the decision-making processes behind effective scaffolding (Margolis & McCabe, 2006; Reynolds & Goodwin, 2016). Although rhetorical questions are not a type of question suggested by any standards, this study highlights the value they can contribute to informational read alouds, and so are also deserving of attention when considering how teachers can support student learning and engagement from a variety of angles.

Professional development on read aloud practices might incorporate some of the findings from this study on low-level and rhetorical questions and their different functions. While still prioritizing asking high-level questions and discussion moves that support student contributions, teachers would benefit from better understanding how different types of low-level and rhetorical questions differently impact student learning in terms of content knowledge acquisition and memory, engagement and content learning. Another option for professional development is to use transcripts of read aloud discussions to illustrate the different types of low-level and rhetorical questions that can be asked. In small groups, teachers can reflect on and talk about how specific types of questions might differently
impact student learning and engagement. Such activities would support more teacher ownership by getting teachers to be reflective about how differences in language, including phrasing and timing of literal questions, can limit or increase active processing on the part of students. There is already considerable evidence that teachers in classrooms need support moving away from, not toward, asking so many low-level questions. But the more teachers understand the range of specific low-level questions, and how they differ, the more purposeful they can be asking low-level questions that effectively support literal comprehension of information read and scaffolding for high-level thinking.

**LIMITATIONS and FUTURE RESEARCH**

This study addressed only one aspect of effective informational read alouds and needs to be considered in combination with other studies on interactive read aloud practices. Teacher statements, for example, were not included in the analyses but can also elicit information from students and encourage student responses. While one purpose of this study was to examine teacher questioning in a commonly used context, that is reading programs that provide comprehension questions for read alouds, the relatively small sample size and intervention nature of the reading program that spanned only six lessons does not allow generalization to larger core reading programs. Therefore, additional studies could examine teacher questions during informational read alouds that are part of nationally used, whole-year core reading programs.

Additionally, while most of the child talk was captured in the recordings of READS lessons, not all utterances by students were audible and able to be transcribed. An additional limitation related to child talk measurements relates to the read aloud texts. While all three informational read alouds were designed to last approximately 20 minutes, differences in
texts could have led to different lengths of read alouds. Time stamps were used in the transcripts of lesson but did not indicate the precise length of interactive read aloud portion.

Yopp & Yopp (2012) suggest that teacher questioning about informational texts may vary even further according to the particular topic or sub-genre such as animal books versus those about natural phenomena. Although data in the present study included read alouds that represented three different categories of informational text – animals (Owls), science (Tornado Alert), and Biography (Helen Keller) – the subsample included one teacher per read aloud. As such, it would be difficult to determine if differences between subcategories of text are due to genre or teacher differences. Additional future research then might include a study that examines similarities and differences in teachers’ questioning between narrative and informational read alouds by the same sample of teachers as well as differences between different subcategories of texts read by the same teacher. Such studies could examine the variety of low- and high-level questions teachers ask by subgenre and how the text topic appears to impact teachers’ follow-up questioning and contingent scaffolding.

An important part of interactional scaffolding is that it is not static but rather reflects fading and transfer of responsibility, movement from more to less support for particular literacy activities (Athanasas & Oliveira (2014). Transcripts of read alouds in this study represent one time period. As such future studies could use longitudinal data to capture this additional characteristic of movement. Of particular interest would be to document changes in instructional contingency in regard to specific comprehension and literacy skills.

An additional limitation of this study was that it focused primarily on the role of the teacher in interactive read alouds. Since interactive read alouds are meant to reflect a practice in which the teacher genuinely shares authority and there is a co-production of meaning making (Beck & McKeown, 2001; Oyler, 1996), future studies should go beyond
teacher questions and statements to examine students’ text-related questions, which can both contribute to, and also be a measurement of, student engagement and comprehension (Oyler & Barry, 1996). Additionally, given the important role of contingent scaffolding in interactive read alouds, a future study might focus specifically on how teachers use follow-up questions to respond to students’ questions and comments during informational read alouds.

**CONCLUSION**

Despite appearances to the contrary, having a quality informational read aloud discussion is a complex task. Even when teachers know high-quality conversations about texts are important and aspire to do so, this disposition does not ensure a productive read aloud (Michaels & O’Connor, 2015). Pre-planned or pre-written comprehension questions can provide teachers with supportive planned scaffolding and offer a starting block for teachers in asking students questions that reflect a desired range of cognitive levels. This study, however, illustrates the critical role teachers’ play in interactive read alouds, a role of contingent scaffolding that should not, nor can be, scripted.

In particular, the different functions of teachers’ spontaneous low-level and rhetorical questions revealed that these types of question offer more value than is often assumed. When used strategically and with contingency, and when asked in addition to many high-level questions, knowledge of these question categories can support teachers in their in-the-moment decision making of how to support students’ content knowledge, critical thinking and engagement with read alouds. When teachers understand the specificity of choices at their disposal within the larger categories of low-level and rhetorical questions, and understand how these choices differently affect student thinking, engagement and
production of student talk, they can be more strategic in pursuing a variety of questions, both high- and low-level, that together challenge and support the students in their classrooms.
Appendix A: Trifold for *Tornado Alert* by Franklyn M. Branley

**Tornado Alert**, by Franklyn M. Branley

**Main Ideas Guesses**

- a. Where do tornadoes occur?
- b. What do tornadoes look like?
- c. How to stay safe from a tornado

- a. What causes tornadoes
- b. How tornadoes destroy things
- c. Where and when tornadoes occur

- a. Things that help us stay safe in a tornado
- b. Ways to avoid tornadoes
- c. How tornadoes are formed

**For Students:** Please circle the best answer. Look back at the story if you need to.

1. What are tornadoes?
   - a. Strong floods
   - b. Snowstorms
   - c. Powerful storms
   - d. Big chunks of hail

2. What are some safe places during a tornado?
   - a. In a car or truck
   - b. In a basement or a ditch
   - c. Near metal wires
   - d. Somewhere high, like a tree

3. Which one is NOT a main idea from this book?
   - a. The biggest tornadoes in the world
   - b. When tornadoes occur
   - c. How to stay safe during tornadoes
   - d. What tornadoes look like

4. This book was
   - a. Too easy
   - b. Just right
   - c. Too hard

5. How much did you like this book?
   - a. I loved it
   - b. I liked it
   - c. It was okay
   - d. I didn’t like it
### Appendix B: Descriptions of NAEP categories of comprehension

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<th>Comprehension Category</th>
<th>Description</th>
<th>Examples</th>
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| **Locate and Recall**  | Identify the main ideas and supporting details; find elements of a story; focus on small amounts of text | What is the main idea of this section?  
Who were the main characters in Goldilocks and the Three Bears? |
| **Integrate and Interpret** | Compare and contrast information or actions by characters; examine connections across parts of text; consider alternatives to what is presented in the text; use mental images | How did the bears feel when they found Goldilocks?  
Why did they feel that way? How did Goldilocks feel?  
Why did she feel that way?  
What are the differences between how Goldilocks and the bears felt? |
| **Critique and Evaluate** | Assess text from numerous perspectives, synthesizing what is read with other texts and other experiences; determine what is most significant in a passage; judge whether and the extent to which certain features in the text accomplish the purpose of the text; judge either the likelihood that an event could actually occur or the adequacy of an explanation in the text | What do you think is the most important message in this story?  
How well did the author describe the new ideas in what you just read?  
If the author asked you what she could have done differently or better to help other students understand, what would you tell her?  
How might Goldilocks behave in the future based on her experience in this story? |

Source: Categories of comprehension and their descriptions are drawn from the *Reading Framework for the 2009 National Assessment*
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