

DIALOGIC VIDEO: INFLUENCE OF DIALOGIC READING TECHNIQUES ON  
PRESCHOOLERS' LEARNING FROM VIDEO STORIES

By

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## CHAPTER I

### INTRODUCTION

Language is an important tool that human adults pass on to infants. Young children begin to speak between 8 and 14 months of age. At first, they slowly learn to say new words, at the rate of one to three words per month (Berk, 2003). As they get older, they start to learn new words very quickly (Ganger & Brent, 2004; McMurray, 2007), leading to a large increase in vocabulary size. For example, children have a median production of just 44 words at 16 months of age, increasing to 573 words by the time they are 30 months old (Fenson et al., 1994). During this period of rapid vocabulary growth, children are not deliberately taught all words one at a time by parents. Rather, they mainly pick up words through everyday interactions with other people (Bruner, 1975; McNeill, 1970). In some instances, called “fast-mapping,” children pair a novel word with its referent after hearing it only a few times (Carey, 1978).

One key to children’s success with fast-mapping is that they use social information to aid their assignment of new word meanings (Baldwin & Moses, 2001). For example, infants check the face of the speaker when they hear a novel label, and use cues like the speaker’s gaze direction, body posture, and gestures to assign a new word to the correct object. When these cues are uninformative, infants use other information – such as a speaker’s emotions and purposeful actions (such as searching) – to guide their word learning (Akhtar & Tomasello, 1996; Tomasello & Barton, 1994; Tomasello, Strosberg, & Akhtar, 1996). Thus, social others play an important role in helping children learn new words.

Social experiences with parents can therefore have an important impact on children’s language development. Both amount and quality of these experiences are important. For example, the more parents talk to their children, the larger their children’s vocabularies tend to be (Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991). Additionally, children whose parents

provide a helpful context for word learning (e.g., through feedback, guiding their child's attention, and encouraging their child to participate in the interaction) have larger vocabularies than children whose parents do not provide these contexts (Weizman & Snow, 2001).

### *Learning Words Through Storybook Reading*

One important experience through which adults provide children with language input is storybook reading, which is associated with better language skills, including a larger vocabulary, during the preschool years (Bus, van IJzendoorn, & Pellegrini, 1995). Research indicates that parents' use of different reading techniques can enhance children's receptive vocabulary (the words that a child understands) and/or expressive vocabulary (the words a child says).

Blewitt, Rump, Shealy, and Cook (2009) have proposed that the most effective reading techniques for increasing children's vocabulary are those that incorporate *scaffolding* of new vocabulary words. Scaffolding occurs when an adult provides information to help a child solve a task that he/she could not solve on his/her own (Wood, Bruner, & Ross, 1976). As the child's knowledge grows, the adult provides less help until the child can solve the task without assistance. Blewitt and colleagues (2009) suggest a scaffolding hypothesis for language acquisition through storybook reading – that children learn the most vocabulary from storybooks when adults adapt their behaviors based on the preschoolers' level of knowledge. This support helps children learn more language than they could on their own.

At first, adults can help children learn to recognize a word using techniques like simple questioning, labeling of the referent picture, and comments that refer to the correct word-meaning pairing. When adults draw children's attention to relevant details it helps them learn the meaning of the word and understand it when it is spoken. Once children have appropriately mapped from the word to its meaning, adults should ask more complex questions, expand beyond the context of the initial word-referent pairing (e.g., talk about other instances of the named category), and give the child opportunities to use the word. When adults give children a chance to learn the word's

meaning first, it gives children context for their later retrieval and practice. Later examples and additional contexts can then be incorporated with what children have already learned to create a more flexible, robust understanding.

Children should also benefit from *repetition* of these techniques. Repeated exposure to the word-referent pairing reinforces the child's receptive understanding of the word. Repetition of questions gives children practice retrieving the word, and can also give them practice saying it. However, although chances to revisit information should help to reinforce the new vocabulary, mere repetitions may not be as helpful for developing a robust understanding of the word as techniques that provide new information (e.g., Ard & Beverly, 2004; Sénéchal, 1997).

An important part of scaffolding during picture book reading is tailoring the interaction to the level of knowledge appropriate for the child. Giving children a chance to understand the meaning of the word is an important first step for building vocabulary (Ard & Beverly, 2004; Justice, 2002; Sénéchal, 1997; Sénéchal, Thomas, & Monker, 1995). Children are most likely to learn a new word if they are explicitly provided with information about the word's meaning. Transparent and simple strategies such as pointing at and labeling pictures with new words are the most effective at increasing children's receptive vocabulary (e.g., Justice, 2002; Sénéchal, Thomas, & Monker, 1995). Less explicit word/meaning information, such as using the new word in a question, or simply reading the text, can help children if repetition is provided (e.g., Ard & Beverly, 2004; Sénéchal, 1997). Only after children learn to understand the meaning of the word will they be able to use it in their own talk.

These studies support the idea that receptive vocabulary is built through exposure to new words and their referents, and that many techniques can be effective at highlighting the relation between a word and its referent. Pointing, labeling, asking simple questions, and repetition are all effective techniques for increasing preschoolers' receptive vocabulary. Parents who scaffold their child's book reading experience can begin with simple techniques like labeling and pointing and move to detailed questioning as their child's knowledge of the word grows.

One well-studied reading program that uses these principles is *dialogic reading* (Whitehurst et al., 1988). Whitehurst and colleagues (1988) began developing the program with 2-year-olds and their parents at home. Since then, the program has been effective with children up through age 5 (Aram, 2006; Hargrave & Sénéchal, 2000; Lonigan & Whitehurst, 1998; Wasik & Bond, 2001; Wasik, Bond, & Hindman, 2006; Whitehurst et al., 1999), in classrooms with teachers (Aram, 2006; Hargrave & Sénéchal, 2000; Lonigan & Whitehurst, 1998; Wasik & Bond, 2001; Wasik et al., 2006; Whitehurst, et al, 1999; Whitehurst, Arnold, et al., 1994), in Chinese-speaking children (Chow, McBride-Chang, Cheung, & Chow, 2008) and in children at risk for reading difficulty (Coyne, Simmons, Kame'enui, & Stoolmiller, 2004). Mol, Bus, de Jong, and Smeets (2008) provide a review of the many studies.

In dialogic reading, parents are taught to use prompts to encourage their children to be active participants in storybook reading (Whitehurst et al., 1988). Parents begin with simple prompts, such as asking children to identify objects on the page or simple actions in the story. As children become familiar with a story through repetition, parents ask more complex questions, calling for more advanced thinking and talking. They give open-ended prompts, encouraging their children to tell the story and think about cause and effect relationships.

Parents are instructed to remember the structure of a dialogic reading interaction using the mnemonic P-E-E-R: *prompt* (ask your child a question), *evaluate* (praise a correct answer or gently correct an incorrect one), *expand* (add to your child's response), and *repeat* (have your child repeat his/her answer) (Whitehurst, Epstein, et al., 1994). These dialogic reading methods exemplify the kinds of parental interaction Blewitt and colleagues (2009) referred to in proposing their scaffolding hypothesis for language acquisition through storybook reading. The P-E-E-R structure builds scaffolding into the interaction, as the parent is always adding a bit more information beyond what the child provides.

As part of the scaffolded interaction, dialogic reading encourages parents to use specific strategies that have been shown to enhance children's vocabulary acquisition from shared book

reading. Parents begin with *wh-* prompts (who, what, when, where, etc.) to help their child become acquainted with the material in the story. These simple, direct prompts are effective at increasing preschoolers' receptive vocabulary because parents use them to focus attention on and explicitly refer to novel information, including the introduction of novel words (Ewers & Brownson, 1999; Sénéchal, 1997).

As children become familiar with the story, parents are encouraged to use *open-ended* prompts and *distancing* prompts. Open-ended prompts such as, "What do you think will happen next?" encourage children to tell parts of the story. These prompts require that children make inferences and explain cause-effect relations in the story. Distancing prompts also require inferences – they encourage children to connect something in the story to something in their own life.

Open-ended and distancing prompts require more complex answers than *wh-* prompts. When children are first exposed to novel words, complex prompts are no more effective at increasing vocabulary than simpler prompts (Justice, 2002). However, they are effective in increasing the vocabulary of children who begin with a relatively high level of word knowledge (Reese & Cox, 1999). They have also been shown to increase the quality and quantity of children's talk during book reading (Kertoy, 1994), giving children chances to retrieve and use new words.

Dialogic reading also focuses on repetition, or reading the same book multiple times, which increases children's vocabulary scores (Sénéchal, 1997). Repeated readings provide children with multiple opportunities to learn the meanings of words. They also provide children with chances to become increasingly familiar with the content of the stories, enabling children to answer more complex prompts as well as practice using the words they have learned. Additionally, the more story details that children know and remember, the more context and retrieval cues they have when recalling and using new words.

The emphasis on scaffolding, using prompts of increasing complexity, and repetition make dialogic reading an effective technique to help children learn vocabulary through storybook reading. But these techniques are also important aspects of learning new words in general (Beals & De Temple, 1992; McNeill, 1970; Weizman & Snow, 2001). While dialogic reading has been studied extensively, parents may be able to use the same dialogic questioning techniques to enhance children's word learning from experiences other than book reading.

### *Learning From Video*

Because most preschoolers cannot read alone, storybook reading is usually a joint parent-child activity. In contrast, watching television or video often is a solitary occupation for young children. In a recent survey, 75% of children ages 6 months to 6 years watched TV on a typical day. Ninety-nine percent of children in this age range lived in a home with a TV and 93% had a DVD player or VCR (Rideout & Hamel, 2006). When parents of TV-watching children were asked how often they viewed with their child, 68% said they were present in the room all or most of the time (Rideout & Hamel, 2006). However, this does not necessarily mean that parents are interacting with their children around child-oriented programs, the way that they engage with children around storybook reading. Not all co-viewing experiences involve parent-child conversations; they may not even involve child-oriented programming.

Researchers have distinguished between co-viewing, when parents and children are in the same room together while the television is on, and "active mediation," in which the parent and child have a conversation about the television before, during, or after viewing (Nathanson, 2001). In a 2006 survey of parents of 2- to 11-year-olds, 30% of parents reported that they *never* used an active mediation style (Barkin, Ip, Richardson, Klinepeter, Finch, & Krcmar, 2006). Additionally, in a 1991 survey, parents most frequently reported co-viewing *adult* programs with their children because their children were in the room while parents were watching television, not because parents were interested in sharing in the child's programming (St. Peters, Fitch, Huston, Wright,

& Eakins, 1991). Thus, adults do not always share video watching with their children, the way they generally share storybook reading with them. Rather, children may be left to interpret child-directed videos on their own.

Interacting with children around video may not come naturally to parents. Unlike picture books, video is a "noisy" medium in which the action never stops. While reading a book, parents can pause to ask questions and probe children's understanding; in contrast, there often is no pause in the action on a video. Voices and music from the screen compete for children's attention with whatever the parent might say. Parents may be loath to interrupt the progression of the story, perhaps fearing they would draw attention away from important information in the program.

In fact, research has shown that preschoolers can learn from age-appropriate television programming, and can benefit to some extent regardless of parental support. For example, preschoolers who watched *Sesame Street* increased their knowledge in areas such as the alphabet, numbers, classifying objects into groups, and receptive vocabulary (Ball & Bogatz, 1970; Bogatz & Ball, 1971; Diaz-Guerrero & Holtzman, 1974; Rice, Huston, Truglio, & Wright, 1990; Zill, 2001). As far as long-term outcomes, children who watched *Sesame Street* as preschoolers maintained academic gains through early elementary school (Wright & Huston, 1995) as well as through adolescence (Huston, Anderson, Wright, Linebarger, & Schmitt, 2001).

Other programs created after *Sesame Street* also have positive effects on young children. Watching the program *Blue's Clues* has been linked with cognitive gains (Anderson et al., 2000), although no difference was found in preschoolers' expressive vocabulary scores. And finally, Singer and Singer (1998) showed that 3- and 4-year-olds improved on a battery of different cognitive and social measures, including vocabulary, after viewing episodes of *Barney & Friends*.

However, there are a number of concerns about the research methods in these studies that may affect how the results are interpreted. Most of the above studies did not use random assignment, leaving third variables (including parent encouragement and interaction) as possible

explanations for children's academic and cognitive gains. Additionally, in some studies, children have failed to learn from television. For example, Crawley and colleagues (2002) found that 3- to 5-year-olds with more experience viewing *Blue's Clues* interacted with the program more but did not comprehend more of the program content than inexperienced *Blue's Clues* viewers (who had never previously seen the program). In two other studies, there was no effect of watching *Blue's Clues* on expressive vocabulary (Anderson et al., 2000; Bryant et al., 1999). Additionally, in a recent study, 3- and 4-year-olds who watched episodes of *Sesame Street* specifically designed to teach words showed no increase in receptive or expressive knowledge of the target words in the episodes (Giles & Boyer-Pennington, 2009). It therefore is possible that preschoolers' reported learning from video has been supported by parental involvement, and that solitary viewing may not be optimal.

Research with infants and toddlers indicates that learning from video may be inefficient, especially at younger ages. Studies with younger children are substantially different than those conducted with preschoolers (due to different study goals and possibly, to different expectations about younger children's memory capacity and duration). While preschool research often has focused on learning from whole episodes of television programs over time – pre-test to post-test times range from months to years – research with infants and toddlers has focused on much shorter time frames and has involved shorter video clips.

For example, 15- to 24-month-olds learned a new object label more often when it was offered by a speaker who was present and shared joint focus with them than when it was presented in a voiceover on a 3-minute *Teletubbies* clip (Krcmar, Grela, & Lin, 2007). In another study, 24- and 30-month-olds who were asked to complete a difficult word learning task (follow the labelers' gaze into an opaque bucket and realize she was labeling an out-of-sight object hidden there) learned the word only when it was presented directly by a person, not when watching a video of the person (Troseth, Saylor, Strouse, & Verdine, 2011). Finally, 24-month-olds failed to learn a new label offered by a video actress after she sang songs and played games

on video for 5 minutes (Strouse & Troseth, 2011). They only succeeded when their parent, who was present in the room, helped them identify the object being labeled. These studies used one repetition of a relatively short (1- to 5-minute) video and then tested word learning on the same day. Preschool studies in which children have learned language through video have involved video exposure lasting days (Reiser, Tessmer, & Phelps, 1984; Reiser, Williamson, & Suzuki, 1988) to years (Huston et al., 2001; Wright & Huston, 1995). Repeated exposure over longer durations in studies with preschool-aged children may facilitate learning gains even when the learning situation is not optimal (e.g., when children view alone rather than with parent scaffolding).

Another important difference between preschool and toddler studies is that children in the former studies often have been compared to themselves (before and after viewing) or to a control group with no exposure. In infant and toddler studies, on the other hand, learning from video often has been compared to learning from other sources (e.g., from direct experience or instruction). For instance, in one study, 9-month-olds were exposed to a native Mandarin speaker over the course of a month, during the time when infants' speech perception normally is narrowing to their native language. These infants maintained the ability to distinguish between Mandarin speech sounds. However, 9-month-olds who were exposed to a video of the Mandarin speaker for the same amount of time did not maintain this ability (Kuhl, Tsao, & Liu, 2003). Studies with this age group therefore indicate that infants and toddlers do not learn language *as efficiently* from people on video as they do from direct interactions; the research typically does not focus on whether toddlers learn *anything* from video. Comparable studies have not been done with preschoolers, so it is possible that this relative inefficiency may also play a role in preschoolers' learning from video.

One reason why very young children have trouble learning words presented on video may be the lack of contingent responsiveness between people on video and viewers. Naigles and Mayeux (2001) argue that new words typically are learned in situations of joint attention – when

an adult and child are aware that they are focused on the same thing. This ability to share focus helps the child to correctly assign the word's meaning by providing clear information about the speaker's point of reference. When the adult and child are not focused on the same object initially, the child will check the speaker's face and orient his/her own gaze to the adult's object of reference (Baldwin, 1991). Actors on video cannot engage in joint attention with their viewers. While a child may be able to follow an actor's gaze, the actor cannot know where the child is attending. Because of this limitation, the actor cannot give the child contingent (or even accurate) feedback or clarification in the way an adult reading a storybook can.

O'Doherty and colleagues (2010) argue that such contingency (or *reciprocal interaction*) is a necessary signal to very young children that information should be learned. Actors on video necessarily lack reciprocal interaction with viewers. As a result, the child may not view an actor's cues (like gaze or pointing) as relevant or meaningful because they are not specifically contingent with the child's actions and attention. Kuhl (2007a) also suggests that lack of responsiveness may be one reason that infants did not extract speech information from videos of Mandarin speakers, even though the speakers on video gazed at and talked about objects of reference on video.

Parental support through active mediation may enhance children's learning by giving parents the opportunity to provide the contingent interaction that people on videos necessarily lack. Ball and Bogatz noted in their original *Sesame Street* study that, "Children who watched *Sesame Street* the most – and hence learned the most – tended to have mothers who often watched the show with them and often talked to them about it" (1970, p.14). Likewise, Singer and Singer (1998) pointed out the "critical role of adult mediation in effective teaching," (p. 314) and indeed, the children in their studies who received teacher support along with viewing *Barney & Friends* outscored the children who simply watched the program.

Parental mediation may be important to preschoolers' video learning in a few different ways. First, research does provide some evidence that adult-child interaction during video viewing can enhance children's positive affect and attention. Salomon (1977) found that low-

income Israeli children whose mothers co-viewed *Sesame Street* with them enjoyed the program significantly more than children whose mothers were not encouraged to co-view. Although Salomon did not investigate what mothers were doing during co-viewing, he hypothesized that mothers may have served as a source of reinforcement, guiding their child's focus to the program. Adults who treat videos as important sources of information that can be used in daily life model that behavior for their children. These factors alone may make preschoolers more motivated to engage in the effort needed to learn from television content, enhancing learning. This might be called the *attention* explanation for enhanced learning. Second, parental mediation may provide children with additional repetition or elaboration of the content presented on television, helping them interpret and store the information for later use (what might be termed the *cognitive* explanation for the effect of co-viewing on learning). In book reading research, authors have proposed that adult mediation can facilitate children's encoding by providing additional details about and repetition of the content (Sénéchal, 1997), give children practice retrieving information from memory (Sénéchal et al., 1995), and give children a chance to rehearse the content (Kertoy, 1994; Whitehurst et al., 1988). Similar benefits may be found with video. For example, adult labeling of on-screen video content can lead preschoolers to better remember and generalize pro-social information presented there (Friedrich & Stein, 1975; Singer & Singer, 1998; Watkins, Calvert, Huston-Stein, & Wright, 1980). Finally, parental mediation may provide preschoolers with the social contingency and feedback that videos necessarily lack, helping them to interpret information and relate it to real life (the *social* explanation for the effect of co-viewing). However, to date, little research has focused on parent mediation of preschoolers' learning of educational content.

In the *Barney & Friends* study briefly mentioned above, children whose teachers used a supportive curriculum in their classrooms based around the episodes they watched had better performance on a wide variety of learning measures, compared to children who only watched the episodes (Singer & Singer, 1998). However, children in the first (*television + curriculum*) group

also had the most exposure to the content, so their increase in learning may not have been due to adult mediation alone, but rather to additional time spent with the material.

Only in three studies have researchers directly investigated whether adult mediation *during* child-oriented programming increased children's learning of educational content. Reiser and colleagues (1984) had 3- and 4-year-olds watch three 35-minute *Sesame Street* videos on separate days with an adult who either asked questions (including identifying letters and numbers and counting) and provided feedback or did not converse with them. Children who interacted with the adult concerning the show scored higher on the posttest of letters and numbers than those who did not converse. These results provide strong support for the idea that adult mediation can improve preschoolers' learning of video content, including the learning of pre-literacy skills. In a follow-up study, Reiser and colleagues (1988) focused on determining which type of adult mediation was the most effective in improving preschoolers' identification of the letters and numbers presented on *Sesame Street*. Children watched with an adult who either: (a) asked the child questions and provided feedback, (b) only asked questions, (c) only directed the child's attention to the screen, or (d) watched the shows without interacting with the child. Children in the two groups who were questioned by the adult scored higher than those in the other two groups. There was no difference between the two groups who were questioned – feedback did not increase children's scores. In discussing these results, the researchers suggested what I am terming the *attention* explanation for the effect of co-viewing – that adult-led questioning may increase the effort children put into understanding the program and may cue children that the program is important and should be taken seriously. However, the *cognitive* mechanism (helping children interpret and store information) and the *social* mechanism (providing contingency and feedback), as I have called them, may also play a role. The procedures used by Reiser and colleagues cannot distinguish between these explanations, and they may be inseparable. For example, social contingency may increase children's motivation to pay attention and learn from video content.

In addition to the studies by Reiser and colleagues, my own earlier research indicated that parental mediation may aid children's learning of a new word presented on video (Strouse & Troseth, 2011). In this study, 2-year-old children watched an actress on video singing songs and playing games similar to those present in popular children's television shows for 5 minutes. She then displayed two new objects, labeling one of them with a new word. Children were given the real objects to hold while watching the video. Only children whose parents (while never labeling the objects) actively pointed out that the objects on screen were the same as the ones they were holding successfully learned the new label from the actress. Children whose parents were present but did not comment on the objects did not learn the word.

These studies suggest that parental interaction in general may enhance preschoolers' learning from videos. In the current study, I investigated whether the same types of parental interactions that increased preschoolers' vocabulary learning from storybooks also increased vocabulary learning from videos. I used two different methods: training parents to interact around videos, and adding an interactive actress to the video itself.

With video, some of these benefits may also be provided by special features of the video itself. Some researchers have argued that videos contain cues, called *formal features*, which serve to direct children's attention and highlight important information (see Naigles & Mayeux, 2001). Zooming in on or panning to an object, highlighting it, making it move, or providing an audio marker when it comes on screen all are ways of directing a child's attention to the correct location without the need for social cues from a co-viewer. As children grow older and become more familiar with television's conventions they may become more adept at picking up on formal features to direct their attention to important content (Calvert, Huston, Watkins, & Wright, 1982). This may provide some of the same benefits as parental mediation through the attention mechanism.

Video can also provide details about the content as well as repetition of content. Adults may facilitate language by providing children with multiple examples of a word's usage. Video

can do this too – and perhaps do it better. A speaker may show a child a picture of an elephant and also refer to a stuffed elephant; however, the number and types of elephants available in the speaker's (and child's) environment may be limited. Video can provide children with visual access to many varied examples not available in their real environments, such as footage of a live, moving elephant.

There may also be ways for video to give children opportunities to retrieve and rehearse information. Actors and actresses on video can ask questions and direct attention. In fact, Singer and Singer (1998) note that the characters in *Barney & Friends* were specifically designed to provide children with effective adult mediation – they point, label, and explain in the way a parent would. The characters on video therefore can make use of many of the questioning techniques that are beneficial when done by parents during storybook reading. Thus, features of video may provide some of the same benefits as parental mediation through the cognitive mechanism.

However, although video may be able to substitute for many of the potential mechanisms through which parental mediation may increase learning, videos necessarily lack reciprocal interaction, and thus cannot mimic the social mechanism. Characters on commercial video cannot base their behaviors on the child's behaviors. They cannot provide feedback, adapt content to be relevant to a child's prior experience, or adjust to the child's skill level. And, unlike a parent using dialogic reading techniques with a child, a video character cannot start with simple, direct questions and increase the complexity of questions over multiple viewings (although it might be possible to design a *series* of videos in which a character adapted questions on subsequent videos). Thus a direct human interaction (like parental mediation) must be used to provide the benefits of the social mechanism.

I investigated whether dialogic reading techniques could be used by a parent to increase children's vocabulary and comprehension of video stories (*dialogic questioning* group). Through a couple of additional conditions, I also attempted to identify the mechanism through which any

benefit may have been achieved. With one of the conditions, I explored whether features of the video itself could replace direct interaction by a parent.

First, I included a group of children whose parents were asked to interact, but were not trained to use dialogic techniques (*directed attention* group). In fact, these parents were asked not to ask questions at all, but only to direct their child's attention to what was happening on the screen. The intention was for these children to benefit from their parent's social contingency (social mechanism) and encouragement to engage with the video story (attention mechanism), but to minimize the benefit of elaboration on and rehearsal of the content in the stories (cognitive mechanism).

I also included a control group, also called the *regular video* group, who watched the stories at home as they would usually watch television. This group was designed not to receive benefits from any of the mechanisms above and beyond what most children normally receive.

Finally, I included a group of children whose parents did not interact, but who saw an actress appear on video, using dialogic techniques (*dialogic actress* group). It may seem logical that parents who are excellent at scaffolding their child's interactions with video can increase their child's vocabulary and comprehension. But not all parents are good at scaffolding and some are too busy or too inattentive to scaffold at all. If the attention or cognitive mechanisms I have described are influential, a well-designed video could provide better information than a parent who is poor at scaffolding or who is absent. Children in the dialogic actress group were necessarily missing out on social contingency and feedback, as well as carefully-crafted questions specific to their own level of knowledge (social mechanism). However, they were able to benefit from enhanced engagement (attention mechanism), repetition, and elaboration of the content in the stories (cognitive mechanism) provided by the actress.

I hypothesized that children in the dialogic questioning group (whose parents were trained in dialogic techniques) would learn more vocabulary words and understand the stories better than children in the other conditions. Children in the dialogic questioning condition would

benefit by all three proposed mechanisms -- attention, cognitive, and social. Additionally, I hypothesized that children in the directed attention condition, who would benefit through the social mechanism and attention mechanisms, and children in the dialogic actress condition, who would benefit through the cognitive and attention mechanisms, would both outscore the regular video (control) group. If this pattern of results was found, the study would imply that contingent social interaction is an important learning mechanism, but that good video design could aid children's learning from video when a social partner was not available.

## CHAPTER II

### METHOD

#### *Participants*

One hundred fifteen families of children aged 36 to 48 months from the Nashville metropolitan area, located via State Birth Records and called on the telephone, agreed to participate. Of these, 4 children did not cooperate at the first visit and 23 did not return for all visits, and therefore were dropped from the study. Seven additional children completed the study but were dropped from analyses due to suspected developmental delay or because they had not been shown the story videos for one or more weeks. Therefore, 81 children were included in the final sample: 21 in the *directed attention* condition and 20 in each of the other 3 conditions. Children were assigned to one of four conditions: *dialogic questioning* ( $M = 41.86$  months,  $SD = 4.03$ ), *directed attention* ( $M = 42.42$  months,  $SD = 3.75$ ), *regular video* ( $M = 42.26$  months,  $SD = 3.96$ ), or *dialogic actress* ( $M = 41.86$  months,  $SD = 4.03$ ) with gender and vocabulary score balanced across conditions. Children were excluded from participating only if they had significant hearing loss, a developmental delay, were not learning English as their primary language, or owned the video or book of the target story, “Bear Snores On.”

I decided to focus on 3-year-olds in this study because dialogic reading is more effective at raising vocabulary scores of 2- and 3-year-old children than it is for older children (Mol et al., 2008). I restricted the age range to 3-year-olds, due to concern that some of my measures would be difficult and frustrating for 2-year-olds, given the enormous growth in language ability during these years. Future research should include 2-year-olds using age-appropriate measures.

The overwhelming majority of the parents who participated in the study were mothers (91%). Participants were asked to indicate their ethnicity by checking one or more listed items. A majority of the final sample identified as White (94%), with 2 participants identifying themselves

as Black (2.5%), 1 participant identifying as Indian (1.2%) and 1 participant identifying as Hispanic (1.2%). The sample had above average education and income levels, with the mean and median level of education of the participating parent being “some graduate work” and the mean and median household income bracket of participating families being \$75-\$100,000.

### *Materials*

#### *Training Video*

Parents in the dialogic questioning group watched a training video based on the *Read Together, Talk Together* (Berner, 2002) video, which has been successfully used to train parents in dialogic reading techniques for storybooks (Blom-Hoffman, O'Neil-Pirozzi, & Cutting, 2006). The training video for the current study included instructions on dialogic techniques followed by scenes of puppets giving an example of each technique and a real parent and child using the technique while viewing a storybook video. For example, the narrator explained that distancing prompts involve “trying to connect something in the video to something in the child’s life.” Then mother and child puppets, while reading a story about a birthday cake, discussed the child puppet’s latest birthday cake. Finally, the real mother on the training video, while watching a video of “Little Red Riding Hood,” asked her child, “Who else do we know that goes down the chimney?”

#### *Storybooks on Video*

During the course of the study, children in all four conditions received DVDs containing sets of *Scholastic* stories. Because we wanted the stories in our study to be new to the children, we gave families visiting our lab for other studies a list of stories that were available on video and asked them which ones they were familiar with. I chose four stories because most children were relatively unfamiliar with them and they included a sufficient number of words unknown to

children in this age group. Over the first two weeks of the study, participants watched “A Weekend with Wendell” and “The Wizard” (Weston Woods Studios, 2001). Over the second two weeks they watched “Bear Snores On” and “The Little Red Lighthouse and the Great Gray Bridge” (Weston Woods Studios, 2003).

Children in the dialogic questioning, directed attention, and regular video conditions watched unaltered commercially available versions of these videos. The videos consisted of static pictures of pages from the storybooks with very light animation and a voiceover of an adult reading the story. The DVDs also included the option to have the story text display across the bottom of the screen (similar to subtitles). Children in the dialogic actress condition watched the same stories altered to include a small picture-in-picture window in the corner of the larger, main picture containing the original story. The window featured an actress who asked questions using dialogic techniques while the storybook main picture remained paused on the relevant page. The original dialogic reading training video (Berner, 2002) suggests that parents ask questions once per page, so the actress on my videos asked questions at an equivalent frequency. Additionally, I counted the number of times the first 7 parents in the dialogic questioning condition paused the “Bear Snores On” video to ask questions. It corresponded roughly to the number of pages in the book ( $M = 20$  times). Because an important element of dialogic questioning is building from simple to more complex questions, I created two versions of the dialogic actress videos. Parents of children in the dialogic actress condition were instructed to show their child the version with simpler questions during the first week (three to five times) and the version with more complex questions during the second week (again, three to five times).

### *Assessments*

*Vocabulary.* In previous research, dialogic reading had stronger effects on expressive than receptive vocabulary growth (Mol et al., 2008), possibly due to the choice of comparison groups in these studies. Parents or teachers in control groups usually are asked to read books to

their children "as usual." Therefore, children in control groups are exposed to normal storybook reading interactions, which are thought to be associated with receptive vocabulary growth (Scarborough & Dobrich, 1994), especially when the same books are read repeatedly (Sénéchal, 1997). For this reason, I expected that the receptive vocabulary of children in my comparison groups would naturally increase. Hence, the advantage of dialogic techniques (which encourage children to express themselves in particular ways) may be more pronounced when measuring growth in expressive vocabulary.

As a measure of expressive vocabulary growth, children were pre- and post-tested on the Expressive One Word Picture Vocabulary Test (EOW-PVT; Brownell, 2000). This standardized measure has been widely used in dialogic reading studies and thus allows the most direct comparison between this study and prior research.

Additionally, I developed expressive story-specific vocabulary measures that included target words from each of the videos that children watched. Because of the relatively short duration of our study compared to previous dialogic reading (picture book) studies, I expected gains on the EOW-PVT to be minimal. The inclusion of story-specific vocabulary measures allowed me to measure learning of a smaller set of words that were explicitly mentioned in the stories. When researchers in other dialogic reading studies have used self-created measures, children have shown gains in expressive vocabulary on these tests (Hargrave & Sénéchal, 2000; Whitehurst, Arnold, et al., 1994).

To develop the measures, I identified nouns in our storybook videos that preschool children might not know. I pilot tested the words by calling 10 mothers of 3-year-olds and asking them to identify which words they thought their child would say. My final measures included seven words from each video that were known by 5 (50%) or fewer of the pilot children. In the administration of the measures, children were first asked to name the objects from a set of "screen captures" (that is, static images) from the videos. The use of this set of pictures tested whether children had learned the vocabulary words as labels for the target objects as they appeared in the

video. For instance, the "lighthouse" screen capture was a picture of the short, red Hudson River lighthouse featured in the video story. Next, children were asked to name the objects from a set of drawings of the same *kinds* of objects as the target objects. The "lighthouse" drawing was a black-and-white line sketch of a tall, skinny lighthouse on a sandy beach. The use of this second set of pictures tested whether children could apply the labels outside of the context of the videos; that is, whether they had acquired a general knowledge of the meaning of the target words.

All tested words were nouns that were included in the text of the story as well as pictured on the screen. Each set of words included one high frequency word (mentioned more than 10 times in the story and included in the title), two medium frequency words (occurring 2 to 9 times in the story), and four rare words (occurring only once in the story). At pre-test, the words that children were the most familiar with were known by only 22% of the participants at pre-test (See Table 1).

Table 1. Pre-test Knowledge of Specific Vocabulary Words

	Proportion of children who knew the word at pre-test	Times word said during the video / Frequency	Story
Weeks 1 & 2			
Wizard	.07	14 / High	The Wizard
Sleeping Bag	.19	2 / Medium	A Weekend With Wendell
Label	.00	4 / Medium	The Wizard
Baker	.17	1 / Low	A Weekend With Wendell
Whipped Cream (or Cream)	.02	1 / Low	A Weekend With Wendell
Trap	.02	1 / Low	The Wizard
Cork	.01	1 / Low	The Wizard
Weeks 3 & 4			
Lighthouse	.22	23 / High	The Little Red Lighthouse
Den, Cave, Lair	.22	2,3,3 / Medium	Bear Snores On
Badger	.01	2 / Medium	Bear Snores On
Canoe	.01	1 / Low	The Little Red Lighthouse
Steamer	.02	1 / Low	The Little Red Lighthouse
Twigs	.01	1 / Low	Bear Snores On
Stew	.00	1 / Low	Bear Snores On

*Comprehension.* Story comprehension has not been studied often in preschoolers, although researchers have stressed its importance (van Den Broek et al., 2005). There is some evidence that children's comprehension of *oral* stories when young is predictive of their later scores on measures of *reading* comprehension (Paris & Paris, 2003). I included story comprehension here because I believed that dialogic questioning techniques would enhance children's comprehension of the target stories.

Dialogic questioning, especially wh- prompts like “why” questions, may help children think about the causal structure of events. Events that are linked together causally are more easily recalled by toddlers (Bauer, 1997; Wenner & Bauer, 2001) and preschoolers (van den Broek, Lorch, & Thurlow, 1996). “Why” questions may also help children think about characters' feelings. Children whose parents talk to them about feelings are better able to make inferences about the internal states of others (Brown & Dunn, 1996). Dialogic questioning may provide opportunities for children to respond to complex prompts about causality and emotion.

I also believed that providing children with contextual background through distancing prompts could increase story comprehension. Background knowledge can help decrease demands on working memory, allowing children to remember more information in domains in which they have prior knowledge (Chi & Koeske, 1983; Gobbo & Chi, 1986). Grounding new stories in prior experience may help children integrate new information more efficiently.

To create the story comprehension measure, I viewed the story “Bear Snores On” and generated questions about the story's content. The questions were then pilot tested on ten 3-year-olds who came in to our lab and watched the video story. Questions were adjusted to make them suitably challenging, allowing room for improvement on the measure across time, but also including some questions they could easily answer (to keep them motivated and interested).

According to research by Bauer and Mandler (1989) 2-year-old children can draw causal inferences between concrete events. This is the first type of relation that children are able to identify in stories (van Den Broek et al., 2005). Therefore, I based most of the comprehension

questions on identifying what actions happened in the story. I incorporated a few more challenging questions (e.g., “Why was the bear sad?”), reasoning that they would be very difficult for children to answer on their own, but might be a good indicator of what children could answer with adult help (i.e., the benefit of dialogic questioning). I also incorporated some story information in the questions as a verbal reminder, since this facilitates young children’s recall (Bauer, 1996). Finally, as a non-verbal comprehension measure, children were asked to put four photos from the story into the proper sequence (à la Wright et al., 1984).

### *Procedures*

#### *Training*

During the initial visit to the lab, while children were completing the pre-test, parents in all groups went over the study procedures with a researcher. Additionally, on each of their first two visits to the lab, parents in the *dialogic questioning* group watched the training video we created. Parents were given a copy of the training video to take home with them as well as a handout detailing the steps in the dialogic sequences and the types of prompts that could be used (see Appendix A). Parents in the *directed attention*, *regular video*, and *dialogic actress* groups were not exposed to the training video or given any specific instructions on what to do while watching the videos. I did not expect them to engage in many dialogic techniques spontaneously, as research has indicated that the use of dialogic techniques is fairly uncommon prior to training (Briesch, Chafouleas, Lebel, & Blom-Hoffman, 2008; Wasik et al., 2006).

Parents of children in the *directed attention* group received a brief handout in addition to a verbal explanation of the procedures they were to follow at home. The handout reminded them to pause the video often and direct their child's attention to what was happening on screen, but *not* to ask questions (see Appendix B). The goal of this condition was to encourage parents to interact socially with their children around the video, but without giving them the benefit of questioning.

Children in the *dialogic actress* group were introduced to a video featuring Miss Sue, the dialogic actress. I used one of the other *Scholastic Stories*, "Bark, George" to create a training video for children in this group. Miss Sue appeared on the video (in a picture-in-picture screen) and directed questions about the story to the viewer at approximately the same interval at which parents tended to ask children questions on the other stories. During this training, an experimenter watched the video with the child, pausing the video if necessary and encouraging the child to respond to Miss Sue's questions. Two coders reviewed videotapes of the training of 17 of the children (3 videotapes were lost) and found that all children responded directly to Miss Sue (without prompting) at least once during the session. Parents of children in the dialogic actress group were instructed *not* to pause the storybook videos and not to prompt children at home, but rather to play the videos through without commenting on the actress or directing their child's attention. We told parents we were specifically interested in what children learned from Miss Sue on their own.

### *Design*

Parents in all four conditions were instructed to show two video stories to their child three to five times per week for 4 weeks. Parents in the *dialogic questioning* and *directed attention* groups were instructed to watch the video with their child, and use the techniques they were taught during training. All parents were given a diary to mark the dates of viewing. For the first 2 weeks of the intervention, parents were asked to show "A Weekend with Wendell" and "The Wizard." Parents in the dialogic questioning, directed attention and regular video conditions viewed commercial versions of the video both weeks, whereas parents in the dialogic actress condition received two lab-created versions of each video (recall that the one for the first week included simpler questions, and the one for the second more complex, difficult questions). Following the study design of Whitehurst and colleagues (1988), parents returned to the lab after 2 weeks and exchanged their DVD(s) for new a new set of stories. Parents were instructed to

watch “Bear Snores On” and “The Little Red Lighthouse and the Great Grey Bridge” (either the commercial or the two lab-created versions, depending on condition) during the final 2 weeks.

### *Assessments*

*Initial visit.* During their first lab visit, children were individually pre-tested on the EOW-PVT and the story-specific vocabulary measure for the first DVD by a trained researcher.

*Midpoint visit.* Children and their parents visited the lab at the 2-week midpoint of the intervention. Children were post-tested on the story-specific vocabulary measure for the stories they had finished watching. They were also pre-tested on the story-specific vocabulary measure for the stories they would be watching in the final 2 weeks.

*Final visit.* After 4 weeks, children and their parents returned to the lab. Children were post-tested on the EOW-PVT as a measure of expressive vocabulary growth. Additionally, after being instructed to watch “the way you have been watching at home”, children and parents watched “Bear Snores On” in the lab. The session was videotaped for later review to ensure that parents in the dialogic questioning group were using dialogic techniques, and that those in the other groups were not. An examination of the video also allowed me to assess whether parents adopted some questioning techniques more easily than others. Children then were asked to complete the story comprehension measure and the story-specific vocabulary test for both sets of stories.

### *Questionnaires*

*Media questionnaire.* Before or during their first visit to the lab, parents were asked to complete a 26-item questionnaire about their child’s experience with media such as television, home videos, and picture books.

*Weekly diaries.* Parents completed weekly diaries indicating how frequently their children viewed the videos at home. These diaries also included a few basic questions about their

experience, including whether they enjoyed the videos, whether they paused the videos, and what types of things they talked about with their children during the videos.

*Exit questionnaire.* Parents also completed a short questionnaire at their final lab visit. This questionnaire included open-ended items where parents could comment on how useful they found the techniques they used and whether they would use them during other activities (e.g., while reading story books).

## CHAPTER III

### RESULTS

#### *Sample Demographics*

To ensure that the groups were comprised of families of a similar background, I computed univariate ANOVAs on parents' income and education levels. There was no difference between conditions on household income level,  $F(3,69) = 0.18, p = .908, \eta_p^2 = 0.01$ . There was a significant difference by condition in the participating parent's reported level of education,  $F(3,76) = 2.91, p = .040, \eta_p^2 = 0.10$  (directed attention:  $M = 5.62, SD = 1.20$ ; regular video:  $M = 5.10, SD = 1.12$ ; dialogic questioning:  $M = 4.95, SD = 1.22$ ; dialogic actress:  $M = 4.55, SD = 1.15$ ). This may have given an advantage to children in the directed attention and regular video groups. However, these groups did not perform systematically higher on the vocabulary or comprehension measures and there was no correlation between parent's education and any of the outcome measures. Additionally, each child was given a household education score comprised of their two parents' scores averaged together. There was no difference by condition in household education,  $F(3,76) = 1.08, p = .362, \eta_p^2 = 0.04$ .

#### *Fidelity of Implementation*

##### *Story Exposure*

I hypothesized that children in the regular video and dialogic actress groups may have watched the video stories more times than children in the dialogic questioning and directed attention groups because of the extra time obligation the latter conditions imposed upon the parent. This difference, if present, would have given children in the groups without parent

questioning more exposure to the vocabulary and content of the video stories than children in the dialogic questioning group. I computed children's viewing score by averaging the number of times they watched each of the 4 stories ( $M = 7.49$ ,  $SD = 1.78$ ,  $\text{min} = 4.5$ ,  $\text{max} = 15.0$ ). There was no effect of condition on the number of times parents reported that their child viewed the stories,  $F(3,77) = 0.71$ ,  $p = .55$ ,  $\eta_p^2 = 0.03$ .

Parents were asked to indicate how frequently during the study they viewed the stories with their children (4 = always, 3 = almost always, 2 = sometimes, 1 = once in a while, 0 = not at all). There was an effect of condition on the frequency with which adults watched the videos with their children,  $F(3,75) = 6.85$ ,  $p < .001$ ,  $\eta_p^2 = 0.22$ . Follow-up contrasts indicated that parents were more likely to view the videos with their children if they were in the dialogic questioning ( $M = 3.60$ ,  $SD = 0.47$ ) and directed attention groups ( $M = 3.82$ ,  $SD = 0.35$ ) than if they were in the regular video ( $M = 3.05$ ,  $SD = 0.92$ ) or dialogic actress groups ( $M = 2.89$ ,  $SD = 1.05$ ).

Additionally, parents were asked to indicate how frequently their child viewed the stories with a sibling. There was no effect of condition on watching with siblings,  $F(3,75) = 1.70$ ,  $p = .17$ ,  $\eta_p^2 = 0.06$ . On average, parents indicated that their children watched with siblings “once in a while” ( $M = 1.57$ ,  $SD = 1.44$ ).

### *Dialogic Techniques*

During the final lab visit, I asked children and their parents to watch “Bear Snores On” as they had done at home and videotaped these sessions. I reviewed the tapes to code instances of parent questioning. This measure provided an indication of how much and what kind of questioning the parents in the regular video group did spontaneously, and how the parents in the dialogic group asked questions when on their best behavior (i.e., when they knew they were being observed).

Parents in the dialogic questioning group paused the video significantly more times ( $M = 18.21$ ,  $SD = 8.11$ ) during the final lab visit than parents did in the directed attention group ( $M = 12.81$ ,  $SD = 6.98$ ),  $t(38) = 2.26$ ,  $p = .029$ . Both groups were instructed to pause the videos approximately once per minute. Since the “Bear Snores On” story is approximately 8 minutes long, both groups exceeded the number of pauses expected. None of the parents in the regular video or dialogic actress conditions paused the video at all.

Parents’ self-report of the number of times they paused the videos at home more closely matched the once-per-minute guideline, with most parents in both the dialogic questioning and directed attention groups reporting that they paused 5-10 times per video. However, parents in the dialogic questioning group still reported significantly more pauses than parents in the directed attention group,  $t(37) = 2.21$ ,  $p = .033$ .

In addition to pauses, I also coded the number of prompts parents used during the final lab visit. When counting the number of questions asked by a parent, only story-related questions were used. Unrelated questions such as, “Will you sit back in your chair?” were not included. A prompt was a verbal attempt from a parent to elicit a response from the child. These were almost always questions, but could also be statements, most frequently completion prompts (or fill-in-the-blanks). There was a significant main effect of condition on the number of prompts parents gave during the video,  $F(3, 76) = 110.88$ ,  $p < .001$ ,  $\eta_p^2 = .81$ . Parents in the dialogic questioning group prompted an average of 53.95 times ( $SD = 2.43$ ), whereas parents in all other groups prompted very little (directed attention:  $M = 5.14$ ,  $SD = 2.31$ ; regular video:  $M = 3.30$ ,  $SD = 2.37$ ; dialogic actress:  $M = 1.35$ ,  $SD = 2.37$ ).

Parents in the dialogic questioning group used a variety of different types of prompts. Prompts were coded as to whether they fell into each of the categories in the CROWD sequence (See Appendix A for explanations of the prompts). A prompt could be counted in multiple categories at once; for example, “What is going to happen next?” was counted as a recall prompt, an open-ended prompt, and a wh-prompt. Prompts could also fall into none of the categories. The

most frequent uncategorized questions were yes/no or multiple choice questions, for example, “Is it summer or winter?” Of the prompts in the CROWD sequence, parents in the dialogic questioning group used wh-prompts most frequently (33% of their prompts), followed by open-ended prompts (9.6%), recall prompts (8.7%), distancing prompts (5.4%), and completion prompts (2.4%).

The questions that parents recorded in their diaries were more likely to fall into one or more of the CROWD categories than the questions parents asked during their lab visits. This is probably because parents were more likely to record questions they thought were of higher quality. Wh- prompts were the most frequent prompts recorded by the dialogic questioning group (75%), followed by open-ended prompts (30%), distancing prompts (8.8%), recall prompts (4.4%), and completion prompts (2.9%).

### *Response to the Actress*

Two coders scored children's responsiveness to the video actress's prompts at both the initial and final visits. Inter-rater reliability was calculated for 20% of the prompts,  $\kappa = .86$ ,  $p < .001$ . During the first visit, the experimenter prompted children for a response if they did not directly respond to Miss Sue on their own. On this visit, children responded 61% of the time on their own, 30% of the time with prompting, and failed to respond 10% of the time. During the final visit, the experimenter was not present in the room, and parents were instructed to watch the video the way they did at home. Recall that parents had been instructed not to prompt children for a response at home, yet some still did so during the final lab visit. Children responded to Miss Sue 60% of the time on their own, 3% with prompting, and made no response 37% of the time.

Children's responsiveness in the lab corresponded to parents' diary reports of their child's participation at home. All parents of children in the dialogic actress condition reported that their child responded to the actress at least sometimes during the study. Three of the 21 parents (14%) indicated that their child “always” responded to the actress in all 4 of the video stories. A majority

of parents indicated that their children always responded to some of the stories and sometimes responded to others. Only two parents (9.5%) indicated that there were stories during which their child never responded to the actress. Each of these parents reported that their child did not respond during 2 of the stories but did respond during the other 2. Thus, all children in the study were at least somewhat responsive to Miss Sue's questions. Finally, a repeated-measures ANOVA indicated that there was no effect of story on parents' reports of children's responsiveness to the actress,  $F(3,57) = 0.66, p = .58, \eta_p^2 = 0.03$ .

### *Child and Parent Engagement*

Parents reported that their children were the fondest of "A Weekend With Wendell," with 75% indicating their child "always" enjoyed watching it and only 6.3% not enjoying it at all. "Bear Snores On" followed with 46% always enjoying it and 2.5% not enjoying it at all. "The Wizard" was less popular, with 29% always enjoying it and 8.9% not enjoying it. Finally, "The Little Red Lighthouse and the Great Gray Bridge" was the least popular story, with 29% always enjoying it and 19% not enjoying it at all.

Chi-square analyses indicated that there were no significant differences by condition in how much children liked the stories: "A Weekend With Wendell,"  $\chi^2(9) = 3.53, p = .939$ ; "The Wizard,"  $\chi^2(12) = 13.62, p = .326$ ; "Bear Snores On,"  $\chi^2(12) = 18.68, p = .097$ ; "The Little Red Lighthouse"  $\chi^2(12) = 15.55, p = .212$ .

Parents' reported that they also favored "A Weekend With Wendell," with 90% of parents indicating they enjoyed the story. This was followed by "Bear Snores On," 87%, "The Wizard," 84%, and "The Little Red Lighthouse and the Great Gray Bridge," 65%.

## Study Outcome Measures

### *Expressive One-Word Picture Vocabulary Test*

To evaluate group differences in EOW-PVT post-test scores, I used a series of planned contrasts. The score of the dialogic questioning group was compared to each of the other groups, using EOW-PVT pre-test as a covariate. There were no significant differences. See Table 2 for group means.

Table 2. Pre-test and Post-test Scores for Vocabulary Outcome Measures

	EOW-PVT Standard Score	Story-Specific Screenshots (of 14)	Story-Specific Drawings (of 14)
<b>Dialogic Questioning</b>			
Pre-test	$M = 106.90$ $SD = 11.53$	$M = 1.00$ $SD = 1.08$	$M = 1.55$ $SD = 1.19$
Post-test	$M = 110.70^*$ $SD = 14.32$	$M = 7.40^*$ $SD = 2.50$	$M = 3.68^*$ $SD = 2.41$
<b>Directed Attention</b>			
Pre-test	$M = 108.48$ $SD = 10.97$	$M = 1.14$ $SD = 1.32$	$M = 1.24$ $SD = 1.09$
Post-test	$M = 113.48^*$ $SD = 12.52$	$M = 5.76^{*a}$ $SD = 2.17$	$M = 3.43^*$ $SD = 1.72$
<b>Regular Video</b>			
Pre-test	$M = 108.90$ $SD = 14.63$	$M = 0.70$ $SD = 1.08$	$M = 1.35$ $SD = 1.39$
Post-test	$M = 110.15$ $SD = 16.71$	$M = 5.50^{*b}$ $SD = 2.44$	$M = 3.55^*$ $SD = 1.91$
<b>Dialogic Actress</b>			
Pre-test	$M = 109.00$ $SD = 13.23$	$M = 1.05$ $SD = 1.05$	$M = 1.05$ $SD = 1.19$
Post-test	$M = 112.70$ $SD = 17.00$	$M = 6.35^*$ $SD = 2.72$	$M = 3.15^*$ $SD = 2.72$

<sup>a,b</sup> mean significantly different from dialogic questioning group at post-test, at the  $p < .05$  level, by planned comparison

\* significant repeated measures t-test,  $p < .05$ , indicating pre- to post-test growth

Despite no group differences in EOW-PVT post-test scores, individual group analyses showed that the 2 parent interaction groups had significantly higher post-test than pre-test scores

(dialogic questioning:  $t(19) = 2.15, p = .045$ , directed attention:  $t(20) = 3.40, p = .003$ ). The scores of children in the other groups did not differ from pre- to post-test (dialogic actress:  $t(19) = 1.93, p = .068$ , regular video group:  $t(19) = 0.48, p = .638$ ). One reason why growth on the measure was easier to detect than condition is the overall variability of the EOW-PVT scores in the sample. The standard deviations for all groups were much larger (11-16 points) than the difference between the groups at post-test (1-5 points). The small mean difference and high standard deviation lead to a small effect size. The relatively short intervention duration and small sample size of this study did not provide sufficient power to detect such a small effect of condition. Previous studies that have found significant effects of condition for this measure have been of longer duration (Wasik et al., 2006; Whitehurst et al., 1999) included teachers as well as parents (Hargrave & Sénéchal, 2000; Lonigan & Whitehurst, 1998; Whitehurst et al., 1999; Whitehurst, Arnold, et al., 1994) or included a larger sample size (Arnold, Lonigan, Whitehurst, & Epstein, 1994; Lonigan & Whitehurst, 1998; Wasik et al., 2006; Whitehurst et al., 1999; Whitehurst, Arnold, et al., 1994). Only one study has found a significant effect of condition with a similar duration, method of implementation, and sample size, and this study did not control for pre-test differences in vocabulary scores (Whitehurst, et al., 1988).

### *Story-specific Vocabulary*

*Screenshots.* I calculated children's total story-specific vocabulary scores by combining their scores across the two sets of stories. Children received separate totals (out of 14) for the screen shots from the stories and for the non-story drawings. I performed a series of planned contrasts comparing the post-test totals of the dialogic questioning group to the scores of the other groups using EOW-PVT pre-test scores as a covariate. There was a significant difference between the dialogic questioning group and the directed attention group,  $t(76), = 2.74, p = .008$ , and between the dialogic questioning group and the regular video group,  $t(76), = 3.16, p = .002$ . There was no difference between the dialogic questioning group and the dialogic actress group,  $t(76), =$

1.80,  $p = .061$  (Table 2). Importantly, children in all four groups had significantly better vocabulary scores after viewing the videos than at pre-test, indicating that all children learned to identify screenshots from the videos.

*Drawings.* For the story drawings (that is, line drawings of the target objects from the stories), none of the planned contrasts comparing group post-test scores were significant. Children in all groups showed a small but significant amount of growth from pre-test to post-test when asked to identify drawings of the objects from the stories (that is, generalizing the target words from the video to pictures of the target objects different from the video).

Table 3. Pre-test, Post-test, and Retention Scores for the *Chrysanthemum* DVD (Weeks 1 & 2)

	Story-Specific Screenshots (of 7)	Story-Specific Drawings (of 7)
<b>Dialogic Questioning</b>		
Pre-test	$M = 0.35$ $SD = 0.59$	$M = 0.40$ $SD = 0.60$
Post-test	$M = 3.65$ $SD = 1.60$	$M = 1.68$ $SD = 1.00$
Retention	$M = 3.40$ $SD = 1.23$	$M = 1.79$ $SD = 1.23$
<b>Directed Attention</b>		
Pre-test	$M = 0.57$ $SD = 0.87$	$M = 0.43$ $SD = 0.68$
Post-test	$M = 2.76$ $SD = 1.18$	$M = 1.24$ $SD = 1.04$
Retention	$M = 2.67$ $SD = 1.18$	$M = 1.38$ $SD = 1.16$
<b>Regular Video</b>		
Pre-test	$M = 0.40$ $SD = 0.75$	$M = 0.60$ $SD = 0.94$
Post-test	$M = 2.90$ $SD = 1.25$	$M = 1.65$ $SD = 1.09$
Retention	$M = 2.60$ $SD = 1.43$	$M = 1.75$ $SD = 1.16$
<b>Dialogic Actress</b>		
Pre-test	$M = 0.65$ $SD = 0.81$	$M = 0.35$ $SD = 0.75$
Post-test	$M = 3.25$ $SD = 1.62$	$M = 1.05$ $SD = 1.10$
Retention	$M = 2.80$ $SD = 1.28$	$M = 1.20$ $SD = 1.11$

On the final testing day, children were also given a *retention* score on story-specific words from the first set of videos (the ones they viewed for the first two weeks, Table 3). I performed a repeated measures analysis of covariance on these scores, using post-test scores (from the first 7 words only) and retention test scores of the story-specific vocabulary as the repeated measure and pre-test as the covariate. There were no significant effects for the screen shots or the drawings, indicating that children in all groups retained the words they had learned (Table 3).

A detailed report of growth on specific vocabulary words can be found in Table 4.

Table 4. Children's Growth on Story-specific Screenshots

Word	Frequency	Proportion of children who knew the word at pre-test	Proportion of children who learned the word	Proportion of children who knew the word at post-test	Average number of times word used during visit 3 viewing
Weeks 1 & 2					
Wizard	High	.07	.77	.84	
Sleeping Bag	Medium	.19	.60	.79	
Label	Medium	.00	.37	.37	
Baker	Low	.17	.35	.51	
Whipped Cream	Low	.02	.30	.32	
Trap	Low	.02	.16	.19	
Cork	Low	.01	.12	.12	
Weeks 3 & 4					
Lighthouse	High	.22	.70	.93	n/a
Den, cave, lair	Medium	.22	.60	.83	2.09
Badger	Medium	.01	.46	.47	1.23
Canoe	Low	.01	.33	.35	n/a
Steamer	Low	.02	.19	.20	n/a
Twigs	Low	.01	.25	.26	0.40
Stew	Low	.00	.07	.07	0.39

Generally, words that were repeated more times in the story narration showed more pre- to post-test growth. I did not have a large enough sample to investigate specific effects of condition on any individual words. However, I did use the transcripts from children's third visit to see if there was a difference by condition in how many times parents and children used the target vocabulary words from "Bear Snores On." Those words mentioned more frequently in the "Bear Snores On" narration were also mentioned more by parents and children during their final lab visit. Across the words from that story, there was a main effect of condition in target vocabulary word usage,  $F(3, 76) = 17.82, p < .001, \eta_p^2 = .41$ . Families in the dialogic questioning group used the target vocabulary words ( $M = 10.47, SD = 7.90$ ) more than families in all of the other groups. Families in the regular video group used the target vocabulary words the least ( $M = 0.70, SD = 1.26$ ), with families in the dialogic actress ( $M = 1.45, SD = 1.54$ ) and directed attention groups ( $M = 4.10, SD = 4.63$ ) falling in between.

### *Story Comprehension*

At the final visit, children received up to 10 points for correctly answering questions about events that happened in "Bear Snores On." Planned contrasts comparing the dialogic questioning group's score to the scores of the other groups indicated that children in the dialogic questioning group showed enhanced understanding of the story content (Table 5). The dialogic questioning group outscored children in the directed attention ( $t(77) = 2.32, p = .023$ ) and regular video groups ( $t(77) = 3.07, p = .003$ ), but not children in the dialogic actress group ( $t(77) = 1.83, p = .071$ ).

Table 5. Scores on the Story Comprehension Outcome Measures

	Comprehension Questions (of 10)	Sequencing Story Photos (of 9)
Dialogic Questioning	$M = 8.20$ $SD = 1.32$	$M = 6.89$ $SD = 2.60$
Directed Attention	$M = 6.86^a$ $SD = 1.82$	$M = 6.81$ $SD = 2.48$
Regular Video	$M = 6.40^b$ $SD = 2.42$	$M = 6.60$ $SD = 2.64$
Dialogic Actress	$M = 7.13$ $SD = 1.69$	$M = 6.50$ $SD = 2.24$

<sup>a,b</sup> mean significantly different from dialogic questioning group at the  $p < .05$  level, by planned comparisons

Additionally, children received a score between 0 and 9 for correctly sequencing the four photos from “Bear Snores On” (following the method described in Wright et al., 1984). Children received 1 point for each picture that correctly followed another (e.g., placing the third picture later in sequence than the second picture) and 1 point for each correct back-to-back pair (e.g., placing the third picture directly after the second picture). This method gave children more points for more accurate orders, but was not a perfectly linear ratio scale. Children's two subscores were dependent on one another (if a back-to-back pair is in sequence, at least one picture correctly follows another). There was no way for children to score a cumulative total of 1, 6, or 7 points. As a result, the scores were analyzed by rank order using the Kruskal-Wallis test. There was no group difference in children’s sequencing scores,  $K(3) = 0.23$ ,  $p = .972$  (Table 5). Half of the children in the study scored a perfect 9 on this measure, so it may not have had sufficient variability to show growth in this sample.

## CHAPTER IV

### DISCUSSION

Parent questioning helped 3-year-old children to learn more from video storybooks than they learned without questioning. As expected, children whose parents were trained in dialogic questioning techniques outscored children in the regular video condition (whose parents were given no instructions regarding questioning or viewing) on the vocabulary test using story screenshots to elicit the new words. This means that children whose parents asked them questions about the video stories were more likely to learn the relation between the words used in the stories and their referents on the screen. Studies from storybook reading have also shown that children whose parents use dialogic questioning during reading improve more on story-specific vocabulary measures than children in control groups. These studies have found both expressive (Hargrave & Sénéchal, 2000; Whitehurst, Arnold, et al., 1994) and receptive (Aram, 2006; Wasik & Bond, 2001) vocabulary gains on story-specific measures. These results makes sense, because parents in questioning groups (whether the stories are on video or in books) should have been directing their children's attention to the images in the story and using the language from the story in their talk. In this study, parents in the dialogic questioning group used the target vocabulary words significantly more times during their lab visit than parents in the other groups. Children should benefit from this increased vocabulary usage whether the story images are presented on a video screen or on the page of a book.

Additionally, children in the dialogic questioning group scored higher on the story comprehension measures than children in the regular video group. I included the story comprehension measure because I believed that the discussion parents and children would have during dialogic questioning would aid children's comprehension. Specifically, dialogic

questioning may have pushed children to think about the causal structure of stories and given children more context in which to understand the actions and characters in the stories.

All three proposed mechanisms of parental mediation could have played a role in children's increased vocabulary learning and story comprehension following dialogic questioning. First, parents could have been directing attention to new words and important aspects of the story (attention mechanism). Additionally, more retrieval and rehearsal of the story content could have led to better encoding and retrieval of the words and story details (cognitive mechanism). Another possibility is that the feedback and contingent responding of parents could have enhanced children's motivation for and attention to the video information (social mechanism).

Children in the dialogic questioning group also outscored children in the directed attention group on the vocabulary screenshots and the story comprehension measure. Compared to the dialogic condition, the directed attention condition was designed to give children the hypothesized benefits of the social and attention mechanisms, but less chance to benefit from the cognitive mechanism. Specifically, parents who were trained in the dialogic questioning techniques paused more often and used more vocabulary words than parents in the directed attention group, who paused the video and pointed out objects on screen, but did not ask questions. As a result, children in the directed attention group received fewer attention cues and chances to encode and retrieve the vocabulary words in the stories – in other words, less attentional and cognitive support from their parents – compared to children in the dialogic group. However, both groups received social support from their parents, as their parents watched with them and modeled attention to the videos. The relative failure of children in the directed attention group on the vocabulary and comprehension measures indicates that social support is not the only mechanism important to children's learning. Some types of parent-child interaction are more effective for teaching; thus, it matters what parents actually do during the interaction.

Children in the dialogic actress group fell between the other groups both in their use of new vocabulary to identify target objects in screenshots and on the story comprehension measure.

The dialogic actress condition was designed to give children the cognitive benefits of questioning as well as some attention benefits (the on-screen actress drew the child's attention to important aspects of the story, and may have made children more engaged in the video). Children in this group did not have the benefit of a social partner watching the videos along with them, as children in the directed attention group did, yet their scores as a group were higher. This indicates that the inclusion of an actress using dialogic questioning may play a potentially positive role in children's learning from video. More research needs to be done with a larger sample, but these results hold promise for the design of effective programs by educational video makers.

On the other hand, children in all groups showed similar, small gains on the vocabulary test using novel drawings (that is, pictures of the target objects that were different from what they actually saw during the videos) to elicit the words. Although contrary to my prediction, this result is not surprising. Children in all conditions saw only the specific referents of the target words that appeared in the video story (for example, they saw only one lighthouse and one badger). Parents' distancing prompts (relating the story to things in the child's life) could have given children in the dialogic questioning group opportunities to compare the video pictures to other instances of the target; however, the chance that parents used such prompts for the precise items from each story that later were tested is relatively low. As a result, children in all groups likely had only the item on the screen in the video storybook as the referent of the new word. Therefore, it is not surprising that they had difficulty generalizing the new word to completely new contexts. In fact, only 9.0% of prompts noted in the parent diaries (across all conditions) were distancing prompts. The percentage of parental prompts during the final lab visit that were distancing prompts was even lower – only 5.42% for the dialogic questioning group and 1.39% for the overall sample.

Regarding children's scores on the standardized vocabulary test, there were two results of interest. First, the two parental-interaction groups (dialogic questioning and directed attention) in this study did have significantly higher post-test than pre-test scores on the EOW-PVT. Children who have conversations with their parents surrounding videos may become more comfortable

using new words and talking with adults in general (such as the researchers). This could serve as another possible mechanism for expressive vocabulary growth. Because children in the dialogic questioning and directed attention groups had parents who paused the videos to allow for conversation, children in these groups may have gotten more experience responding to adults than children in the dialogic actress and regular video groups. This increased confidence in speaking may have led children to say words aloud during the EOW-PVT post-test that they were hesitant to say during the pre-test.

The second result was that the post-test standardized expressive vocabulary scores of children in the dialogic questioning group were not higher at post-test than those of children in the other groups. The relatively short duration of the current study makes it difficult to demonstrate differential gains on a general vocabulary measure. Previous studies of dialogic questioning in which children exhibited gains in expressive vocabulary lasted at least 4 weeks and as long as 6 months between pretest and posttest (Arnold et al., 1994; Hargrave & Sénéchal, 2000; Lonigan & Whitehurst, 1998; Wasik et al., 2006; Whitehurst et al., 1988; Whitehurst et al., 1999; Whitehurst, Arnold, et al., 1994).

Few (if any) of the vocabulary words tested on the EOW-PVT were included in the video stories that children watched during the current study. Thus, growth on the EOW-PVT would not have been directly due to the same mechanisms of parental mediation as growth on the story-specific measures. One possible mechanism for more general expressive vocabulary growth is that parents who are trained to use dialogic techniques with videos might begin to use them in other aspects of daily life (such as storybook reading, or the discussion of real objects). If so, children may learn vocabulary words from other sources through dialogic-style questioning. In fact, 89% of the parents in the dialogic questioning group indicated on their exit questionnaire that they had noticed themselves using questioning while reading storybooks, and 90% indicated they used questioning during other activities. Additionally, I have followed up with 8 of the parents 5-7 months after the study (others will be contacted later this spring). All of these parents

indicated that they have continued to use the specific types questioning that they learned after the end of the study. Thus, gains on a standardized vocabulary measure could be realized months to years after parent training.

In this study, dialogic questioning was effective in increasing preschoolers' story-specific vocabulary and story comprehension scores. Children whose parents were trained to use dialogic questioning increased on these scores more than children who watched the video without being questioned. The scores of children who were asked questions by the video actress fell in between. This suggests that questioning around watching videos could be an important learning tool.

These findings fit well with prior research on parental interaction during video viewing. They support the anecdotal claims of researchers like Ball and Bogatz (1970) who noted that children whose mothers talked to them about *Sesame Street* learned more, and Singer and Singer (1998) who believed that teacher mediation was important for effective teaching from *Barney & Friends*. Additionally, Reiser and colleagues (1984; 1988) showed that adult questioning during *Sesame Street* could increase the number of letters and numbers that children learned from the program. The findings also fit well with Singer and Singer's (1998) claim that an actress can be beneficial if designed to point, label, and explain the way that a parent would.

There are several implications of the current research for parents and educators. First, teachers and parents should be informed of the gains that can be made when they become involved in talking with their children about videos. Videos are often thought of as a negative influence, but educational videos may be useful when used appropriately. Parents should think about videos as they think about storybooks, realizing that they can use videos to create learning experiences for their children. Such experiences are most beneficial when the parents are active, thoughtful participants.

In fact, dialogic techniques may be especially beneficial when parents learn to use them with videos because parents do not usually pause videos to discuss them with children. On the other hand, parents often stop and discuss stories with their children during book reading. Future

research could compare the benefit of training parents to use dialogic techniques with videos versus with storybooks.

Second, if dialogic techniques are an effective learning tool when used both with storybooks and videos, this may be a teaching method that parents and educators could use more generally. If social interaction is an important component of learning, and training parents in dialogic techniques can help provide appropriate social interaction, parents and teachers may wish to use the techniques in other aspects of daily life.

Results from the children who were questioned by an on-screen “dialogic actress” indicate that social contingency does play an important role in language learning. The children’s scores on the vocabulary screenshots and the story comprehension measures fell below those of the dialogic questioning group, indicating that without the responsiveness that occurred during direct interaction with an adult in the room, the dialogic techniques were not fully effective. However, the children’s scores in the dialogic actress group were higher than those of children in the regular video and directed attention groups. An actress on video both may provide motivation for children to pay attention and direct children to relevant content through the *attention* and *cognitive* mechanisms. Compared to a parent or teacher who is present, an actress on video may not be able to adapt as well to a child’s educational needs. However, questions asked by an on-screen actress may enhance children’s learning beyond what they learn from a video without questioning. In the current study, all 20 children were responsive to the questions of the actress on video. Additionally, most parents indicated that they and their children enjoyed the stories that incorporated the questions of the actress.

One alternative explanation for why the performance of the group who watched the dialogic actress fell below that of the dialogic questioning group is the familiarity of the questioner to the child. Perhaps parents play a special, familiar role such that children learn more from parents than strangers. Studies with younger children have shown that the familiarity of a demonstrator did not affect children’s imitation of their actions (Devouche, 1998; Seehagen &

Herbert, 2010). However, older children learning vocabulary words may be influenced in different ways. Future research should address this issue by having the same adult questioner appear on the video and interact with children in the other groups.

Finally, videos can be an important tool for educators because preschoolers enjoy watching them. Given that questioning by an on-screen actress is effective, dialogic techniques can be incorporated into future educational videos designed for preschoolers. For many parents, it is not practical to be engaged with their child every time he or she watches videos. Thus, even though videos may not be as effective on their own as they are with parental mediation, a well-designed video may still offer educational benefits.

## APPENDIX A

### DIALOGIC QUESTIONING PARENT HANDOUT

In dialogic questioning, you and your child become actively involved in the video by having conversations about the story. You become the listener, questioner, and audience for your child. Your child becomes the teller of the story. With each repetition of the story, you should pause more often and let your child tell more of the story.

The **PEER** sequence will help you remember four steps to involve your child in the story:

- 1) Prompt your child to say something about the story
- 2) Evaluate your child's response (that is, decide how correct or complete it is)
- 3) Expand on your child's response by re-phrasing or adding information
- 4) Repeat the prompt to make sure your child has learned from what you added

The word **CROWD** will help you remember different types of prompts that you can use in the first step of the sequence, to get your child talking about the story:

#### Completion prompts

Leave a blank for your child to fill in. These prompts work especially well with a rhyming or repetitive story. For example you might say, "I'll huff and I'll puff \_\_\_\_\_," leaving your child to fill in "and I'll blow your house in."

#### Recall prompts

These are questions about something that has happened in the story. You can use recall prompts at the end of a story you have just read. Since you will be watching the video

stories multiple times, you can also use recall prompts at the beginning or the middle of the story to ask your child to remember the story from previous viewings.

#### Open-ended prompts

These prompts encourage children to describe what they see on the screen. For example, “Tell me what is happening here.” These prompts help your child become more fluent and able to express himself/herself. They encourage children to pay attention to the details of the story.

#### Wh- prompts

Start out asking “what” questions. As your child becomes more familiar with the story, add “where”, “when”, “why”, and “how” questions. These questions help your child to use new vocabulary.

#### Distancing prompts

These prompts help a child relate what is happening in the story to events in their life. For example, ask “Which of these animals did we see at the zoo last week?” Distancing prompts help a child build a bridge between videos and the real world, as well as helping with conversational abilities and the ability to narrate a story.

Remember to watch each story **3 to 5 times per week** to allow your child to become familiar with the story’s plot and vocabulary. Each time you watch it, allow your child to tell you more about the story.

## APPENDIX B

### DIRECTED ATTENTION PARENT HANDOUT

We are interested in what your child learns from stories on video on his/her own, without being explicitly taught. We would like you to draw your child's attention to what is happening on the screen (e.g., point to the screen or say "look at that!") and help to interest him/her in the story. Please, however, do not question your child about the story elements – rather, let him/her consider them on his/her own.

We would like you to pause the video at least once per minute and direct your child's attention to what is on the screen. Don't ask your child a question; instead make comments about what is happening. For example, "Wendell is doing \_\_\_," "Look, there's a \_\_\_\_\_!" or simply, "Look at that!"

With each repetition of the story, you should pause more often.

We want watching the video to be a fun, social experience that children share with their parents. But we also want to see what children learn without being questioned or taught.

Remember to watch each story **3 to 5 times per week** to allow your child to become familiar with the story's plot and vocabulary.

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