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Fostering Preschoolers' Narrative Comprehension through Inference Making and Story Reenactment Training

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Fostering Preschoolers' Narrative Comprehension
through Inference Making and Story Reenactment Training
Aline Barbosa de Sá

A Dissertation

Presented to the Graduate and Research Committee
of Lehigh University
in Candidacy for the Degree of
Doctor of Philosophy

in

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Aline Barbosa de Sá

Approved and recommended for acceptance as a dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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Fostering Preschoolers' Narrative Comprehension Through Inference Making and Story Reenactment Training

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ABSTRACT

This study compared the contribution of two inference training programs, Story Grammar and Narrative Dynamics in promoting narrative comprehension abilities among preschoolers. It also tested whether reenactment, as a postreading activity, promoted children's narrative comprehension differently, if it followed either of these two reading programs.. While we expected that both book reading training programs would improve children's overall narrative comprehension abilities, we also expected that children in the Narrative Dynamics condition would experience greater gains than children in the Story Grammar condition. And this would be especially true when reenactment followed the narrative dynamics training program. We further expected these gains would be reflected in children's ability to answer inference questions.

This study used a pre- and post-test design with an eight week bookreading training program that was conducted twice per week. A total of 51 low-income 4- to 5-year-olds participated in this study, 12-14 in each of the conditions... During each of the book reading programs, the experimenter read aloud a book to groups of 4-5 children and asked questions according to the training condition being conducted: story grammar or narrative dynamics. For the story grammar training, the questions were aimed to bring out an overall story structure schema, while for the Narrative Dynamics inference training, to help children build story knowledge by prompting children to understand the character's perspective, the effects their actions had on others, activating relevant background knowledge., and predict what is going to happen next. After the bookreading, half of the children in one condition reenacted the story just read and the other

half participated in an art activity. A total of eight books were read twice to the children, one book for each two days of the intervention. Children were pre- and post-tested on narrative comprehension measures (assessing literal and inferential knowledge), narrative production measures, vocabulary, and theory of mind tasks.

Supporting our hypotheses, it was found that children in the Narrative Dynamics condition showed greater narrative comprehension gains than children in the Story Grammar condition, and this was true across all narrative comprehension measures. Results further indicated that the comprehension gains were driven by gains in children's inference making abilities, as hypothesized, and not by their ability to answer literal questions. It was also found that Narrative Dynamics helped improve children's first order theory of mind understanding more so than did Story Grammar. However, no such improvements were found for children's vocabulary gains or other theory of mind abilities.

Concerning the differential effects of reenactment on children's narrative comprehension, our results indicated that children participating in Narrative Dynamics plus the Story Acting condition demonstrated greater comprehension gains than children participating in Story Grammar conditions, but this was only true for a task that asked children to tell a story based on pictures. Theory of mind results revealed an overall advantage of Story Acting over Art Activity for second order theory of mind ability, however no interactions were found with the different book reading conditions.

These findings suggest that helping children build story knowledge through characters' perspective and their coordination, story predictions, and links between the story and background knowledge is more beneficial for promoting understanding of the

story than providing them with an overarching somewhat abstract story structure schema. These findings also point to the importance of understanding narratives beyond the structure proposed by story grammar researchers, but as a constant interplay between plot (structure) and characters, unfolding and expanding through the textual dynamics.

CHAPTER 1: INTRODUCTION

The aim of this study is to examine the impact of different inference training programs on preschool children's narrative comprehension abilities. Narrative comprehension refers to one's ability to derive an overall interpretation of the state of affairs described in a story while going beyond the meaning of specific words or sentences (Cain & Oakhill, 2007; Nation, 2005; Oakhill & Cain, 2007; and Perfetti, Landi & Oakhill 2005). It has also been described as "the identification of the meaning of the text as a connected whole rather than as a series of individual words and sentences" (Rapp, van den Broek, McMaster, Kendeou, & Espin, 2007, p. 292).

To clarify, when talking about the object of comprehension – the text - , comprehension scholars tend to refer to it differently according to their focus. Specifically, while some researchers refer to it as text, others refer to it as narrative. Researchers using the term "text comprehension", do so as a way to refer to the comprehension of more local (text specific) connections needed to interpret a given passage. This terminology is mostly used among those focusing on reading comprehension (Kintsch, 1998, and Kintsch & Kintsch, 2005). Other researchers use the term "narrative comprehension" when referring to the connections needed to understand the passage more globally, across different levels of the text. This terminology is used by researchers who focus more broadly on comprehension, either listening or reading (van den Broek et. al, 2005 & van Kleeck, 2006). For my purposes, in my review I will use the terminology proposed by each researcher in order to contextualize their claims, but when making my own claims or conclusions, I will use the term "narrative comprehension" since my focus is to promote an encompassing understanding of stories.

That being said, scholars of text comprehension (Kintsch, 1998; Kintsch & Kintsch, 2005; van den Broek, Kendeou, Kremer, Lynch, Butler, White & Lorch, 2005; and Rapp et al., 2007) have argued that in order to achieve successful understanding of a

text, two types of processes come into play, lower- and higher-level processes. Lower-level processes involve the translation of oral (or written) codes into meaningful language units (e.g., sounds to words). While these processes are certainly important, scholars argue that they are not sufficient. In order to reach a successful understanding of a story, reading comprehension researchers (Cain, Oakhill & Bryant, 2000; Oakhill, Cain & Bryant, 2003; Rapp et al., 2007; van Kleeck, 2009; and for review, see Cain & Oakhill, 2007) have argued that higher level processes are the ones driving the broader connections and interpretations of the text. It is these processes that allow text comprehension to move from individual word understanding to a more encompassing understanding of the story. Researchers propose that without successfully developing or using these higher level processes, comprehension would falter. In fact, problems with higher level processes have been labeled the “hallmark of poor comprehension” (van Kleeck, 2009, p. 628).

To illustrate the importance of higher level processes to text comprehension, we will use the following example:

“James went to the beach for a picnic with his friends. He stepped on some broken glass. His friends took him to the hospital.”

At the level of lower level processes, the words in this text are fairly familiar. If a young child is asked to listen (or read) these words individually, they are very likely to know the meaning of each one. However, to understand this short passage, the listener’s understanding needs to go beyond the definitions of each word; it requires bridging together aspects of the text in order to reach the meaning it is attempting to convey. For example, to understand the meaning of the first and second sentence, the listener must

efficiently connect the meaning of the first sentence with that of the second. Specifically, the listener (or reader) must understand that the pronoun “he” in the second sentence refers to James, who was introduced in the first sentence. In this case, the pronoun links the two sentences together and allows their meanings to be integrated, which in turn, permits the listener to understand that the first sentence is introducing the main character and providing the setting, thus establishing a context under which the second sentence must be understood. Furthermore, in order to connect the first and second sentences to the following sentence, more connections are required. If one looks back at the text, nothing in this specific excerpt explicitly says why James was taken to the hospital. The meaning of the third sentence on its own is unclear unless the comprehender goes beyond the explicit information provided by the text and spontaneously connects the second sentence as the implicit cause for the hospital trip. That is, James was taken to the hospital because he stepped on some broken glass. Finally, although to the proficient reader it is understood that James went to the hospital because he *cut* his foot on the broken glass, this connection between the text and the reader’s background knowledge is only possible if the reader has that specific knowledge. Had the reader not known about experiences with broken glass, he would not be able to fully grasp the meaning of this simple passage.

Through this example one can see the importance of going beyond word meaning or decoding to effectively understand a given text. Specifically, one can begin to understand the significance of higher level processes to comprehension, illustrated by this need to bridge elements and expand the text beyond its explicit and implicit elements. This ability to connect textual and non-textual elements is referred to as *inference making*. Among the abilities involved in higher level processes, inference making abilities are

argued to be at the core of comprehension (Cain & Oakhill, 1984, 1999, 2004, 2007; Nation, 2005; Perfetti et al., 2005; and van den Broek et al., 2005). Inferences can be of different types and extend between different textual and non-textual elements. For example, they can be referential, in order to keep track of characters (or objects) that move through the text; they can be connections of explicit or implicit textual information; or they can connect the individual's background knowledge to the information provided by the text. These connections can also be local, between different sentences, or global, between and across paragraphs, idea units, or chapters.

In assessing the contribution of inference making abilities to comprehension, researchers have compared the importance of inference making abilities along with lower-level abilities, such as decoding, to memory and vocabulary (Kendeou, van den Broek, White, & Lorch, 2009; Oakhill, 1984; and Cain, Oakhill & Bryant, 2003, 2004). Overall, they found that not only is inference making important and uniquely contributes to text comprehension, but it does so above and beyond children's basic decoding, memory, and vocabulary skills. In fact, in one such study, Kendeou and colleagues (2009) assessed the contribution of inference making and vocabulary to children's comprehension abilities over time and found that while vocabulary and inference making abilities appeared to be important during the early years, as children got older, inference making abilities became the most critical component of comprehension. In fact, researchers have argued that difficulties in comprehension (specifically, reading comprehension) may occur in older children for two reasons: either because inference making abilities may not be well developed (van Kleeck, 2008), or because some listeners (or readers) have not developed these abilities appropriately (Oakhill, 1984).

Given the significance of inference making abilities to comprehension, one can understand why fostering this ability has been the major focus of interventions seeking to promote text or narrative comprehension, especially for school-age children. Although many studies have focused on narrative promoting comprehension abilities in school-age children (an age group that heavily relies on their comprehension abilities for listening to lessons or reading school books), children seem to acquire the foundation for comprehension much earlier. This is what some researchers have referred to as “emergent comprehension” (Dooley & Mathew, 2009). Emergent comprehension is defined “as the period when young children, prior to conventional reading, engage in meaningful experiences that stimulate the development and use of [comprehension] strategies with potential to affect later reading comprehension” (p.2). Lending evidence to this idea, Kendeou and colleagues (Kendeou et al., 2009) found that preschoolers’ comprehension abilities are one of the best predictors of children’s later reading comprehension competence. Specifically, they found that preschoolers’ narrative comprehension, as assessed through listening to orally presented and televised stories, predicted later reading comprehension above and beyond basic vocabulary and decoding skills. They also found that narrative comprehension abilities assessed during the preschool years were a better predictor of children’s reading comprehension abilities than narrative comprehension abilities assessed at children’s entry to school. These findings not only indicate that preschoolers’ narrative comprehension abilities are present at an early age, but that these early abilities also affect and predict children’s later reading comprehension abilities, the ultimate goal of literacy.

Because inference making abilities are an important component of reading comprehension, it follows that comprehension difficulties at an early age are likely to lead to comprehension deficits at a later age. Van Kleeck (2008) has argued that, while reading interventions conducted with school-age children are important, they may not be as impactful because they attempt to remedy already established comprehension problems. For this reason, van Kleeck (2008) has proposed that interventions targeting narrative comprehension, should focus on strengthening comprehension during the preschool years, before these difficulties become established. Although fostering comprehension abilities in preliterate children is important, few studies have targeted this population.

To address van Kleeck's call, the purpose of the current study was to develop and assess narrative comprehension training programs aimed at fostering preschoolers' inference making abilities as a way of promoting comprehension. Before I introduce the training program under consideration, I first review the studies that have focused on promoting inference making abilities in children. In the process, I will present and evaluate the strategies used, the generalizability of the results, and the feasibility of these strategies with preschool children.

Promoting Inference Making Abilities: Focus on Structure vs. Focus on Text

Due to the importance of inference making abilities to comprehension and the need to promote comprehension abilities in children, researchers and educators have developed training programs mostly targeting language delayed children and children who are at risk for language delays (ie. low-income children). Through these programs, researchers have demonstrated that a variety of strategies can be effectively taught to

children in order to facilitate narrative comprehension. Among these strategies, two broad types of programs seem to emerge in this literature: (1) those that focus on promoting inferences related to a preset story structure, and (2) those that focus on promoting text-based inferences,. I will review these programs in turn.

Story Grammar Training Programs: Focus on Structural Inferences.

To understand the importance of structural inferences to narrative comprehension, one has to first understand what has been argued in terms of how narratives are organized. One prominent line of research in the field of narrative development is the story grammar approach. Proponents of this approach (Stein & Glen, 1979; and van den Broek et al., 2005) have argued that narratives have a specific structure that serves a dual function: it helps the story unfold, while also holds it together. Specifically, Stein (1982) and Stein and Glenn (1979) have argued that the basic structure of a narrative is organized around the goal of the main protagonist who reacts to an initiating event, or state lack, and attempts to change it. This basic structure is referred to as an “episode” that consists of five categories. The first category, *initiating event*, marks some change in the protagonists’ environment that motivates the formation of a goal. The second category, the goal, or *internal response* is the most critical part of the story since the narrative is organized around the goal of the protagonist. This category contains not only the goal, but also thoughts and plans about how to achieve this goal. The function of this category is to motivate the protagonist to carry out a set of explicit actions, defined as the *attempt* category. This is the externalized form of thoughts or plans related to goal achievement. This, in turn, results in the fourth category, *consequence*, which reflects whether or not the protagonist attained the goal. Finally, the *reaction* category varies according to the

consequence. If the protagonist attained the goal, the category may include information related to the evaluation of the goal attainment as well as a moral summarizing what the character may have learned from attaining the goal.

To illustrate, in the story of “*Goldilocks and the Three Bears*” a story grammar analysis will parse it in the following ways: *Once upon a time there were three bears, the momma bear, the poppa bear and the baby bear and they lived in a tiny house in a great big forrest* (setting). *One day a little girl named Goldilocks came by* (initiating event). *She was surprised to see the house and noticed it was empty* (internal response). *She went inside to find the three bears gone and ate the baby bear’s food, broke the baby bear’s chair, and fell asleep in the baby bear’s bed* (attempt). *The bears return to find the things eaten and broken, and to find Goldilocks in the baby’s bed* (consequence). *Goldilocks ran away* (reaction). *The end.*

Another way to view this is that, story grammar refers to a set of causal connections related to how a narrative is structurally put together (Dymock, 2007). Although one could argue that there are other narratives with different underlying structure, story grammar researchers argue that narratives that violate these rules are unnatural and thus more difficult to comprehend (Baker & Stein, 1981). Furthermore, they propose that the organizational structure put forward by story grammar is the most relevant and prevalent since it is the one found in novels and children’s storybooks (Graesser, Golding, & Long, 1991). Due to the prevalence of this underlying narrative structure in verbally told stories as well as in novels, it follows that one way to foster young children’s comprehension would be to explicitly teach them the story grammar structure. Specifically, teaching children story elements, what they represent, and

modeling how they are connected to each other, one provides children with a structural inference schema that can be used to aid comprehension of narrative texts. By teaching children the skeleton of a narrative and how the elements are related, one is giving them an important cognitive resource which can be used to aid comprehension. In fact, researchers have argued that specific instruction on story grammar elements helps children identify the main aspects of the story as well as how it is organized into a plot structure (Paris, 2003).

As my review will show, research focusing on structural inferences, through teaching story grammar elements, have mainly focused on fostering narrative comprehension (specifically reading comprehension) of elementary school children and beyond, and seldom focused on younger children. Also, most of them have targeted either language delayed, ESL or low-income children who are at risk for language delays. Among the various strategies used to teach story grammar components to school-age children two have been the most prevalent: (1) story mapping techniques, and (2) teaching question-answering techniques.

Story Mapping Technique. The story mapping technique provides children with graphic organizers that need to be filled with information derived from the text. The graphic organizers consist of story grammar labels, such as characters, setting, initiating events, problem, resolution, and consequence, connected from top to bottom through straight lines. These story grammar labels are blank so that children can fill them in with information derived from the story being listened or read to.

The few studies that have used the story mapping technique to promote narrative comprehension have mostly focused on children with some language difficulties.

Schoenbrodt, Kerins, and Gesell (2003) taught 12 ESL 6- to 11-year-olds the story grammar components through a 7-week training program using the story mapping technique. During training, the experimenter met with small groups of children once a week, taught them the meaning of different story grammar components, modeled the identification of these components by reading children a storybook, and made use of a story map to fill in the missing information. Children were assessed through pre and post-intervention tests on their ability to retell an orally presented story and to generate a story from a story stem. These stories were coded for the inclusion or not of story grammar components. The results indicated that, after the training, children were able to provide more story grammar elements in their story productions for both retelling and the story stem tasks. However, no information was provided as to the type of story elements the children included by post-test. It is not clear then whether the elements included indicated improvements in story coherence or they simply comprise isolated pockets of story knowledge. Furthermore, because no control group was used, it is not clear whether this method promoted story-grammar improvements beyond mere exposure to stories.

Similar results were found in a study that used the story mapping technique and targeted children with language delays. Idol and Croll (1987) trained 5 language delayed 9- to 12-year-olds using this technique. The children were trained individually until they were 80% correct in abstracting information from the text and filling out the story maps. During training, children were first explicitly taught story elements, and later on, through reading different stories, how to use story maps and assign elements on the map. Then children were left to practice on their own for awhile. The children were pre- and post-tested on their comprehension of new stories by using comprehension questions and

through story retelling. Results were evaluated in terms of children's individual rate of change.

All five students improved on their ability to answer comprehension questions about story grammar components and also included more story grammar elements in their retellings. Both improvements were present two weeks after the training was over. However, because no information was provided as to the types of questions and coding conducted, one cannot be sure whether children actually understood the implicit connections between story elements or whether children's responses were simply reflected isolated knowledge of story grammar elements. To better assess whether this type of training would generalize to other aspects of narrative comprehension, one would need to include a standardized narrative comprehension task, or a task that focused on broader narrative comprehension abilities. Furthermore, since no comparison group was included, it is not clear whether it was mere long term exposure to stories or the story grammar techniques that lead to the increase in children's inclusion of story grammar elements.

To address some of the methodological issues just outlined, Idol (1987) used the story mapping strategy while working with small groups of 11 language-delayed 8- to 9-year-olds and added a comparison group. She trained teachers to explain the story grammar components, who modeled the identification of these components, as well as asked children to place the knowledge derived from the stories to the story map. Children worked together in small groups and were also allowed time to practice individually. Similar to the Idol and Croll (1987) study, children were required to achieve a minimum of 80% correct performance before post-test. To better assess the effectiveness of the

training, Idol worked with a multiple-baseline design, in which one group started the intervention earlier while the other only started it when the first group had finished it. In this way, the subsequent group acted as a control for the earlier one. Idol also added a small control group of 5 children who were matched in age and language abilities, but received no intervention. All groups of children received pre- and post-tests, with the post test being immediate and delayed (two weeks post-intervention). Children were assessed on their understanding through comprehension questions of stories read to them as well as a standardized reading task (Neale Analysis of Reading Ability).

Although children who participated in the intervention improved on their ability to answer comprehension questions that focused on story grammar components and again they maintained this improvement two weeks post-intervention, similar improvements were found with the control group. In fact, there were no differences between control and intervention groups at the end of the intervention. In addition, no improvements were found in the standardized task of reading comprehension for either experimental or control groups. It should be noted that this reading task focused on literal and inferential questions, thus broader aspects of narrative comprehension and just story grammar elements were assessed. It seems then, that when addressing some of the methodological limitations of the Idol and Croll's (1987) study, such as including a control group as well as using a standardized comprehension task, story mapping training was not as effective in promoting children's narrative comprehension.

In short, while story mapping technique appears to be effective when used with language delayed or ESL elementary school children, this improvement seems to be weak. While these studies claim improvements, when comparing the results to a control

group that received no training, no differences were found (Idol, 1987). Therefore these positive results need to be taken with caution.

Question-Answering Technique. Another technique used to teach children story grammar components has been training them to use specific question-answering techniques. This involves teaching children not only the specific story grammar components, but also the types of prompts and questions that can be asked in order to remind the child whether or not they have abstracted all the necessary story grammar information from the text. While this technique appears to be similar to the story mapping one in that children are also required to abstract specific information from the text, the key difference is that in the question-answering technique, children do not have a graphic aid to remind them of the information, rather they make use of a set of scripted questions to aid their memory. In fact, it appears that this is a method used with slightly older children.

There is only one such study using this technique and results from this study are similar to the story mapping studies. Carnine and Kinder (1985) trained 27 language delayed 10- to- 12-year-olds in abstracting story grammar components and compared its effectiveness to a summarization technique. They used nine sessions to individually teach children specific questions to help aid their understanding of story grammar components. For the story grammar training group, children read stories and were taught questions such as “Who is the main character of the story about?” “What is the setting?” “What was the problem?” and “What happens at the end?” Questions were taught through direct instruction on story grammar components as well as modeling, repetition, and feedback. For the summarization training group, teachers read short excerpt of the story at a time

and asked children to think about what was read and make a short summary statement about the excerpt read. Children in both training groups were assessed on their understanding of stories read to them through both comprehension questions (literal and inferential) and retellings that were coded for idea units. This testing was done before, immediately, and two weeks after training.

The results indicated that, following training, children's comprehension of story and retellings significantly increased and these gains were maintained even two weeks after the intervention was over. However, no differences were found between the two training conditions. Despite the advantage of this study that the comprehension questions were not limited to story grammar components, because no control group was included and no differences were found between training conditions, we cannot be sure whether there was a significant improvement in children's comprehension due to effective training or to the simple exposure to books.

Combining Story Mapping and Question-Answering Techniques. While the studies reviewed so far have focused on teaching story grammar components using story mapping or question-answering techniques, a few other studies have combined both of these methods.

For example, Westerveld and Gillon (2008) trained for six weeks 10 language delayed 7- to 9-year-olds in small groups on story grammar understanding. Children were introduced to storybooks, were encouraged to think about what makes a good story, identify story elements, and were provided with feedback when telling stories based on books. Feedback was provided through the extensive use of question-answering, story maps, and story element cue cards (cards with story component names, which were used

to prompt children's storytellings). Children were encouraged not only to identify the story grammar components, but also to tell stories keeping in mind the structure provided by these components (order of elements). Similar to Idol's study (1987), Westerveld and Gillon used a delayed intervention design (or multiple baseline design) in which the second group only commenced their training once the first group had finished theirs, and thus served as a delayed control for the first group. They also added a normal developing control group, composed of 10 7- to 9-year-olds, who received no training. Children were pre and post-tested on their listening and reading comprehension, as well as narrative retelling.

Overall, results revealed a significant increase on children's listening comprehension, as assessed through questions focusing on story grammar components. Results also indicated that children in the training condition, despite their initial language limitations, outperformed their normal developing peers in their understanding of story grammar information. However, this improvement did not generalize to retellings or reading comprehension tasks.

Similar results were found in a study by Cable (2007), while also using a combination of different techniques to promote story grammar understanding. She trained 18 language delayed children ranging from 7 to 9 years of age using a wide combination of methods. For 8 weeks, the children were read books and actively taught story grammar components through specific descriptions, question-answering techniques, story mapping, oral narrations, feedback, as well as story reenactments with puppets. A control group was also included that consisted of 18 language-delayed 7- to 9-year-olds who did not participate in any training. Children were pre- and post-tested on narrative retelling,

picture sequence, and a single picture task, as well as on their comprehension of an orally narrated story, which consisted of questions requiring implicit inferences about motivations and internal states of characters. Results indicated that, in comparison to the control group, children who received story grammar training significantly improved in their ability to tell stories through picture sequence and single picture tasks, as measured through the story grammar component, length, as well as complexity of stories. No differences were found, however, for retellings and comprehension of oral stories. While these results seem to indicate that children's knowledge of story grammar components improved in comparison to the control group, they also indicate that story grammar training did not generalize to broader comprehension questions that require other types of inferences to be made (i.e. character's feelings and motivations).

While all of the studies reviewed so far have been conducted with children with language delays, few studies have also been conducted with normal developing children who demonstrate no language difficulties. One such study was conducted by Garner and Bochna (2004) who attempted to promote 37 normal developing first graders' (6-year-olds) narrative comprehension. They did this through a 16 week guided story telling program that imparted story grammar knowledge to a large group of children while using storybooks. Specifically, children were taught story grammar components while actively being read storybooks, answering questions, and discussing the different story elements. To assess the effectiveness of this intervention, Garner and Bochna included a comparison group which consisting of 32 6-year-olds who children listened to stories in the same frequency, but the discussion did not focus on story grammar components. Children were pre- and post-tested on their ability to retell and answer comprehension

questions from an orally presented story, as well as from a story independently read by the child. Results indicated that children who participated in the intervention were able to answer more comprehension questions that referred to story grammar elements than children who did not receive the training, independently of the story's mode of presentation (oral or read). However, results revealed no differences between intervention and comparison group concerning their overall ability to retell a story.

With an even younger population, Stevens, Van Meter, Warcholak (2010) also attempted to promote young children's narrative comprehension through a Story Structure Instruction program (SSI). Specifically, they used explicit instruction and practice to teach 321 low-income 5- and 6-year-old children about the structure of stories. The program extended throughout the entire school year and was conducted with entire classrooms. In this program, teachers explained the story grammar elements, taught children how to identify the elements and used question-answering techniques within the read-alouds as a way to promote narrative comprehension. To assess the effectiveness of this intervention, they included a comparison group consisting of 121 low-income 5- and 6-year-olds who listened to the same set of books with the same frequency but did not participate in direct instruction of story grammar elements. Children were pre- and post-tested on their ability to retell and answer story grammar comprehension questions from an orally presented story, as well as post-tested on a standardized reading comprehension task (Metropolitan Achievement Test). Results indicated that 5- and 6-year-olds who participated in the SSI training were better able to introduce a character and included more resolutions in their recalls than children in the control group. For comprehension questions, 5- and 6-year-olds participating in the SSI training included all story grammar

elements more so than children in the control group. To assess the overlap between both tasks the standardized comprehension task was correlated to children's total retelling score (production and comprehension). Results revealed a small shared variance of 9%, indicating that the target retelling task is not assessing children's reading comprehension gains at its more encompassing level.

In short, when assessing children's understanding of story grammar elements, both story mapping and question-answering techniques have been demonstrated as effective for school-age children. However, the training on this type of story understanding does not appear to generalize to broader aspects of comprehension, as assessed through standardized tests of narrative comprehension or broader comprehension tasks. This finding is consistent across studies and seems to indicate that children are not connecting these elements coherently as is required for good story understanding, and consequently for actual improvements in comprehension abilities.

Strategies used with Pre-literate Children. While story mapping and question-answering techniques have been the most prevalent strategies in teaching story grammar components to school-age children, when attempting to foster story grammar understanding in younger children, researchers have employed more concrete and simplified strategies in order to make them more appropriate to this age group. Specifically, they have embedded the teaching of story grammar components in the context of book reading, playing games, or telling stories.

Morrow (1985a) trained 89 normal developing 5-year-olds on story grammar inferences through guided story retelling practices. She developed an 8 week training program which focused on listening and actively retelling stories. Specifically, children

listened to a story as a group and were instructed to individually retell the same story to an experimenter in the classroom. During these retellings, the experimenter focused on helping and teaching the child story grammar components by giving them feedback and asking questions that helped them in their retellings. To assess the effectiveness of this program, Morrow included a comparison group of 5-year-olds who were also read stories, but instead of retelling the story to the experimenter, they were given a drawing activity. Children, in both conditions, were pre- and post-tested on their ability to answer comprehension questions about an orally presented story that tapped their awareness of story grammar components, as well as, literal and inferential information. They were also tested on their ability to retell a story.

Results indicated that overall children who participated in the story grammar training answered more comprehension questions correctly than the comparison group, and their retellings included more story grammar elements in the proper sequence than children in the control group. However, because the comprehension questions were taken as a composite score, we are not able to tell whether the training affected children's understanding of all comprehension questions (story grammar, literal and inferential), or whether the results were driven by children's understanding of story grammar components.

Similar results were found by Morrow, Sisco, and Smith (1992) with language delayed children, however they teased apart the gains in terms of the types of comprehension questions. Specifically, they trained 12 language delayed 4- to 7-year-olds for 8 weeks in the same program. Groups of children were read a story and were asked to individually retell the same story to an experimenter, who provided them with

guided feedback. During the retelling, the experimenter helped the child to include story grammar components by asking contextualized and focused questions, and through discussions that focused on the ordering of events. To assess the effectiveness of the intervention, they included a comparison group which consisted of 12 language delayed children of similar age who were instructed to draw pictures instead of retelling the story read. Children were pre- and post-tested on their ability to answer comprehension questions from an orally presented story that tapped story grammar components, as well as literal and inferential information. They were also assessed on their ability to retell and produce a spontaneous story.

Results indicated that overall, children in the story grammar training group answered more comprehension questions correctly than in the comparison group. When looking specifically at the questions children answered correctly, Morrow and colleagues (1992) indicated that the results were mainly driven by children's increased understanding of story grammar components and did not generalize to literal and inferential questions. Concerning retellings and spontaneous stories, they found that children in the intervention group included more story grammar components in their stories than did children in the comparison group, however when looking at the specific components being added, children appeared to add mainly settings and resolutions, elements that seem to be disconnected and do not allow for a coherent story.

With an even younger age group, Hayward and Schneider (2000) also aimed to promote story grammar understanding in language delayed 4- to 6-year-olds. Their program lasted 6 weeks and children were trained individually. During these training sessions, children were taught story grammar components through concrete explanations

(i.e. explanations that used examples from the book being read) and by making use of different story grammar practice activities, such as cue cards (cards with story grammar component names that were used to prompt the child to add or remember a component). In addition, they asked the children to sequence stories, to identify missing story components, and reformulate scrambled stories. Children were also given daily opportunities to tell stories to different adults and they received feedback on these stories. A total of 13 children were tested but no control group was included. Children were pre- and post-tested on a narrative production picture sequence task. Results indicated that children's productions significantly improved over time, and that this was true in terms of story grammar information included, as well as the overall episode complexity (how many story grammar elements were included in the story). However, because no control group was added one cannot assess whether these results were due to the training or to exposure to books.

In short, similar to the studies with school-age children, studies conducted with young children have found that using embedded story grammar training promotes children's understanding of story grammar components. Also, similar to the findings of studies conducted with school-age children, the studies reviewed above seem to indicate that training young children on story grammar understanding does not generalize to other aspects of narrative comprehension, such as literal and broader inferential questions.

General Summary on Story Grammar Training. Studies conducted with *school-age children* have consistently found that training children on story grammar elements, independently of using story mapping techniques or question-answering techniques, allows for better abstraction of story grammar components as seen through children's

answers to story comprehension questions (Garner & Bochna, 2004, Idol, 1987, Morrow et al, 1992, Westerveld & Gillon, 2008) as well as the increased inclusion of story grammar components in children's narrative productions (Cable, 2007, Hayward & Schneider, 2000, Stevens et al., 2010). Specifically, these studies have indicated that making use of a story map or using question-answering techniques allows children not only to become more aware of story grammar elements, but also to better identify these elements within a story. Similarly, the few studies conducted with *children younger than 6 years* have provided evidence that embedding story grammar strategies in book reading interactions are effective in training young children's awareness and understanding of story grammar components, assessed similarly through comprehension questions and retellings.

While these results seem promising, two limitations are evident. The first relates to the persistent methodological shortcomings in these studies. Because the majority of these studies focused their narrative training on language delayed children, as a way to remedy comprehension problems, most of them do not include comparison groups. Without a comparison groups one questions whether the increase in children's comprehension abilities simply reflects the systematic exposure to stories or whether these increases are due to the active training on structural inferences, as captured by training on story grammar elements. Nevertheless, few studies did include comparison groups. When comparison groups were included, some studies found an advantage for the story grammar training group (Cable, 2007; Westerveld & Gillon, 2008) and others found no difference between groups (Carnine & Kinder, 1985, and Idol, 1987). To address this issue, more systematic comparisons need to be conducted. The second limitation refers to

lack of generalizability of the findings. Within the studies that found an advantage for the story grammar training in comparison to control groups, their effects seem to be limited to children's understanding of specific story grammar elements and does not generalize to broader comprehension abilities. In fact, in the few studies that included a standardized comprehension test or tasks with broader comprehension questions, no increases in comprehension were found.

Text-based Inference Training: Focus on Text. Although structural inferences, as captured by the story grammar approach, are an important component of inference making abilities, they are not the only ones required for successful narrative comprehension. Other researchers who have focused on promoting text comprehension (e.g., Cain & Oakhill, 1984, 1999, 2004, 2007; Gillam, 2007; Nation, 2005; Perfetti et al, 2005), have argued that other types of inference making abilities are also required to help comprehenders make textual connections. Specifically, they propose that for text comprehension to take place, comprehenders need to make use of literal textual information, presented at different points of the text, to make local connections within the text, as well as the individual's background knowledge to fill in gaps and create the links required for textual understanding. In addition, predictive inferences (*"what do you think will happen next?"*) are necessary for understanding sequencing of events, and associative inferences (*"why do you think [character1] is upset at [character2]?"*) for understanding interactions between and across characters, as well as between and across events. Specifically, while associative inferences prompt the listener (or reader) to connect story information to better motivate story events, predictive inferences prompt the listener (or reader) to use connected story information in order to move the story

forward. These inferences are important for comprehension as they help the listener build their story knowledge inline with the natural unfolding of the story events. In line with this, Gillam (2007) argues that these inferences (i.e. predictive and associative), are necessary for providing children with the general ability of deriving an understanding of stories that may or may not follow the structure proposed by story grammar researchers. In sum, while structural inferences seek to promote comprehension through a top-down process, text-based inferences attempt to do the same through a bottom-up process.

To promote text-based connections, researchers in this line of research have created their own stimuli as a way to actively train children on the type inference being fostered. By creating the text, researchers were better able to tailor their training and ask questions that address the inferences being targeted. Specifically, for text-based inferences, they have mostly focused on promoting predictions, associations, and connections to background knowledge (Carmin, Kameenui, & Woolfson, 1982; Carmin, Stevens, Clements & Kameenui, 1982; Hansen and Pearson, 1982; Oakhill & Yuill, 1988; and McGee & Johnson, 2003).

Question-Answering and Discussion Techniques. The specific technique aimed to promote text-based inference making abilities has not varied much across studies (Carmin et al, 1982; Hansen & Pearson, 1982; Oakhill & Yuill, 1988; and McGee & Johnson, 2003). Researchers incorporate questions and discussions, during and after reading, that aim to make children reflect and connect important explicit and implicit information. Specifically, they ask and teach children questions like: “*Why do you think this happened?*” “*What do you think is going to happen next?*” “*How do you think [Character1] said that to [Character2]?*” “*Why do you think [character] felt this way?*”

“*Why do people go to the hospital?*” etc. By teaching children these types of questions, encouraging them to discuss the questions, and teaching them the predictive behaviors necessary to coherently connect a story, one is providing children with knowledge about how story information comes together based on elements provided by the text, as well as knowledge about how a story moves forward through character’s intentions and motivations.

Similar to story grammar training, text-based inference training has been primarily conducted with school age children. However, in contrast to story grammar training, that has mostly targeted at-risk or language delayed children, text-based inference training has focused on assessing good and poor comprehenders. The term “poor comprehenders” refers to a group of children who are at their appropriate developmental level for vocabulary and reading fluency abilities (the ability to fluently read the words in the text), but fall behind their normal developing peers (good comprehenders) in terms of their ability to understand a given passage. In addition, these researchers have used a better experimental methodology. They have included comparison groups and assessed comprehension outcomes through a variety of questions (literal and inferential questions), while also including standardized comprehension tasks.

One of these earlier studies that showed the significance of using specific textual inferences to promote reading comprehension was conducted by Carnine, Kameenui and Woolfson (1982). They trained 36 normally developing 9-year-olds on text-based inferences using a question-answering technique and assessed its efficacy in comparison to corrective feedback instruction or no instruction at all. Children in the question-answering condition received six training sessions, with the first half of the training

consisting of teaching the strategy and the other half in actively practicing it. In the first three sessions, the children read the story individually with the experimenter and were helped in learning how to ask the text-based inference questions that would help connect information from the text (e.g. “*what did the [main character] want?*” “*What type of information does the story give us about [main character’s] desire? How did [main character] achieve this?*”). In the last 3 sessions, children were instructed to read the text and answer text-based inferential questions about the passage read. If the children answered these questions correctly, they were moved to another set of questions or a different passage; if not, they were instructed to use the specific questions and strategies they learned in the training, and try to answer the comprehension question again. In contrast, children in the simple corrective feedback condition were instructed to read the passage and answer the same comprehension questions as the inference question group. If they answered the question correctly, they moved on to a different set of questions or a different passage. If they answered the question incorrectly, they were simply given the correct answer. Finally, in the no instruction condition, children received no training and no feedback. In this group, they simply read the stories and answered the questions. Children were pre- and post-tested on their comprehension of 3 stories, all involving comprehension of implicit inferences of various types (story structure, evaluation, predictions). Results indicated a clear advantage of children who had been trained on the text-based question-answering technique, in comparison to the simple corrective feedback, and to the no instruction group. Thus, the results indicated that text-based inference training was more effective in helping children make various forms of implicit inferences related to the text, than corrective feedback training or no training at all.

However, these results were only partially supported by a study conducted by Carnine, Stevens, Clements and Kameenui (1982). They individually trained 30 9- to 11-year-olds who received only a three session training. Like before, three training groups were compared. A question-answering training, a feedback, and a no instruction groups. Children were pre and post-tested on their comprehension of three stories, assessed by comprehension of various implicit inferences (story structure, evaluation and predictions). Similar to the previous study, the results revealed that children who received the text-based inference training had a clear advantage in comparison to the no instruction group. However, different from the previous study, the corrective feedback group demonstrated a clear advantage in comparison to the no instruction group, and their comprehension appeared to be no different from children in the text-based inference group. It was not clear what contributed to these differences, but two factors could have lead to these results: (1) children in the second study received half the practice time of first one; and (2) the second study tested a wider age range than the first, which may indicate that older children may benefit equally from the corrective feedback and the question-answering format.

The effectiveness of text-based inference was further supported by Hansen and Pearson (1983). They used a combination text-based inference questions of topic discussions to help children better connect the stories presented to them. A total of 40 9-year-olds who were categorized as good or poor comprehenders were trained and assessed. Training took place twice per week for 10 weeks, and good and poor comprehenders were trained in groups of 10 children. Children were randomly assigned to one of two conditions, text-based inference training and typical classroom practice

following an teacher's manual. In the text-based inference training condition, teachers were instructed to read one storybook per week. For each book the experimenter conducted pre-reading discussions to activate relevant background knowledge before introducing the story, and then conducted a postreading discussion to discuss the implicit information derived from the story. In the comparison group, good and poor comprehenders were also read the same storybook each week, but their prereading discussions were based on the teacher's manuals, which discussed broadly the theme of the book (e.g. friendship) and conducted post-reading discussions based on literal and inferential questions, in a ratio of 4 to 1, respectively. Children were pre- and post-tested on their comprehension of stories, using literal and inferential questions, one story at their age-specific reading level (reading level of 3rd graders), and another at level below their reading level (reading level of 1st graders).

For children's comprehension of stories at their age-specific reading level, results revealed that poor comprehenders did better in the text-based inference training group than in the teacher's manual group. However, no such difference was found for good comprehenders. For children's comprehension of the simpler story, both good and poor comprehenders did better in the text-based inference training group than in the teacher's manual group. Results indicate that not only did text-based inference training appear to be more effective than the teacher's manual training, but also that this training was especially important for children with comprehension-specific difficulties.

Partially supportive results for inference-making training were found while extending to predictive and associative inferences. Oakhill and Yuill (1988) sought to promote comprehension by asking questions that involved evaluations, character's

psychological states as well as story grammar, while also including predictive inferences. They trained 52 7- to 8-year-old good and poor comprehenders on three different strategies in order to test their effectiveness. Children were trained in small groups (three to five children) over a period of seven weeks. In the first condition, children in the text-based inference group were trained in a program that taught children predictive behavior, question-answering techniques, and text based interpretations of story content. Specifically, children were trained on how to make and answer inference related questions, guess what would happen next in the story, and gather relevant information from a story. In the second condition, children in the comprehension question group read stories and were asked to answer comprehension questions. The final comparison group was simply trained on word decoding. Children were pre- and post-tested on a standardized reading comprehension task (Neale Analysis of Reading ability), which included both literal and inferential questions.

Results revealed that, overall, poor comprehenders benefited more from the text-based inference training than good comprehenders, and this was especially true in comparison to the word decoding group. However, contrary to their expectations, there were no differences between text-based inference training and the comprehension question group. In fact, both appeared to be equally effective strategies to improve comprehension. Oakhill and Yuill argued that this could have been the case because in the comprehension questions group, the answers to the questions were discussed and negotiated during the training which may have lead to indirect training of inference making questions.

To verify whether this explanation was true, McGee and Johnson (2003) conducted a similar study to the one just reviewed, but they were careful about the execution of the different training conditions. Specifically, they trained 75 good and poor comprehenders ranging from 6 to 9 years of age on either text-based inference strategies or on answering comprehension questions - with no discussion questions. Children were trained in small groups of five, over six sessions. They were pre- and post-tested on their comprehension of stories, using literal and inferential questions, through a standardized reading task (Neale Analysis of Reading Ability). Results revealed that that text-based inference training had an overall advantage in fostering comprehension in comparison to the comprehension question condition, and that this was especially true for children with comprehension difficulties. Moreover, similar to Oakhill and Yuill (1988), the results showed that poor comprehenders benefitted more from any type of comprehension training than good comprehenders.

Summary of Text-based Inferences. Studies that have focused on training children text-based inferences using questions have been successful in promoting narrative comprehension, as measured by both standardized and non-standardized tasks. Results revealed that children appear to benefit more from text-based inference training than an array of other training techniques, and this is especially significant for poor comprehenders. Nevertheless, although text-based inference training appears to clearly benefit children's comprehension abilities, no studies have focused on promoting these inferences with young children. In fact, only studies that have used a combination of text-based inference training and story grammar training have been used to train younger children. I turn to review these studies next.

Combination of Story Grammar and Text-based Inference Training. The first study that used a combination of story grammar and text-based inference training to foster narrative comprehension was one conducted by Paris (2003), also reported by Paris and Paris (2007). A total of 123 first graders participated in a five week training program conducted with entire classrooms. The goal of the program was to go beyond story grammar elements, while also fostering other aspects of successful comprehension, including psychological aspects of characters (intentions and motivations), inferences about theme and dialogue, and predictive inferences. To achieve this, children were taught question-generation and summarization strategies, and were also allowed to actively practice these strategies. During each training week, children had the opportunity to learn a strategy through active instruction, as well as the opportunity to practice through story productions. Training occurred twice a week and teachers read two books a day. One book was used in order to illustrate and model a lesson, and the other was used to allow children to practice and generalize the skill to a new book. To fully assess the effectiveness of this training, Paris (2003) included a control group that received a similar multi-skill instruction in a different narrative genre (e.g., poetry). Children were assessed before and after the training on a standardized narrative comprehension task (Test of Narrative Language), a narrative retelling task, and a narrative production task based on a picture book with no words. Narrative comprehension was assessed through a combination of story structure and inferential questions. Narrative retelling and production were coded in terms of children's language production and the underlying narrative structure.

Overall, for retelling and production, results revealed that children in the experimental group improved in terms of the number of story elements included and order of story elements, in comparison to the control group. Furthermore, picture-based production also revealed that children in the experimental group had a better understanding of explicit pictorial information and better inferences about implicit pictorial information, in comparison to the control group. In terms of comprehension questions, results revealed that children in the experimental group demonstrated a clear advantage, in comparison to the control group, in terms of answering explicit and implicit inferential questions. These results were taken to indicate that through the combination of story grammar and text-based inference training, 6-year-olds were better able to comprehend and produce stories as seen through their ability to produce, recall and order story grammar elements as well as in their ability to make inferences about implicit and explicit pictorial information contained in the story.

Similar results were found in study conducted with even younger children. Van Kleeck, Vander Woude and Hammet (2006) also used a combination of text-based and story grammar inference training to foster preschoolers' ability to answer of literal and inferential questions. In this study, 15 low-income preschool children (3 to 5 years) were trained individually, twice per week, over a period of eight weeks. Different from the previous studies conducted with older children, in which training occurred through direct instruction, in this study questions and training occurred through questions embedded in the book reading. This was done because van Kleeck (2008) argues that it is the adult's role to pose questions throughout the story and to guide young children in answering and discussing questions, as they do not yet know how to do it on their own. By doing this,

preschoolers witness, in natural apprenticeship, the adult modeling and requesting the kinds of information that support text comprehension. With this in mind, two books with three different versions of scripted questions were used for the 8 weeks. Questions consisted of literal and inferential questions that tapped children's knowledge of story grammar elements, their ability to make appropriate causal connections, evaluations and predictions. For example, throughout a given story, children were asked questions like: *who the story was about* (character), *what the problem was*, *what they did to solve it* (attempt), *whether it worked* (evaluation), and *what they thought the character was going to do next* (prediction). To better assess their results, they included a control group of 15 preschool children of similar age who received no training at all. Children were assessed before and after the training on tasks tapping their specific abilities to answer literal and inferential questions.

Similar to the finding by Paris (2003), results revealed that children who received the combined inference training had a clear advantage in answering literal and inferential questions over children who did not receive any training. Nevertheless, it is important to note that, different from all of the studies reviewed in this paper, the task used in this study did not assess children's ability to answer literal and inferential questions in the context of a story. Instead, the task measured children's ability to make inferences and answer literal questions based on short sentences. It would be interesting to verify whether these results go beyond these short sentences and extends to richer stories.

Is there an optimal type of inference training for preschoolers? Thinking back to van Kleeck's (2008) call for training programs focusing on preliterate children as a way to promote comprehension and prevent comprehension difficulties, one can see that

few studies have been conducted with this age group. And among the studies using preschoolers, most focused on promoting narrative comprehension through story grammar understanding (Morrow et al., 1985, 1992, Garner & Bochna, 2003), or through a combination of story grammar and text-based inference training (Paris, 2003 & van Kleeck et al., 2006).

Looking back at the studies reviewed (Garner & Bochna, 2003; Idol, 1987; Morrow 1985, Morrow et al, 1992; and Westerveld & Gillon, 2008), one can see that there is a clear tendency for researchers and practitioners to target story grammar understanding in their narrative comprehension training. Whether they focus on story grammar alone or in a combination with other text-based elements, the fact is that most researchers have found story grammar to be a useful strategy to promote comprehension across different age groups (e.g. Cable, 2007; Morrow, 1985; Paris, 2003; and van Kleeck et al, 2006), and across children with different language difficulties (e.g. Idol & Croll, 1987; Garner & Bochna, 2004; and Kerins & Gesell, 2003) Nevertheless, while promoting story grammar knowledge is useful, as it provides children with a narrative structure schema that can be used to aid story understanding, two issues can be raised: (1) not all narratives follow the structure proposed by story grammar proponents, and (2) even if they did, this structure on its own may not be enough to foster a more encompassing understanding of stories.

One alternative to story grammar would be the text-based inference training. While this strategy appears promising, as demonstrated by the pattern of results found with older children, it has only been extended to preschoolers in combination with story grammar training (Paris, 2003 & van Kleeck et al., 2006). Although the combination of

strategies appears to be useful for promoting broader comprehension abilities, to better understand the contributions of each inference training to narrative comprehension, these two strategies need to be compared to each other first, before combined. Only through comparison, one would be able to tease apart the contributions of each inference training strategy and assess whether one strategy is optimal in comparison to another.

Other Strategies that Foster Preschoolers' Narrative Comprehension: Retelling vs. Reenactment

So far I have reviewed research that has aimed to promote comprehension through storybook reading. However, it may be the case that engaging young children in book reading may require more than reading books and asking questions. Specifically, for young children to fully take advantage of book reading practices, perhaps they also need to be engaged through actions and negotiations that extend past the dynamic reading of the book. In fact, few other post-reading activities have also been found to promote narrative comprehension. Namely, story retelling and story reenactment. On the one hand, Morrow (1984 & 1985) has argued that story *retelling* practices help children better organize their narratives into the plot structure as well as aids their memory for story elements. On the other hand, Pellegrini and Galda (1982, 1993), as well as Silvern, Williamson, Surbeck and Kelley (1986) have argued that story *reenactment* provide children with a rich opportunity to engage in meaning making, story organization and negotiation. I first review the evidence for retelling practices and then for reenactment in promoting narrative comprehension.

Story Retelling. Morrow (1985b) argues that story retelling enables children to play a large and active role in reconstructing stories. By actively engaging in retellings

children are given opportunities to engage in story organization, interpretation, and evaluation. As reviewed earlier, Morrow (1985) and Morrow and colleagues (1992) used a combination of question-answering inference strategies and retellings to promote kindergarteners' comprehension of stories. In these studies, children were first told a story as a group and were later asked to retell the story to an experimenter. While retelling the story, the experimenter guided the children through structured story grammar questions to help them fill in the missing information (e.g. *What is the problem with this story? What was the consequence of doing X?*). Results indicated that retelling, along with story grammar questions, promoted the inclusion of more story grammar elements in children's stories. However, because story retelling and story grammar questions were used together it is not clear whether retelling made a unique contribution to story understanding or whether the guided story grammar inference questions were responsible for this difference.

To address this question, Morrow (1985b) conducted a study in which children were told a story as a group, but they were asked to retell the story to an experimenter without being provided with guided questions. A total of 59 5-year-old children were tested, of which half were asked to retell the story (with no guiding questions), the other half was instructed to do a drawing activity. A total of three books were read to all of the children and they were asked to either retell or draw after each book reading. Children were pre- and post-tested on their comprehension of orally presented stories. Results demonstrated that children who engaged in retellings had a marginal advantage in their story understanding, in comparison to children in the drawing activity. She explains this results by arguing that by having children verbally retell the story to an adult, children are

forced to coherently pull together the pieces of story information in order to convey what they understood. Through this practice children come to realize the missing or disconnected pieces of information in their story and will aim to remedy this situation by making new connections and/or reorganizing their understanding.

Story Reenactment. Despite the argument in favor of retelling activities as a way of fostering children's narrative comprehension abilities, the activity itself has a couple of limitations. First, the activity is not easy to be conducted in an entire classroom setting. Story retelling requires individualized attention for each child in a classroom, and in classrooms with young children, teachers generally do not have a lot of time to work with individual children, let alone work individually with every child every day or every week, for that matter. The second limitation is that results in support of retelling as a comprehension strategy were not strong. In fact, it only demonstrated a marginal advantage in comparison to engagement in art activities. Because of these limitations, researchers have sought other methods of promoting comprehension that better cater to whole classroom settings, that are highly engaging, and that demonstrate a clear effect on narrative comprehension. Nicolopoulou and colleagues (Nicolopoulou, de Sá, Ilgaz & Brockmeyer, 2010) have argued that reenactment activities creates a powerful context for enhancing children's narrative skills. Similarly, Cooper (2005), has also proposed that through the active linking of dialogue and description to character's action, reenactment helps young children internalize the nuances of language and derive meaning of the story being read. Furthermore, Karweit (1989 & 1994) has argued that reenactment, or role playing, is a high engagement activity that allows for more meaning making opportunities and story organization than retelling, or follow-up art activities.

In line with these claim, Pellegrini and Galda (1982) examined the effects of two modes of story reconstruction training, story reenactment and story discussion, against a control art activity. A total of 108 5- to 7-year-olds were distributed evenly across the three groups. Children were trained in small groups over a total of three sessions. Children in the reenactment condition listened to the story as a group and reenacted the story with suggestions from the teacher. Children in the discussion condition read the book as a group and discussed the book with the guidance of the teacher. Children in the control art activity condition read the book as group and were given an art activity after the reading. Children were only tested after the third session on a retelling task targeting children's comprehension of the story enacted (or heard, in the case of the drawing activity group), and a standardized language task (Criterion Reference Task).

Results indicated that 5- and 6-year-olds benefitted more from the story reenactment than the discussion and art activity condition, and this was true for the standardized, as well as the retelling task. They also found that the story reenactment condition was more beneficial than either discussion or art activity condition for all age groups, and this was especially true for 5-year-olds. Pellegrini and Galda explain these results by arguing that through reenactment children use language to transform roles, props, and setting to correspond to the original story. They also argue that the extent to which children engage in negotiation with other children it seems to affect their ability to retell the story. This appears to be the case since, through a joint effort to reconstruct the story as a group, children become aware of story aspects that would have otherwise been foreign to them if attempting to remember the story on their own.

While Pellegrini and Galda found support for reenactment in fostering children's comprehension of a story just heard, researchers were further interested in assessing whether the power of reenactment generalized to children's comprehension abilities in general. Specifically, they were interested in verifying whether reenactment training would impact children's comprehension of new stories, not only the comprehension of the enacted story. To do this, Silvern, Taylor, Williamson, Surbeck and Kelley (1986) trained 257 5- to 9-year-olds on a story reenactment activity over a period of 14 sessions. Children in the training group had the opportunity to listen to stories as a group and, on alternating days, half the class reenacted the story as the other half observed, and they switched the groups on the following day. Teachers were only allowed to facilitate, but never to guide the reenactment. They also included a control group consisting of 248 similar age children, who were only read the stories with the same frequency, but were immediately lead back to their regular classroom activities after the readings. All children were pre- and post-tested on their comprehension of an new orally presented story through comprehension questions. Results indicated that story reenactment training benefited children's story comprehension more so than simply reading the stories to children, and that this was especially true for 5- and 6-year-olds.

Although teachers were explicitly told, in this study, to not direct children's reenactment, Silvern and colleagues found that teacher's did engage in directive behavior. Because of this, they argued that, from this study, one could not certify whether it was the simple act of story reenactment/play that lead to an increase story comprehension, or whether teacher's interventions and directions were responsible for the increase. In a follow-up study, Silvern and colleagues aimed to tease apart these

results by comparing different reenactment conditions and including a discussion-based control group. They also varied the groups between training children with familiar stories and training children with unfamiliar stories. Within the reenactment training groups, 2 groups were created: directive and facilitative reenactment. In the directive reenactment condition children listened to stories as a group and reenact the story with the guidance of the teacher. In the facilitative reenactment condition children listened to stories and reenacted the stories with minimum teacher input. In the discussion-based control condition children listened to the story as a group and discussed the story with the teacher. A total of 340 5- to 8-year-olds were assessed, 106 in the directive condition, 79 in the facilitative condition, and 155 in the control condition. Children were trained over 14 sessions, and were pre- and post-tested on their understanding of an orally presented story through comprehension questions. Results revealed that children's comprehension of stories was more affected by children's engagement in directive or facilitative reenactment than discussion-based engagement. However, no differences were found between the two reenactment groups. Results were taken to indicate that independently of teacher involvement, story reenactment is a beneficial strategy in promoting children's story comprehension, more so than book-based discussions. No differences were found for familiarity of stories, meaning that the effect of reenactment extends beyond familiar stories.

Pulling it all together: Would reenactment affect comprehension differently according to the inference strategy being fostered? While the studies conducted by Silvern and colleagues (1986), as well as the study conducted by Pellegrini and Galda (1982), repeatedly point to the advantage of story reenactment, the question remains is

whether the effect of reenactment differs according to the inference training being fostered at the same time. Although no studies, to the best of our knowledge, have directly addressed this question, studies have attempted to use a combination of reenactment and inference strategies, among other things, as a way to promote narrative comprehension abilities. Karweit (1989, 1994) developed a curriculum (STaR - Story Telling and Reading Program) in which 206 4- to 5-year-olds were read stories daily while being trained on story grammar elements. After the reading children were instructed either to tell the story back to the teacher individually, or to tell the story back to the teacher as a group, or to reenact the story in alternating days. In this study, every child had the opportunity to engage in retelling and reenactment at least once a week over the entire school year. To better assess the effectiveness of the STaR curriculum, they also included a control group of 103 children who did not partake in this specific curriculum, but were matched to the target group in terms of age and cognitive abilities. Children were tested at the end of the school-year on a standardized language task (Merrill Language Screening Test) which included a retelling comprehension assessment. Results revealed that children who participated in the STAR curriculum had better story understanding than children in the control group, as well as better vocabulary and memory for literal information. This study indicates that using a combination of inference training and other highly engaging post-reading activities strategies is beneficial for promoting young children's comprehension abilities. Nonetheless, because this study was conducted in the form of a curriculum with a combination of strategies and activities, one cannot tease apart what component of the curriculum was most effective in promoting comprehension or whether different combinations of strategies and activities were more

effective than others. More systematic comparisons are needed to assess the effectiveness of different inference training strategies, and whether reenactment affects comprehension differently according to the inference training being conducted.

The Current Study

As the review highlighted, researchers have been increasingly interested in fostering children's comprehension skills through inference training, but very few have focused on preliterate children, a group whose comprehension abilities have been argued to predict school-age reading comprehension competence (Kendeou et al. 2008). Furthermore, within the few studies that targeted young children, most have focused on promoting story grammar understanding or a combination of text-based and story grammar training as a way to foster comprehension. These studies have found that while story grammar training fosters story grammar understanding, this training does not generalize to broader comprehension questions, unless paired with text-based inference training. Although no studies have solely focused on training preliterate children on text-based inferences, research conducted with older children have repeatedly pointed to the advantage of text-based inference training to narrative comprehension. All the while, researchers have also found story reenactment to be a useful activity for promoting children's narrative comprehension abilities, however they have not tested whether the contribution of reenactment varies according to the bookreading training being conducted. With this in mind, the current study aimed to systematically compare the effects of two types of book reading inference training, as well as the effect of reenactment on children's narrative comprehension abilities. Specifically, it compared the contributions of story grammar to a new text-based inference training, and tested whether

reenactment affected children's comprehension differently, according to the inference training being conducted.

Before describing the bookreading programs used in this study, it is important to first address why we created a new text-based inference program. While the text-based inference studies conducted with older children have repeatedly pointed to the advantage of this training to comprehension (e.g., Carmine and colleagues, 1982 & 1983, Yuill & Oakhill, 1988), most these studies have resorted to using text-based inferences within a story grammar framework. Meaning that the text-based questions used in these studies were still aimed to address the structure proposed by story grammar researchers, while occasionally going beyond it. Therefore, in order to fully assess the impact of an inference training program that focuses on the story at hand (text-based) and compare it to one that focuses on promoting story structure schema (story grammar), a new training program needed to be developed that allowed for this distinction to be drawn.

While most approaches to narrative have followed story grammar's structuralist framework, it is clear that not all stories follow the structure put forth by these researchers, or are limited to it. Stories are also imbued with underlying meanings, emotions, character interactions, and overarching lessons that engage the reader or listener, and motivate them to make connections that go beyond those proposed by story grammar. In the current study we propose a new story-based inference strategy called *Narrative Dynamics*. This terminology was derived from a theoretical framework in the field of narrative and literary studies that has moved away from the structure focused approach to narrative (i.e. Story Grammar) and proposed a new approach called Narrative Dynamics. Specifically, this framework argues that narratives are not static and universal,

as proposed by story grammar researchers. On the contrary, narratives are seen as dynamic and fluid, and are understood as progressively unfolding through the intentions, actions, and interactions of characters (Richardson, 2002).

In line with this approach, researchers within the field of narrative and literary studies have pointed to various aspects of narrative texts that go beyond the structural dimension. Specifically, they propose that theory of mind abilities, such as perspective taking, as well as the need to use background knowledge to fill in story gaps are crucial for understanding the complexities and richness of any given narrative (Herman, 2010, Palmer, 2002, Zunshine, 2009). Several researchers in the field of psychology, have also attempted to move away from the structural approach to narrative to a more dynamic and fluid approach, that does not exclude the structure, but integrates it more meaningfully. Specifically, Bruner has proposed a model of narratives in which a fully developed narrative involves integrating plot (structure), character, and consciousness within what he calls a "dual landscape" of action and consciousness (Bruner, 1986). Bruner argues that for a narrative to be rich and gripping, it must develop within two dimensions: first, through physical events and actions that are happening in the story, the landscape of action; second, by taking into account the mental activity of the protagonist and other relevant characters, the landscape of consciousness. Bruner and colleagues (Feldman, Bruner, Renderer, Spitzer, 1990) propose that the dual landscape of narratives push the reader (or listener) to go beyond what is being presented in the text and in doing so the reader is required to use more complex cognitive processes in order to understand the story at the level of character's unfolding *actions*, as well as the level of unfolding *consciousness* – intents, motivations, emotionality, etc. Feldman and colleagues further

argue that understanding stories at the level of consciousness allows a reader to understand the story as fluid and dynamic, rather than static, which in turn, will lead to more engagement and anticipation of story events.

Nicolopoulou (2008), and Nicolopoulou and Richner (2007) has also argued in favor of a narrative framework that moves away from structural approach put forth by story grammar, to one that integrates characters and the unfolding of story events through characters. She argues that while researchers have mainly conceptualized narratives as temporally and causally connected sequences of events, the fact is that “narratives take on more meaning and become more powerfully absorbing when they include vivid, effective, and engaging depictions of characters” (Nicolopoulou, 2008, p.2). That being said, to understand the richness of a story, with the emotionality and complexity intended by the author, one needs to go beyond the story’s structure (i.e. plot) and build story knowledge through the unfolding of character’s intentions, motivations and actions, while also tying it to the necessary background knowledge.

To better illustrate what these researchers (Bruner, 1986; Nicolopoulou, 2008; and Richardson, 2002) are trying to indicate in terms of understanding the story through the unfolding of character’s intentions, motivations and the individual’s background knowledge, we will use the story “How to Catch a Star” by Oliver Jeffers. This is a very simple story about a boy that likes stars and decides he wants to catch one so the star can be his friend. The boy attempts several things to catch a star in the sky. He jumps, he climbs on a tree, he tries to lasso, but he cannot reach it. He then sees the reflection of the star in the water (it is never said in the text that it is a reflection) and thinks it must have fallen from the sky, making it easier to reach. The boy tries to reach it, but he only

touches the water. He then realizes that it will eventually wash up in the sand. He goes to the sand and waits. Sure enough, a star (starfish) washes up in the sand and the boy is happy he has finally caught his star. In this story, the boy never realizes that the star he caught is not the star he wanted from the sky.

From the stand point of Story Grammar, this is a very upfront story in which the boy has a problem (he wants to catch a star but cannot reach it), attempts to solve it (tries several things) and finally resolves it (he gets a star from the sand). However, through this simple example one can see that looking at the story simply through its structure, much of the story's richness is left out. For example, it is never mentioned that the boy has a misconception about the reflection, or even that the star he caught is not really the one he saw in the sky. Now, if we attempt to understand the story through the perspective of the character, paying attention to his failed attempts, the motivation for the new methods of catching a star, to his thoughts about where stars come from, and contrast it to our own thoughts about stars, one is not only bound to realize the boy's misconception about the reflection and starfish, but also that, although the boy caught a star, it was not the star he wanted.

Taking this distinction into consideration, *Narrative Dynamics* training seeks to help children build story knowledge, while taking into account the unfolding of events through character's perspective, helping children anticipate story events through predictions based on previously built story knowledge, and drawing meaningful links from the text to children's background knowledge. In contrast, *Story Grammar* training aims to help children develop an understanding of a story's underlying structure as a way of providing them with structure schema that can easily be applied to different stories.

Our aim was to assess the impact of each inference training condition, *Narrative Dynamics* and *Story Grammar* on children's narrative comprehension abilities in order to verify whether there is an optimal training condition.

Other Factors for Engaging Preschoolers in Book Reading Activities

While our main goal was to foster comprehension through inference training programs, other factors also contributed to how we put these programs together. Specifically, we were interested in using the best practices for engaging preschoolers with bookreading activities.

Group Size. One of the factors that has been often evaluated when teaching or training young children is the optimal number of children that can be trained at once. As should be apparent in our review, research with children has generally been conducted in small groups (Oakhill and Yuill, 1988 & McGee and Johnson, 2003) or, at times, individually (Morrow, 1986, Morrow et al., 1992 & van Kleeck et al. 2006). To assess the best group size for young children, Morrow and Smith (1990) conducted a study that compared children's engagement in book reading activities, as well as their overall comprehension of stories, according to the group size children were participating in. A total of 27 children were tested. A total of 3 conditions were compared: children who participated individually, in groups of 3 or in groups of 15. Children in those different conditions were read three different and after third book was read, children were assessed on their comprehension of an orally presented story and a retelling task. Children were also video-recorded during the third session in order to code for children's involvement with the book reading activity. Overall, results indicated that children in small groups engaged in more story discussion than children who were read stories individually or in

large groups. In addition, children who participated in small groups performed significantly better in story comprehension than children in large groups or individually. Morrow and Smith argue that small group settings provide children with more opportunities to engage with the teacher, activity, and with peers.

In the current study, we separated children into small groups (4 to 5 children) to enhance children's interactions with the storybook reading activity, experimenter, and with peers. This was also done to allow for more question-answering and better reenactment opportunities.

Storybook Repetition. Another factor that influences children's involvement with book reading activities and comprehension is the practice of repeated readings. Although in our review, not many studies indicate whether they repeated the readings or not, researchers (DeTemple, 2001; Fletcher & Reese, 2005; and Morrow, 1997) have argued that repeated readings aid comprehension as they provide children with more opportunities to listen to stories and to add more story information to the ones previously stored by the child during the first reading. Martinez and Roser (1985) addressed this questions by investigating how 4-year-old's responses to stories changed with the increased familiarity with a given story. In a case study, stories were read to a 4-year-old at home, and in another study, stories were read to a preschool classroom of 15 children. In both studies, adults read 6 stories a total of 3 times. Children's book reading participation was coded in terms of form (whether the conversation was a question, comment, or answer) and focus (whether the talk was directed toward the story's title, characters, events, details, setting, language, or theme). Results indicated that as the children had more opportunity to listen to a story, their engagement increased. In other

words, as stories were being re-read, children had more opportunities to clarify, to fill in gaps, and to make connections. They argued that children gained increased understanding and control over stories they heard more than once.

Similar results were found with even younger children in a study conducted by Phillips and McNaughton (1990). They found that over the course of repeated readings with caregiver, 3- and 4-year-old children progressively modified their comprehension questions and discussions from simply predicting what would happen next in a story, to actually attempting to understand the reasoning behind different story events. Furthermore, changes in children's story understanding have also been found to affect how parent engage with the children over the course of book reading; moving from conversations and questions about literal and explicit information provided by the stories, to more implicit and causal questions that provide a richer understanding of story events. According to Wasik & Bond (2001) repeated readings are beneficial as it is proposed that learning within a familiar context and with familiar materials provide a structural scaffold that fosters children's understanding of new concepts and skills.

Since repeated readings are a beneficial practice for promoting children's story understanding, it follows that a narrative intervention aimed at fostering narrative comprehension should also include repeated readings. The current study incorporates two repeated readings as a way to engage children and promote narrative comprehension.

Book Difficulty. One factor that has often been overlooked in research is the impact of book difficulty on children's comprehension. After carefully reading and analyzing children's books, Nicolopoulou (2011) argues that storybook difficulty varies within several dimensions, such as number of characters, cognitive abilities required for

story understanding, and story structure complexity (stories with no episodes, and stories with one or more episodes). She further argues that difficulties imposed by these dimensions may lead to comprehension difficulties in young children, independently of the child's mastery of higher-level comprehension abilities. For example, when looking at some of the cognitive demands placed on the child by different books, we see that some stories require children to not only have mastered specific theory of mind abilities, but generalize this understanding across situations and characters. Specifically, some books require children to not only have an understanding of appearance-reality, but to generalize this understanding to several ongoing events proposed by the book. To illustrate, in the book "Duck Soup", the main character, Max (the duck), is making a soup and invites his friends over for dinner. As Max goes out to pick some herbs in the garden, his friends arrive. As they walk-in to the kitchen looking for Max, they see that he is nowhere to be found. However, the soup is still being made. When the friends look in to the soup they see different pieces of vegetables that look like "duck pieces". The friends assume that Max must have fallen into the soup. Chaos breaks loose while they are thinking of poor Max falling into his own soup, and are seeing pieces of potato that looks like a beak, or a pea that looks like an eye. In the midst of these events, Max comes back from the garden and the friends realize their misconception. All ends well.

When reading this book, one immediately sees that in terms of length and language, the book is quite easy, with no major vocabulary difficulties arising. However, when analyzing the content of this book one verifies that the book is a little more challenging than is initially thought. Specifically, to fully understand the story's plot children must apply their appearance-reality knowledge to the events occurring in the

story, while also taking into account different characters' the perspective as well as their own perspective (understanding why the friends had the misconception, while keeping in mind the "reality" that is known to the child, that Max is really in the garden). In other words, children must have mastered and generalized their theory of mind understanding to the story, while coordinating different perspectives.

By looking and considering book difficulty, one is not proposing to ban the practice of reading more difficult books to children. On the contrary, by considering these difficulties one is actually arguing that perhaps some books require progressive work and are not to be read without providing children with some foundation. Through considering book content, its respective difficulty, and actively planning to read books that build on each other in terms of cognitive demands, one would be helping children build the necessary foundation to understand more difficult books.

Unfortunately, while it has been argued that story content is an important component for successful comprehension, none of the studies reviewed in this paper have taken this into account. In fact, of the studies previously reviewed, few have mentioned the name of books used during the intervention (Cable, 2007; Paris 2003; van Kleeck et al., 2006; and Westerveld and Gillon, 2001), fewer have controlled for differences between books, such as length (Paris, 2003 and van Kleeck et al., 2006), and none have considered or taken into account differences in book difficulty. The current study ensures that the books used are engaging and interesting for the age group being targeted, while they also build on each other in terms of themes and challenges.

In sum, the current study aimed to compare the effects of Story Grammar against Narrative Dynamics training, while also assessing whether reenactment contributed

diffently to children's comprehension according to the inference training conducted. A total of 4 book reading conditions were created. Conditions systematically varied across two variables: type of book reading inference training (Story Grammar and Narrative Dynamics) and post-reading activity (Reenactment and Art Activity). The conditions created were: Narrative Dynamics/Reenactment, Narrative Dynamics/Art Activity, Story Grammar/Reenactment, and Story Grammar/Art Activity.

Finally, to make the training programs more appropriate for preschoolers, we conducted studies in small groups to allow better engagement and opportunities. We also incorporated repeated readings, with the expectation that familiarity with books would promote deeper story understanding. Finally, we controlled for book difficulty, as a way to help children progressively build a richer and more generalized story understanding.

Hypotheses and Predictions

Overall we hypothesized that book reading training would affect children's overall comprehension abilities, but that children in the Narrative Dynamics condition would experience greater gains than children in the Story Grammar condition. Specifically, we predicted that an approach that focused on helping children build story knowledge based on the books read would promote children's narrative comprehension more so than an approach that focused on promoting preset story structure knowledge. We further expected these differences to be reflected on all narrative comprehension tasks, and especially pronounced in children's ability to answer inference questions.

Since we also measured children's vocabulary and theory of mind abilities, we also expected that children in the *Narrative Dynamics* condition to demonstrate an advantage over *Story Grammar* in terms of vocabulary. We expected this because it has

been found that when children are taught vocabulary in a meaningful context they are more likely to develop vocabulary skills than when in a context that does not provide opportunities for meaning making (Beck & McKeown, 2007; and Biemiller & Boote, 2006). Concerning children's theory of mind abilities, though this was more exploratory, and we expected that perhaps children in the *Narrative Dynamics* condition would experience greater gains than *Story Grammar* since children were being trained on taking on character's perspective.

To address whether reenactment would contribute differently according to the inference training condition, we hypothesized that children in the Narrative Dynamics condition would benefit more from story reenactment, than children participating in the Story Grammar condition. We expected this across all narrative tasks. We predicted this because the Narrative Dynamics condition proposed to promote inferences related to perspective taking abilities, though not restricted to it, which would align with the abilities fostered through reenactment. This being the case, in terms of theory of mind abilities, we also hypothesized that children in the Narrative Dynamics condition would benefit more from story reenactment than children participating in the Story Grammar condition.

CHAPTER 2: METHOD

Participants

Fifty-seven normally developing children were recruited from several preschool and PreK-Counts classrooms that were part of a child care program in a northeastern city in the US. Of these children, six withdrew from the child care program (and thus from this project) due to family-related reasons. Thus, a total of 51 (27 girls) 4- and 5-year old children ($M = 4;8$; range 4;0- 5;8) participated. All participants were from households with incomes lower than 300% of the federal poverty level. Participants were 38% Hispanic, 37% Caucasian, and 14% African American (see table 1). About 75% of the participating children had mothers with high school education or less and 25% had mothers who had completed some college. The majority (63%) were from households headed by single parents and 85% had at least one sibling.

Study Design and Procedure

This study used a randomized design with four independent conditions: (1) Narrative Dynamics/Story-Acting, (2) Story Grammar/Story-Acting, (3) Narrative Dynamics/ Art Activity, (4) Story Grammar/ Art Activity. Each classroom had all 4 conditions represented. Averaging over the number of groups per condition, two groups with 12 children, one with 13, and one with 14 children. Children were pre- and post-tested on their narrative abilities (assessed through comprehension of books, retelling and picture sequence tasks), vocabulary, and theory of mind abilities. An 8-week intervention program followed the pre-test. Prior to testing, all classrooms received consent forms and parents had approximately two weeks to return them. We had a 97% return rate of consent forms. Upon receiving the consent forms, groups of 4-5 children were formed with the help of the classroom teachers to avoid creating highly conflictual groups.

Children were administered a battery of tasks before and after they completed the training. This battery of tasks included control measures as well as a series of target measures. Control measures were only assessed during pre-test, while target were assessed during pre- and post-test. All of these tasks were administered individually to children in a room adjacent to their classroom. Testing was conducted in three separate sessions to avoid fatiguing the children. For most of the tasks, children's responses were recorded on paper, except for the narrative tasks and memory tasks, which were also audiorecorded. Narrative and memory tasks were transcribed by the experimenter and research assistants at a later time.

In each book reading condition, groups of children participated in 16 experimenter-led storytelling sessions in a room adjacent to their classroom. The experimenter read a total of eight books, each read twice in the span of two days. Sessions took place twice per week in each classroom and were consistently done on the same two days (either Mondays and Wednesdays or Tuesdays and Thursdays). All groups listened to the same eight books in the same order. The order of the books was fixed in that the level of difficulty of the books increased over time (see Appendix A for list and order of books).

Training books were selected by carefully researching children's library and bookstores, as well as the suggestions made by an experienced preschool teacher. From a long list of books, the experimenter selected eight books that she thought were most engaging and that built on each other with respect to themes and/or cognitive demands. The book reading sessions occurred in a room adjacent to the children's classroom and each lasted about 20-30 minutes. Each of the storytelling sessions were videotaped so

that conversations about stories and interactions during book reading could be used for later analyses (such analyses were not undertaken in this project).

Each book was read in an interactive way, asking questions at critical points where we had determined that questions needed to be inserted. This was done because research (McMaster et al., 2012) has indicated that asking questions during the book reading aids children's story comprehension more so than asking questions after reading the entire book. This is because reading questions during book reading places less demands on children's memory and helps children progressively build story knowledge. Furthermore, asking questions during the book reading also allows the experimenter to verify *online* which portions of the story children have difficulties understanding. In the case of the current study, if children were not able to answer the question correctly, the experimenter provided the correct answer and continued with the story. To ensure fidelity, the experimenter had two copies of each book each with a script per story condition. Placement of the questions was signaled within the book with a number that corresponded to the script of questions. When the experimenter saw the number in the book, she looked up the question on a sheet of paper and read the question to the children. After the book reading was finished, children moved on to their respective post-reading activity (reenactment or art activity). Each book reading session took about the amount of time across conditions.

To keep the children motivated and to reward them for their participation, children were given stickers after each session. They were also given a small piece of paper with a 4x4 table, with the cells numbered from 1-16. After children participated in a full training session (book reading and post-reading activity), they were asked to fill

their chart by placing a small sticker in one of the cells. The chart was kept by the experimenter as a way to keep track of children's attendance.

Book Reading Conditions: Narrative Dynamics vs. Story Grammar. In each training session, the experimenter read a storybook to the same group of 4-5 children. The questions for each book were developed to reflect the conceptual differentiation between conditions. Children assigned to the *Narrative Dynamics* conditions were asked questions that probed their inferential abilities regarding character motivation/perspective, story predictions, and complex book themes (See Appendix A for story scripts examples). The goal of this strategy was to help children build the necessary knowledge for an encompassing story understanding. In these sessions the experimenter read the story, while intermittently asking questions that probed children's story knowledge. Book reading questions were developed in two phases. First, the experimenter created the questions aimed to bring out the knowledge required to understand the story. Second, an experienced preschool teacher met with experimenter and helped her with the phrasing and placement of the questions in each book.

For the other half of participants, those assigned to the Story Grammar conditions, children were asked questions that probed their understanding of story grammar elements – or basic story structure, (See Appendix A for story scripts examples). In these sessions, the experimenter read the story while asking questions that probed children's knowledge of the main characters, setting of the story, and their understanding of the problem, attempt and resolution. These questions were based on previous training studies (Cable, 2007; Davies, Shanks & Davies, 2004; and Paris 2003) that had made use of story grammar comprehension questions. The questions loosely focused on asking children the

“who, what, when, where, why, and how” of the stories. Questions were placed according to when the story grammar element was mentioned in the story. Phrasing of the questions was also fine-tuned with the help of a preschool teacher.

To illustrate the focus of each book reading condition, we will use the example of a simple story and what the different conditions would target. In the case of *Mo's Stinky Sweater*, the story is about a monkey, named Mo, that has a favorite sweater. He uses the sweater all the time, and as a consequence the sweater gets very dirty. One day his mother decides she wants to wash the sweater, but Mo does not want to let go of it. They engage in a tug-of-war with different animals helping on each side. Meanwhile, the sweater is being stretched and getting very long. Mo decides he needs to let go of the sweater, or else it would rip (this is not mentioned in the actual text) and he signals to his helping friends to let go all at once. All the animals helping his mother fall on a puddle of mud, so now everyone needs a bath. Mo decides that he can wash the sweater himself, but when he hangs it up to dry, it's too long. But Mo doesn't mind, because now he can make it into a hammock and sleep in it as well.

For the purposes of illustrating the differences between the two approaches, I will only highlight these differences until part where sweater is being stretched. In the Narrative Dynamics conditions, questions are asked to build the necessary story knowledge for that individual book. One of the central elements in this story is this conflict between Mo and his mother. Therefore, our first goal was to prompt the reasoning behind this conflict by bringing each character's differing perspective. To do this, we ask questions that: (1) prompt the need for the mother to wash the sweater (“*what is going to happen to the sweater if he cleans his hands and feet, and wipes his face with*

it?” “ *Why does Mo’s sweater need to be washed?* ”) and that (2) prompt Mo’s hesitation (“*why won’t Mo let go of his sweater?*”). We then move on to the next story event of different animals either helping Mo or his mother pull the sweater. There is a sequence of 3 pairs of animals the come to help Mo and his mother. In the first pair of animals, we do no ask, but in the other two, we first prompt the child to the logic of who is helping whom (*who is helping Mom and who is helping Mo?*) and then we ask children to predict what animal is going to help who, based on what they already know (*Who is the Elephant mom and the Elephant baby (Ellie) going to help?*). Finally, when it comes to the sweater being stretched, we bring that to the child’s attention, even though the text does not mention it (*What is happening to Mo’s sweater?*).

For the same portion of the story in the Story Grammar condition, our goal is to promote children’s awareness of story grammar elements. To do that we follow the order of the episodic structure while asking some literal questions to engage the child with the pictures. We start by asking the child who the protagonist of the story is about (*who is this story about?*). We then ask about the setting (*where is this story happening?*) and a literal question (“*what colors are Mo’s sweater?*” “*How many colors are there?*”), followed by the initiating event (*why did Mo’s Mother want to wash the sweater?*). Finally, we focus on the problem of the main protagonist (*why doesn’t Mo want to wash the sweater?*). While there is no direct attempt to resolve the problem, there is a need to deescalate the problem.

For both book reading conditions we kept approximately the same number of questions across conditions, ranging from 10-16 questions per book depending on the length and complexity of the story. In each case, we also included a set of post-reading

questions (5 or 6 questions per book) in order to get an overall assessment of how much the children understood of the story. These post-reading questions were the same across book reading conditions, but were not analyzed here.

Post-Reading Activity: Story-Acting/Art Activity. After the groups finished their bookreading, children engaged in one of two post-reading activities. Half of the participants participated in the Story-Acting, and the other half in the Art Activity. For those in the Story-Acting condition, they were asked to take on roles and act-out the story while the experimenter read the story for the second time. Since acting occurred twice for each storybook (in two different days), children were able to rotate chosen roles during these story dramatizations.

For those in the art activity condition, they engaged in a simple art activity such as coloring story characters or story themes (for a list of activities, see Appendix A) after the book reading. The art activities were designed to take the same amount of time as the story enactment conditions. To equalize the number of times children heard each story across conditions, children in the art activity condition listened to an audio-recording of the book while completing their art project. The audio-recording of the book was made by the experimenter, who read the book out loud to a voice-recorder as if she was reading it to a group, but now omitting the questions and reading it straight through. She tried to use the same voice and animation as she did in the bookreading conditions.

Pre- & Post-Test Measures

Control Memory Measures. Researchers have argued that working memory is an important aid of comprehension (Jonge & Jong, 1996 and Oakhill, 1984). Children rely on their memory of recent textual and pictorial information to draw inferences and

overall make connections throughout the story. Although it has been found that comprehension requires more than memory of textual information (Cain & Oakhill, 1998 and Bowyer-Crane & Snowling, 2005), working memory is still found to be a central cognitive ability that aids children's efforts during the comprehension process. For this reason, we included 3 measures of working memory as control. Two of these measures assessed children's sentence recall and one, a more traditional working memory task, assessed children's recall of separate nouns.

Sentence Recall Memory Tasks. To assess memory abilities, children were tested on the sentence recall portion of the *Clinical Evaluation of Language Fundamentals* (CELF: Wiig, Secord, & Semel, 2004). This is a widely used standardized language task for children 2 to 6 years of age. It comprehensively taps core language and cognitive abilities. This test has high test-retest reliability ranging between .78 and .94 for all the subtests across age groups. Children were tested on two subtests of the CELF, *sentence recall* and *sentence recall in context*.

For the *sentence recall* subtest, children were assessed on their ability to listen and repeat spoken sentences of increasing length and complexity. This subtest includes 13 sentences. For the first two items, which were the shortest and simplest, children could receive a score from 0-2 points: 2 points if they repeated the sentence correctly; 1 point if they made one error in repeating the sentence, and 0 points if they made 2 or more errors (e.g., word omissions, repetitions, transpositions, substitutions, and change of sentence meaning). For the remainder of the items, which were longer and more complex, children could receive a score from 0-3 points: 3 points for sentences that were repeated correctly; 2 points for sentences with 1 error; 1 point for sentences with 2-3 errors; and 0

points, for sentences with 4 or more errors. A Sentence Recall Score (ranging from 0 to 37) was obtained by summing the scores for all the items in this task.

For the *sentence recall in context*, children were also assessed on their ability to listen and repeat spoken sentences, however these sentences were presented in the context of a story. Specifically, the experimenter read a storybook to the child and they asked to repeat parts of the story. For example:

“Mom and the children were getting ready for lunch. Mom and Amy were making sandwiches and salad. Mark was setting the table, and Billy was looking for mustard and apple juice. Billy looked in the refrigerator – no mustard – no juice! He said: “I can’t find them!” What did Billy say?”

Similar to the sentence recall subtest, in this task the sentences also ranged from easy to difficult, and errors were scored in the same way: 3 points were given for sentences that were repeated correctly; 2 points for repeated sentences with 1 error (e.g., word omissions, repetitions, transpositions, substitutions, and change of sentence meaning); 1 point for sentences with 2-3 errors; and 0 points for sentences with 4 or more errors. Children were asked to repeat a total of 14 sentences. A Sentence Recall in Context Score (ranging from 0 to 42) was obtained by summing the scores of all 14 items in this task.

Animal Span Memory Task. This measure was adapted from the *Wechsler Intelligence Scale for Children-Revised* (WISC-R, 2004) digit span task. In the original task children are orally given sequences of numbers and asked to repeat in the order heard and backwards. Because not all preschool children are familiar with numbers and since the backward order is too difficult for them, in this version of the task we

substituted the numbers for familiar animal names and asked them only to repeat the names in the order heard. To align this version to the original, each number was assigned an animal name with the same number of syllables (e.g. the number sequence 3-8-6 was changed to Dog, Horse, Sheep). In the current task, children started by repeating two trials of two animal names and slowly progressed to repeating two trials of eight animal names. They receive 1 point per successful repetition and 0 points for any mistakes made on the trial. An Animal Span score (ranging from 0 to 14) was obtained by summing the totals for all trials on this task.

Target Measures

Narrative Tasks

Storybook Comprehension. Children's storybook comprehension was assessed by their understanding of two commercially available storybooks (*Harry the Dirty Dog*, by Gene Zion and *Peter's Chair*, by Ezra Keats), a task was developed. For each of these books children were asked a series of literal and inferential questions. Questions were embedded within the book reading in order to make the task engaging and to assess children's comprehension abilities at specific points of the book (Laing & Kahmi, 2002; Spinillo & Mahon, 2007, van den Broek, Young, Tzeng, & Linderholm, 1998). Children were also asked a series of post-reading questions that assessed their knowledge of the main character, setting, and their comprehension of the main points of the story. These books were chosen because in order to fully grasp the meaning of the book, several inferences need to be made.

For Book 1, *Harry the Dirty Dog*, the story is about a white dog with black spots that dislikes taking baths and runs away from home. During his exploration of the city, Harry becomes very dirty and changes color, from white with black spots to black with

white spots. When he decides to go back home, his owners do not recognize him because he does not look anything like himself. In an effort to be recognized Harry does his old tricks, but to no avail, the family does not recognize him. Then Harry find his scrub brush and runs to the bathroom. Only after Harry is clean, the family recognizes its him.

To assess children's story comprehension, a total of 11 embedded questions (3 literal questions and 8 inferential) and 5 post-reading question were asked about this book. Literal questions were: "*What color is Harry?*" and "*What is Harry looking for?*" Inferential questions included predictive, causal, and theory of mind questions, for example: "*Why did the little boy say there was a strange dog in the backyard?*" and "*Why is Harry doing his old tricks for the family?*" The questions were piloted by the experimenter and a research assistant on 8 preschoolers for the clarity, engagement of task, and types of responses given. They were adjusted accordingly (for exact testing protocol see Appendix B).

For the book *Peter's Chair* (Book 2), the story is about a little boy who come to feel jealous about the arrival of a new baby sister because he seems to be displaced. Peter notices that all of his old baby things (e.g. his cradle and crib) are being painted for pink for the new baby. All, except his little blue chair. Peter decides to run away with his little chair. He runs away and decides to sit on his baby chair only to realize that he had outgrown his chair. Peter's mother invites him to come back home, and he decides that he is going to play a trick on her. Peter hides behind the dresser but puts his shoes behind the curtain to trick his mom. After that they all have dinner together and Peter offers to paint the little chair pink for his little sister.

A total of 16 embedded questions (3 literal questions and 13 inferential) and 5 post-reading question were asked about this book. Literal questions were: “*Is Peter a kid or a baby?*” and “*Why did Peter’s mother ask him to play more quietly?*” (even though it is a *why* question, the answer to the question was given by the text). Inferential questions included predictive, causal, and theory of mind questions, for example: “*Why does Peter want to run away?*” and “*Why did Peter put his shoes behind the curtain?*” Questions were piloted by the experimenter and a research assistant on 8 preschoolers for the clarity, engagement of task, and types of responses given. They were adjusted accordingly (for exact testing protocol see Appendix B).

Coding. Children’s responses were coded from 0 or 1 for literal questions and 0 or 2 for inferential questions (for a detailed coding schemes see Appendix C, for Book 1 and Book 2). Children received a 0 for incorrect responses, and 1 or 2 (depending on the type of question) for correct responses. For each book, 3 scores were derived. First, a total comprehension score (ranging from 0-25 for Book 1 and from 0-29 for Book 2) was obtained by summing children’s score on each question. Second, a total literal score (ranging from 0-3, for Book 1 and Book 2) was obtained by summing children’s score on each literal question. Third, a total inferential score (ranging from 0-22, for Book 1 and 0-26 for Book 2) was obtained by summing children’s score on each inferential question. Reliability was done by a graduate student on 20% of the data. The student was trained on the coding scheme, and after clarifying the remaining questions, she was left to independently code the data. Overall coding agreement was $K = .91$ for Book 1 and $K = .90$ for Book 2. Disagreements were resolved through discussions.

Retelling.

This task was developed by the Narrative Lab at Lehigh University and it assesses children's ability to retell a story with no picture prompts, and to answer comprehension questions (literal and inferential) about the story told.

In this task, children are told a story about a birthday surprise. In this story, a little boy is made to believe that he is getting a puzzle for his birthday, even though he explicitly told his mother that he really wanted a bike. When he sees the puzzle, he becomes upset. But his mother tells him to go outside to play. When he goes outside, he sees his new bike and all ends well. In this task, children are told this story and then asked to tell the story back to the experimenter. After the child is finished with their retelling, they are asked 7 comprehension questions (3 literal and 4 inferential). Literal questions were similar to "*What was the boy's name in the story?*" Inferential questions included: "*Why did Peter's mom give him a puzzle first, what was trying to do?*" (for exact testing protocol, see Appendix B).

Coding. For children's story production, the retelling was coded in two ways: for *total number of idea units* mentioned and for the *total number of story grammar elements* included.

To identify the Idea Units present in the original story, the story was parsed into clauses. A clause is identified by a phrase that contains a subject (explicit or omitted) and a verb (i.e. "*Dave got out of bed*" clause 1 & "*and ran to the living room*" clause 2). Furthermore, each clause must contain some sort of idea related to the story, whether descriptive or action based. A total of 19 clauses were identified in this story (see Appendix C for detailed coding scheme). To code children's retelling, children's recall was compared to the original parsed story. Responses were coded based on how closely

the information mentioned by the child matched to the gist of the original parsed text. Scores ranged from 0 to 1 per mentioned clause. If children did not mention a clause or mentioned something unrelated to the story, they received a 0, if they mentioned the clause (or something close to the gist of the clause) they received a 1. A total Idea Unit score (ranging from 0-19) was obtained by summing the number of mentioned clauses. Reliability was done by research assistants on 20% of the data. The students were trained on the coding scheme, and after clarifying the remaining questions, they were left to independently code the data. Overall coding agreement was $K = .92$. Disagreements were resolved through discussions.

For Story Grammar Elements, we first coded the original story in terms of characters, setting, initiating event, goal, problem, reaction, attempts, resolution/consequence, and formulaic openings and endings. A total of 13 story grammar elements were accounted for by this story (see Appendix C for detailed coding scheme). Children's retelling was then individually coded for each one of these elements. Scores ranged from 0 to 1 per element. If children did not mention an element, they received a 0, if they mentioned the element they received a 1. A total Story Grammar score (ranging from 0-13) was obtained by summing the number of elements mentioned. Reliability was done by research assistants on 20% of the data. The students were trained on the coding scheme, and after clarifying the remaining questions, they were left to independently code the data. Overall coding agreement was $K = .93$. Disagreements were resolved through discussions.

For children's retelling comprehension, children's responses were coded from 0 to 1. Children received 0 for incorrect responses, and 1 for correct responses (See

Appendix C for detailed coding scheme). Three scores were derived from the retelling comprehension task. First, a total retelling comprehension score (ranging from 0-7) was obtained by summing children's score on each comprehension question. Second, a total literal score (ranging from 0-3) was obtained by summing children's score on each literal question. Third, a total inferential score (ranging from 0-4) was obtained by summing children's score on each inferential question. Reliability was done by research assistants on 20% of the data. The students were trained on the coding scheme, and after clarifying the remaining questions, they were left to independently code the data. Overall coding agreement was $K = .93$. Disagreements were resolved through discussions.

Picture Sequence Narrative Task

This task was developed by the Narrative Lab at Lehigh University and it assesses children's ability to tell stories based on a sequence of four pictures. In this task children were asked to tell a total of 4 different stories, each story based on 4 pictures. The stories varied in terms of the number of main characters depicted (1 vs. 2 main characters), and type of problem being portrayed (internal vs. external). Children were first asked to produce a story based on the pictures and then asked broad follow-up comprehension questions for each story ("*What's happening in this picture? Why is this happening?*", for exact testing protocol, see Appendix B).

Coding. Narrative picture sequence task was coded for the total number of sequential story grammar elements included in the story. This means that story grammar elements need to be mentioned in a specific order, that is: formulaic opening, setting, initiating event, problem and/or motive, emotional reaction, attempt, resolution/consequence, formulaic ending. Furthermore, for an element to be given a

point, the inclusion of all previous story grammar elements was required (with few exceptions). For example, for an attempt to be coded, a problem needs to have been established, or for a resolution to be coded, there needs to be an attempt, etc (see Appendix C for detailed coding scheme for each story). Children's responses were coded per story. For each story, children could receive a 0 to 1 per element. If children did not mention an element, or mentioned the element without having mentioned the previous ones, they received a 0. If children mentioned the elements in the correct order and all previous elements were in place, they received a 1. Each element was only counted once. Children's scores were based on the total number of sequential elements included in the production and comprehension. A Picture Sequence Task Total score (ranging from 0-38) was obtained by summing the number of sequential story grammar elements included. Reliability was done by a graduate student on 20% of the data. The student was trained on the coding scheme, and after clarifying the remaining questions, she was left to independently code the data. Overall coding agreement was $K = .90$. Disagreements were resolved through discussions.

Vocabulary

While the main goal of this study was to address the impact of narrative training on comprehension, researchers have found that interactive book readings promote children's vocabulary (Kimmer, 2007; Whitehurst et al. 1988; Whitehurst & Lonigan, 1998 and 2001). To assess this possible gain, children were assessed on the expressive vocabulary portion of the *Clinical Evaluation of Language Fundamentals* (CELF: Wiig et al., 2004). This is a widely used standardized language task for children 2 to 6 years of age. It comprehensively taps core language abilities such as semantics (expressive

vocabulary) and has high test-retest reliability ranging between .78 and .94 for all the subtests across age groups.

The expressive vocabulary subtest assesses children's referential naming ability: that is, the ability to label people, objects, and actions. Children were administered 20 items in which they were shown a picture from a stimulus book and were asked to provide the appropriate word to describe the person/object/action in the picture. For each item, children's responses were awarded between 0 and 2 points: 2 points for the target response (or a semantic equivalent); 1 point for responses that were somewhat related to, but not the same as the target response; and 0 points for responses that were inappropriate. An Expressive Vocabulary Score (ranging from 0 to 40) was obtained for each child by taking the sum of scores from the 20 vocabulary items administered.

Theory of Mind Tasks

Researchers have argued that through telling and listening to stories one is required to coordinate perspectives in order to understand the nuances and meanings of the story (Bruner, 1986, 1990; Nelson, 1996, & Nicolopoulou, 2009). By engaging with narratives, a listener or reader is forced to not only coordinate their own perspective to that of the character, but also to coordinate the perspectives of characters against other characters, an important ability related to Theory of Mind. Specifically, in making sense of the experiences described by a story, one connects story information while attempting to infer character's intentions and motivations as a way to understand and explain story events. This theoretical claim has been supported by studies that have demonstrated that book reading practices that include theory of mind elements foster young children's theory of mind abilities. In one of these studies, Guajardo and Watson (2002) found that

narrative training produced greater theory of mind gains in comparison to the normal developmental trajectory of children, assessed by a control group. Brockmeyer (2009) also found that children who participated in narrative training improved their theory of mind abilities more so than children who did not partake in narrative training. Furthermore, she found that participation in story-enactment amplified the effect of narrative training on theory of mind development to a greater extent than children engaged in a simple art activity. Because of these findings and other research on bookreading, and because some of our books did include theory of mind themes, we included Theory of Mind measures to assess whether the current bookreading programs would also affect children's theory of mind abilities.

Theory of Mind Scale. This scale was developed by Wellman and Liu (2004) and it is used to assess a wide range of young children's theory of mind competence, for our purposes we only used 5 tasks within this scale. For each task included in this scale, children were presented with pictures and/or toy props that were used to tell short vignettes (pictures were colored and laminated). Children were then asked to make predictions about the characters' actions.

Not Own Desire. This task assessed children's understanding that others may have desires that differ from their own, and that these desires influence their actions. Specifically, children were presented with scenarios in which they have to contrast their desire to that of a character. Children's responses were scored as correct (1 point) if children acknowledged that the character had a desire different from their own. All other responses were scored as incorrect (0 points).

Knowledge Access. This task assessed children's understanding that another character does not necessarily have the same knowledge as they do. Specifically, children were presented with a scenario in which they knew something that another character did not. Then they were asked to predict what this other character would do if presented with the scenario that included information they knew, but this character did not know. Children's responses were scored as correct (1 point), if they acknowledged that the character could not have known the correct answer because the character was not exposed to the scenario before. All other responses were scored as incorrect (0 points).

Unexpected Contents. This task assessed children's ability to understand that their expectations about the world may not be in accordance with the actual state of the world, and that another character may hold a false belief about the object in the world, even though the child has been shown otherwise. Children's responses were scored as correct (1 point) if the child acknowledged that the character would hold the same false-belief as they (the child) once had because the character had not been shown that their belief was false. All other responses were scored as incorrect (0 points).

Not Own Belief. This task assessed children's ability to understand that someone else may hold a belief about the world that is different from their own; and that this different belief would result in actions different from their own. Children's responses were scored as correct (1 point) if children said that the character would act based on the character's own belief, and not the child's belief. All other responses were scored as incorrect (0 points).

Explicit False Belief. This task assessed whether children understand that another's belief of a given situation is different from their own, and whether the child is

able to predict the other person's behavior based on that understanding. Children's responses were scored as correct (1 point) if they were able to predict that the character would act upon their own belief, even though the child knew the character's belief was false. All other responses were scored as incorrect (0 points).

In sum, children's correct responses for each of the *Not Own Desire*, *Knowledge Access*, *Unexpected Contents*, *Not Own Belief*, and *Explicit False Belief* tasks could earn a score of 1 point, while incorrect responses were given a score of 0 points. A composite *Theory of Mind Scale Score* (ranging from 0-5) was calculated by summing the total number of points obtained on each of Wellman and Liu's tasks (for detailed testing protocol see Appendix B) .

Second Order Theory of Mind Task. This task is adapted from the Second order scenarios task developed by Astington, Pelletier, and Homer (2002). The purpose of this task is to assess children's understanding that one person may hold erroneous beliefs about another person's beliefs. Specifically, children were given two story scenarios that assessed whether they could predict a character's false beliefs about another character's mistaken knowledge. Different from the original task, which used figurines to act out the scenario, in the current version of the task, scenarios were illustrated in drawings. For each story scenario four pictures were shown to the child, one at a time, at specific points during the narration. After the story was finished, the pictures were taken away and the child was asked questions that tapped their 1st and 2nd order theory of mind knowledge, as well as some control comprehension questions. For example, in the first scenario the experimenter tells the following story: "*This is a story about Mike and his sister Kate (Picture 1). This is Mike. This is Kate. One day, Mike and Kate have a new toy train.*

They are playing it in Mike's room (Picture 2). Kate says, "It's time for dinner. Let's put the train away and we can play with it later." She puts the train in the drawer and goes to set the table (Picture 3). When Mike sees that Kate has left, he decides to play a trick. He takes the train out of the drawer and hides it under his bed (Picture 4). But Kate finishes setting the table and walks by Mike's door. She sees Mike hide the train under the bed. Kate sees Mike do this, but Mike can't see Kate."

For this story, the first-order theory of mind question was "Does Mike think that Kate saw him?" and a second-order theory of mind question was "Where does Mike think Kate will look for the train when she comes back?" Children were also asked to explain their answers to the second-order theory of mind question: "Why does he think this?" (for the testing protocol, see Appendix B).

Children's theory of mind scores were calculated based on correct (1 points) or incorrect (0 points) However, in order for the Theory of Mind questions to be considered for scoring, children were required to answer at least one of the control comprehension questions correctly. If no control questions were answered correctly, children received a 0 on the entire story. Three different types of scores were derived from this task. First, a Total 2nd Order Task score (ranging from 0-11) was calculated by summing the total number of points obtained on each question (theory of mind and control questions), across both scenarios. Second, a Total 1st Order Question score (0-2) was obtained by summing the total number of points obtained on the 1st order theory of mind questions, across both scenarios. Third, a Total 2nd Order Question score (ranging from 0-4) was obtained by summing the total number of points obtained on the 2nd order theory of mind and justification questions, across both scenarios.

Active Deception. We also tested children's ability to spontaneously deceive characters in the context of a competitive game by using a modified version of an active deception task created by Chandler et al. (1989). In this task children were put in a competitive situation against a story character and explained that in order to win the game they had to deceive the character. The experimenter then showed the child a very basic way in which they could do deceive the character in order to make the character hold a false-belief. After the experimenter models the simple deception, the child is asked to do something to actively deceive the character and win the game (for detailed testing protocol, see Appendix B).

Children's responses were scored according to the degree to which the child was able to manipulate the perspective of the character in order to win the game. Scores ranged from 0-4 points: 4 points was given to the highest level of manipulation and 0 was given to a child to did not deceive the opponent. If children provided more than one of deceptive behavior, they were given the score that corresponded to their most advanced act of deception.

CHAPTER 3: RESULTS

Two research questions were addressed in this study. In the first, we were interested in whether there is an optimal book reading inference strategy for promoting children's narrative comprehension. While we hypothesized that bookreading programs would overall increase children's comprehension abilities irrespective of condition, we expected that children in the Narrative Dynamics condition would experience greater gains than children in the Story Grammar condition. In our second question we were interested to see whether reenactment would affect children's narrative comprehension differently, depending on the book reading inference training that accompanied it. Specifically, we expected more gains for children who participated in Narrative Dynamics/Reenactment condition than for children in the Story Grammar condition.

Prior to testing our hypotheses, bivariate correlations were run to confirm the relationship between control and target variables. Correlations confirmed that *Age in Months*, *Sentence Recall*, and *Sentence Recall in Context* were significantly correlated to most target measures, while *Animal Span* was not (see Table 2). The *Animal Span* memory task was therefore excluded from all subsequent analyses, while these three other variables were kept as controls. Control variables were centered to their respective mean to calibrate the results on the target age group (preschoolers) as opposed to a broader age range. To determine whether there were differences between conditions at pre-test, a 2 (Book Reading Condition: Narrative Dynamics, Story Grammar) X 2 (Post-Reading Activity: Story Acting, Art Activity) multivariate ANOVA was run on all target measures. Results revealed no significant differences between conditions on any of the target measures, $p > .05$.

To address the two research questions, mixed ANOVAS were run on each measure. A series of 2 (Time: Pre-Test, Post-Test) X 2 (Book Reading Condition: Narrative Dynamics, Story Grammar) X 2 (Post-Reading Activity: Story Acting, Art Activity) mixed ANOVAS were conducted with Time as within and Bookreading and Post Reading activity as between subjects variables. Preliminary analyses indicated that Gender was not a significant factor for most measures and was dropped when not significant. There was only one measure in which Gender was significant and it will be reported in the relevant section. Simple main effects were run as a follow-up to significant interactions, and Bonferroni adjustments were implemented to maintain a family-wise error rate of $p < .05$. Effect size for main effects are reported as partial eta squared, and for interactions as partial eta squared and Cohen's d. We used two different measures of effect size for interactions since they assess effect size differently. While partial eta squared refers to the proportion of the variance in the dependent variable that is attributable to the independent variable, cohen's d refers more broadly to the extent to which two groups differ from one another. To calculate cohen's d for the interactions, the following formula was used:
$$= \frac{(M1_{time2} - M1_{time1}) - (M2_{time2} - M2_{time1})}{\sqrt{MSE}}$$
. Descriptive statistics are reported in Table 3, while estimated marginal means are reported in the text and in Table 4.

Effects of Narrative Training on Storybook Comprehension Measures

Children's storybook comprehension was analyzed in two ways. First we collapsed across storybooks to assess children overall storybook comprehension abilities. Second, we analyzed each book separately, *Harry the Dirty Dog* (Book 1) and *Peter's Chair* (Book 2), to capture differences between books, if any. For each analysis, the

results are reported in terms of: children's performance on (1) total storybook comprehension task, (2) literal questions, and (3) inferential questions.

Comprehension across Books

Total storybook comprehension. For children's overall comprehension of story books, results revealed a main effect of Time, $F(1,44) = 76.50, p < .001, \eta^2 = .64$, indicating that all participants improved their comprehension from Pre-Test ($M = 14.18$) to Post-Test ($M = 19.96$). In addition, we found a main effect of Book Reading Condition, $F(1,44) = 15.48, p < .01, \eta^2 = .26$, in which children in the Narrative Dynamics condition had better story understanding ($M = 19.10$) than children in the Story Grammar condition ($M = 15.04$). As predicted, these results were qualified by a Time X Book Reading Condition interaction, $F(1,44) = 5.67, p < .05, \eta^2 = .11$, in that children in the Narrative Dynamics condition improved their storybook understanding more so (from $M = 15.43$ to $M = 22.78, p < .01$) than children in the Story Grammar condition ($M = 12.94$ to $M = 17.14, p < .05$), $d = .95$.

Literal storybook comprehension. For children's overall ability to answer literal questions, results revealed a main effect of Time, $F(1,44) = 37.66, p < .001, \eta^2 = .46$, indicating that all participants improved from Pre-Test ($M = 3.47$) to Post-Test ($M = 4.65$). In addition, we found a main effect of Book Reading Condition, $F(1,44) = 5.01, p < .05, \eta^2 = .10$, in which children in the Narrative Dynamics condition answered more literal questions correctly ($M = 4.42$) than children in the Story Grammar condition ($M = 3.70$). There was also a marginally significant main effect of Post-Reading Activity, $F(1,44) = 3.40, p = .056, \eta^2 = .07$, in which children in the Acting Out condition appeared to answer more literal questions correctly ($M = 4.37$) than children in the Art

Activity condition ($M=3.75$). As expected, this was not qualified by a Time X Condition interaction, indicating that the narrative training conditions did not differ on their effect on children's understanding of literal information over time.

Inferential storybook comprehension. For children's overall ability to answer inferential questions, results revealed a main effect of Time, $F(1,44) = 21.79, p < .001, \eta^2 = .33$, indicating that all participants improved from Pre-Test ($M = 10.72$) to Post-Test ($M = 13.58$). In addition, we found a main effect of Book Reading Condition, $F(1,44) = 13.31, p < .01, \eta^2 = .23$, in which children in the Narrative Dynamics condition made more correct inferences about the story ($M= 13.77$) than children in the Story Grammar condition ($M= 10.53$). As predicted, these results were qualified by a Time X Book Reading Condition interaction, $F(1,44) = 5.76, p < .05, \eta^2 = .12$, in that children in the Narrative Dynamics condition improved their overall inference making ability more so (from $M= 11.60$ to $M= 15.93, p < .01$) than children in the Story Grammar condition (from $M=9.83$ to $M=11.22, p < .05$), $d = .95$.

Storybook Comprehension: Book 1

Total storybook comprehension. For children's total comprehension of book 1, *Harry the Dirty Dog*, results revealed a main effect of Time, $F(1,43) = 46.53, p < .001, \eta^2 = .52$, indicating that all participants improved from Pre-Test ($M = 3.32$) to Post-Test ($M = 6.24$). In addition, we found a main effect of Book Reading Condition, $F(1,43) = 6.07, p < .05, \eta^2 = .12$, in which children in the Narrative Dynamics condition had better story understanding ($M=5.60$) than children in the Story Grammar condition ($M=3.95$). As predicted, these results were qualified by a significant Time X Book Reading Condition interaction, $F(1,43) = 6.35, p < .05, \eta^2 = .13$, in that children in the Narrative Dynamics condition improved their storybook comprehension more so (from $M=3.6$ to

$M=7.6, p<.01$) than children in the Story Grammar condition (from $M=3.03$ to $M=4.87, p>.05$), $d= 1.01$.

Literal storybook comprehension. For children's ability to answer literal questions in book 1, results revealed a main effect of Time, $F(1,43) = 19.50, p < .001, \eta^2 = .31$, indicating that all participants improved from Pre-Test ($M =1.16$) to Post-Test ($M = 2.00$). As expected, this was not qualified by a Time X Condition interaction, indicating that the narrative training conditions did not differ on their effect on children's understanding of literal information over time.

Inferential storybook comprehension. For children's ability to answer inferential questions in book 1, results revealed a main effect of Time, $F(1,43) = 37.63, p < .001, \eta^2 = .47$, indicating that all participants improved from Pre-Test ($M =2.15$) to Post-Test ($M = 4.24$). In addition, we found a main effect of Book Reading Condition, $F(1,43) = 5.78, p < .05, \eta^2 = .12$, in which children in the Narrative Dynamics condition were better able to make inferences ($M= 3.80$) than children in the Story Grammar condition ($M= 2.60$). As predicted, these results were qualified by a Time X Book Reading Condition interaction, $F(1,43) = 10.37, p < .01, \eta^2 = .19$, in that children in the Narrative Dynamics condition improved their inference making ability more so (from $M=2.20$ to $M=5.39, p <.01$) than children in the Story Grammar condition (from $M=2.11$ to $M=3.10, p>.05$), $d= 1.29$.

Storybook Comprehension: Book 2

Total storybook comprehension. For children's total comprehension of book 2, *Peter's Chair*, results for total comprehension scores revealed a main effect of Time, $F(1,43) = 43.82, p < .001, \eta^2 = .51$, indicating that all participants improved from Pre-

Test ($M=10.98$) to Post-Test ($M=14.03$). In addition, we found a main effect of Book Reading Condition, $F(1, 43)=16.27, p<.001, \eta^2=.26$ in which children in the Narrative Dynamics condition had better story understanding ($M=13.80$) than children in the Story Grammar condition ($M=11.21$). As predicted, these results were qualified by a marginal Time X Book Reading Condition interaction, $F(1, 43)=2.89, p=.09, \eta^2=.06$, in that children in the Narrative Dynamics condition appeared to improve their storybook understanding more so (from $M=11.88$ to $M=15.72, p<.01$) than children in the Story Grammar condition (from $M=10.08$ to $M=12.34, p>.05$), $d=.67$.

Literal storybook comprehension. For children's comprehension of literal questions in book 2, results revealed a main effect of Time, $F(1,43)=12.95, p<.01, \eta^2=.23$, indicating that all participants improved from Pre-Test ($M=2.32$) to Post-Test ($M=2.71$). In addition, we found a main effect of Book Reading Condition, $F(1,43)=6.00, p<.05, \eta^2=.12$, in which children in the Narrative Dynamics condition answered more literal questions correctly ($M=2.65$) than children in the Story Grammar condition ($M=2.37$). As expected, this was not qualified by a Time X Condition interaction, indicating that the narrative training conditions did not differ on their effect on children's understanding of literal information over time.

Inferential storybook comprehension. For children's comprehension of inferential questions in book 2, results revealed a main effect of Time, $F(1,43)=35.27, p<.001, \eta^2=.45$, indicating that all participants improved from Pre-Test ($M=8.66$) to Post-Test ($M=11.32$). In addition, we found a main effect of Book Reading Condition, $F(1,43)=15.27, p<.01, \eta^2=.26$, in which children in the Narrative Dynamics condition were better able to make inferences ($M=11.15$) than children in the Story

Grammar condition ($M= 8.84$). However, there were no significant interactions, indicating that the narrative training conditions did not differ on their effect on children's inference making abilities over time, for book 2.

Nonetheless, because this task included some inference questions that were not embedded within the main context of the story, we reran the analysis including only contextualized inference questions. When this was done, results revealed a main effect of Time, $F(1,43) = 41.36, p < .001, \eta^2 = .49$, indicating that all participants improved from Pre-Test ($M=3.06$) to Post-Test ($M= 4.92$). In addition, we found a main effect of Book Reading Condition, $F(1, 44)= 10.99, p < .01, \eta^2 = .20$, in which children in the Narrative Dynamics condition made more contextualized inferences ($M=4.63$) than children in the Story Grammar condition ($M=3.35$). Furthermore, in partial support of our hypothesis, this result was qualified by a marginal Time X Book Reading Condition interaction, $F(1, 43) = 3.74, p = .06, \eta^2 = .08$, in that children in the Narrative Dynamics condition improved their ability to make contextualized inferences more so (from $M=3.42$ to $M=5.84, p < .01$) than children in the Story Grammar condition (from $M=2.70$ to $M=4.00, p < .05$), $d = .77$

Summary. Overall our central hypothesis was supported in that children who participated in the Narrative Dynamics condition made greater comprehension gains than children who participated in the Story Grammar condition, as measured through book reading tasks similar to our intervention but with two new books children had not seen before. This was reflected on children's total comprehension results, as well as their inference results. On the other hand, no relevant differences were found in children's responses to literal questions, indicating that children's comprehension gains appear to be

driven by their improvement on inference questions. Concerning children's involvement in post-reading activities, our hypothesis was not supported as reenactment did not affect children's narrative comprehension differently according to the book reading condition being conducted.

Effects of Narrative Training on Narrative Retelling Task

The retelling task was coded and analyzed in terms of narrative retelling and retelling comprehension. For the retelling, children's stories were analyzed for the total number of idea units retold by the child and the total number of Story Grammar elements mentioned in the retelling. For comprehension, children's responses were coded and analyzed for total comprehension, and for comprehension of literal and inferential questions.

Retelling total number of idea units

For children's ability to retell the story in the form of idea units (i.e. general ideas presented in the original text), results revealed a main effect of Time, $F(1,44) = 27.95$, $p < .001$, $\eta^2 = .35$, indicating that all participants included more idea units from Pre-Test ($M = 5.30$) to Post-Test ($M = 8.06$). However, no other main effects or interactions were found, indicating that the narrative training conditions did not impact children's retelling abilities differently, as assessed through idea units.

Retelling story grammar elements.

For children's ability to retell the story as story grammar elements, results also revealed a main effect of Time, $F(1,44) = 39.63$, $p < .001$, $\eta^2 = .48$, indicating that all participants told stories with more story grammar elements from Pre-Test ($M = 4.60$) to Post-Test ($M = 7.71$). However, no other main effects or interactions were found,

indicating that the narrative training conditions did not impact children's retelling abilities differently, as assessed through story grammar elements.

Retelling comprehension questions.

Comprehension questions were coded and analyzed in terms of children's total comprehension of the retelling story as well as their comprehension of literal and inferential questions.

Retelling total comprehension. For children's total comprehension of the retelling story, results revealed a main effect of Time, $F(1,44) = 51.61, p < .001, \eta^2 = .55$, indicating that all participants improved from Pre-Test ($M = 3.18$) to Post-Test ($M = 4.44$). In addition, we found a main effect of Book Reading Condition, $F(1, 44) = 5.96, p < .05, \eta^2 = .12$, in which children in the Narrative Dynamics condition had better story understanding ($M = 4.16$) than children in the Story Grammar condition ($M = 3.46$). As predicted, these results were qualified by a Time X Book Reading Condition interaction, $F(1, 44) = 12.52, p < .001, \eta^2 = .23$, in that children in the Narrative Dynamics condition improved their story understanding more so (from $M = 3.21$ to $M = 5.10, p < .01$) than children in the Story Grammar condition (from $M = 3.15$ to $M = 3.78, p < .05$), $d = 1.43$.

Retelling literal questions. For children's comprehension of literal questions, results revealed a main effect of Time, $F(1,44) = 11.60, p < .001, \eta^2 = .21$, indicating that all participants improved from Pre-Test ($M = 1.70$) to Post-Test ($M = 2.10$). As predicted, this result was qualified by a marginal Time X Book Reading Condition interaction, $F(1, 44) = 2.93, p = .09, \eta^2 = .06$, in that children in the Narrative Dynamics condition appeared to improve their ability to answer literal questions more so (from

$M=1.71$ to $M=2.32$, $p < .01$) while children in the Story Grammar condition did not (from $M=1.69$ to $M=1.90$, $p = .24$).

Retelling inferential questions. For children comprehension of inferential questions, results revealed a main effect of Time, $F(1,44) = 37.12$, $p < .001$, $\eta^2 = .46$, indicating that all participants improved from Pre-Test ($M = 1.48$) to Post-Test ($M = 2.34$). In addition, we found a main effect of Book Reading Condition, $F(1, 44) = 7.51$, $p < .01$, $\eta^2 = .15$, in which children in the Narrative Dynamics condition were better able to make inferences about the story ($M=2.15$) than children in the Story Grammar condition ($M=1.67$). As predicted, these results were qualified by a Time X Book Reading Condition interaction, $F(1, 44) = 8.83$, $p < .01$, $\eta^2 = .17$, in that children in the Narrative Dynamics condition improved their inferential abilities more so (from $M=1.51$ to $M=2.79$, $p < .01$) than children in the Story Grammar condition (from $M=1.45$ to $M=1.88$, $p < .05$), $d = 1.18$.

Summary Focusing on the narrative retelling task, we see that our central hypothesis was also supported. Children who participated in the Narrative Dynamics condition had greater narrative comprehension gains than children who participated in the Story Grammar condition, but this was only true when the narrative retelling task was analyzed in terms of children's retelling comprehension scores, not for their scores on Idea Units and Story Grammar Elements. Furthermore, when separating children's comprehension scores between literal and inferential questions, results indicated that children's comprehension gains were mostly driven by their improvements on inferential questions and not literal questions. Concerning children's involvement in post-reading activities, our hypothesis was not supported as reenactment did not affect children's

narrative comprehension differently, according to the book reading condition being previously conducted.

Effects of Narrative Training on Narrative Picture Sequence Task

Because children's narrative abilities were also assessed through a picture sequence task (on 4 different stories), which varied in terms of number of characters (1 vs. 2) and types of problem (External vs. Internal), the picture sequence task was analyzed in 5 ways. We first analyzed the task in terms of children's total picture sequence score (averaging over 4 picture sequences), indicating their overall ability to tell a story based on pictures. We further probed the data and analyzed the task in terms of children's performance on stories consisting of 1 or 2 main characters, as well as their performance on stories with an external or internal problem.

Total picture sequence score. For children's overall ability to tell stories based on pictures, results revealed a main effect of Time, $F(1,43) = 54.99, p < .001, \eta^2 = .56$, indicating that all participants improved from Pre-Test ($M = 12.31$) to Post-Test ($M = 14.30$). In addition, we found a main effect of Book Reading Condition, $F(1,43) = 4.18, p < .05, \eta^2 = .09$, in which children in the Narrative Dynamics told stories with more story elements ($M = 14.30$) than children in the Story Grammar condition ($M = 12.31$). As predicted, these results were qualified by a significant Time X Book Reading Condition interaction, $F(1,43) = 24.23, p < .001, \eta^2 = .36$, in that, over time, children in the Narrative Dynamics condition included more story elements in their narratives (from $M = 11.43$ to $M = 17.16, p < .05$) than children in the Story Grammar condition (from $M = 11.72$ to $M = 12.90, p = .08$), $d = 1.22$. Results further supported our predictions by revealing a marginal Time X Book Reading Condition X Post-Reading Activity

interaction, $F(1,43)=3.36, p=.07, \eta^2 = .07$, suggesting that while children in the Narrative Dynamics condition seemed to benefit more from participating in the Story Acting over time (from $M=9.97$ to $M=17.02$) in comparison to children in the Art Activity (from $M=12.89$ to $M=17.30$), there appeared to be no significant differences between post-reading groups for children participating in the Story Grammar condition (from $M=12.39$ to $M=13.17$, for Story Acting, and from $M=11.06$ to $M=12.63$, for Art Activity).

One character stories. For children's ability to tell stories with only one main character, results revealed a main effect of Time, $F(1,43) = 20.59, p < .001, \eta^2 = .32$, indicating that all participants improved from Pre-Test ($M=6.59$) to Post-Test ($M=8.21$). As predicted, this result was qualified by a significant Time X Book Reading Condition interaction, $F(1,43) = 14.10, p < .01, \eta^2 = .25$, in that, over time, children in the Narrative Dynamics condition included more story elements in their narratives (from $M=6.19$ to $M=9.15, p < .05$) than children in the Story Grammar condition (from $M=6.97$ to $M=7.27, p > .05$).

Two main character stories. For children's ability to tell stories with two main character, results revealed a main effect of Time, $F(1,43) = 37.40, p < .001, \eta^2 = .47$, indicating that all participants improved from Pre-Test ($M=4.99$) to Post-Test ($M=6.82$). In addition, we found a main effect of Book Reading Condition, $F(1,43) = 6.34, p < .05, \eta^2 = .13$, in which children in the Narrative Dynamics told stories with more story elements ($M=6.62$) than children in the Story Grammar condition ($M=5.18$). As predicted, these results were qualified by a significant Time X Book Reading Condition interaction, $F(1,43) = 10.01, p < .01, \eta^2 = .19$, in that, over time, children in the

Narrative Dynamics condition included more story elements in their narratives (from $M=5.24$ to $M=8.0$, $p<.05$) than children in the Story Grammar condition (from $M=4.74$ to $M=5.63$, $p<.05$), $d= 1.30$. Results further supported our predictions by revealing a significant Time X Book Reading Condition X Post-Reading Activity interaction, $F(1,43)=6.47$, $p <.05$, $\eta^2 = .13$, indicating that while over time children in the Narrative Dynamics condition seemed to benefit more from participating in the Story Acting (from $M=4.40$ to $M= 8.05$) than the Art Activity (from $M= 6.08$ to $M=7.96$), there were no differences for children participating in the Story Grammar (from $M=3.99$ to $M=5.52$ for Art Activity, and from $M=5.48$ to $M=5.74$, for Story Acting).

External problem stories. For children's abilities to tell stories based on external problems of characters, results revealed a main effect of Time, $F(1,43) = 42.48$, $p < .001$, $\eta^2 = .50$, indicating that all participants improved from Pre-Test ($M =6.00$) to Post-Test ($M = 7.62$). As predicted, this result was qualified by a significant Time X Book Reading Condition interaction, $F(1,43) = 26.27$, $p < .001$, $\eta^2 = .38$, in that, over time, children in the Narrative Dynamics condition included more story elements in their narratives (from $M=5.69$ to $M=8.57$, $p<.05$) than children in the Story Grammar condition (from $M=6.31$ to $M=6.66$, $p>.05$).

Internal problem stories. For children's abilities to tell stories based on internal problems of characters, results revealed a main effect of Time, $F(1,43) = 24.63$, $p < .001$, $\eta^2 = .36$, indicating that all participants improved from Pre-Test ($M =5.58$) to Post-Test ($M = 7.42$). In addition, we also found a main effect of Book Reading Condition, $F(1,43) = 4.86$, $p < .05$, $\eta^2 = .10$, in which children in the Narrative Dynamics told stories with more story elements ($M=7.13$) than children in the Story Grammar condition ($M=5.83$).

As predicted, these results were qualified by a significant Time X Book Reading Condition interaction, $F(1,43) = 7.58, p < .01, \eta^2 = .15$, in which, over time, children in the Narrative Dynamics condition included more story elements in their narratives (from $M=5.74$ to $M=8.59, p < .05$) than children in the Story Grammar condition (from $M=5.4$ to $M=6.24, p > .05$), $d = 1.11$.

Summary. Focusing on children's ability to tell stories using picture prompts, overall, our central hypothesis was supported in that children who participated in the Narrative Dynamics condition included more sequential story grammar elements over time than children who participated in the Story Grammar condition, and this was true for their overall performance on the picture sequence task, as well as their performance across story types. Concerning children's involvement in post-reading activities, our hypothesis was partially supported in that children who participated in the Narrative Dynamics/Story Acting condition had greater gains than children who participated in the other groups, but this was only the case for children's performance on two-character stories and marginally significant for children's overall performance on the task.

Effects of Narrative Training on Vocabulary

Concerning children's vocabulary gains, we found a significant main effect of Time $F(1,44) = 24.41, p < .001, \eta^2 = .36$, suggesting that all participants improved from Pre-Test ($M = 21.16$) to Post-Test ($M = 23.59$). However, no other effects were found, indicating that the Narrative Training conditions did not affect children's vocabulary gains.

Effects of Narrative Training on Theory of Mind

Since some of the books in our program addressed theory of mind themes and previous research (Brockmeyer, 2009) has found the book reading affects children's theory of mind abilities, we also included tasks that assessed children's theory of mind abilities to test the effects our book reading programs on these abilities. Children were tested on their first and second order theory of mind abilities, as well as an active deception task.

Theory of mind scale.

For children's first order theory of mind abilities, results revealed a main effect of Time, $F(1,44) = 12.51, p < .01, \eta^2 = .22$, indicating that all participants improved from Pre-Test ($M = 2.71$) to Post-Test ($M = 3.45$). In addition, we found a main effect of Book Reading Condition, $F(1,44) = 5.49, p < .05, \eta^2 = .11$, in which children in the Narrative Dynamics overall performed better on the first order theory of mind scale ($M = 3.30$) than children in the Story Grammar condition ($M = 2.76$). However, no interactions were found, indicating that the narrative training conditions did not affect children's first order theory of mind abilities differently, as assessed through this task.

Second order theory of mind task.

The second order theory of mind task was coded and analyzed in 3 ways. First we assessed children's overall performance on the second order theory of mind task, which included combination of 1st and 2nd order questions, as well as some control questions. We then assessed children's first and second order theory of mind abilities separately.

Total Score. For children's overall performance on the second order theory of mind task, results revealed a main effect of Time, $F(1,44) = 33.82, p < .001, \eta^2 = .44$,

indicating that all participants improved from Pre-Test ($M = 4.81$) to Post-Test ($M = 6.08$), In addition, we found a main effect of Book Reading Condition, $F(1,44) = 3.48$, $p = .07$, $\eta^2 = .07$, in which children in the Narrative Dynamics overall performed better on the second order theory of mind task ($M = 5.71$) than children in the Story Grammar condition ($M = 5.17$). However, no interactions were found, indicating that the narrative training conditions did not appear to affect children's overall performance on the second order theory of mind task differently.

First order theory of mind questions. For children's ability to answer first order theory of mind questions, results revealed a main effect of Time, $F(1,44) = 13.63$, $p < .01$, $\eta^2 = .24$, indicating that all participants improved from Pre-Test ($M = .95$) to Post-Test ($M = 1.34$). In addition, we found a main effect of Book Reading Condition, $F(1,44) = 5.29$, $p < .05$, $\eta^2 = .11$, in which children in the Narrative Dynamics performed better on first order theory of mind questions ($M = 1.36$) than children in the Story Grammar condition ($M = .93$). As predicted, these results were qualified by a significant Time X Book Reading Condition interaction, $F(1,44) = 4.21$, $p < .05$, $\eta^2 = .09$, in that children in the Narrative Dynamics improved their performance on first order theory of mind questions (from $M = 1.06$ to $M = 1.66$, $p < .05$) while children in the Story Grammar condition did not (from $M = .84$ to $M = 1.01$, $p > .05$), $d = .79$.

Second order theory of mind questions. For children's ability to answer second order theory of mind questions, results revealed a main effect of Time, $F(1,44) = 7.35$, $p < .05$, $\eta^2 = .14$, indicating that all participants improved from Pre-Test ($M = .20$) to Post-Test ($M = .53$). As predicted, this result was qualified by a marginal Time X Post-Reading Activity interaction, $F(1,44) = 3.47$, $p = .07$, $\eta^2 = .07$, in that children in the

Acting Out condition improved their performance on second order theory of mind questions (from $M=.13$ to $M=.70$, $p<.05$) while children in the Art Activity condition did not (from $M=.26$ to $M=.36$, $p >.05$).

Active Deception

For children's ability to actively deceive an opponent, results revealed a main effect of Time, $F(1,40) = 7.04$, $p < .05$, $\eta^2 = .15$, indicating that all participants improved from Pre-Test ($M = 1.51$) to Post-Test ($M = 1.89$). This result was qualified by a Time X Gender X Book Reading condition, $F(1,40) = 11.81$, $p < .01$, $\eta^2 = .23$. Follow-up tests indicated that while in the Narrative Dynamics condition boys significantly improved their active deception abilities (from $M=1.18$ to $M=2.20$, $p<.05$) and girls did not (from $M=1.80$ to $M=2.01$, $p>.05$), in the Story Grammar condition girls significantly improved (from $M=.94$ to $M=1.68$, $p<.05$) and boys stayed the same (from $M=2.14$ to $M=1.69$, $p>.05$).

Summary of Theory of Mind Results

In regard to children's theory of mind results, our predictions were partially supported, in that that children who participated in the Narrative Dynamics condition had greater 1st Order Theory of Mind gains than children in the Story Grammar condition, but this was true only for first order questions answered in the second order theory of mind task and not on the theory of mind scale. Furthermore, we found that Acting Out was more beneficial for performance on 2nd order theory of mind questions than a simple art activity, but that this was true independently of book reading conditions.

CHAPTER 4: DISCUSSION

This study systematically compared the effects of two types of book reading inference training programs as well as the effect of story reenactment on children's narrative comprehension abilities. Specifically, it compared the contributions of Story Grammar to a Narrative Dynamics inference training conditions, and tested whether story reenactment affected children's narrative comprehension differently depending on the the inference training condition that preceded it..

Two research questions were addressed in this study. In the first, we were interested in whether there is an optimal book reading inference strategy for promoting children's narrative comprehension. While we hypothesized that both bookreading programs would affect children's comprehension abilities , we expected that children in the Narrative Dynamics condition would experience greater gains than children in the Story Grammar condition as seen through narrative comprehension, and possibly vocabulary and theory of mind gains. In our second question we were interested to assess the effects of reenactment on children's narrative comprehension abilities. Specifically, we expected greater gains, for children who participated in Narrative Dynamics/Reenactment condition than for children in the Story Grammar conditions as seen through narrative comprehension and perhaps theory of mind tasks.

Overall, our central predictions were supported. Results indicated that children benefitted from both book reading training condition. Results also indicated that children in the Narrative Dynamics condition experienced greater comprehension gains than children in the Story Grammar condition and this was true across all narrative comprehension measures. Specifically, this improvement was found in children's

comprehension of storybooks, their comprehension of an orally presented story with no picture prompts, and even when probed to tell a story about a sequence of pictures. Results further indicated that comprehension gains experienced by children in the Narrative Dynamics condition were driven by gains in children's inference making abilities, and not by their ability to answer literal questions about the text. This difference was consistent across storybooks and retelling comprehension tasks. Nevertheless, our predictions were not supported for children's vocabulary, and they were only partially supported for children's first order theory of mind abilities.

Concerning our predictions about the differential effects of reenactment on children's narrative comprehension, we also found partial support for our hypothesis. Specifically, our results indicated that children participating in the Narrative Dynamics/Story Acting condition demonstrated greater comprehension gains than children participating in Story Grammar conditions, but this was only true for the picture sequence task. Theory of mind results did not support our central hypothesis and revealed an overall advantage of Story Acting over Art Activity for second order theory of mind ability, however this did not differ by bookreading conditions.

Is there an optimal type of book reading inference training to promote preschoolers' comprehension and comprehension related abilities?

Concerning our first question, results indicated that Narrative Dynamics inference training promoted more comprehension gains than Story Grammar inference training. It appears that that training children with Narrative Dynamics questions is more beneficial than training children with Story Grammar questions. Our results further indicate that that differences between book reading conditions were due to the types of questions

being asked in each condition. Specifically, while questions in the Story Grammar condition probed children's connections about the overarching structure of the story (who, what, where, and why), questions in the Narrative Dynamics condition sought to help children build their story knowledge by taking on character's perspective, predicting story events, and linking story information to relevant background knowledge.

Although previous research has mostly focused on promoting comprehension through fostering structural connections, as proposed by the story grammar approach (e.g. Idol & Croll, 1987, Idol, 1987, Morrow, 1985a & 1985b, Morrow et al. 1992, Hayward and Schneider, 2000), we argue that this may not be optimal for two reasons. First, since the structure put forth by story grammar researchers does not apply to all stories, one can expect that training children to understand the stories through this abstract story structure schema would restrict their ability to generalize their understanding to different stories that do not adhere well to this schema. Second, even if all stories followed the structure put forth by story grammar researchers, by only focusing on the structural elements and ignoring other story aspects, one takes away from the richness intended by the narrative.

Scholars in narrative and literary studies (Richardson, 2002), as well as researchers in the field of psychology (Bruner, 1986, and Nicolopoulou, 2008) have pointed to the importance of understanding stories beyond its plot (structure) in order to derive a richer, more encompassing, understanding of the narrative at hand. Specifically, Richardson (2002), has argued in favor of a more dynamic approach to narratives, one that takes the story on its own, acknowledging the challenges it poses, and making the necessary connections to reach a deeper story understanding. Bruner (1986) has further proposed that understanding the story beyond its structure and focusing on the mental

states of characters allows for higher engagement, as well as better meaning making opportunities. Nicolopoulou (2008) has also argued in favor of the importance of understanding the story through its characters as way of developing a richer understanding of the story at hand.

Our goal, with the Narrative Dynamics training condition, was to address the ideas expressed by these researchers by creating an inference training program that took into account the challenges posed by each individual story while focusing specifically on character dynamics. In doing this, we expected to create more opportunities for children to connect the necessary story information by moving away from the abstract structure proposed by story grammar and training children to understand the story through story's motivator, the character. By helping children take on character perspective, understand the dynamics between characters, and prompting them to make story connections based on characters' motivations and intentions, we expected children to better understand the story at hand due to the inferences they were learning to make during the book reading training.

Results from the current study revealed that not only were children in the Narrative Dynamics condition better able to understand stories, in comparison to children participating in the Story Grammar condition, but also that comprehension gains for children in the Narrative Dynamics condition were driven by their increasing abilities to make inferences. Furthermore, results also indicated that training on Narrative Dynamics also generalized beyond children's ability to answer comprehension questions by extending to children's ability to tell stories based on pictures.

We argue that Narrative Dynamics training contributes to children's comprehension above Story Grammar training by fostering children's ability to make the necessary story connections at several different levels. Either through connections of textual elements, text and pictures, or text and background knowledge, this training prompted children to think about stories as dynamic and in doing so it helped children to become versatile in the resources they could use in order to move the story forward and predict future story events. By further asking questions that helped children take on character's perspective, we also prompted children to understand the dynamics of a story by proposing an understanding of the plot as motivated through character's motivations, intentions and actions. In doing this, children were better able to understand the connections of story events through the characters and the dynamics between characters as a motivator of drama and complex story events.

Although some researchers within the Story Grammar approach (van den Broek et al., 2005, McMaster, van den Broek, Espin, White, Rapp, Kendeou, Bohn-Gettler, & Carlson, 2011) concede that focusing on other aspects of the story is important for comprehension, they still argue in favor of story elements within a story grammar framework. Specifically, these story grammar researchers emphasize that comprehension is derived from the understanding of how these story grammar elements are causally connected to each other through the goal, and that each element could directly or indirectly cause the occurrence of the rest of them. Based on this premise, van den Broek and colleagues propose that in order to understand a narrative well, one must be able to make causal connections between goals with the rest of the story elements,

and that depending on the length as well as the complexity of a story, different passages will have a more or less complex causal network.

To assess the effectiveness of training children on story grammar causal connections, McMaster and colleagues (McMaster, van den Broek, Espin, White, Rapp, Kendeou, Bohn-Gettler and Carlson, 2011) compared the effects of causal story grammar training to two other programs. In the causal training program, children were asked questions that brought out the causal connections among central story grammar elements, in the second, children asked simple *wh-* questions (*who, what, when, where and how*), and in the third program, children were explicitly taught the importance of connecting the textual elements (*“how does the sentence you just read connect to something else in the story”*). They tested a total of 246 7- to 9-year-olds, divided evenly between the three training conditions. Children participated in a 9-week training, occurring three times a week, with their entire classroom. Results revealed no differences between any of the training conditions, indicating that causal training did not affect children’s story comprehension differently. When probing the data further and assessing subgroups of poor comprehenders, they found an advantage for children in the causal-questioning condition, but only for a subgroup of poor comprehenders that had a difficult time making accurate inferences. While this approach to understanding stories is an advance, in comparison to teaching children story structure schemas, it still holds that these results did not extend to normally developing children. It seems then that causal connections may not be the driving force of comprehension, especially when understood in story grammar framework. In the current study, we found comprehension results with a smaller sample size and that generalized across an array of narrative comprehension

tasks, indicating that perhaps it is time to move away from a structural approach to narrative, to a more dynamic approach that takes the story as it is and allows it to unfold through the intentions and actions of characters.

Before discuss the rest of the results in this study, it may be appropriate to evaluate how children, overall, enjoyed both training programs similarly.. Here we will rely on observational evidence, as well as feedback from parents and teachers, since we did not consistently ask children about their experiences. Our observations indicate that children in all training conditions were always eager and willing to participate in our bookreading program. They were always enthusiastic about when it would be their turn to “read stories” and excited when a new book was introduced (“*What book are we reading next time*”, or “*What’s this one going to be about?*”). Most telling was the instance when one of our research assistants asked a child to name one the favorite thing he did over the summer, and he eagerly responded that he enjoyed reading books with the experimenter. In addition, teachers and parents both reported that children came back to the classroom or to their home eager to talk about the story we have just read. Some parents of children in either training conditions inquired further about our bookreading activities because they sensed the child’s enthusiasm at home and were interested in knowing more about bookreadings. In fact, one mother asked us eagerly whether we had programs for older children because she was very impressed how her younger child was turned into books and she was hoping that we had such a program for her older child, who showed no interest in books.

Overall it seems that children in both bookreading conditions enjoyed them. While this may be the case, our results still indicate *Narrative Dynamics* as more beneficial in promoting children's narrative comprehension than Story Grammar. Concerning children's vocabulary abilities, researchers have argued that vocabulary is an important component of comprehension, especially in the early years (Kendeou et al. 2006). , In addition, researchers have found that participation in read-aloud practices improve children's vocabulary (e.g., Wasik, Bond & Hindman, 2006, and Wasik & Bond, 2001). Although the main focus of this study was to promote comprehension and not vocabulary, during the book reading sessions, the experimenter explained some vocabulary words either because it was central for the understanding of the story or because children asked for clarification so it seems reasonable to expect that vocabulary growth may be present. Furthermore, because the *Narrative Dynamics* condition is seen provide more meaning-making opportunities for children, in that they would understand the story better, children in the *Narrative Dynamics* condition were expected to experience greater vocabulary gains than children in the *Story Grammar* condition. , Our hypothesis was not supported. Results indicated an overall increase in vocabulary ability, but this did not differ by bookreading condition.

One possible explanation for this result may be that perhaps the vocabulary task used was not sensitive enough to detect differences between conditions in vocabulary growth. In fact, studies that focus on promoting vocabulary have resorted to creating more sensitive vocabulary measures based on the words being taught to the children, and assessing children on these measures (e.g., Wasik, Bond & Hindman, 2006). Due to time constraints in starting the project, we did not create a vocabulary task based on the books

included in our intervention. However, through observations of the videotaped bookreading session we saw instances of vocabulary gains through the use new vocabulary words and by children being able to point or discuss a new word when asked by the experimenter. For example, children were more likely to use a learned vocabulary word when asked comprehension questions, and they were also more likely to ask for clarifications about vocabulary when they did not understand a specific word. Although we cannot claim that these differences are significant, it appears that children in Narrative Dynamics condition used new vocabulary words more frequently than children in the Story Grammar condition and they also appeared to be more inclined to ask for clarifications about unknown words. In future studies, vocabulary gains should be assessed more thoroughly.

We also expected, in a very exploratory way, that Narrative Dynamics condition would promote greater theory of mind gains than story grammar condition. Because the Narrative Dynamics condition attempted to promote story understanding by prompting children's ability to take on characters' perspective, we expected that children who participated in the Narrative Dynamics condition would benefit more than those participating in the story grammar condition. In partial support of our hypothesis, results demonstrated an advantage for children in the Narrative Dynamics condition for first order theory of mind ability. However, curiously this was true for the first order questions in the second order theory of mind task, and not for the theory of mind scale.

Differences in results for the second order theory of mind task and not the theory of mind scale could explained by the fact that the second order theory of mind task is presented in a more elaborate story context, a context similar to the ones provided for

storybooks. In addition, Hough and Nicolopoulou (2011) have found that children are more likely to pass theory of mind tasks if questions are embedded within a more elaborate story context in comparison to a less elaborate context. Furthermore, while the theory of mind scale presents the scenarios by contrasting the character's perspective to that of the child, the second order theory of mind task presents the scenarios contrasting the perspective of two characters external to the child. Although contrasting character perspective is argued to be more complicated as it requires coordinating 3 perspectives at once (2 characters and the child's), this is similar to the demands of a storybook, which is what children were exposed to during the book reading sessions. , Thus, children could have found the format of the second order theory of mind task more familiar and more accessible than the theory of mind scale.

While we found evidence for Narrative Dynamics benefitting children's first order theory of mind understanding, this did not hold for children's second order theory of mind ability or active deception. This could be the case because these abilities are simply more difficult and would require more training with books and other language and cognitive experiences. Furthermore, concerning children's ability to deceive another pretend character, although we did find an overall improvement, we did not find differences between any of the two training conditions. Results only revealed gender differences, which was not a question we asked. We believe that, although we did have some books with deception theme, these books were few, and were only read towards the end of the training because of its theme complexity. This being the case, it could be that we did not focus on this ability enough or that the deception theme was too complex for children this age. Another explanation may be that during the testing we found that some

children had a particularly difficult time deceiving the pretend opponent. While they were able to actively deceive in parts of the task, at the end of the task, when the pretend opponent asks “Where did you put the sticker?” children told the opponent the truth, instead of deceiving them to “win the game.” This was particularly true in the case of Latino children, indicating that perhaps this task not very culturally sensitive.

It should be made evident that although we found less consistent theory of mind results than studies that have sought to promote theory of mind abilities (Brockmeyer, 2009), these findings were exploratory and do not take away from the benefit of Narrative Dynamics to children’s developing comprehension abilities.

Does reenactment promote comprehension differently according to the inference training condition being conducted?

To address our second question, we expected that reenactment would benefit children in the Narrative Dynamics condition more so than children in the Story Grammar condition. This expectation was based on the understanding that the Narrative Dynamics condition was aimed to promote inferences related to perspective taking abilities, though not restricted to it, which we expected may align better with experiences fostered through story reenactment. In partial support of our hypothesis, results revealed that reenactment only impacted children’s narrative comprehension differently in the picture sequence task. Specifically, results indicated that while reenactment benefitted children in the Narrative Dynamics condition more so than a simple art activity, no such difference was true for children in the Story Grammar condition. This result was significant for children’s picture sequence score in the stories with two characters and marginally significant for children’s total picture sequence score.

This result could be explained by the fact that direct gains from training in perspective taking can only be seen in tasks that puts this ability to the test. In having to tell stories with two main characters, children need to coordinate character's perspective in order make the story unfold coherently. While we expected reenactment to promote children's overall comprehension above the impact of the inference training, our sample size might have been too small to really assess these differences (approximately 13 children per cell for a 3-way interaction). Nevertheless, we did find some indication that our predictions were in the right direction.

For theory of mind abilities, we also expected differences in favor of reenactment and Narrative Dynamics condition, because of the combination of perspective taking training in the narrative dynamics and reenactment. Our predictions were not supported in any of the theory of mind tasks. We found, however, an overall advantage for children in the Story Acting condition for second order theory of mind understanding in comparison to children in the Art Activity condition. Second order theory of mind requires coordinating character's false-beliefs, how they relate to each other ,and the repercussions of this false-belief in character's future actions. Although children only begin to really pass the 2nd order theory of mind task at 6-7 years of age, our results indicated the children in the acting out condition were more likely to coordinate character's perspective than children in the art activity condition. This could be the case because children in the acting out condition were trained in coordinating perspective through taking on character's perspectives, their false-beliefs and the repercussions of these beliefs, while children in the art activity were not given such opportunities.

In sum, while we expected reenactment to interact with inference training conditions in favor of *Narrative Dynamics*, our results were only partially supported for gains in narrative comprehension, and they were not supported for gains in theory of mind abilities. We did, however, find some indication that Narrative Dynamics, in combination to reenactment, fosters children's narrative comprehension abilities, but this was only found in the picture sequences. Because the lack of differences between conditions could be due to our small sample size, the impact of reenactment is still left an open question.

Strengths and Limitations

To begin, one of the strengths of this study was the creation of a new book reading method based on theoretical principles of narratology and story understanding. Another strength was the finding that this method was highly effective in promoting children's narrative comprehension abilities, even when compared to the mainstream approach put forth by story grammar researchers. In comparing these methods, our research design was stringent since comparisons between methods were always in relation to each other and not to a control group with no book reading training. While this made the design stronger, this also made our task more difficult, in that differences between groups needed to go beyond the general exposure to books and above the effects of the other book reading condition. Furthermore, we also used a randomized control design, in which children were randomly assigned to different conditions within their classrooms and all conditions were represented in each of the classrooms. We also controlled for differences between conditions by making sure that all conditions had

approximately the same number of questions being asked about each book, as well as the same amount of time to be conducted (between 20 to 30 minutes).

Nevertheless, although we used a stringent research design, few limitations need to be brought to light. One limitation of this study is the fact that the experimenter was not blind to the conditions. We attempted to control for experimenter bias in several different ways. The first was by controlling for the bias during the actual training. We used scripted questions for the different conditions, two books for each story, and specific placement of the questions in each book. The second was by controlling for the bias during testing. Children were only assigned to book reading conditions after pre-test, and during both pre-test and post-test, children were assessed by the experimenter as well as a group of research assistants who were blind to the conditions and hypothesis. The third way to control for experimental bias was to have the experimenter and blind research assistants code the data separately in order to get reliability ratings. By doing these things we hoped to address and control for the possibility of this bias.

Another limitation was that since we did not include a delayed post-test, we cannot fully assess the long term effect of the book reading trainings on children's narrative comprehension abilities. Future studies would benefit from including a delayed post-test in order to assess the impact of these training studies long term. Finally, to reinstate a point mentioned earlier, perhaps some of our task choices were not the best, in that the task may not have been sensitive enough to tap significant differences between the conditions. In future studies we would recommend using a tailored vocabulary task and perhaps a better deception task.

Implications

In addressing van Kleeck's call for interventions focusing on preschoolers, the current study points to two major implications for researchers and practitioners. The first is that specific training on inference making abilities is useful in promoting preschool children's comprehension abilities, as seen through the consistent comprehension findings across a variety of tasks. As proposed by van Kleeck, if we are to prevent literacy difficulties in children, we have to start when they are young, and this study points to the fact not only can we start when children are young, but also that children are receptive to this early guidance.

Second, our study draws attention to the importance of promoting inferences through a text-based approach instead of a structural approach. Although this goes against what researchers and practitioners are currently doing, we are proposing that by focusing on complexities of the story and helping children work through those complexities, comprehension gains are higher, and this finding cannot be ignored. Children need to be guided through the comprehension processes and perhaps teaching them the overarching skeleton of the story and expecting them to generalize this structure across different narrative text is too daunting of a task. By prompting children to the importance of characters, their perspective, and asking questions that prompt them to connect story information based on unfolding of story events, we are better able to support them at their developmental level.

Finally, this study draws particular attention to the need to move from a structural approach to narratives to one that perceives narratives as dynamic and fluid, that unfolds through the constant interplay between plot (structure) and characters, and explores story

understanding based on this textual dynamic. This is specially important to psychologists in the field of narrative development. Although some researchers have began to move in this direction (Bruner, 1986 & Nicolopoulou, 2008), few have attempted to promote this theoretical argument further. If stories are, in fact, more complex than the structure it proposes, it is important to study narrative development in a more encompassing manner. In failing to do so, we may be missing important developmental milestones in children's narrative or language growth.

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Table 1

Demographics Characteristics by Condition				
Book Reading Conditions	Story Grammar/Acting N=14	Story Grammar/Art Activity N=12	Narrative Dynamics/Acting N=12	Narrative Dynamics/Art Activity N=13
Mean Age	4;8	4;6	4;8	4;6
SD	.45	.45	.54	.42
Range	4;3-5;7	4;0-5;7	4;1-5;8	4;0-5;5
Gender				
# Boys	6	6	7	5
# Girls	8	6	5	8
Race/Ethnicity				
White	29%	25%	25%	46%
Black	21%	33%	33%	8%
Hispanic	50%	41%	42%	46%
# Siblings				
0	14%	25%	0%	8%
1 or more	86%	75%	100%	92%

Table 2

Correlations Between Measures Assessed at Pre-Test

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Age In Months	1															
2. Animal Span	.01	1														
3. Sentence Recall	.48**	.42**	1													
4. Sentence Recall in Context	.81**	.57**	.16	1												
5. Storybook Comprehension Total	.68**	.58*	.20	.09	1											
6. Storybook Comprehension Book 1	.86**	.91**	.09	.47**	.27	1										
7. Storybook Comprehension Book 2	.55**	.06	.12	.63**	.23	.37**	1									
8. Retelling-Idea Units	.91**	.21	.21	.09	.21	.49**	.38**	1								
9. Retelling-Story Grammar Elements	.18	.45**	.40**	.56**	.49**	.53**	.24	.28	1							
10. Retelling- Comprehension Questions	.35*	.49**	.42**	.18	.22	.28*	.07	.14	.13	1						
11. Narrative Picture Sequence- Total	.17	.55**	.38**	.17	.29*	.31*	.22	.22	.25	.29*	1					
12. Vocabulary	.41**	.38**	.24	.31*	.41**	.38**	.24	.31*	.25	.29*	.31*	1				
13. ToM Scale	.34*	.24	.36**	.38**	.24	.38**	.24	.31*	.25	.29*	.31*	.24	1			
14. 2 nd Order Task – 1 st Order Question	.11	.08	.08	.11	.08	.11	.08	.11	.08	.11	.08	.11	.08	1		
15. 2 nd Order Task – 2 nd Order Question	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	.17	1	
16. Active Deception																1

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

Table 3

Target Measure Means (and Standard Deviations) for Bookreading Conditions over Time

	Story Grammar				Narrative Dynamics			
	Acting Out		Art Activity		Acting Out		Art Activity	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Storybook Comprehension - Total	14.43 (6.67)	18.64 (5.38)	11.08 (6.35)	15.17 (6.34)	17.00 (4.07)	25.17 (6.37)	14.15 (6.38)	20.77 (8.12)
Storybook Comprehension - Factual	3.71 (1.90)	4.64 (1.82)	2.42 (1.56)	3.83 (1.52)	4.33 (1.37)	5.50 (1.44)	3.38 (1.61)	4.62 (5.04)
Storybook Comprehension Inference	10.71 (5.36)	12.43 (4.59)	8.67 (4.99)	9.67 (4.89)	12.67 (3.23)	17.83 (5.42)	10.77 (5.51)	14.31 (6.52)
Storybook Comprehension: Book 1 - Total	3.77 (3.49)	5.54 (2.85)	2.17 (2.73)	4.00 (4.33)	4.17 (2.66)	8.33 (4.31)	3.15 (3.60)	7.08 (4.13)
Storybook Comprehension: Book 1 - Factual	1.31 (1.75)	2.15 (1.63)	.50 (.80)	1.33 (1.23)	1.83 (1.40)	2.50 (1.45)	1.00 (1.15)	2.00 (1.83)
Storybook Comprehension: Book 1 - Inference	2.46 (2.03)	3.38 (2.22)	1.67 (2.06)	2.67 (3.23)	2.33 (1.67)	5.83 (3.35)	2.15 (2.88)	5.08 (2.78)
Storybook Comprehension: Book 2 - Total	10.93 (4.14)	13.21 (3.36)	8.92 (4.25)	11.17 (3.27)	12.83 (2.29)	16.83 (3.13)	11.17 (3.71)	14.83 (4.20)
Storybook Comprehension: Book 2 - Factual	2.50 (.52)	2.50 (.76)	1.92 (.90)	2.50 (.52)	2.50 (.52)	3.00 (0.0)	2.33 (.78)	2.83 (.39)
Storybook Comprehension: Book 2 - Inference Total	8.43 (3.94)	10.71 (3.00)	7.00 (3.47)	8.67 (3.23)	10.33 (2.06)	13.83 (3.13)	8.83 (3.35)	10.33 (3.90)
Storybook Comprehension: Book 2 - Inference Context	2.64 (2.17)	4.57 (1.51)	2.67 (1.56)	3.33 (1.72)	3.83 (1.53)	6.50 (1.73)	3.08 (1.62)	5.25 (2.42)
Retelling- Idea Units	6.08 (4.07)	9.08 (3.64)	4.50 (3.15)	6.25 (1.87)	4.42 (3.94)	8.75 (2.18)	6.15 (4.06)	8.15 (3.21)
Retelling – Story Grammar Elements	5.54 (3.62)	8.54 (2.85)	4.00 (2.99)	6.33 (2.01)	4.00 (3.54)	8.33 (2.06)	4.85 (3.02)	7.62 (3.02)
Retelling – Total Comprehension	3.38 (1.61)	4.00 (1.47)	2.83 (1.27)	3.50 (1.24)	3.42 (1.24)	5.42 (.79)	3.08 (1.71)	4.85 (1.68)
Retelling –Factual Comprehension	1.77 (.93)	1.85 (.80)	1.58 (.90)	1.92 (.67)	1.75 (.62)	2.42 (.51)	1.69 (1.03)	2.23 (.83)
Retelling – Inference Comprehension	1.62 (1.12)	2.15 (1.14)	1.25 (.75)	1.58 (.90)	1.67 (.79)	3.00 (.60)	1.38 (1.04)	2.61 (1.04)
Narrative Picture Sequence - Total	12.38 (4.33)	13.38 (3.86)	10.83 (4.04)	12.25 (4.29)	10.08 (3.42)	17.25 (2.38)	13.00 (4.60)	17.23 (4.53)

Narrative Picture Sequence - One Character Stories	6.92 (3.43)	7.46 (2.11)	6.92 (2.43)	7.00 (2.30)	5.58 (2.11)	9.00 (1.28)	6.92 (2.78)	9.38 (2.33)
Narrative Picture Sequence - Two Character Stories	5.46 (1.56)	5.92 (5.25)	3.92 (2.28)	5.25 (3.01)	4.50 (2.15)	8.25 (1.82)	6.08 (2.53)	7.85 (2.86)
Narrative Picture Sequence- External Problem	6.54 (2.40)	6.62 (2.10)	6.00 (2.86)	6.67 (2.61)	4.92 (2.07)	8.33 (1.61)	6.54 (1.66)	8.85 (2.41)
Narrative Picture Sequence - Internal Problem	5.85 (2.48)	6.77 (2.80)	4.83 (2.37)	5.58 (2.61)	5.17 (2.69)	8.92 (2.19)	6.46 (3.38)	8.38 (2.47)
Vocabulary	23.36 (8.42)	24.79 (8.74)	15.67 (5.76)	19.00 (6.16)	24.33 (6.68)	26.00 (7.14)	21.23 (6.15)	24.54 (6.80)
ToM Scale	2.57 (1.45)	2.93 (1.54)	2.33 (.78)	3.08 (.99)	2.92 (1.08)	3.83 (1.12)	3.00 (1.53)	3.54 (1.45)
2 nd Order ToM Task - Total	5.14 (1.35)	6.00 (1.88)	4.17 (.58)	5.17 (1.19)	5.00 (1.21)	6.5 (2.07)	4.9 (1.98)	6.62 (1.45)
2 nd Order ToM Task – 1 st order question	1.00 (.78)	1.00 (.74)	.64 (.65)	1.00 (.85)	.83 (.94)	1.50 (.91)	1.31 (.86)	1.85 (.38)
2 nd Order ToM Task- 2 nd Order Question	.14 (.36)	.57 (.94)	.08 (.29)	.08 (.29)	.17 (.39)	.92 (1.17)	.38 (.87)	.54 (.77)
Active Deception	1.57 (1.16)	1.57 (1.02)	1.33 (.99)	1.75 (.87)	1.75 (1.29)	2.25 (.97)	1.31 (1.21)	2.00 (1.08)

Table 4

Target Measures Estimated Marginal Mean (and Standard Deviations) for Bookreading Conditions over Time

	Story Grammar				Narrative Dynamics			
	Acting Out		Art Activity		Acting Out		Art Activity	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Storybook Comprehension – Total	13.67 (1.13)	17.78 (1.21)	12.20 (1.23)	16.49 (1.31)	16.00 (1.23)	24.16 (1.32)	14.85 (1.19)	21.40 (1.29)
Storybook Comprehension – Factual	3.54 (.35)	4.51 (.37)	2.67 (.38)	4.06 (.40)	4.09 (.38)	5.32 (.40)	3.57 (.37)	4.71 (.39)
Storybook Comprehension Inference	10.13 (.99)	11.74 (1.07)	9.54 (1.07)	10.70 (1.17)	11.91 (1.08)	17.04 (1.17)	11.29 (1.04)	14.83 (1.13)
Storybook Comprehension: Book 1 – Total	3.41 (.69)	5.11 (.86)	2.65 (.73)	4.63 (.90)	3.73 (.73)	7.88 (.90)	3.47 (.71)	7.34 (.87)
Storybook Comprehension: Book 1 - Factual	1.17 (.31)	2.05 (.39)	.67 (.39)	1.5 (.41)	1.68 (.33)	2.40 (.41)	1.15 (.32)	2.05 (.40)
Storybook Comprehension: Book 1 - Inference	2.24 (.52)	3.07 (.65)	1.98 (.55)	3.13 (.68)	2.08 (.54)	5.49 (.69)	2.32 (.53)	5.29 (.66)
Storybook Comprehension: Book 2 – Total	10.53 (.77)	12.82 (.72)	9.61 (.84)	11.85 (.79)	12.34 (.84)	16.38 (.78)	11.41 (.84)	15.05 (.79)
Storybook Comprehension: Book 2 - Factual	2.45 (.17)	2.47 (.12)	2.01 (.19)	2.56 (.13)	2.45 (.19)	2.95 (.13)	2.36 (.19)	2.86 (.13)
Storybook Comprehension: Book 2 – Inference Total	8.08 (.70)	10.35 (.70)	7.61 (.76)	9.30 (.77)	9.89 (.76)	13.43 (.76)	9.07 (.76)	12.19 (.77)
Storybook Comprehension: Book 2 – Inference Context	2.53 (.45)	4.43 (.46)	2.87 (.49)	3.56 (.50)	3.71 (.49)	6.38 (.49)	3.13 (.49)	5.31 (.50)
Retelling- Idea Units	5.93 (1.05)	8.96 (.80)	4.79 (1.10)	6.43 (.84)	4.55 (1.10)	8.65 (.84)	5.91 (1.06)	8.20 (.81)
Retelling – Story Grammar Elements	5.31 (.87)	8.42 (.72)	4.38 (.91)	6.51 (.76)	3.99 (.91)	8.23 (.76)	4.72 (.87)	7.66 (.73)
Retelling – Total Comprehension	3.21 (.33)	3.86 (.32)	3.08 (.33)	3.70 (.34)	3.26 (.35)	5.28 (.34)	3.17 (.34)	4.92 (.33)
Retelling –Factual Comprehension	1.71 (.24)	1.80 (.19)	1.67 (.25)	1.98 (.20)	1.72 (.25)	2.36 (.20)	1.69 (.24)	2.27 (.19)

Retelling – Inference Comprehension	1.50 (.20)	2.06 (.24)	1.41 (.21)	1.72 (.25)	1.54 (.21)	2.92 (.25)	1.47 (.20)	2.65 (.24)
Narrative Picture Sequence – Total	12.39 (1.09)	13.17 (1.03)	11.06 (1.14)	12.63 (1.07)	9.97 (1.14)	17.30 (1.03)	12.89 (1.10)	17.30 (1.03)
Narrative Picture Sequence - One Character Stories	6.91 (.75)	7.44 (.57)	7.62 (.79)	7.11 (.60)	5.57 (.79)	8.97 (.60)	6.81 (.76)	9.34 (.58)
Narrative Picture Sequence - Two Character Stories	5.48 (.57)	5.74 (.69)	3.99 (.60)	5.53 (.72)	4.40 (.60)	8.05 (.72)	6.08 (.58)	7.96 (.70)
Narrative Picture Sequence- External Problem	6.45 (.63)	6.55 (.62)	6.18 (.65)	6.77 (.65)	4.83 (.65)	8.21 (.65)	6.54 (.63)	8.93 (.62)
Narrative Picture Sequence - Internal Problem	5.94 (.74)	6.62 (.66)	4.87 (.77)	5.87 (.69)	5.14 (.77)	8.81 (.69)	6.35 (.74)	8.37 (.67)
Vocabulary	22.90 (1.62)	24.22 (1.76)	16.40 (1.76)	19.85 (1.91)	23.62 (1.76)	25.17 (1.92)	21.70 (1.69)	25.13 (1.85)
ToM Scale	2.45 (.27)	2.81 (.29)	2.50 (.30)	3.26 (.32)	2.72 (.30)	3.65 (.32)	3.16 (.28)	3.68 (.31)
2 nd Order ToM Task - Total	5.03 (.31)	5.88 (.38)	4.38 (.34)	5.41 (.41)	4.94 (.34)	6.45 (.41)	4.90 (.33)	6.57 (.40)
2 nd Order ToM Task – 1 st order question	.97 (.22)	.96 (.19)	.72 (.24)	1.06 (.21)	.80 (.32)	1.46 (.21)	1.33 (.23)	1.87 (.20)
2 nd Order ToM Task- 2 nd Order Question	.11 (.13)	.52 (.23)	.16 (.14)	.17 (.24)	.16 (.14)	.88 (.24)	.36 (.14)	.55 (.23)
Active Deception	1.44 (.28)	1.47 (.24)	1.52 (.30)	1.87 (.26)	1.62 (.30)	1.42 (.29)	1.42 (.29)	2.10 (.25)

APPENDICES

APPENDIX A

A1. Training Materials - Order of the Books and their Proposed Challenges

Books	Challenges
1. How to Catch a Star (Oliver Jeffers)	<ul style="list-style-type: none"> - Child needs to understand misconception of boy who finds a star in the sand (a starfish) but thinks it is a star from the sky. - 1 character story
2. Mo's Stinky Sweater, (David Bedford)	<ul style="list-style-type: none"> - Child needs to coordinate the perspective of two characters that are in conflict because of competing desires.
3. The Very Cranky Bear (Nick Bland)	<ul style="list-style-type: none"> - Child needs to coordinate the perspective of 2 groups of characters who have competing desires, but one group attempts to manipulate the desire of the other based on their own wants.
4. The Happy Lion (Louise Fatio)	<ul style="list-style-type: none"> - Child needs to coordinate 2 groups of characters who also have different perspectives on the same experiences. Book is longer and requires an overarching connection to be made at the end of the book.
5. Lost and Found (Oliver Jeffers)	<ul style="list-style-type: none"> - Child needs to coordinate the perspective of two characters, while basing this coordination on a misconception of one of character about the other. Child needs to progressively gather knowledge in order to fully understand how the misconception is resolved.
6. Anansi and the Moss-Covered Rock (Eric A. Kimmel)	<ul style="list-style-type: none"> - First trickery book. The child needs two coordinate the perspective of two groups of characters in order to understand a trick that is being done. The same trick is done several times throughout the book.
7. My Lucky Day (Keiko Kasza)	<ul style="list-style-type: none"> - Second trickery book. Child needs to coordinate the perspective of two characters, but the trick is only fully understood at the end of the book. Child needs to gather relevant story knowledge throughout the book in order to understand the trick.
8. The Gruffalo (Julia Donaldson)	<ul style="list-style-type: none"> - Third trickery book. Child needs to understand several tricks that are being done in the book, and what makes it most challenging is that one of the tricks is based on another trick already done. This book is very difficult and requires active coordination of character perspective and misconception.

A2. Training Materials - Story Scripts

Mo's Stinky Sweater (Reading Protocol) – Narrative Dynamics

Before you start ask child:

Have you seen (read) this book
before?_____

1. (p.4) What do you think is happening to the sweater?
2. (p.6) What is going to happen to the sweater if he cleans his hands and feet, and wipes his face with it?
3. (p.8) Why does Mo's sweater need to be washed?
4. (p.10) Why won't Mo let go of his sweater?
5. (p. 11 ' But Tig and Mo pulled the other way') Who is helping Mom and who is helping Mo?
6. (p.12) Who is the Elephant mom and the elephant baby (Ellie) going to help?
7. (p.14) What is happening to Mo's sweater?
8. (p.16) What do you think Mo is telling his friends? Why did he start counting? (Let's see)
9. (p.17 ('after laugh) Why did he tell his friends to let go?
10. (p.18) Did the Mothers fall into the mud on purpose or was it by accident?
11. (p.21) Look at it, what has happened to Mo's sweater?
12. (p.22) Why do you think he likes his sweater is even better now?

Post-Reading Questions

Mo's Stinky Sweater

- 1) Who is this Story about?
- 2) Where is this story happening?
- 3) Why did the Mom want to wash Mo's sweater?
- 4) Why didn't Mo want to let go of his sweater?
- 5) Why did Mo finally let go of his sweater? (Did he do it on purpose of accidentally? How can you tell?)
- 6) What happened to Mo's sweater at the end of the story?

A2. Training Materials - Story Scripts

Mo's Stinky Sweater (Reading Protocol) – Story Grammar

Before you start ask child:

Have you seen (read) this book before?_____

Protagonist

- 1) Who is this story about?
 - a. Mo

Setting

- 2) Where is this story happening?
 - a. In the forest
- 3) What colors are Mo's sweater?
- 4) Can we count the colors?

Initiating Event

- 5) Why did Mo's Mother want to wash the sweater?
 - a. Because the sweater is dirty.

Problem

- 6) Why doesn't Mo want to wash the sweater?
 - a. Because it's his favourite sweater.
- 7) How's feeling?
 - a. Angry/Upset

Attempt Resolution

- 8) How does the Mother finally manage to wash Mo's sweater?
 - a. Mo lets go of the sweater.

Consequence

- 9) What happened to the sweater after it was washed?
 - a. It stretched out. It was too big.
- 10) How did Mo feel now that the sweater was washed? Was he upset?
 - a. No... he liked it because now he can sleep in it too.

Post-Reading Questions

- 1) Who is this Story about?
- 2) Where is this story happening?

- 3) Why did the Mom want to wash Mo's sweater?
- 4) Why didn't Mo want to let go of his sweater?
- 5) Why did Mo finally let go of his sweater? (Did he do it on purpose of accidentally? How can you tell?)
- 6) What happened to Mo's sweater at the end of the story?

A2. Training Materials – Story Scripts

How to Catch a Star (Reading Protocol) – Narrative Dynamics

Before you start ask child:

Have you seen (read) this book
before?_____

1. (p.2) This boy likes stars, do you like stars? Where do you see them?
- In the Sky
2. (p.7) Do you think this is a good idea, would he be able to get a star this way?
3. (p.10) Did he see a star all morning? Let's see.
4. (p13 – before resolution of action). Can he get the start that way?
5. (p. 14) If you wanted a star from the sky, what would you do? – Let's see what he does.
6. (p.22 'just a baby star') Do you think there are stars in the water? (We said before that stars are in the sky, are there stars in the water?)
7. Could this star really have fallen from the sky?
8. So why is this star in the water? What is he really seeing in the water?

The water is smooth like a mirror, when you look in the mirror what do you see? This is called a reflection. The star is actually seeing itself in the water.

9. (p.24) Even if he could reach the star, would he be able to scoop it up?
10. (p.25) Could that star that he is seeing in the water really wash up at the shore?
11. The boy thinks that this is the same start he saw in the water, could it be the same star he saw before?
12. Why does he think it's the same star?

How to Catch a Star

- 1) Who is this story about?
- 2) Where did this story take place?
- 3) Why did the little boy want a star?
- 4) What did he try to do to get a star?
- 5) How did he finally get his own star?
- 6) Was the star he got, the same or different from the one he wanted in the beginning of the story? (How can you tell?)

A2. Training Materials – Story Scripts

How to Catch a Star (Reading Protocol) – Story Grammar

Before you start ask child:

Have you seen (read) this book before? _____

Protagonist

- 1) Who is this story about?
 - a. The little boy

Setting

- 2) Where is this story happening?
 - a. In the boys city/fields/beach/Outside

Initiating Event

- 3) Why did the boy want to catch a star?
 - a. Because he loved stars and wanted one to be his friend.
- 4) What did the boy plan to do with the star?
 - a. Play hide-and-go-seek, take long walks

Problem

- 5) To catch a star is very difficult, why?
 - a. Because they are up in the sky, because they come up at night.
- 6) Why is the boy having a hard time catching a star?

Attempts

- 7) What were some of the things the boy tried to do to catch a star?
 - a. Wake up early, go on trees, use his spaceship.
- 8) Did any of them work?
 - a. No
- 9) Why couldn't the little boy catch the star that he saw on the water?
 - a. It was a reflection

The water is smooth like a mirror, when you look in the mirror what do you see? This is called a reflection. The star is actually seeing itself in the water.

Resolution

- 10) How did the boy finally catch a star?
 - a. He got one from the ocean
- 11) Was it the star he wanted, the same one he saw before?
 - a. No... it was a different star

Consequence

- 12) How does the boy feel now that he was a star?
a. He is happy

Post Reading Questions

- 1) Who is this story about?
- 2) Where did this story take place?
- 3) Why did the little boy want a star?
- 4) What did he try to do to get a star?
- 5) How did he finally get his own star?
- 6) Was the star he got, the same one he wanted from the beginning of the story?
(How can you tell?)

A3. Training Materials – List of Art Activities

1. How to Catch a Star:
 - a. Color a Star Similar to the one in the book.
 - b. Color a a rocket ship on a paper moon.
2. Mo's Stinky Sweater:
 - a. Color the sweater with all different colors
 - b. Color a Monkey
3. The Very Cranky Bear
 - a. Glue cotton on a drawing of sheep
 - b. Color the cranky bear
4. The Vert Happy Lion
 - a. make a fence with popcicle sticks
 - b. Color the Happy Lion
5. Lost and Found
 - a. Draw an iceberg on black construction Paper
 - b. Glue cotton balls in a picture of the northpole – Snow
6. Anansi and the Moss-Covered Rock
 - a. Color a spider
 - b. Glue colored cotton balls on a rock.
7. My Lucky Day
 - a. Color a pig
 - b. Make a notebook with their friends names
8. The Gruffallo
 - a. Color a picture of a mouse
 - b. Color a nut

APPENDIX B

B1. Testing Materials - Testing Protocol for Harry the Dirty Dog

1. What color is Harry? (Pg. 1)
2. Why did Harry bury the scrubbing brush? (Pg. 3)
3. What color is Harry now? (Pg. 10—pointing to coal chute and harry)
4. Why did the little boy say there was a strange dog in the backyard? (pg. 15)
5. Why is Harry playing his tricks for the family? (pg. 19)
6. How would the tricks make the family know it was him? (pg 19)
7. Why didn't the tricks work /Why didn't they think it was Harry? (pg 19)
8. Why was Harry digging furiously? What was he looking for? (pg. 21)
9. Where do you think Harry is going with the scrubbing brush? (pg. 23)
10. Why does Harry want a bath? (pg. 25)
11. Why are the children calling for their parents? (pg. 26)

Post Reading Questions

1. Who was this story about?
2. Where did this story take place?
3. When Harry finally came back home, why didn't the family know it was him?
4. What did Harry try to do to make them know it was him?
5. How did they finally know it was Harry?

B2. Testing Materials - Testing Protocol for Peter's Chair

- 1. (p.2) How old do you think Peter is? (Is Peter a Baby or a Kid?)**
- 2. (p.4) Why is his mother asking him to play quietly? (Why did Peter have to be quiet)**
- 3. (p.5 – after painted pink) Whose cradle got painted Pink?**
- 4. (p. 10 – it's painted pink too) Why are they painting Peter's old things pink? (Who are they painting them for?) --- Probe: Is the new baby a boy or a girl?**
- 5. (p.11) Why did Peter take his chair?**
- 6. (p.14) Why did Peter want to run away? (How is Peter feeling?)**
- 7. (p.15) Do you think he will fit in his baby chair?**
- 8. (p.17—after “chair”) Why couldn't Peter fit in his chair? (If it was his chair, why couldn't he fit in it?)**
- 9. (p.22 – after “Peter was home”) Where does Peter's mother think Peter is?**
- 10. (p. 22 – Read the rest of the PAGE ---) Why does Peter's Mother think that Peter is hiding behind the curtain? (Let's see where Peter is...)**
- 11. (p. 24) Where was Peter hiding?**
- 12. (p.24) Why did Peter put his shoes behind the curtain? What did he want his mom to think?**
- 13. (p.24) How did Peter trick his mom?**
- 14. (p. 25) Why did Peter offer to paint his little chair pink (for Susie)?**

Post-Reading Questions:

1. Who was this story about?
2. Where did this story take place?
3. How did Peter feel when he first saw that his old things were being painted pink for his sister?
4. Why did Peter run away with his little chair?
5. How do you think Peter was feeling when he was helping his dad paint the chair for Susie? (Why was he feeling this way now?)

B3. Testing Materials - Narrative Retelling Task Testing Protocol

I. Retelling Story: Birthday Surprise

Directions: Say to child, “We are going to play a game together where we tell stories, Sometimes it will be my turn to tell a story and sometimes it will be yours. OK? Introduce monkey puppet, “This is my friend Mason the monkey. He wants to tell some stories with us. But, his mom just called and said she wants Mason to go home to help her make banana soup. So, Mason has to go home now. But he’ll come back later to listen to some of our stories. But for now, say “Bye- Bye!”

Once puppet is put away, explain “Now I’m going to tell you a story. Listen carefully because when I’m finished, Mason is going to come back and you get to tell HIM the same story I tell you. O.K?” Read story to child. Be careful to articulate story clearly and read it at a slow, pleasant, reading pace.

My story goes like this:

Once, there was a boy named Dave and it was his birthday. He was very excited because he really wanted a bike and his mom had promised she would get him one. Dave got out of bed and ran to the living room to find his present. He saw a big box. When he opened the box, it was just a puzzle. Dave was upset, but his mom said: “Why don’t you go outside to play?” When he went outside, Dave found a beautiful brand new bike with a ribbon on it. His mom said: “Surprise!” Dave thanked his mom and rode his new bike all day long. The End.

Production Directions:

Once the child is finished listening to the story, bring puppet back for retelling. Say to child, “Oh look...Mason’s back. He’s finished helping his mom make the banana soup. But, he didn’t get to hear the story that I just told you. Mason would really like to hear the story I just told you. Can you tell Mason the story?”

Allowable probe: “What happened to the boy in the story?”

(Make sure that you’re tape recording what the child says. However, write down as much as you can the story the child says. But do not **stop** the child. Allow him/her to continue and listen to audiotape **later one the same day** to transcribe.)

When the child is finished telling you his/her story, ask: **is there any more to your story?**

If they are done, say: **Hum... I don’t really remember everything in this story, so I’m going to ask you some questions for you to help me remember, ok?!**

Narrative comprehension questions (correct responses)

- Ask each recall question, even if you think child may have included information that's pertinent to the question in an answer to earlier question.

(Check one)

Correct

Incorrect

- 1) **What was the boy's name?** (*Dave*)
- 2) **What special day was this for Dave?** (*it was her birthday*)
- 3) **Why was Dave upset when he opened the big box?**
(*cause it wasn't the present he wanted*)
- 4) **What did Dave find outside?** (*a beautiful brand new bike*)
- 5) **Why did his mom give him a puzzle first, what was she trying to do?**
(*she wanted to surprise Dave, trick Dave to surprise him*)
- 6) **What was Dave thinking when saw the puzzle?** (*That he wasn't going to get a bike*)
- 7) **What did Dave get for his birthday?**(*a bike and a puzzle*)

B4. Testing Materials - Narrative Picture Sequence Task Protocol

Target Stories: (Order ____)

“Here is a page with pictures only and no words. My friend told me that these pictures make a story. (Pointing from LT to RT)

But I don’t really know this story. Maybe you can help me?

What I need you to do is to look carefully at all these pictures (pointing from LT to RT) before telling the story? When you’re done looking at the pictures, you can tell me a story that the pictures make.

(Give the child a minute to look at the pictures).

Now can you tell me a story that the pictures make?

(Put your finger at the first picture, as you invite child to tell story. But do not point to the rest of the pictures as child continues. Do not try to bring child’s attention to a picture they skipped over.)

Allowable Probes: Uh,Uh, hmm, hmmm or And then? Anything else? or Is there any more to your story?

After the child finished telling the story say: **That was a great story! But I want to ask you some questions about this story.** (Or say, **I got a bit confused, so let me ask you...**)

Follow naturally from the child’s narration and probe further the answers they gave: *(Point to picture 2)* **“What’s happening here?”**

If child gives something relevant, follow up with **WHY** question. If not, move on.

(Point to picture 3) **“What’s happening here?”**

If child gives something relevant, follow up with **WHY** question. If not, move on.

(Point to picture 4) **“What’s happening here?”**

If child gives something relevant, follow up with **WHY** question. If not, move on.

B5. Testing Materials - Theory of Mind Scale (Wellman & Liu) – Testing Protocol

Experimenter: We're going to play a game together. I'm going to show you some pictures and I need you to pay attention to what I say. **Ready?**

Not-Own Desire (X)

Story: Here's Boy (place figurine next to picture, midway between two items) . It is his snack time. So, the boy wants his snack. Here are two different snacks: a carrot (point) and a cookie (point).

Own Desire: Which snack do **YOU like** best? Do you like a **carrots** (point) or... **cookies** (point) best?

___ If carrot: Well, that's a good choice, **BUT**...this boy doesn't like carrots, he **REALLY LIKES cookies** (don't point). He loves to eat cookies best of all.

___ If cookie: Well, that's a good choice, **BUT**...this boy doesn't like cookies, he **REALLY LIKES carrots** (don't point). He loves to eat carrots best of all.

Question: So, now the boy can choose only **one** food. Which one will he (point to the boy) **choose**?...A carrot or...a cookie?

___ carrot ___ cookie

SCORING: To be scored as correct, or to "pass" this task, the child must answer the *target* question opposite from his/her answer to the *own-desire* question.

Not-Own Belief (X)

Story: Here's girl (place figure on table next to picture midway between two items).
This girl wants her cat. The cat is hiding. It could be in the bushes (point) or...it could be in the trash can (point).

Own Belief: Where do **YOU think** the cat is? **In the bushes** (point) or...**in the trash can** (point)?

___ If bushes: Well, that's a good idea, **BUT**...the girl **THINKS** the cat is **in the trash can** (don't point).

___ If trash can: Well, that's a good idea, **BUT**...the girl **THINKS** the cat is **in the bushes** (don't point).

Question: Where will the girl (point to the girl) **look** for her cat?...In the bushes or...in the trash can?

___ bushes ___ trash can

SCORING: To be scored correct the child must answer the *target* question opposite from his/her answer to the *own-belief* question.

Knowledge Access (X)

Experimenter: Here's a drawer (keep finger over drawer).

Question to child: What do you think is in it (point to drawer)?
(If child gives an answer): _____

Experimenter: (With drama) Let's see...Oh, look! There's a **DOG** in it!
(Pull out drawer to show dog)
(Close the drawer to restrict view again after a pause)

Post-view Question: Okay...so, what is in the drawer? _____
(If child makes an error here, show contents inside again until child gets this question correct)

The Figurine Enters...

Experimenter: This girl has **never seen** this drawer before. She has never opened to see inside it.

Question: So...does the girl **KNOW** what is in the drawer?

___ yes ___ no

_____ **Did the girl see inside this drawer?**

___ yes ___ no

SCORING: To be scored correct the child must answer the *target* question "no" and answer the *memory* control question (the last question about seeing) "no."

Explicit False-Belief (X)

Story: Here's a boy, and the boy wants to find his mittens. His mittens could be in his backpack (point) or...they may be in the closet (point). Well...**Really**, his mittens are **really** in his backpack (point and pause)—but the boy **THINKS** his mittens are **in the closet** (point).

Questions: So...where will the boy (point to the boy) **look** for his mittens?...In his backpack or...in the closet?

___ backpack ___ closet

Where are the boy's mittens **really**?...In his backpack or...in the closet?

___ backpack ___ closet

SCORING: To be scored correct the child must answer the *target* question “closet” and answer the *reality* question (the last question) “backpack.”

Contents False-Belief (X)

Experimenter: Here is a band-aid box.

Question to child: What do you think is inside the band-aid box? _____
(Prompt child to say Band-Aids if necessary: for example,
first prompt, “Does it look like there would be band-aids inside?”
second prompt, “What kind of box is this? What should be in here?”
third prompt, “Should there be band-aids in here or books in here?”)

Experimenter: (With drama) Let’s see...it’s really a **PIG** inside!
(Pour pig out)
(Close the lid to restrict view again after a pause)

Post-view Question: Okay...what is in the box? _____
(If child makes an error here, show contents inside again until child gets this question correct)

Boy figurine arrives

Experimenter: Here comes the boy. He has **never ever** looked inside this box.

Question: So...what does the boy **THINK** is in the box? Band-aids or a Pig?
(Reiterate choice again if child still does not answer)

___ band-aids ___ Pig

Did he look in the box?

___ yes ___ no

SCORING: To be scored correct the child must answer the *target* question “band-aids” and answer the *memory* question (the last question about seeing) “no.”

B6. Testing Materials - Second-order False Belief Tasks (Astington et al., 2002)
Testing Protocol

Experimenter: I'm going to tell you some stories and I need you to pay attention.
Are you ready to start?

KATE'S GAME

Scene 1: (1) This is a story about Mike and his sister Kate. This is Mike and this is Kate. (2) One day, Mike and Kate have a new toy train. They are playing it in Mike's room.

Scene 2: (3) Kate says, "It's time for dinner. Let's put the train away and we can play it later." She puts the train in the drawer and goes to set the table.

Scene 3: (4) When Mike sees that Kate has left, he decides to play a trick. He takes the train out of the drawer and puts under his bed. But Kate finishes setting the table and walks by Mike's door. She sees Mike hide the train under the bed. Kate sees Mike do this, but Mike can't see Kate.

Experimenter: Now I'm going to ask you some questions, ready?! (Take pictures away before asking questions)

1. Does Kate see Mike hide the train? (control)

Yes **No** **Other:**

2. At the end of the story, where does Kate think the train is? (control)

The Bed **The drawer** **Other:**

3. Does Mike think that Kate sees him? (first-order false belief)

Yes **No** **Other:**

4. Where does Mike think that Kate will look for the train when he they go back to play in his room? (second-order false belief)

The Bed **The Drawer** **Other:**

5. Why does he think this? (justification)

KATE'S PAINTING

- Scene 1:** (1) This is a story about Kate and her dad. This is Kate, and this is her dad. (2a) Her dad is at work. Tomorrow it will be her dad's birthday. (2b) Kate wants to surprise Dad with a beautiful painting she made at school. On the painting it says, "To Dad from Kate". Kate hides the painting in the hall closet.
- Scene 2:** (3) Dad comes home from work. He says to Kate, "Hi, Kate, did you make anything at school today." Remember, Kate wants to surprise Dad so she says, "Sorry, Dad, I didn't make anything today. I just played." Then she goes upstairs to play in her room.
- Scene 3:** (4) After she's gone, Dad goes to the closet to put away his scarf. When he opens the door, he sees Kate's beautiful painting. Kate doesn't see Dad look in the closet. Dad doesn't tell Kate that he saw the painting.

Experimenter: Now I'm going to ask you some questions, ready?! (Take pictures away before asking questions)

1. What did Kate tell Dad she did at school? (control)

Nothing/Played A picture Other:

2. Did Dad see the painting? (control)

Yes No Other:

3. (So) at the end of the story, does Dad know she did a painting at school? (control)

Yes No Other:

4. Does Kate think that Dad saw the painting? (first-order false belief)

Yes No Other:

5. What does Kate think Dad will tell her mom he did at school today? (second-order fb)

Nothing/Played A picture Other:

6. Why does she think this? (justification)

MIKE'S PAINTING

Scene 1: (1) This is a story about Mike and his mom. This is Mike, and this is his mom. (2a) His mom is at work. Tomorrow it will be his mom's birthday. (2b) Mike wants to surprise Mom with a beautiful painting he made at school. On the painting it says, "To Mom from Mike". Mike hides the painting in the hall closet.

Scene 2: (3) Mom comes home from work. He says to Mike, "Hi, Mike, did you make anything at school today." Remember, Mike wants to surprise Mom so he says, "Sorry, Mom, I didn't make anything today. I just played." Then he goes upstairs to play in his room.

Scene 3: (4) After he's gone, Mom goes to the closet to put away her scarf. When she opens the door, she sees Mike's beautiful painting. Mike doesn't see Mom look in the closet. Mom doesn't tell Mike that he saw the painting.

Experimenter: Now I'm going to ask you some questions, ready?! (Take pictures away before asking questions)

1. What did Mike tell Mom he did at school? (control)

Nothing/Played

A picture

Other:

2. Did Mom see the painting? (control)

Yes

No

Other:

3. (So) at the end of the story, does Mom know he did a painting at school? (control)

Yes

No

Other:

4. Does Mike think that Mom saw the painting? (first-order false belief)

Yes

No

Other:

5. What does Mike think Mom will tell his dad he did at school today? (second-order fb)

Nothing/Played

A picture

Other:

6. Why does he think this? (justification)

B7. Testing Materials - Active Deception. (Chandler et al., 1989) Testing Protocol

Show children the metal pan filled with sand (13” x 9”) and the three small plastic teacups turned upside down in a line at one end of the pan.

Then **show** the children two dolls, Mark and Sue.

“We are going to play a game of hide and seek, and we are going to play with Mark and Sue. This is Mark and this is Sue. Who would you like to be on your team?”

After children picked Mark or Sue to be on their team, say:

“Okay, so Mark/Sue will go away now (and was placed behind experimenter’s back). The game is, you and Mark/Sue are going to take this piece of candy and you are going to hide the candy under one of the three cups in the sand. And when you are finished, Mark/Sue (not chosen doll) will come back and try to find the candy. But, for you to win, you do not want Mark/Sue (not chosen doll) to find the candy. So, you want to make sure that Mark/Sue (not chosen doll) will look under the wrong cup. Okay?”

After children understand the point of the game (to hide the candy so the other character cannot find it). the **show** children how to hide candy (while making footprints through the sand). After the candy is hidden, then say,

“Now look at the sand. What do you see here? _____(child’s response).”

If children respond with “footprints,” say: ***“That’s right! You can see Sue/Mark’s footprints. So (other doll’s name) will know where you’ve been walking to hide the candy. Hmm. We don’t want that!”***

If the children did not mention the footprints, say ***“Look Sue/Mark has left footprint in the sand! See? So (other doll’s name) will know where you’ve been walking to hide the candy”***

Wipe away the footprints, while the child is watching,

Remove the piece of candy from under the cup, and say:

“Okay, now it’s your turn. Pick which cup you would like to hide the candy under. Then take Sue/Mark and walk with her/him to the cup you have chosen like I just showed you.”

Once children make footprints with their doll accomplice to their chosen cup, help them to put the candy under that cup and then say,

“Okay. Now, before Mark/Sue (not chosen doll) comes back, what can you do to make him/her look under the wrong cup?”

If children erased the footprints to the correct cup and made an alternative set of footprints with their doll to a wrong cup, say:

“Okay. Now Mark/Sue will come back to look for the candy.”

Bring the other doll back, make it look under the wrong cup for the candy, and tell the child that s/he won the game.

If children do not give this response, prompt them further before you bring the other doll back with

Prompt 1: “Can you do anything else to make Mark/Sue look under the wrong cup so he/she will not find the candy?”

If children still have difficulty generating a new response, say:

Prompt 2: “Can you do anything to the sand or can you do something with your doll (Sue/Mark) to make the other doll (Mark/Sue) look under the wrong cup?”

If children could still not generate any deceptive behaviors, say:

“Okay, now Mark/Sue will come back to look for the candy (bring the doll back).

Mark/Sue wants to know where he/she should look to find the candy. Where should s(he) look?” _____ (child’s response)

Response	Score
Did not generate any deceptive behaviors	0
Left the set of footprints to the correct cup but lied about the location of the candy	1
Simply erased the footprints made to their chosen cup	2
Made multiple false sets of prints to incorrect cups	3
Erased the set of footprints leading to the correct cup & made a fresh set of footprints to an incorrect cup	4

APPENDIX C

C1. Coding Materials - *Harry the Dirty Dog* Coding Rubric

Q1: What color is Harry? (Pg. 1) <i>Factual (Literal)</i> – Answer has been verbally stated and can be taken from the picture.			
	Level 0	Level 1	
<i>Explanation</i>	<i>Incorrect response</i>	<i>Correct response from text</i>	
Examples	Child 1: Blue Child 2: White Child 3: Black	Child 1: White with black spots	
Q2: Why did Harry bury the scrubbing brush? (Pg. 3) <i>Inference-Explanation & Connection</i> with information that has been previously stated in the text (2 pages back)			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Logical answer</i>	<i>Correct answer from text</i>
Examples	Child 1: He wanted to be clean	Child 1: He did not like water(?)	Child 1: He did not like to take a bath
Q3: What color is Harry now? (Pg. 10—pointing to picture) <i>Factual</i> (Read from picture)			
	Level 0	Level 1	
<i>Explanation</i>	<i>Incorrect response</i>	<i>Correct response from picture</i>	
Examples	Child 1: Blue Child 2: White	Child 1: Black Child 2: Black with white spots	
Q4: Why did the little boy say there was a strange dog in the backyard? (pg. 15) <i>Inference-ToM</i> – Child needs to connect Harry's color change with possible identity misconception.			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Acknowledges color change</i>	<i>Acknowledges that something has happened that makes one question Harry's identity. (perspective)</i>

			<i>doesn't matter)</i>
Examples	Child 1: He's their dog	Child 1: Because now he's black Child 2: Because he's black with white spots	Child 1: Because he didn't know it was Harry/his dog Child 2: It didn't look like Harry
Q5: Why is Harry playing his tricks for the family? (pg. 19) <i>Inference-ToM</i> Needs to be able to infer Harry's attempt to manipulate the family's perspective.			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Inference about tricks, but does not relate to family</i>	<i>Inference about Harry manipulating family's perspective</i>
Examples	Child 1: He likes his tricks	Child 1: Because he did his old tricks before	Child 1: Because these were Harry's tricks and the family would remember
Q6: How would the tricks make the family know it was him? (pg 19) <i>Inference-ToM (explanation)</i> Child needs to explain HOW the manipulation would work.			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Inference about reasoning, but does not relate to family</i>	<i>Relates inference to family; understands that the family would remember his old tricks</i>
Examples	Child 1: He likes his tricks	Child 1: Because they were his tricks (from before).	Child 1: Because they will probably remember them
Q7: Why didn't the tricks work? Why didn't they think it was Harry? (pg 19) <i>Inference- Perspective taking and Connection</i> Needs to connect (1) identity misconception with (2) failure of tricks.			

	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Acknowledges color change</i>	<i>Acknowledges identity change-that Harry doesn't look like Harry</i>
<i>Examples</i>	Child 1: They did work	Child 1: Because he's black now Child 2: Because he's a black dog with white spots	Child 1: Because he no longer looks like Harry
Q8: Why was Harry digging furiously? What was he looking for? (pg 21) <i>Factual (can read from picture)-connective with previously stated information.</i>			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Incorrect response</i>	<i>Correct response from text</i>	
<i>Examples</i>	Child 1: A bone Child 2: A flower	Child 1: The scrubbing brush Child 2: The scrub	
Q9: Where do you think Harry is going to go with the scrubbing brush? (pg. 23) <i>Inference-predictive --- Based on Harry's goals (to be recognized). child needs to predict Harry's intention.</i>			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Irrelevant/incorrect response</i>	<i>Predictive Inference, but does not take Harry's goal into consideration</i>	<i>Correct inference-- Infers answer from tying together story</i>
<i>Examples</i>	Child 1: Outside Child 2: Up the stairs (already stated in text)	Ex: To the bedroom	Child 1: To the bathtub Child 2: Bathroom
Q10: Why does Harry want a bath? (pg. 25) <i>Inference-motivational Motivates Harry's action by coordinating the action with his goal (to be recognized by the family).</i>			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Motivation of current state/irrelevant answer</i>	<i>Motivation of intended action-- Acknowledges Harry wants to be clean, but does not coordinate with his goal.</i>	<i>Connecting motivation of Harry's action with his goal (to be recognized)</i>

Examples	Child 1: Because he's dirty Child 2: He likes baths	Child 1: Because he wants to be clean	Child 1: So the family knows it's Harry/him Child 2: So they know it's him
<p>Q11: Why are the children calling for their parents? (pg 26) <i>Inference-explanatory</i> Child needs to explain children's actions (excitement) based on the realization of Harry's identity and their (children and parent's) previous misconception.</p>			
	Level 0	Level 1	Level 2
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Explains/acknowledges it's Harry</i>	<i>Explaining and taking the family's knowledge into account</i>
Examples	Ex: Because they want to	Child 1: It's Harry	Child 1: Cause they know it's Harry now Child 2: Because they want to tell them that it's Harry

C2. Coding Materials - Peter's Chair Coding Rubric

Q1: How old do you think Peter is? Is Peter a (big) Baby or a Kid? Literal (can be derived from picture)			
	0 points	0.5 points	1 point
<i>Explanation</i>	<i>Incorrect response</i>		<i>Correct response</i>
<i>Examples</i>	Child: Baby		Child: Kid Child: Big Kid Child: He is 6
Q2: Why is his mother asking him to play quietly? Inferential			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Connecting information but not being explicit about baby</i>	<i>Full answer</i>
<i>Examples</i>	Child 1: He wants to be loud	Child: Because he made lots of noise. Child: Because the dog crashed the tower and made noise.	Child: Because there is a new baby in the house Child: Because the new baby is sleeping. Child: Because the baby.
Q3a: Whose cradle got painted Pink? Literal – answer provided in text			
	0 points	0.5 points	1 point
<i>Explanation</i>	<i>Incorrect response</i>		
<i>Examples</i>	Child: the mom's Child: the baby's		Child: Peter's Child: The boy's
Q3b: Who did it belong to before? (If child did not respond Q3a correctly, they were asked 3b)			
	0 points	0.5 points	1 point
<i>Explanation</i>	<i>Incorrect response</i>		
<i>Examples</i>	Child: the mom's Child: the baby's		Child: Peter's Child: The boy's Child: His
Q4a: Why are they painting Peter's old things pink? Inferential (needs to connect the color of the paint with who it was intended for)			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant</i>	<i>Correct response-</i>	<i>Explains reasoning</i>

	<i>response</i>	<i>partial</i>	<i>behind who they are for AND why Peter doesn't need his old things anymore</i>
Examples	Child: For Peter Child: For the dad Child: For the mom	Child: For the new baby Child: For the sister	Child 1: Because he has a baby sister and he's all grown up and he doesn't need those things anymore
Q4b. Who are they painting them for? (If child did not respond Q4a correctly, Q4b was generally asked)			
	0 points	0.5 points	1 point
<i>Explanation</i>	<i>Irrelevant response</i>		
Examples	Child: For Peter Child: For the dad Child: For the mom		Child: For the new baby Child: For the sister Child: for the baby
Q5: Why did Peter take his chair? Inference-motivational			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Explains Peter's action for motivation– does not link it to the sister and the emotions being aroused)</i>	<i>Explains emotion for motivation (needs to mention the sister or the emotion that Peter was feeling)</i>
Examples	Child: Because he wanted it in his room.	Child: Because he didn't want it to be painted pink Child: Because he didn't want his mom to take it.	Child: Because he didn't want to share with his sister. Child: Because he thought it was his and he didn't want his sister to have it. Child: Peter was jealous
Q6a: Why did Peter want to run away?			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>		

Examples		Child: Because he didn't want his things to be painted pink. Child: Because they were painting all of his things pink. Child: Because he didn't want his chair to be pink.	Because he was upset. Because he was hurt that his things were being painted pink.
Q6b. How was Peter feeling? (Independently of whether the child responded Q6a correctly, Q6b was always asked)			
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Emotion Valence</i>	<i>Full emotional understanding</i>
Examples	Child: Happy	Child: not good Child: bad	Child: Sad Child: Mad Child: Frustrated Child: He was feeling hurt
Q7: Do you think he will fit in his (baby) chair?			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Incorrect understanding</i>		<i>Accurate understanding</i>
Examples	Yes		NO
Q8: Why couldn't Peter fit in his chair? Inference-explanatory			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Incorrect response</i>	<i>Explains based on physical aspects of chair and Peter.</i>	<i>Full explanation, based on how Peter couldn't fit in the chair because he had grown up.</i>
Examples		Child: He is too big Child: The chair was too little	Child: He grew up and he couldn't fit in it anymore. Child: Because he is grown up now and the chair is from when he was a baby

Q9: Where does Peter's mother think Peter is? <i>Inference-ToM</i>			
	0 points	1 point	2 points
Explanation	Irrelevant/incorrect response		Inference-tying together information from picture and mother's perspective
Examples	Child 1: Outside		Child: Behind the curtain.
Q10: Why does Peter's Mother think that Peter is hiding behind the curtain? <i>Inference-ToM</i>			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>		<i>Explanation of perspective</i>
Examples	Child: I don't know.		Child: Because she can see his shoes Child: Because she can see his legs.
Q11: Where was Peter hiding? <i>Literal (from picture and text)</i>			
	0 points	0.5 points	1 point
<i>Explanation</i>	<i>Irrelevant response</i>		<i>Correct answer</i>
Examples			Child: Behind the dresser Child: Behind the shelf Child: Behind the drawers
Q12a. Tell me something... but why are Peter's shoes over here? Or Why did Peter put his shoes behind the curtain?			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>		
Examples	Child: He forgot them there Child: They are not his shoes Child: He didn't put them there.		Child: He put them there
Q12b: What did he want his mom to think? (If child responded to Q12a correctly, they were asked Q12b) <i>Inference-explanatory</i>			

	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>		<i>Explanation</i>
Examples	Child: He took the off there. Child: He wanted to trick her		Child: He wanted her to think he was behind the curtain.
Q13: How did Peter trick his mom? Inference-explanatory			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Explanation of trick without mom's perspective</i>	<i>Needs to state how Peter attempted to manipulate the mother's perspective</i>
Examples	Child: He jumped and said: Here I am! I tricked you!	Child: He puts his shoes (here) behind the curtain and then he goes behind the dresser.	Child: He put the shoes behind the curtain, so She thinks he is there, but he really hid behind the dresser to surprise her.
Q14. Why did Peter offer to paint his little chair pink (for Susie)?			
	0 points	1 point	2 points
<i>Explanation</i>	<i>Irrelevant response</i>	<i>Answers that involve the physical aspect of the chair and Peter. Responses that involve simple social conventions as well as Peter's feelings towards his sister.</i>	<i>Answers that involve Peter growing up and not needing the chair anymore... so he can give it to his sister.</i>
Examples	Child: Because he wants to paint.	Child: Because he is too big Child: Because the chair is too little Child: Because he doesn't fit in it anymore. Child: Because he loves her. Child: Because he wants to give it to Susie	Child: Because he wants to paint everything from when he was a baby for his little baby sister. Because now he doesn't need that stuff because he is too big.

C3. Coding Materials - Narrative Retelling Task Coding Rubric

I. Retelling Story: Birthday Surprise

My story goes like this:

Once, there was a boy (named X) ____ and it was his birthday ____ . He was very excited ____ because he (really) wanted a bike ____ and his mom had (promised) she would get him one ____ . Dave got out of bed ____ and ran to the living room (downstairs/kitchen) ____ to find his present ____ . He saw a big box ____ . When he opened the box ____, it was just a puzzle (there was a puzzle) ____ . Dave was upset ____, but his mom said: ____ “Why don’t you go outside to play?” ____ When he went outside ____, Dave found a beautiful brand new bike with a ribbon on it ____ . His mom said: “Surprise!” ____ Dave thanked his mom ____ and rode his new bike all day long. The End ____ .

Categories	
1. Formulaic Opening (Once, One Day, Once upon a time)	
2. Introduction of Main Character (Dave, Mason, David, Jason, the Boy, there was a boy)	
3. Setting (It has his birthday)	
4. Initiating Event and Introduction (He wanted a bike – [his mom had promised him one] -)	
5. Introduction of Secondary character (Mom)	
6. Goal (went to find his present).	
7. Problem (it was a puzzle)	
8. Reaction (Dave was so upset/sad/angry)	
9. Attempt 1 (His mom told him to go outside and play)	
10. Attempt 2 (he saw/there was a beautiful bike).	
11. Trick of Secondary Character (His mom said “surprise”)	
12. Consequence (Thanked him mom and/or rode bike)	
13. Formulaic Ending (The end)	

Narrative comprehension questions (correct responses)

- | | (Check one) | |
|--|--------------------------|--------------------------|
| Incorrect | Correct | |
| 8) What was the boy's name? (<i>Dave/David</i>) | <input type="checkbox"/> | <input type="checkbox"/> |
| 9) What special day was this for Dave? (<i>it was his birthday</i>) | <input type="checkbox"/> | <input type="checkbox"/> |
| 10) Why was Dave upset when he opened the big box?
(<i>cause it wasn't the present he wanted</i>) | <input type="checkbox"/> | <input type="checkbox"/> |
| 11) What did Dave find outside? (<i>a beautiful brand new bike</i>) | <input type="checkbox"/> | <input type="checkbox"/> |
| 12) Why did his mom give him a puzzle first, what was she trying to do?
(<i>she wanted to surprise Dave, trick Dave</i>) | <input type="checkbox"/> | <input type="checkbox"/> |
| 13) What was Dave thinking when saw the puzzle? (<i>That he wasn't going to get a bike</i>) | <input type="checkbox"/> | <input type="checkbox"/> |
| 14) What did Dave get for his birthday? (<i>a bike - and a puzzle-</i>) | <input type="checkbox"/> | <input type="checkbox"/> |

C4. Coding Materials - Coding for Picture Sequence

Balloon Story

Story Elements	Description	0pt responses	1pt Responses
Setting (1pt)	Any statement describing where the story is happening and/or when it is happening		<ul style="list-style-type: none"> - The boy is coming from the carnival - The boy got a balloon at the fair - It's morning time
Initiating Statement (1pt)	<p>Any statement in which protagonist (the boy) is introduced.</p> <p>Should supply the background for the problem including the main protagonist.</p>	<ul style="list-style-type: none"> - <i>Wind blew the balloon</i> - <i>The ballon</i> - <i>The ballon is flying</i> <p>(There is no mention of the boy)</p>	<ul style="list-style-type: none"> - <i>The boy is walking with a balloon,</i> - <i>He is walking with a balloon,</i> - <i>The boy is walking walking walking...</i>
Problem (1pt)	Problem (1) - The boy somehow loses the balloon; the balloon escapes him.	<ul style="list-style-type: none"> - <i>The balloon went away</i> - <i>The balloon went in the sky</i> <p>(These phrases simply describe the picture)</p>	<ul style="list-style-type: none"> - <i>The boy lets go of the balloon,</i> - <i>the boy lets the balloon fly away,</i> - <i>the balloon falled down,</i> - <i>the balloon flowed away,</i> - <i>the balloon is gone</i>
	Problem (2) - The balloon gets stuck in the tree		<ul style="list-style-type: none"> - <i>The balloon is in the trees,</i> - <i>the balloon is in the branches,</i> - <i>the balloon flies up to the tree</i>
Emotional Reaction (1pt)	Statement stating how the protagonist reacted to the problem		<ul style="list-style-type: none"> - The boy is sad - The boy is angry
Motive (1pt)	Motive for Problem (1) - The motive states why the balloon escaped the boy		<ul style="list-style-type: none"> - <i>The wind was blowing hard.</i> - <i>The boy opened his hand,</i> - <i>the wind blowed it away,</i> - <i>the boy was holding the string</i>

			<i>too close to the end,</i>
	Motive for Problem (2) - The motive states why the balloon got caught in the tree		- <i>The boy let it go,</i> - <i>the balloon flew away from the boy,</i> <i>the wind was too strong,</i> - <i>the boy didn't hold on tight, he let go</i>
Attempt (1pt)	The attempt relates the secondary character (the old man) and how he helped the boy get his balloon back. Both characters need to be mentioned in the attempt, along with the action of getting the balloon	- <i>the man got the balloon</i> (does not count as an attempt that was made toward helping solve the protagonist's problem, the protagonist needs to be mentioned as the benefactor of the action)	- <i>The man got the balloon for the boy,</i> - <i>the man got the balloon for the little kid,</i> - <i>the man got the balloon because he saw the boy had it</i>
Resolution (1pt)	The resolution needs to state whether the protagonist actually got his balloon back, therefore it needs to relate the boy (protagonist) with his balloon again *** In special cases, we can have a Resolution without an Attempt (attempt is implied)		- <i>The boy walked home with his balloon,</i> - <i>the boy was happy with his balloon,</i> - <i>the boy got his balloon back,</i> - <i>the boy had his balloon and walked home</i> *** <i>"The little boy gets the balloon(</i> initiating event <i>). Then the little boy lost I</i> (problem <i>)t. Then the guy gave it back. Then the little boy got it back(</i> resolution <i>)."</i> Here, "the guy gave it back" is the Resolution; however, this child skips the Attempt

			(although it is implied). They do not get credit for the Attempt (there is no actual mention of the man getting the balloon for the boy), but do receive credit for the Resolution.
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Nightmare Story

Story Elements	Description	Opt responses	1pt Responses
Setting (1pt)	Any statement describing where the story is happening and/or when it is happening		- The girl is in her room - It's nighttime
Initiating Statement (1pt)	Introduces the protagonist and their initial state	- The ghostes come	- <i>The girl was sleeping,</i> - <i>she was laying in bed,</i> - <i>he was having dreams</i>
Problem (1pt)	States the protagonist and the negative feeling/emotionality that protagonist was undergoing. Simply stating that the character saw a ghost or monster is not enough to count as a problem, since the story requires understanding the implied emotion as the actual problem of the story.	- She saw monsters	- <i>She was feeling scared,</i> - <i>she had a nightmare,</i> - <i>she was scared of ghostes,</i> - <i>she was sad,</i> - <i>she screamed,</i> - <i>she was crying for her mommy</i>
Emotional Reaction (1pt)	Statement stating how the protagonist reacted to the problem		- The girl is scared
Motive (1pt)	The motive indicates what caused the negative state of the character.		- <i>She saw two ghostes (and she was scared)</i> - <i>the girl saw shadows (and she was scared)</i> ** if the child says that the protagonist had a nightmare – it is coded as both motive and problem since it has implied meanings linked to the word.

<p>Attempt (1pt)</p>	<p>The attempt states that the teddy bear was brought to comfort the child.</p> <p>It needs to include the protagonist (child), the secondary character (mother), the object of comfort (teddy bear) – and verbally state the purpose of the object.</p>	<p>- <i>She (the mother) gave the teddy bear.</i> - <i>the girl got her teddy bear.</i> - <i>then mommy bringed his bear in</i></p> <p>** There is no explanation of the purpose of the teddy bear.</p>	<p>- <i>The mother gave her a teddy bear so she wouldn't be scared,</i> - <i>the mother brought the teddy bear so she could sleep better and not see ghosts, -</i> - <i>the woman gave her a teddy bear so she stopped crying,</i> - <i>the mother gave her the teddy be so she could sleep again</i></p>
<p>Resolution (1pt)</p>	<p>Resolution (1) - States the protagonist, the object of comfort (teddy bear), and the resolving action (the girl falls back asleep)</p>		<p>- <i>she sleeps again with her teddy bear</i> - <i>Now he sleeps with him bear</i></p>
	<p>Resolution (2) - States the protagonist and the direct resolution of the problem</p>		<p>- <i>there are no more monsters,</i> - <i>he's not scared anymore</i></p>

Stream Story

Story Elements	Description	0pt responses	1pt Responses
Setting (1pt)	Any statement describing where the story is happening and/or when it is happening		-They are at the park - They are in the backyard
Initiating Event	Any narration in which the boy and girl are described interacting together Can also introduce characters through grouping: “they” “two kids” etc.	- “The girl throwing the ball” is not an acceptable initiating event b/c it is not implied that she is throwing to someone.	- The girl and boy play catch, - the girl throws the ball and the boy catches it, - the girl passes the ball [implies she is passing it to someone], - they play basketball
Problem	Needs to state the boy protagonist and external event of falling into the water.	- “went in the water” - “got in the water” ** not enough to count as a problem since the story requires understanding of the external event as the actual problem of the story (usage of the verb went indicates the boy purposely goes into the water). - “He falled” is not enough of a problem. We need to imply that he is falling into the water.	- He fell in the water, - he tripped into the pond, - he falls in, he stumbles in the river
Emotional Reaction (1pt)	Statement stating how the protagonist reacted to the problem		- The boy is sad - The boy is angry

Motive	<p>Girl's motive: It needs to state that the girl threw the ball in a way that the boy couldn't catch it. The girl's motive needs to initiate the boy's motive -- which will ultimately cause the problem.</p>	<p>- She throw the ball</p>	<p>- She threw too high - The girl threw too far</p>
	<p>Boy's motive: Needs to state that the boy couldn't catch the ball.</p> <p>** This motive directly causes the problem, whereas the girl's motive is indirectly causing it.</p>		<p>- The boy missed the ball - The boy couldn't catch it - He can't reach it"</p>
Resolution	<p>The resolution needs to mention both characters and a resolving action</p>		<p>- The boy and girl walk away to the park, - the boy and girl walk home so the boy can change into dry clothes, - they are best friends, - - the boy and girl stop playing catch and walk home</p>

Beach Story

Story Elements	Description	Opt responses	1pt Responses
Setting (1pt)	Any statement describing where the story is happening and/or when it is happening		-They are playing at the beach - It's summer time
Initiating Event (1pt)	Any narration in which the boy and girl are both described playing on the beach Can also introduce characters through grouping: "they" "two kids" etc.	- The girl playing	- The girl and boy play in the sand, - the girl plays with the truck and the boy plays with the castle, - the girl plays with the truck and the boy is looking at her
Problem (1pt)	Needs to state the boy taking the truck away from the girl ** Simply stating that the character took the truck is not enough to count as a problem since the story implies a problem between the two characters (usage of the verb "take" also needs to use the phrase "from the girl" to indicate the boy purposely takes the truck away).	- He takes truck	- He steals the truck, - he took the car away from the girl, - he takes truck from her
Emotional Reaction (1pt)	Statement stating how the protagonist reacted to the problem		- She was so mad - She was upset
Motive (1pt)	<i>Girl's motive:</i> Reason for why the boy taking the truck away is a problem from the girl's perspective		- She wasn't done playing with it, It was her truck
	<i>Boy's motive:</i> Reason why the boy took the truck from the girl		- The boy wants the truck - The boy likes the truck" (implies jealousy),

			- The boy is curious
Attempt (1pt)	Both characters need to be mentioned in the attempt and needs to include the protagonist (girl) running after boy to get the truck	- they run together	- the girl chases the boy, - the girl goes after boy to get truck
Resolution (1pt)	The resolution needs to mention both characters and a resolving action	- they play together (does not indicate full resolution)	- The boy and girl play together instead of fighting, - they play together and are happy

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Education

- Ph.D. Lehigh University, Bethlehem, PA
Expected Graduation, May 2012
Concentration: Developmental Psychology
Advisor: Ageliki Nicolopoulou, Ph.D.
- M.S. Lehigh University, Bethlehem, PA
September, 2008
Concentration: Developmental Psychology
Title: *Low-income Preschooler's Expressive and Situational Emotion Knowledge.*
Advisor: Ageliki Nicolopoulou, Ph.D.
- B.A. Universidade Federal Fluminense, Rio de Janeiro- Brazil
February, 2005
Major: Psychology

Research Experience

- 2011-2012 Research Coordinator
Narrative Lab
Coordinating research assistants working with preschool classrooms and teachers, as well as research assistants working with data organization and analysis. Training assistants on different language and social measures, as well as on different coding schemes used for language and social data.
- 2010- 2012 Doctorate Thesis Project
Fostering Preschoolers' Narrative Comprehension through Inference Making and Story-Engaging Activities
Developing 4 8-week bookreading intervention programs, collecting data from 80 preschoolers (pre and post-test), carrying out the intervention, coordinating research assistants, organizing, coding and analyzing data. Writing up results.

Committee: Ageliki Nicolopoulou, Ph.D, Diane Hyland, Ph.D., Susan Barrett, Ph.D., Patricia Manz, Ph.D., Christopher Burke, Ph.D.

- 2006-2008 Master's Thesis Project
Low-income Preschooler's Expressive and Situational Emotion Knowledge
Collecting data of 130 preschoolers on an emotion understanding task, coordinating undergraduate research assistants, coding and analyzing data, writing up the results.
Committee: Ageliki Nicolopoulou, Ph.D, Deborah Laible, Ph.D., Susan Barrett, Ph.D.
- 2006-2008 Research Coordinator
Story-Telling Story-Acting, NICHD Funded Project
Administering educational and cognitive measures to preschool children, and observing peer interactions. Coordinating undergraduate research assistants, training and lending support to teachers throughout the intervention. Coding and analyzing data. Writing up the final report.
Supervisor: Ageliki Nicolopoulou, Ph.D.
- 2007-2009 Research Consultant – Pennsylvania Government
Lehigh Valley Child Care – Pre-K Counts Program
Coordinating and assisting the evaluation of a Pre-K Counts program in the Lehigh Valley Child Care. Administering educational measures to preschool children, entering and analyzing data, writing up final report.
Supervisor: Ageliki Nicolopoulou, Ph.D.
- 2007-2008 Research Consultant
Early Reading First Project – Funded by the United States Department of Education.
Administering educational measures to preschool children in Spanish.
Supervisor: Karen Guishlar, Ph.D.
- 2003-2005 Undergraduate Research Assistant – Funded by the Brazilian Government
Early Education and the role of parents
Observing parent-child interactions during the first 2 months of their day-care experience, and observing children's social interactions throughout the school year.
Supervisor: Vera Maria Ramos de Vasconcelos

Software and Technology Experience

Extensive knowledge of statistical programs such as SPSS, AMOS and SAS,
Also, extensive knowledge of Microsoft Word, Excel and Powerpoint.

Teaching Experience

Summer 2010 Adjunct Professor
Lehigh University
Course: Social and Personality Development

Teaching Assistant Experience

Spring, 2011 Teaching Assistant, Lehigh University
Course: Research Methods
Professor: Pdraig O'Seaghdha, Ph.D.

Spring, 2010 Lab Instructor and Teaching Assistant, Lehigh University
Course: Statistics
Professor: Almut Hupbach, Ph.D.

Fall & Spring, 2009 Teaching Assistant, Lehigh University
Course: Research Methods
Professor: Chris Burke, Ph.D.

Fall, 2008 Teaching Assistant, Lehigh University
Course: Research Methods
Professor: Sue Barrett, Ph.D.

Fall, 2005 Teaching Assistant, Lehigh University
Course: Developmental Psychology
Professor: Deborah Laible, Ph.D.

Spring, 2006 Teaching Assistant, Lehigh University
Course: Developmental Psychology
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Teaching Interests

Developmental Psychology, Cross-Cultural Psychology, Narrative Development, Emotional Development, Social and Personality Development, Comprehension Development, Introductory Psychology, Statistics, Research Methods.

Publications

Nicolopoulou, A., de Sá, A., Ilgaz, H., & Brockmeyer, C. (2010). Using the transformative power of play to educate hearts and minds: From Vygotsky to Vivian Paley and beyond. *Mind, Culture, and Activity* (for Special Issue, "Playworlds of Children and Adults: Cross-Cultural Perspectives on Play Pedagogy").

Professional Presentations

de Sa, A. & Nicolopoulou, A. (2012) *Fostering Low-income Preschoolers' Narrative Comprehension through Interactive Reading and Reenactment* Poster to be presented at Tenth National Head Start conference (Washington, DC: June 18-20, 2012).

de Sa, A. & Nicopoulou, A. (2011) *The Development of Emotion Knowledge in Preschoolers: Testing the Relationship between Emotion Expression and Situational Knowledge*. Poster presented at the SRCD 2011 Biennial Meeting (Montreal, CA: March 31 – April 2, 2011).

de Sa, A. & Nicopoulou, A. (2010) *Preschoolers' Understanding of Emotions: Expressions and Emotion Causes and Consequences*. Poster presented at Ninth National Head Start conference (Washington, DC: June 21-23, 2010).

Nicolopoulou, A., Ilgaz, H., de Sa, A., Brockmeyer, C. & Cortina, K. S. (2010) Using play and narrative to promote oral language and social competence in low-income preschoolers: A case study. Paper presented at American Psychological Association Annual Convention (Denver, CO, April 31-May 4, 2010).

de Sa, A. & Nicopoulou, A. (2009) *Low-Income Preschoolers' Understanding of Causes, Consequences, and Expression of Emotions*. Poster presented at the SRCD 2009 Biennial Meeting (Denver, CO: April 2-4, 2009).

Nicolopoulou, A., Ilgaz, H., Brockmeyer, C., de Sa, A. & Schnabel-Cortina, K (2009). *Promoting Oral Language Skills of Low-Income Preschoolers Using a Narrative Activity*. Poster presented at the SRCD 2009 Biennial Meeting (Denver, CO: April 2-4, 2009).

- Brockmeyer, C., Nicolopoulou, A., de Sa, A. & Ilgaz, H. (2009). *Finding the Best Narrative Assessment Techniques for Preschoolers: Elicitation Methods Compared Across Ages and Over Time*. Poster presented at the SRCD 2009 Biennial Meeting (Denver, CO: April 2-4, 2009).
- Nicolopoulou, A., de Sa, A., Ilgaz, H., Schnabel-Cortina, K., & Brockmeyer, C. (2008). *Can storytelling and story-acting by low-income preschoolers promote school readiness?* Poster presented at Ninth National Head Start conference (Washington, DC: June 23-25, 2008).
- Nicolopoulou, A., Ilgaz, H., de Sa, A., Brockmeyer, C., & Schnabel-Cortina, K. (2008). *Promoting narrative competence among low-income preschool children*. Poster presented at the International Association of the Study of Child Language (Edinburgh, Scotland: July 28-August 1, 2008).
- Brockmeyer, C., Nicolopoulou, A., de Sa, A., & Ilgaz, H. (2008). *Multitasking: The best way to assess preschoolers narrative competence?* Paper presented at the International Association of Child Language (Edinburgh, Scotland: July 28-August 1, 2008).
- Nicolopoulou, A., Ilgaz, H., de Sa, A., Brockmeyer, C., & Schnabel-Cortina, K. (2008). *Promoting narrative competence among low-income preschool children*. Poster to be presented at the International Association of Child Language (Edinburgh Scotland: July 28-August 1, 2008).
- de Sa, A. & Nicolopoulou, A. (2008) *Gender differentiation pattern for gendered narrative styles, partner preferences, and stereotypic role adaptation*. Poster presented at the Third Gender Development Research Conference (San Francisco, CA, April 11-12).
- Nicolopoulou, A., Brockmeyer, C., Schewebel-Cortina, K. Ilgaz, H., & de Sa, A. (2008) *Using Play and Narrative to Promote Low-Income Preschoolers' Language, Literacy, and Social Competence*, In: The Developmental and Educational Contributions of Pretend Play Across the Life Span, Symposium presented at AERA 2008 Annual Meeting (New York, NY, March 24-28).
- de Sa, A. (2007) *Promoting Social Understanding and Social Competence in Low-Income Preschoolers through a Storytelling and Story-Acting Activity*, Symposium presented at the 7th Annual Cross University Collaborative Mentoring Conference (New York, NY, May 4-5).
- Vasconcellos, V. & de Sa, A. (2006) *Play and imitation in peer interactions*, Symposium presented at the Annual Jean Piaget Society Meeting (Baltimore, MD, June1-3).

Vasconcellos, V., Lopes, J. & de Sa, A. (2004) Migration of Children: Understanding Space and Place, In: *Development in poverty-stricken contexts*. Symposium presented at the Annual Jean Piaget Society Meeting (Toronto, Canada, June 3-5).

Professional Service

2010-2011	Member of Dean's Graduate Advisory Committee College of Arts and Sciences, Lehigh University
2009-2010	Colloquium Assistant Psychology Department, Lehigh University
2006-2007	Graduate Student Senate Representative Psychology Department, Lehigh University

Professional Affiliations

Society for Research in Child Development
International Association for the Study of Child Language
Jean Piaget Society