

Denyse V. Hayward
Phyllis Schneider
University of Alberta

and

Ronald B. Gillam
Utah State University

Age and Task-Related Effects on Young Children's Understanding of a Complex Picture Story

In this study we examined age- and task-related effects in story schema knowledge across an independent narrative task (story formulations) and a supported narrative task (answering questions). We also examined age-related changes to questions about the story as a whole. Participants were typically developing English-speaking children aged 4, 5, and 6 (50 per age group). Results showed more successful performance on all tasks as a function of age. In addition, all the children were more successful in the supported versus independent narrative context. Results are discussed in terms of the importance of oral narratives to social and educational milieus.

Ce projet porte sur les effets liés à l'âge et la tâche qui se manifestent dans les connaissances sur les abrégés dans une tâche narrative indépendante (élaboration de récits) et une tâche narrative avec appui (répondre à des questions). Nous avons également étudié les changements, liés à l'âge, dans les questions portant sur l'histoire dans son ensemble. Typiquement, les participants étaient des enfants anglophones de 4, 5 et 6 ans (50 enfants par groupe d'âge). Les résultats révèlent un meilleur rendement sur toutes les tâches en fonction de l'âge. De plus, les enfants ont mieux réussi la tâche narrative quand ils avaient de l'appui. Les résultats sont évoqués en fonction de l'importance des récits oraux dans des milieux sociaux et éducationnels.

Narratives are a part of everyday life in interaction with others, in educational contexts, and in recreation (e.g., books, television, and film). Oral narratives are a form of discourse characterized by the relating of events (ongoing or past, actual or fictional), generally in the same temporal order as the events occurred. Stories are a common type of oral narrative. Stories can be personal, that is, relating events that have happened to the speaker or someone known to the speaker. Other stories are fictional, that is, stories that are removed from the

Denyse Hayward is an SSHRC postdoctoral fellow in the Canadian Centre for Research on Literacy. Her research primarily focuses on language and literacy development in young children. Phyllis Schneider is a professor in the Department of Speech Pathology and Audiology. Her research interests are primarily in the area of narrative development, assessment, and intervention.

Ronald Gillam is the Raymond L. and Eloise H. Lillywhite Professor of Communicative Disorders. His research primarily focuses on language development and disorders in school-aged children.

personal experience of the speaker and not necessarily presented as having actually happened.

Oral narratives, particularly the telling or retelling of fictional stories, have been described as a literate language genre that serves as a bridge between oral and literate language styles (Bashir & Scavuzzo, 1992; Westby, 2005). In other words, children's mastery of the characteristics of oral stories moves them along the oral-literate style continuum and prepares them to master formal written language necessary for academic success. Evidence supporting stories as a bridge between oral and literate styles comes from a number of studies that found that in contrast to conversation, children's oral stories contained features characteristic of written language such as longer sentences (Wagner, Nettelbladt, Sahlén, & Nilholm, 2000), more syntactically complex language (Westerveld, Gillon, & Miller, 2004), and more phrasal expansions (Wagner et al., 2000). In addition, story production abilities have been found to predict later linguistic and academic achievement (Griffin, Hemphill, Camp, & Wolf, 2005; O'Neill, Pearce, & Pick, 2004). Thus the motivation for the present study arises from the knowledge that the development of successful oral narrative skills has significant importance in both social and educational milieus.

At the present time most of the research has focused on evaluating children's narrative abilities via production tasks such as retelling a story that has been heard or formulating a story from a series of pictures. Production tasks can provide a good picture of children's ability to produce stories, but they cannot give a definitive picture of their understanding of the story or story components, or of their general knowledge about stories (Westby, 2005). This is particularly true for young children, who may understand aspects of a story very well, but who may not be able to demonstrate such knowledge due to the cognitive and/or linguistic demands of a particular narration task. Researchers have, therefore, emphasized the importance of using a variety of methods to evaluate young children's knowledge about stories because young children can appear more or less competent depending on the task (Goldman et al., 1999; Stein & Glenn, 1979). However, in the few studies that have examined children's narrative abilities across tasks (e.g., story-retelling, answering questions) the theoretical constructs for each task have not been equivalent, making interpretation of children's competences challenging. In this study we seek to investigate the narrative abilities of young children by applying the same theoretical model (described below) across two tasks so as allow for examination of young children's competences as they relate to both age and task.

Narrative Tasks

In our study, we contrasted a story formulation task from pictures with a questioning task in which children were asked individual questions about the story from beginning to end while viewing the same pictures as in the formulation task. When considering the nature of the difference between these narrative tasks, we drew on Vygotsky's (1978, 1987) developmental theory. Vygotsky viewed children as developing and functioning in a social context where social interaction is essential for development not only as a source of stimulation and feedback, but as the means by which psychological functioning arises. Vygotsky proposed that initially psychological functions are carried out between a child and a more capable partner (adult or peer); over time the

child internalizes the processes that were carried out jointly and is then able to carry out the function independently. What a child is able to accomplish with minimal adult guidance is thought to indicate what the child will be able to do independently in the near future. Our choice of narrative tasks allowed us to compare children's independent functioning in the story formulation task and functioning with adult support in the questioning task.

We chose a questioning task as the supported functioning task for several reasons. Questions provide a retrieval path that may aid children in accessing schema information that they understood but did not or could not include in their stories because they were not able to generate appropriate retrieval cues (Trabasso, van den Broek, & Liu, 1988). Anderson (1994) suggests that questions directed toward activation of relevant story schema knowledge increase comprehension because young children may not spontaneously integrate the task at hand with what they already know. In addition, asking a child questions about a story may make explicit relationships among story events that otherwise need to be inferred.

When questioning tasks were used to examine children's story knowledge, Bishop and Adams (1992) found that older children answered more questions correctly than younger children, and across all ages children answered fewer inferential questions correctly. Studies that asked questions requiring integration across several story elements or the whole story versus inferencing across a few events were more difficult for younger children (Crais & Chapman, 1987; Harris Wright & Newhoff, 2001). The ability to draw inferences is essential for comprehension of narratives because no story is completely explicit. Therefore, we included two types of questions in our study: questions about individual elements of the story and questions that required understanding of the story as a whole.

Finally, interpretation of results across the various studies reviewed is complicated by differences in questioning modes (e.g., yes/no, true/false, responses scored against a criterion) and which particular story elements were examined. A review of the literature revealed no studies that questioned children about story elements from the beginning to the end of the story using a theoretical model of story structure or applied the same underlying theoretical model to examine children's narrative abilities across tasks.

Theoretical Model Underlying Narrative Comprehension

Comprehension is a matter of activating or constructing a schema that provides a coherent explanation of objects and events mentioned in a discourse. There are schemas for various genres of discourse (oral and written) because each type of discourse has its own organization. The schema represents the organizational pattern of story elements that is independent of specific content and is often referred to as the macrostructure (Hughes, McGillivray, & Schmidek, 1997). Narrative comprehension becomes easier when the child has some understanding of story macrostructure, because the macrostructure of story texts acts as a scaffolding for assimilating story information by providing slots for certain information, which in turn enables selective allocation of attention to relevant versus insignificant story information (Anderson, 1994). Further, because no story is completely explicit, macrostructure knowledge provides the basis for making inferences that go beyond infor-

mation stated in a story. In addition, macrostructure knowledge allows for the orderly searches of memory for the types of information that need to be recalled.

Most fictional stories conform to a stereotypical pattern: they begin with establishing a setting, followed by an event to which a character reacts, which in turn motivates the character to establish a goal to deal with the event. In order to achieve the goal, the character must implement a series of actions that generate outcomes to which the character responds emotionally. Although various researchers have posited somewhat varied schematic organizations (Mandler & Johnson, 1977; Rumelhart, 1975; Stein & Glenn, 1979; Thorndyke, 1977), there is agreement on these basic story components or slots. The surface structure of a particular story need not, and often does not, contain all the components of this idealized schema. It is assumed that individuals will use their knowledge of the schema to supply missing story components in order to construct a coherent representation of a story (Mandler & Johnson; Stein & Glenn). Research has shown that when children use story macrostructure knowledge, comprehension of narratives becomes a rapid and efficient process (Pearson & Fielding, 1991; Westby, 2005). The acquisition of story schema knowledge appears to develop as a function of age, with older children's stories approximating competence observed in adults. Cross-cultural research conducted with literate and nonliterate adults and children from a non-Western culture suggests that the macrostructure may reflect universal aspects in how individuals encode, understand, and recall stories regardless of culture or amount of schooling (Mandler, Scribner, Cole, & DeForest, 1980).

The Study

In our study, we used the idealized story schema categories of Stein and Glenn (1979) as our basis of analysis across our independent and supported narrative tasks to examine both age- and task-related differences. Using the well-researched theoretical model to analyze the results for both tasks minimized the differences between tasks and made it more likely that differences would be due to the task demands themselves.

A descriptive, cross-sectional research design was used to examine narrative abilities of children at three ages (4, 5, and 6). We hypothesized that (a) younger children would perform better in the supported narrative task (answering questions about the story from beginning to end) than in the independent narrative task (story formulation) whereas older children would perform more similarly across tasks; and (b) younger children would have more difficulty than older children in answering questions about the story as a whole.

Method

Participants

Participants were part of a larger norming project, the Edmonton Narrative Norms Instrument (Schneider, Dubé, & Hayward, 2004). Data from 150 typically developing, English-speaking children aged 4, 5, and 6 were examined for this study. Each age group consisted of 50 children (25 boys, 25 girls). Age distributions for the three groups are presented in Table 1. Participants resided in Edmonton, a large western Canadian city; the 4- and 5-year-olds attended

preschools or daycare centers and the 6-year-olds attended kindergarten or grade 1 in either the Public or Catholic School Systems. Children were selected if English was the primary language spoken in the home and if there was no known history of vision or hearing impairments, cognitive delay or emotional problems, or speech and language delays. In addition, any child who had been referred for speech and language, educational, or cognitive assessment was also excluded as a participant. Data collection was conducted throughout the school year, with care taken to collect data from the full age range throughout the year so that no age group was sampled at a different point in the school year than any other age group.

Demographic information was collected on the families of participating children to permit description of socioeconomic status and ethnic composition of the sample. The purpose of collecting demographic information was to ensure a sample representative of the population. Socioeconomic status (SES) was estimated from parents' occupations using the Blishen Scale (Blishen, Carroll, & Moore, 1987). This scale, based on Canadian census information, provides a list of numerical values for occupations that are equally weighted for education and income. Values on the Blishen Scale range from 17.81 (newspaper carriers and vendors) to 101.74 (dentists) with a mean of 42.74 ($SD=13.28$). Examples of occupations with scores falling near this mean are mail carriers (42.29), typesetters (42.35), rail transportation mechanics and repairers (42.57), and radio and TV repairers (43.76). Table 1 presents the socioeconomic distributions for children's parents based on occupations reported on the consent forms and matched to values on the Blishen Scale. An analysis of variance for SES X Age Group showed no differences in family SES distributions among groups, $F(2,143)=0.187, p=.83$.

Table 1
Means and (Standard Deviations) for Participant Demographics for Age, Socioeconomic Status, and Language Skills.

	4-Year-Olds	Group 5-Year-Olds	6-Year-Olds
Age ^a	4;6 (.24)	5;6 (.26)	6;6 (.28)
SES ^b	47.38 (13.57)	46.63 (12.11)	48.31 (14.75)
Receptive Language ^c	10.82 (3.32)	10.74 (2.62)	11.58 (3.03)
Expressive Language ^d	9.96 (2.38)	9.96 (2.79)	11.76 (3.31)

Note. a=Age is expressed in years;months.

(Standard Deviations) expressed as a fraction of one year.

b=Values represent weighted components for education and income for occupation from the Blishen Scale: mean=42.74, ($SD=13.28$).

c=Ages 4-5, CELF-P Linguistic Concepts; Age 6, CELF-III Concepts and Directions (mean=10).

d=Ages 4-5, CELF-P Recalling Sentences in Context; Age 6, CELF-III Recalling Sentences (mean=10).

Ethnic composition corresponded closely to the range of ethnic diversity in the city of Edmonton according to Statistics Canada data (Statistics Canada, n.d.). Ethnic groups accounting for more than 1% of the population makeup were as follows: European descent 80%, Asian 5%, Aboriginal 4.4%, East Indian 3%, and African American 1%.

All children were administered two subtests of the Clinical Test of Language Fundamentals (CELF), using either the CELF-Preschool (Wiig, Secord, & Semel, 1992) for children aged 4 and 5, or the CELF-III (Semel, Wiig, & Secord, 1995) for children aged 6. The CELF tests were chosen because they are used in research and community contexts to diagnose language impairments. Subtests from the CELF-P were Linguistic Concepts and Recalling Sentences in Context. Subtests from the CELF-III were Concepts and Directions and Recalling Sentences, which are analogous to the CELF-P subtests used. These two subtests were chosen in order to have information on one receptive subtest and one expressive subtest for all the children. The CELF-P manual recommends these two subtests for use as a language screening (Wiig et al., 1992). Means for both subtests for each age group are reported in Table 1. A multivariate analysis of variance (MANOVA, $p < .05$) with Age Group (4-, 5-, 6-year-olds) as the independent variable and standard scores on the receptive and expressive language tests entered as the dependent variables was significant, Wilks Lambda $F(4, 292.0) = 3.27, p = .012$. However, follow-up tests found a difference for the expressive language measure only $F(2, 149) = 6.621, p = .002$. Post hoc tests showed that the 6-year-olds had higher scores than both the 4- and 5-year-olds, who did not differ from each other. This result may be the consequence of using two tests, the CELF-P for the 4-5-year-olds and the CELF III for the 6-year-olds, rather than a real difference in language ability. However, in order to account for the possible effect of this pretest difference on narrative tasks, the expressive language test scores were used as a covariate in all analyses.

Independent and Supported Narrative Tasks

The narrative tasks in this study were developed for use in conjunction with original one-, two-, or three-episode picture stories designed to collect story narrations from children using the Edmonton Narrative Norms Instrument (Dubé, 2000; Hayward, 2003). For this study, we selected a three-episode story "The Airplane" because it was the most complex of the three stories both in terms of number of episodes and number of characters. The story was illustrated by a professional cartoonist and consists of a series of 13 black-and-white line-drawn cartoon pictures presented one at a time in book format. The story takes place at a swimming pool; the first episode shows a giraffe playing with his toy airplane. In subsequent pictures a second story character, an elephant, grabs the plane and it ends up in the swimming pool. In the second episode, a lifeguard attempts to reach the plane but is unsuccessful. The third episode sees the arrival of a female elephant with a net who retrieves the plane and gives it to the giraffe. Story pictures are shown in the Appendix.

Independent task: Story formulation

This task involved children formulating a story from the picture scenes and was chosen to provide a measure of children's independent narrative abilities. The illustrations were specifically designed to match the fictional story macro-

structure categories. We used the categories described by Stein and Glenn (1979), commonly known as story grammar categories, so as to allow for examination of children’s understanding of the story macrostructure and to facilitate reliable scoring. See Table 2 for a description of each category.

Supported Task: Questions

Twenty-one questions were asked. The first 19 were developed to match the Stein and Glenn (1979) story grammar categories to permit comparisons across narrative tasks. Question wording was specifically designed to be as free as possible of specific story content information so that (a) we could evaluate whether children fitted the specific story information into the appropriate story macrostructure slot, and (b) so that similar questions could be used with novel stories by parents, educators, and therapists. Finally, the 19 questions were asked in accordance with the temporal-causal sequence of the story as recommended by Trabasso et al. (1988, see Table 2).

Table 2
Story Grammar Categories with Example Questions

<i>Category</i>	<i>Description</i>	<i>Questions</i>
Settings*	Introduces characters and their habitual states; describes social, physical or temporal contexts of the story.	<i>Who is in this story?</i>
Initiating Events*	Causes the main character to respond in some way. An Initiating Event can be an action, a change in the physical environment, or a character’s internal perception of an event.	<i>What happens first in the story?</i>
Internal Responses/Goals*	Refers to a character’s emotions, goals, desires, intentions, or thoughts in respect to an Initiating Event. The primary function of an Internal Response is to motivate the character to formulate a plan or to take action to achieve a goal.	<i>What was the story character thinking?</i>
Attempts*	Overt actions toward resolving a situation or achieving a goal.	<i>What did the story character do?</i>
Consequences*	Represents the character’s attainment or non-attainment of a goal, and other changes that occur as part of the Consequence, including natural occurrences or end states.	<i>What happened when the story character did that?</i>
Reactions*	Refers to how a character felt, thought or acted in response to the Consequence.	<i>How did the story character feel?</i>
Problem	Refers to the main problem that needed to be solved in the story.	<i>What was the problem in this story?</i>
Resolution	Refers to the event(s) that solved the main problem.	<i>How did the problem get fixed in the story?</i>

Note. *Categories compared across narrative tasks.

The remaining two questions were included to examine children's ability to infer information across the story as a whole. Because fictional stories are about a character solving a problem, we asked children to identify both the problem and resolution in the story (see Table 2). To answer these questions successfully, children must hold the critical story elements (including people, objects and places) in working memory as they figure out the causal links between them, thus creating a mental representation of the various story events and states in relationship to each other.

Procedures

Children were seen individually at their preschool, daycare, or school. The story formulations were collected first, followed by answers to questions. We specifically collected story formulations before question responses as we wished to obtain spontaneous narrations that were not influenced by the possible priming effect questions may have created. Questioning children about a story before narrating it may result in differences in the quantity and quality of story information retold.

Story formulations

Each child was first presented with a five-picture training story. The purpose of this was to familiarize the child with the storytelling format. Prompts that were not allowable when administering the test story were used to help children tell a story from the pictures if a child had trouble getting started or simply described the picture scenes rather than telling a story. Similar to the test story, the training story consisted of a series of pictures that told a story. The child was given specific instructions (*First I'll show you all the pictures. Then we'll go back to the beginning of the story. And then I want you to look at the pictures and tell me the story that you see in the pictures. I won't be able to see the pictures so you need to tell me the story really well so I can understand it*).

Questions

This questioning task was administered within three weeks of each child completing the story formulation task. Before asking the questions, the story pictures were previewed by the child and the examiner together. The examiner opened the cover of the book and slowly turned each page, showing the child each picture of the story until the end of the story had been reached. Afterward, the examiner returned to the beginning of the story to start asking the questions. The story pictures were visible to both the child and the examiner for this task. Once the child had answered the questions related to the first page of the story, the examiner turned the page and asked the next question. The Appendix displays the pictures and question sequence. No time limitations were imposed for answering the questions; however, questions were repeated if the child requested it or if he or she had not responded within 15 seconds.

Scoring Criteria

Children's story formulations and responses to questions were audio-recorded using a JVC portable minidisk recorder. Narrative utterances and question responses were transcribed in full and analyzed using transcription programs. Specific criteria were established for scoring children's story formulation utterances and responses to questions. Children's stories were scored for in-

clusion of story grammar categories. Responses to questions were scored on a 3-point scale. Two points were given for answers that were considered fully correct (i.e., included the most salient information), one point was given for answers that were partly correct, and a score of zero was given for answers that failed to meet these criteria, including "I don't know" or non-responses. For example, when asked *How did the giraffe feel?* (Question 6—Picture 5) a fully correct response required children to provide an appropriate feeling (e.g., mad, sad, worried, bad). Children who responded "mean" were given part credit; no credit was given responses such as "happy." The Appendix shows an example of coded transcript for story formulation utterances and question responses.

Measures

Measures used in the study were as follows.

1. Total percentage of story grammar categories included in the story formulation.
2. Total percentage of story grammar category questions about the story from beginning to end answered correctly.
3. Total percentage of Problem and Resolution questions answered correctly.

Reliability

Transcription reliability

For the story formulation transcripts, 24 recordings (16% of the total) were independently transcribed by a second person who was blind to the ages of the children and the purpose of the study. Word-by-word agreement was 96.5%. For the question response transcripts, 24 randomly chosen audiorecordings were also independently transcribed by a second trained person who was blind to the ages of the children and the purpose of study. Word-by-word agreement was 97.2%.

Scoring reliability

Story formulation utterances. Twenty-eight randomly selected transcripts were independently scored by a second scorer (the first author). Inter-rater reliability was calculated using Cohen's (1998) kappa, which provides a chance-corrected measure of agreement between raters. Agreement was $k=.91$ for story grammar categories.

Question responses. Eight randomly selected transcripts from each age group (16% of the total transcripts) were independently scored by a speech-language pathology master's-level student trained in coding story grammar categories. Agreement was as follows: story grammar category questions $k=.90$, Problem and Resolution questions $k=.86$.

Results

Along with main effects, effect size (partial η^2) are reported. Effect size provides information about the actual strength of the relationship between the dependent variable(s) and the population under investigation. As it is applied in this study, effect size describes how much of the variability in the dependent variables is associated with variability in the independent variable, and is reported in values that range from 0-1. Effect sizes for η^2 that are 0.10 or less are considered small effects, 0.25 medium effects and 0.40 and greater, large

effects (Cohen, 1988). Post hoc differences were examined using the Tukey test. Means and standard deviations for all measures are displayed in Table 3.

Question 1: Independent and Supported Task Comparisons

Analyzing whether children provided story macrostructure category information when formulating a story and/or when answering questions about the story from beginning to end allowed us to examine possible age- and task-related effects. We hypothesized that the youngest children would perform better in the supported narrative task (answering questions) than in the independent narrative task (story formulation) whereas older children would perform more similarly across tasks.

A repeated-measures ANOVA conducted for the independent variables, Task (percentage of story grammar categories included in story formulations and percentage of story grammar category questions answered correctly), and Age (4-, 5-, and 6-year-olds) with standard scores from the CELF expressive language subtest entered as a covariate. Main effects were found for Age, $F(2, 146)=35.93$, $p<.001$, partial $\eta^2=.33$, and Task, $F(1, 146)=48.25$, $p<.001$, partial $\eta^2=.25$. However, the Task X Age interaction was not significant: $p=.325$. Post hocs showed that the 6-year-olds achieved higher overall mean scores in both the story formulation and questioning tasks than 5-year-olds, who in turn had higher mean scores across both tasks than 4-year-olds (see Figure 1).

Question 2: Problem and Resolution Questions

Our second question examined possible age-related differences in children's responses to questions that required integration of the story as a whole (Problem and Resolution). A repeated measures ANOVA was conducted for the independent variables, Question (percentage of Problem and Resolution questions answered correctly), and Age (4-, 5-, 6-year-olds) with standard scores

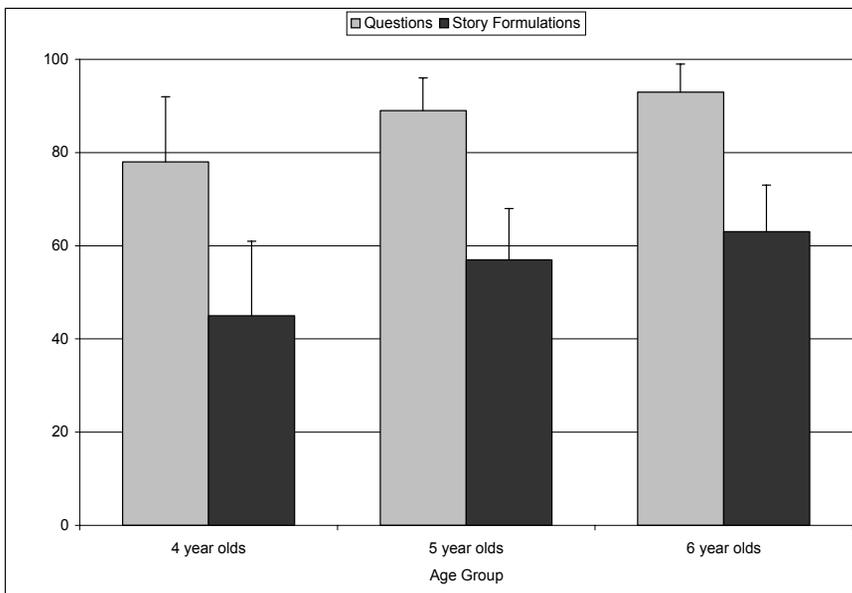


Figure 1. Mean percentages for story grammar categories across questioning and story formulation tasks.

Table 3
Means and (Standard Deviations) for Narrative Tasks and Age

<i>Narrative Tasks</i>	<i>Age</i>		
	<i>4-Year-Olds</i>	<i>5-Year-Olds</i>	<i>6-Year-Olds</i>
Independent—Story Formulation			
Macrostructure categories	.45 (.16)	.57 (.11)	.63 (.10)
Supported—Questions			
(a) Macrostructure Categories	.78 (.14)	.89 (.07)	.93 (.06)
(b) Problem	.31 (.39)	.51 (.46)	.88 (.24)
Resolution	.43 (.41)	.71 (.33)	.84 (.26)

from the CELF expressive language subtest entered as a covariate. A main effect was found for Age, $F(2, 146)=27.343, p<.001$, partial $\eta^2=.27$ along with a significant Question X Age interaction $F(2, 146)=4.448, p=.013$, partial $\eta^2=.06$. Means and standard deviations for the Problem and Resolution questions are displayed in Table 3. As predicted, 6-year-olds achieved higher overall mean scores than 5-year-olds, who in turn had higher mean scores than 4-year-olds for both questions. The interaction effect was accounted for the 4- and 5-year-olds answering more Resolution questions correctly than Problem questions (see Figure 2).

Discussion

Independent and Supported Narrative Tasks

Our first research question was about age- and task-related differences in children’s abilities across an independent narrative context, formulating a story from pictures, and a supported narrative context, answering questions about the story from beginning to end. We had hypothesized that the youngest children would be more successful in the supported rather than independent context; however, this would change as a function of age with the oldest children performing equally well across both contexts. Although children performed more successfully on both tasks as a function of age, our results did not support the interaction effect we had predicted. As shown in Figure 1, children in all age groups performed more successfully on the supported task than the independent task. The inclusion of the supported task revealed that even though children had failed to include some information when formulating a story, they were able to respond successfully when asked specific questions.

The questioning task revealed a high level of competence across all three age groups. Several factors probably supported this finding: (a) the questions provided support by focusing on the causes and consequences of schema categories of the story; (b) the questions followed the temporal-causal sequence of the story, which supports children’s ability to make connections between events and states; and (c) the task presentation in which pictures were available for viewing when children answered questions. Thus a high level of scaffolding support was available to children in this task.

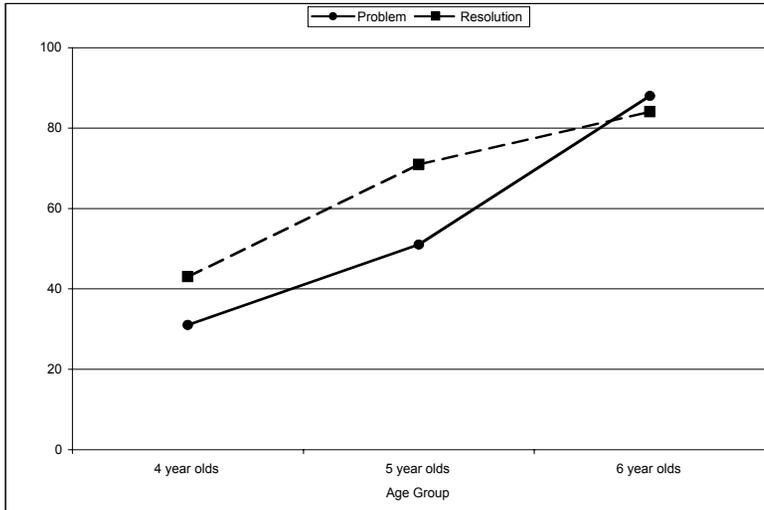


Figure 2. Mean percentages for problem and resolution questions for each age group.

It is possible that in answering questions, children were actually demonstrating story schema knowledge, even though it was not reflected in their narrations. An alternative possibility is that the questions induced inferencing, allowing children to go beyond what they included in their initial narration of the story. These two premises, (a) that questions allow children to demonstrate knowledge that was not apparent in a production context versus (b) that questions induce inferences, are difficult to separate entirely. As proposed by Vygotsky (1978), performance on a supported task reveals children's emerging competences that allow them to perform at a higher level with adult guidance than they could do independently. In addition, van den Broek (1989) states that even when children possess understanding of story macrostructure, being questioned about the macrostructure may induce the development of new inferences. Our questioning task probably provided optimal conditions for children to demonstrate knowledge and/or make inferences because we asked about the entire story and our questions followed the temporal-causal unfolding of the story. In our study, the questioning task was completed after the narration task so as not to confound the children's spontaneous story narrations; we presumed that the questioning task could possibly evoke inferences about the causal relationships among story events within and across episodes. However, because we did not counterbalance the order of tasks, we could not determine whether questioning did in fact evoke such inferences. Further research is needed to determine the possible priming effects of questioning on both inference inducement and narrative productions.

Problem and Resolution Questions

Our second question concerned potential age-related effects in children's responses to questions about the story as a whole. As expected, children did answer more questions correctly overall as a function of age; however, there was also an interaction effect that we had not expected. As shown in Figure 2, both the 4- and 5-year-olds answered the Resolution question more successfully than the Problem question whereas the 6-year-olds answered both questions

successfully. Younger children's greater success with the Resolution question could be due to a recency effect—that is, children did not need to go back as far in the story to answer the Resolution question as they did the Problem question. However, it is still somewhat surprising that some young children could correctly answer the Resolution question (*How did that problem get fixed?*), which seems to require some understanding of the problem, without being able to state the Problem when asked (*What was the problem in this story?*). It may be easier for children to describe an action (i.e., the action that resolved the problem, which was getting the plane back) than to describe a problem, which involves not only actions but also characters' perspectives on those actions. By age 6, children can answer both types of questions quite well.

In the studies that we reviewed that had used questioning tasks, children older than those participating in our study evidenced difficulty in answering inferential questions, particularly those that required inferencing across several story events. However, in earlier studies, children did not have pictures available to them when they answered questions, and many of the questions asked about elements (e.g., *What colour was X's shirt? What should X do if this happened again?*) that tap memory for story details or ability to make predictions: questions not germane to the problem(s) and outcome(s) of the story. Van den Broek and Kremer (2000) state that children can understand connections between story events more readily when sufficient information about the characters and events is presented and when distracting components, that is, information that is superfluous in the story, are reduced or eliminated. Our story may have in fact represented an ideal context for young children to demonstrate competences because the story pictures were constructed to match story schema categories and as such did not include distracting or anomalous information. Thus when reading or telling stories to young children, particularly if there is any uncertainty about the children's story schema knowledge, it is important to choose stories that closely conform to story schema macrostructure before introducing stories with anomalous or contradictory information.

Educational Implications

At this juncture, we situate the importance of our findings in the broader educational context. Narrative is the dominant form of oral and written discourse encountered in formal schooling and is especially pervasive in the elementary school curriculum. In fact it has been estimated that as much as 90% of what is read by elementary schoolchildren is narrative in form (Trabasso, 1994). Therefore, mastery of oral narrative abilities supports academic success, particularly in the elementary grades, due to the preponderant use of narrative as an instructional medium.

In addition, numerous studies have indicated links between oral narrative skills and reading success, particularly as the focus shifts from decoding to reading comprehension (Whitehurst & Lonigan, 1998). Westby (2005) suggests that reading, even in its earliest stages, is a process motivated by the extraction of meaning. Westby proposes that if children are taught to recognize that the goal of reading is the comprehension of text meaning, they are more likely to be actively involved in achieving this goal by monitoring their comprehension. In fact, there are resources describing reading comprehension strategy instruction

(Cunningham & Shagoury, 2005) incorporating questioning tasks similar to those used in our study. In addition, studies have shown that effective readers have awareness and control of cognitive strategies such as inference-making that they use when reading, whereas poor readers exhibit less awareness and use of these strategies (Oakhill & Yuill, 1996). This may be related to a number of factors: lack of relevant schema knowledge; difficulty accessing relevant schema knowledge and integrating it with story content due to processing limitations; and lack of awareness that inference generation is necessary to comprehending a story. Thus teachers could evaluate young children's abilities to focus on relevant schema knowledge and inference generation by using a questioning task such as that developed in our study before implementing comprehension strategy instruction. In fact Anderson (1994) strongly suggests a questioning approach be used to prepare, promote, and improve reading comprehension in general. Anderson points out that the principal function of scaffolding questions like those developed for our study is to help bridge the gap between what a child knows and what he or she needs to know before he or she can successfully learn the task at hand. This is of particular importance for those children who may not spontaneously integrate what they hear or read with what they already know due to maturation, developmental disabilities, or cultural background.

Limitations

We caution that a limitation of our study was the use of a cross-sectional design to examine age-related changes. This design makes it more difficult to be certain that age-related changes are the result of development and not of inherent differences among the groups. We sought to minimize such effects by collecting data from a large sample (50 children per group) and by collecting data over an entire school year to equalize sampling in each group. Although the children were selected from the same neighborhoods across the city and the age groups had similar SES scores, the 6-year-olds had higher scores on the expressive language subtest; we suspect that this may be because a different test was used for this age group. However, to offset any effect this difference may have contributed to narrative tasks, test scores were entered as covariates in our analyses.

Another study limitation is our use of a fixed task order (i.e., formulation before questioning). The reason for this order was that we believed that questioning would serve as a scaffolding for children's story comprehension, and thus would affect the quality of their formulations, whereas independent story formulation was unlikely to affect the quality of children's responses to questions. However, use of a fixed order does not allow us to investigate whether such an effect does in fact occur. Future research might include a comparison of formulations told before and after questioning.

Conclusions

Our investigation of young children's understanding of fictional story macrostructure was motivated by the importance of narrative skills in both social and educational milieus. By applying a well-researched and well-accepted theoretical model, story grammar, we were able to compare children's abilities in both independent and supported narrative tasks. We found that children aged 4-6

could provide more information with adult support than they spontaneously include in their independent formulations. The results have implications for the broader educational context as related to academic success. Our research suggests the need to investigate further children's understanding of stories from beginning to end under differing task demands (e.g., no picture support when answering questions, answering questions before or after retelling a story that has been heard or read, comparisons of questions related to the global story structure versus specific story content). Only by investigating children's performance on a variety of tasks can we attain a complete picture of narrative competence.

Notes

Correspondence about this article should be addressed to Denyse Hayward, dhayward@worldgate.ca

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Appendix
Illustrations, Story Grammar Categories, Questions and Response Examples, and
Story Formulation Utterance Examples from a 5-Year-Old Child

Picture	Supported Narrative Task Questions and Response Examples	Independent Narrative Task Story Formulation Utterance Examples
<p>Episode 1</p> <p>1.</p> 	<p>Setting-Ch. 1 & 2</p> <p>Q1. Who is in this story?</p> <p><i>F: Kind of a giraffe was one and elephant.</i></p>	<p><i>F: The cow and the elephant they want to go in the water.</i></p>
<p>2.</p> 	<p style="text-align: center;">Initiating Event</p> <p>Q2. What happens first in the story?</p> <p><i>F: The horse is flying his airplane.</i></p> <p>Internal Response/Goal</p> <p>Q3. What was the elephant thinking?</p> <p><i>F: He was thinking that whoa that's a cool plane I wanna play with that.</i></p>	<p><i>N: Then they broke their airplane.</i></p> <p><i>F: And then the elephant wanted to see it.</i></p>
<p>3.</p> 	<p style="text-align: center;">Attempt</p> <p>Q4. What did she do?</p> <p><i>F: She grabbed it from him.</i></p>	<p><i>N: (child includes no Attempt information)</i></p>
<p>4.</p> 	<p style="text-align: center;">Consequence</p> <p>Q5. What happened when she did that?</p> <p><i>F: She dropped it in the pool and it started to sink.</i></p>	<p><i>F: And then he put it in the water.</i></p>
<p>5.</p> 	<p style="text-align: center;">Reaction Ch. 1</p> <p>Q6. How did the giraffe feel?</p> <p><i>F: Angry</i></p> <p style="text-align: center;">Reaction Ch. 2</p> <p>Q7. How did the elephant feel?</p> <p><i>F: Bad</i></p>	<p><i>F: And then the cow was so mad at that elephant.</i></p> <p><i>N: (child include no Reaction Ch. 2 information)</i></p>

Episode 2

Setting-Ch. 3 Initiating Event

6.

Q8. What happens next?

F: The plane doctor came by.

F: And then the other elephant came.

7.

Internal Response/Goal



Q9. What was the lifeguard thinking?

F: If he could reach in there and get it.

N: And then the other elephant talked to the cow.

8.

Attempt



Q10. What did he do?

N: He scooped it right back out.

F: And then it was trying to reach the airplane.

9.

Consequence



Q11. What happened when he did that?

F: Just sunk a little more.

N: Then he got soaked.

Reaction Ch. 1

Q12. How did the giraffe feel?

F: The giraffe cried.

N: (child includes no Reaction Ch. 1 information)

Reaction Ch. 3

Q13. How did the lifeguard feel?

N: Happy

N: (child includes no Reaction Ch. 3 information)

Episode 3

Setting-Ch. 4 Initiating Event

10.

Q14. What happens next?

Setting and Initiating Event

F: He called someone else to scoop it right back out.

N: (child includes no Setting information)

Initiating Event

F: And then he got a net.



Internal Response/Goal

Q15. What was the lady elephant thinking?

F: If she should get it with the net.

N: (no Internal Response/Goal information included)

11.

Attempt



Q16. What did she do?

F: Scooped it right back out.

F: And then he grabbed it out of the water.

12.



Consequence

Q17. What happened when she did that?

N: She got his plane back.

F: And then he gave it to the cow.

13.



Reaction Ch. 1

Q18. How did the giraffe feel?

F: Happy

F: And then he was so proud.

Reaction Ch. 2

Q19. How does the little elephant feel?

F: Good

N: (child includes no Reaction Ch. 2 information)

Main problem to be solved

Q20. What was the problem in this story?

N: That the horse didn't get his airplane until the lady lifeguard came.

Not Applicable

Successful resolution of story

Q21. How did that problem get fixed in the story?

F: They netted it out.

Not Applicable

Note. Ch. 1=giraffe, Ch. 2=girl elephant, Ch. 3=male elephant, Ch. 4=female elephant.

F= Fully acceptable question response/story formulation utterance.

P=Partly acceptable question response/story formulation utterance.

N=Not acceptable question response/story formulation utterance.