JSLHR

Research Article

Age-Related Progressions in Story Structure in Young Children's Narratives

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Purpose: Prior theoretical and empirical work has referenced several broad stages of narrative development, particularly in terms of young children's understanding of story structure. However, there is considerable variation in how story structure has been defined and assessed across these studies. The aims of the present study were threefold: (a) to test the unidimensionality of items designed to assess story-structure knowledge, (b) to examine story-structure item difficulty levels, and (c) to examine age-related progressions on individual story-structure components across 3-, 4-, 5-, and 6-year-olds.
Method: Participants included 386 children (M = 4.8 years, SD = 11.67 months) from the Narrative Assessment Protocol study (http://www.narrativeassessment.com/), which was designed to revise a new narrative assessment tool for children between the ages of 3 and 6 years.
Results: Factor analysis indicated that 16 of 21 items reflecting story-structure knowledge constituted a unidimensional construct. Individual story-structure item analyses further revealed that establishing subgoals and tracking the overall goals in the stories were particularly challenging for 3- and 4-year-olds.
Conclusion: These findings hold implications for refinement of theoretical models of story-structure emergence in early childhood.

A growing body of research has established a link between children's narrative abilities in preschool and their later reading abilities and academic success (Griffin, Hemphill, Camp, & Wolf, 2004; O'Neill, Pearce, & Pick, 2004; Reese, Suggate, Long, & Schaughency, 2010; Tabors, Snow, & Dickinson, 2001). Given the predictive potential of early narrative skill for later academic outcomes, it is important to understand how children progress in these abilities across early childhood. One aspect of narratives that shows a clear developmental progression is story-structure knowledge, or the mental representation of how stories are organized (Johnson & Mandler, 1980; Stein & Glenn, 1979). Children between 3 and 6 years of age are actively developing knowledge of story structure, both in terms of the components of a story and how these link together to form a coherent plot line. Moreover, researchers have observed a developmental trend wherein children produce more story-structure components overall in their narratives as age increases from 3 to 9 years (Castilla-Earls, Petersen, Spencer, & Hammer, 2015; John, Lui, & Tannock, 2003; Price, Roberts, & Jackson, 2006; Schneider, Hayward, & Dubé, 2006; Trabasso, Stein, Rodkin, Munger, & Baughn, 1992). However, there is incomplete understanding of the order of emergence of individual story components across the early preschool and kindergarten years, when story structure is developing at its most rapid pace. The present study seeks to improve our understanding of story-structure development in these early childhood years prior to, and around, school entry.

From a cognitive–developmental perspective, story structure is conceived of being a "schema" or type of cognitive map that children as well as adults use to understand, interpret, and produce stories. Indeed, stories that conform to this predictable structure are shown to be comprehended more readily by both children and adults (Hudson & Nelson, 1983; Stein & Albro, 1997). According to Stein and Glenn's (1979) story-grammar model, stories must at minimum include several key components: some orientation to the setting, main characters in the story, and an "episode." An episode consists of an initiating event that launches the main character into forming a goal plan, a subsequent attempt to achieve the goal, and the outcome or consequence of the attempt. Stories may also consist of multiple episodes that are organized in a linear or a

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Editor: Rhea Paul
Associate Editor: Sandra Gillam
Received August 5, 2015
Revision received January 14, 2016
Accepted February 11, 2016
DOI: 10.1044/2016_JSLHR-L-15-0275

Disclosure: *The authors have declared that no competing interests existed at the time of publication.*

hierarchical manner, with the latter type of stories being more complex forms of narrative. For the more complex stories with multiple embedded episodes within a particular story arc, a well-specified story model can be especially useful for young children as a scaffolding tool to anticipate, organize, and process the sequence of events in a story.

The extant literature on narrative development in young children provides a general framework for the characterization of emergence of story structure in children's narrative productions. Applebee (1978), presenting the stages of story schema development, theorized that there are five distinct stages of story-structure understanding and competence during early childhood. At 2 years, children are at Stage 1, where they label and describe character actions without linking them to a central theme. Between 3 and 4 years, children proceed through Stages 2 and 3, demonstrating narration shifts that include making local connections between adjacent story events and being able to make simple inferences across a story episode. This shift in narration may be supported conceptually by an increase in children's cognitive processing capacities (Leonard et al., 2007). At younger ages, one processing constraint is a limit on the number of operations that can be processed in parallel (Demetriou, Christou, Spanoudis, & Platsidou, 2002; Halford, Wilson, & Phillips, 1998). Producing a narrative that is both locally cohesive and globally coherent draws on these processing capacities because not only do individual events need to be processed and encoded in terms of their immediate causes and consequences but also extended sequences of events need to be tied back to an explicitly motivated plot line. It is not surprising that 3- to 4-year-olds' narratives often do not include causal connections between events. And, in the event that character states or outcomes are identified, these tend not to be linked to the main plot line. Thus, at these younger ages, there is a disproportionate emphasis on actions rather than on purposeful goals or events that initiate goal sequences (van den Broek, Lorch, & Thurlow, 1996). During Stage 4, children begin to show an understanding of how story events relate to one another in a causal manner but still have difficulty conceiving an overall plot or overarching goal. In contrast, sustained plans of actions (characteristic of Stage 5 narratives) are sometimes present in 5-year-olds' narratives, indicating an increasing ability to structure and organize higher level goals. For instance, Muñoz, Gillam, Peña, and Gulley-Faehnle (2003) found that some 5-year-olds were capable of generating multiepisode sequences in their narratives. However, it is not until late childhood that children are able to successfully and consistently construct internally cohesive story episodes and specify all within- and cross-episodes connections in their narratives. Developments in working memory (Montgomery, Polunenko, & Marinelli, 2009; Nordberg, Dahlgren Sandberg, & Miniscalco, 2015), theory-of-mind capacities (Kim, 2016), and executive function skills (Friend & Bates, 2014) may also be important for the kinds of parallel processing required for tracking character perspectives and constructing structurally sophisticated oral stories.

Although informative, stage-based models of narrative development are inadequate in capturing and explaining individual differences in children's story-structure competencies. Specifically, there is a dearth of research investigating variations in competence on individual story-structure components across different age groups. The few studies that have tracked story-structure development in young children are inconsistent in how they estimate story-structure knowledge; methods include creating composite scores for the overall amount of information included (Mäkinen, Loukusa, Nieminen, Leinonen, & Kunnari, 2014; Schneider et al., 2006), counting the number of complete and incomplete episodes (Muñoz et al., 2003), or simply calculating the average number of instances a particular component was produced (Price et al., 2006). To our knowledge, only Trabasso and colleagues (Trabasso & Nickels, 1992; Trabasso, van den Broek, & Suh, 1989) have examined the proportion of children identifying individual story-structure components (for example, each of the five attempts by the story's protagonist to fulfill the goal) across different ages. However, the study's findings are limited in generalizability and scope due to a very small sample size (only 12 children per age group), examination of select story components related to goal plans only, and discontinuous sampling across 3-, 4-, 5-, and 9-year-olds. Because children are still actively developing story-structure knowledge as they transition into kindergarten and first grade, it is important to investigate and document story-structure development at these stages as well.

It is also unclear whether individual story-structure components, as laid out in various theoretical models (e.g., Stein & Glenn, 1979) share common variance such that, together, they form a unidimensional construct of story-structure knowledge. Only one prior study conducted by Liles, Duffy, Merritt, and Purcell (1995) utilized a factor analysis approach to determine whether certain macrostructural estimates of narrative (including proportion of episodes in children's elicited retells and total number of episodes) were distinct from microstructural features (cf. Justice et al., 2006). The contribution of individual story-structure components (such as references to characters, setting, goal plans, attempts, solutions, and resolutions) to the latent construct of story-structure knowledge has yet to be empirically tested, however, and is included as an aim in the present study. Also, given that story-structure instruction is often a component of narrative interventions with young children (Green & Klecan-Aker, 2012; Hayward & Schneider, 2000; Khan, Nelson, & Whyte, 2014; Petersen, Gillam, Spencer, & Gillam, 2010), it is important to identify what constitutes the latent construct of story structure.

In summary, the overall picture of children's developing narrative competencies, particularly in terms of the level of sophistication of story-structure representation, suggests that children are actively acquiring these skills between 3 and 6 years of age. Prior conceptual and empirical work on children's narrative abilities provides a general overview of the pattern of story-structure development, but our understanding of the order of emergence of individual story components is incomplete. The present study addresses

this gap in the literature by providing a more thorough investigation of story-structure development across 3-, 4-, 5-, and 6-year-olds. An improved understanding of how children progress in their story-structure competencies has the potential of contributing to (a) theoretical work on developmental changes in narrative development and (b) identification of developmentally appropriate norms for narrative development and potential intervention targets for children lagging behind their peers in their narrative competencies.

The present study is also the first to test the contribution of various components identified in theoretical models of story grammar (Johnson & Mandler, 1980; Stein & Glenn, 1979) as well as those targeted in remedial efforts (e.g., Petersen et al., 2010) to the latent construct of story structure. The variability in types of elicitation materials, methods (story generation vs. story retell), and age ranges used in prior research seeking to examine age-related progressions in narrative abilities has resulted in an unclear picture of children's emerging story-structure abilities. The present study addresses this issue by utilizing a story-retell approach, given prior evidence that retold stories are longer, contain fewer inaccuracies, and have more episode-related story components than self-generated stories (Boudreau, 2008).

The aims of the present study include the following: (a) to examine whether story-structure components, as identified in theoretical story-structure models and targeted in remedial narrative work, constitute a unidimensional latent construct; (b) to characterize the item difficulty levels for individual story-structure components using the item response theory approach; and (c) to determine whether children make age-related progressions on items identified as representing the construct of story structure. In addition, in order to examine changes in children's abilities to construct higher level, goal-based episodes, we examine children's ability to construct complete episodes across the different age groups. We perform this analysis by examining the number of events included for each episode in the narratives as a function of age.

Method

Participants

Children (N = 386) between the ages of 3 and 6 years (M = 57.90 months, SD = 11.34 months; range = 36–83 months) served as participants in a larger study designed to revise a recently developed narrative assessment tool, the Narrative Assessment Protocol (see Justice et al., 2006). Recruitment was conducted by distributing flyers and caregiver consent materials at local child care, school, and community (e.g., public library) sites across two states in the midwestern United States. Children whose caregivers provided consent and met eligibility criteria (i.e., children were between the ages of 36 and 83 months [3 years, 0 months, to 6 years, 11 months], proficient in spoken English, and free of any significant language or developmental delays) were enrolled in the study; inclusion was determined on the basis of parent report. Slightly more than half of the sample (57.1%) were girls, and almost three fourths were White (73%), with African Americans and multiracial children representing the second (13%) and third (9.9%) largest groups. With regard to maternal education, the majority of mothers had obtained a university degree (n = 241, 62%); 92 mothers reported a bachelor's as their highest degree earned (24%). English was the primary language spoken by 96% (n = 372) of the children according to caregiver report; in addition, no difficulties with receptive or spoken English were reported for any child in the final sample. About 9% (n = 34) of children were reported to have a medical/developmental condition (such as attention-deficit/hyperactivity disorder, vision problems) with low or no impact on children's abilities to learn and participate in classroom activities; reports further indicated no learning or intellectual disabilities.

Given the interest in examining children's use of story-structure components at ages 3, 4, 5, and 6 years, the sample was divided into the following four age groups: 36–47 months, 48–59 months, 60–71 months, and 72–83 months. The number of children per age group varied between 60 and 135 children. About a quarter of the sample (n = 87) consisted of 3-year-olds (M = 43.43 months, SD = 2.80 months; range = 36–47 months). Four-year-olds composed a third of the sample (n = 135 children), resulting in the largest age group (M = 53.84 months, SD = 3.10 months; range = 48–59 months). Another quarter of the sample (n = 104) consisted of 5-year-olds (M = 64.53 months, SD = 3.80 months; range = 60–71 months). The fourth and smallest age-group (n = 60) consisted of 6-year-olds (M = 76.50 months, SD = 3.22 months; range = 72–83 months).

Procedure and Measures

Children were assessed individually by trained research assistants in a quiet location at their respective child care, school, or community sites or at an alternative location that was based on caregiver preference. The assessment was conducted over a single 30-minute session, which involved administering two narrative-elicitation tasks described in the following paragraphs. Prior to the session, parents filled out a demographic questionnaire and signed a consent form, and children gave verbal assent to participate. Children and their families were compensated with two storybooks and a gift card for their participation. Prior to conducting assessments, research assistants completed a multiprong training program that included review of the all assessment tools, practice, and implementation observation.

Children's narratives were assessed using a set of wordless picture books developed for this study. Similar to elicitation contexts used by standardized narrative measures such as the Renfrew Bus Story (Renfrew, 1977), spoken narratives were elicited via a story-retell task. Each child was randomly assigned two of four possible wordless picture books developed for this study (*Wolf Cleans His Bedroom*, *Tiger Gets Ready for Bed*, *Raccoon Makes Lemonade*, and *Rabbit Goes for a Bike Ride*) and asked to retell the story that was read to them. Each of the four picture books consisted of 16 pages and was accompanied by a script

between 364 and 375 words in length (see Appendix A for sample script). All stories were constructed to follow an identical format starting with a conventional opening (e.g., "One summer day…"), an introduction to the main character and setting of the story (Willy Wolf wakes up to a messy room) followed by an initiating event (his mother reminds him to clean his room) that results in a main goal being formulated by the protagonist (he needs to come up with a plan to clean the mess). The main goal then branches into a series of three episodes, each containing a subgoal (Willy Wolf needs to pick his clothes off the floor), a subproblem (there are too many clothes for him to gather), a subsolution (he remembers the cart in his closet), and subresolution (he transfers the clothes to the cart). Following the last embedded episode in the story, there is a completion of the overall goal (the room is clean), an overall resolution to the story (his mother is proud to see that his room is clean), and a conventional ending (The End).

After reading each scripted story, the research assistant elicited a narrative from each child by using a scripted prompt. If the child hesitated, the research assistant prompted the child by saying, "I just told you a story about the pictures. Now it is your turn to tell me a story about the pictures." During the story retelling, the following prompts were permitted: "Tell me about this page," "What about this page?" or "You can use the pictures to help." Children's narratives were video-recorded and subsequently scored by trained research assistants within a laboratory setting for inclusion of a total of 60 individual items designed to capture an array of narrative macro- and microlevel features, ranging from items assessing presence of story-structure components such as establishing settings and goals, frequency of storytelling conventions such as reference to characters, frequency of verbs and noun modifiers, and frequency of complex sentence structures. These items were identified from prior research describing measurable features of children's conversational and fictional narratives (e.g., Eisenberg et al., 2008; Liles et al., 1995; Peña et al., 2006; Petersen, Gillam, & Gillam, 2008; Price et al., 2006). Two research assistants independently searched scholarly journals on ProQuest/-PsycINFO using search terms related to narrative assessment (e.g., *narrative language assessment*, *microstructure*, *macrostructure*, *story grammar*). Once items were identified, the item pool was reviewed and finalized by three experts in narrative skills for comprehensiveness.

Note that every scorable item occurred at least once within each story. Items that were used with less frequency (e.g., emotional references, direct quotes) were represented in similar locations in each script, occurring approximately the same number of times. Items used with greater frequency (e.g., pluralized nouns, irregular past tense verbs) were represented throughout the stories. Some of the rarer items were expected to be difficult for the youngest children by design, but the scripts were constructed to include all items and capture the range in narrative abilities from 3 years 0 months to 6 years 11 months (see Bowles et al., 2016, for more details on Narrative Assessment Protocol stories and item development).

Prior to conducting scoring procedures, the 60 items were divided into five sets of conceptually similar items: nouns and noun modifiers, verbs and verb modifiers, sentence complexity, storytelling conventions, and story structure. Eighteen videos were designated as training videos and were coded for all items independently by three experts; any disagreements were discussed and resolved to yield a set of master-coded narratives. Research assistants familiarized themselves with syntax and grammar by reading Appendix 2 of *The Syntax Handbook* (Justice & Ezell, 2002) and were then randomly assigned to two or three sets of items. Item descriptions and examples were provided for each item to assist in scoring. The next step in the training procedure involved viewing two videos with accompanying master-coded transcripts. Next, the research assistants completed practice scoring for five videos on their assigned items, comparing their scores with the master codes. Finally, they scored three videos and were required to reach 85% agreement with the master codes to achieve coding reliability; those unable to reach the criterion could repeat with a new set of three videos up to a total of four times. All research assistants were able to achieve coding reliability with this approach.

Each narrative was separately scored for each set of items. Coders could pause or rewind the video as many times as necessary. Twenty percent of the narratives were double coded to ensure reliability. Overall, interrater agreement was high, with an average agreement rate of .844. Twenty-one items assessed story structure and were the focus of subsequent analyses. Interrater agreement on the story-structure items was .90, with agreement ranging from .81 to .98 across the items. Each story-structure item was scored on a 0–1 scale, with 1 indicating that a particular story-structure component was present in a child's narrative retelling. These items were as follows: title, abstract, conventional opening, setting, overall goal, completion of overall goal, resolution of overall goal, conventional ending, coda, and three sequences of subgoals, subproblems, subsolutions, and subresolutions that corresponded to the three embedded episodes in the story. Table 1 provides definitions and examples of each story-structure component. Internal responses and reactions by the characters in the stories were not included as story-structure items on the basis of prior research showing that children younger than 8 years produce very low frequencies of these components in their retold stories (e.g., John et al., 2003; Merritt & Liles, 1987).

Results

Story-Structure Unidimensionality

Parallel Analysis and Exploratory Factor Analysis

The first aim of the study was to examine whether the 21 items reflecting story structure constituted a unidimensional latent construct using parallel analysis (PA) and exploratory factor analysis (EFA). The PA was conducted using SAS 9.4 to determine the number of factors to extract in the subsequent EFA. This method was selected because Monte Carlo analyses have found that PA is accurate more than 92% of the time, compared with the Kaiser rule

Table 1. Definitions and examples of individual story-structure items.

Story-grammar item	Definition	Example
1. Title	An appropriate title for the story.	*Wolf Cleans His Bedroom*
2. Abstract	Summary of the story.	This story is about a wolf who needs to clean his messy bedroom.
3. Conventional opening	A phrase that marks the beginning of a story.	Once upon a time.
4. Setting	Physical context for the story.	Bedroom.
5. Overall goal	Overarching goal that propels the story.	Wolf needs to clean his room before his mother returns.
6. Subgoal 1	The context that leads to the first problem in the story.	Wolf needs to pick up his clothes.
7. Subproblem 1	The first problem or obstacle in the story.	There are too many clothes to carry.
8. Subsolution 1	The solution to the first problem/obstacle.	He finds a shopping cart.
9. Subresolution 1	The consequence/outcome of first the solution.	He places the clothes in the cart.
10. Subgoal 2	The context that leads to the second problem in the story.	He notices cobwebs on the ceiling.
11. Subproblem 2	The second problem/obstacle in the story.	The cobwebs are too high.
12. Subsolution 2	The solution to the second problem/obstacle.	Finds a broom.
13. Subresolution 2	The consequence/outcome of the second solution.	Removes cobwebs.
14. Subgoal 3	The context that leads to the third problem in the story.	He notices toys on the floor.
15. Subproblem 3	The third problem/obstacle in the story.	His toy box is full.
16. Subsolution 3	The solution to the third problem/obstacle.	Finds a box in the garage.
17. Subresolution 3	The consequence/outcome of the third solution.	Fills the box with all the toys.
18. Completion overall goal	The successful completion of the overall goal of the story.	His room is clean.
19. Resolution overall goal	Successful resolution of the overall goall in the story.	His mother praises him on cleaning his room.
20. Conventional ending	A phrase that marks the end of the story.	The End.
21. Coda	Moral or theme of story.	Being resourceful can help you complete challenging tasks.

Note.

(eigenvalues > 1) and scree plots methods, which are accurate only 22% and 57% of the time, respectively (Hayton, Allen, & Scarpello, 2004). The PA indicated that a single factor should be retained (see Figure 1).

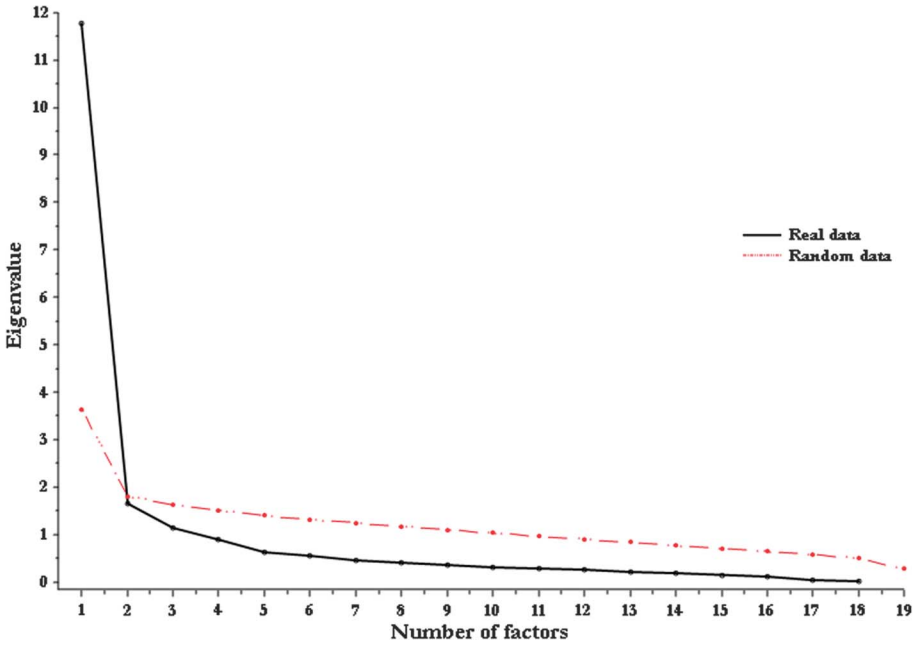
Next, an EFA, using SAS PROC CORR, was performed on the tetrachoric correlation matrix to determine the degree to which the items measured the same latent construct and the factor loadings were nontrivial. The tetrachoric correlation measures the degree of association between two categorical variables constructed by dichotomizing the two underlying distributions (Crocker & Algina, 1986). Per recommendations in the field (Tabachnick & Fidell, 2013), items with loadings less than 0.3 were deemed trivial and eliminated from further analysis. A total of two items (title and abstract) were excluded from the PA and subsequent EFA because they resulted in singular matrices due to high correlations with other items and very low frequencies. The EFA indicated that all remaining items but one (i.e., coda) had factor loadings smaller than the recommended 0.30. As a consequence, this item was also deleted from subsequent analyses.

Rasch Modeling and Item Fit

Rasch modeling includes a set of logistic models that transform ordinal item data into an interval linear composite score (Boone, Staver, & Yale, 2014). This study used the Rasch dichotomous model because each narrative item was coded 0 or 1. In addition to construct unidimensionality, Rasch modeling has two other assumptions: continuity of the latent construct and item fit. Unidimensionality was investigated by PA and EFA and further confirmed by a principal-components analysis of the Rasch residuals conducted in Winsteps 3.75 (Linacre, 2013). Per the recommendations in the field (Boone et al., 2014; Linacre, 2013), an instrument is deemed unidimensional if the eigenvalue of the unexplained variance in the first contrast (potential secondary dimension) is smaller than 2.0. In our case, the eigenvalue associated with a secondary dimension was 1.6, thus confirming the instrument's unidimensionality. The continuity of the latent construct was assumed, given that narrative ability is a continuous rather than discrete variable. Item fit to the Rasch model was examined using the outfit statistics and point-biserial correlations between the estimated trait level and the item responses. The outfit statistic is computed as a mean-square and transformed into a standardized normal variable with a mean of 0.0 and a standard deviation of 1.0. Following conventional recommendations (Linacre, 2002, 2013), items with outfit mean-squares fit statistics (MNSQ) between 0.5 and 1.5 logits, a point-biserial correlation greater than 0.30, and close observed and expected point-biserial correlations (less than .15) were deemed to fit the Rasch model well.

Next, Rasch analysis was used to determine whether the data fit the measurement requirements of the Rasch model. Inspection of the outfit MNSQ statistics revealed

Figure 1. Parallel analysis of the story-structure items. The plot depicts actual versus randomly generated eigenvalues.



that two items (conventional ending and conventional opening) had MNSQ values larger than 1.5 logits, low point-biserial correlations (.24 and .32, respectively), and large differences between observed and expected point-biserial correlations (.14 and .20, respectively). Eliminating the item with the worst statistics (conventional ending) failed to improve the fit of the second item (conventional opening) identified as a misfit in the first model run. As a consequence, both items were eliminated from further analysis. The remaining 16 items fit the Rasch model well; outfit MNSQ values ranged between 0.80 and 1.42, the smallest point-biserial correlation was .42, and the largest difference between the expected and observed point-biserial correlations was .10. The 16 items included the following: setting; overall goal; completion of overall goal; resolution for overall goal; and three distinct episodes each consisting of a subgoal, subproblem, subsolution, and subresolution.

Item functioning across different age groups. To make meaningful comparisons across different groups assessed with the same instrument, items must be invariant. An item is considered to be invariant if its item difficulty does not vary as a function of the sample (or subsample) used to derive the estimates (Boone et al., 2014; Smith, Wright, Selby, & Velikova, 2007). An item that fails to demonstrate invariance is referred to as exhibiting differential item functioning (DIF) or item bias. It is considered that "the item defines a trait in a different manner when its performance is compared across two or more groups of respondents" (Boone et al., 2014, p. 275). The presence of item DIF was assessed using the recommended contrast between item difficulty of 0.64 logits or higher and $\alpha = .05$ (Linacre, 2013). All analyses were performed using Winsteps 3.75.

To determine item invariance across the four age groups, the 16 items were tested for the presence of DIF. Given that the number of pairwise comparisons was large (four age groups and 16 items), there was a high probability that some comparisons would be statistically significant by chance alone. To adjust for multiple comparisons and maintain an overall Type I error rate of .05, the critical value for each individual comparison was adjusted using the Benjamini-Hochberg procedure (Benjamini & Hochberg, 1995). With this adjustment, no item had statistically significant contrast values, indicating that all items were invariant across age groups and that comparisons across these groups were appropriate.

Item functioning across different books. Because four different books were used in the assessment of story-structure knowledge, DIF analysis was also performed to determine whether the items were invariant across books. Two items (Subproblem 3 and completion of overall goal) were not invariant across books. Specifically, Subproblem 3 exhibited DIF across two books and completion of overall goal exhibited DIF across three books; as a consequence, both were dropped from subsequent item difficulty analyses. The remaining 14 items continued to fit the Rasch model well, with outfit MNSQ values between 0.82 and 1.44, point-biserial correlations above .38, and small differences between observed and expected point-measure correlations, with the largest difference being .13.

Item Difficulty Analyses

The second aim of the study was to characterize the item difficulty level for individual story-structure items.

Using a Wright map (see Figure 2), the 14 items that were invariant across books were examined to determine how their level of difficulty aligned with children's story-structure ability. The items are presented in ascending order of difficulty (right panel), whereas the children's abilities are presented in ascending order of ability (left panel). That is, the easiest items are at the bottom of the map, whereas the more difficult items are at the top of the map. Similarly, children with the lowest ability are located at the bottom of the map, and children with the highest ability are located at the top of the map. As Figure 2 shows, Subgoal 1 was the most difficult item, followed by Subgoal 3. In contrast, Resolution 1, Resolution 2, and Problem 2 were the easiest items to answer.

Age-Related Progressions in Story Structure

The third aim of the study was to determine the pattern of age-related progressions with regard to story structure. This aim was addressed in two ways: (a) by examining gains across all story-structure components, and (b) by tracking children's abilities to construct complete episodes in their narratives across the different age groups. To assess whether children in the study made age-related advancements in their story-structure ability across the four age groups, a nonparametric rank analysis of variance was performed. Although Rasch scores are linear, they are measured in logits, which do not always conform to the normal distribution, as was the case here. The dependent variable for this analysis was the Rasch person measure score transformed into a rank score (or average rank in the case of a tie), ranging between 18.5 and 345.5 logits, with greater values representing higher narrative ability. The test was performed using Proc GLM in SAS 9.4.

The global rank analysis of variance was statistically significant ($F = 29.93$, $p < .0001$) with a moderate effect size ($\eta^2 = 0.19$). Statistically significant differences were also found among the four age groups; children in the three youngest age groups were all statistically different from one another in terms of story-structure ability and from the children in the oldest age group in the study ($p < .001$). However, the children in the two oldest age groups (60–71 months and 72–83 months, respectively) were not statistically different in terms of their story-structure ability (see Figure 3). Tukey's method was used to adjust for multiple comparisons. This pattern of results did not differ when examining only the 14 items that were invariant across different books. Sample narratives for each age group are included in Appendix B.

Figure 2. Wright map of the Narrative Assessment Protocol items. Each "#" corresponds to seven children and each "." corresponds to one to six children. M denotes the mean of child abilities (left side) and item difficulties (right side). S denotes one standard deviation from the mean, and T denotes two standard deviations from the mean.

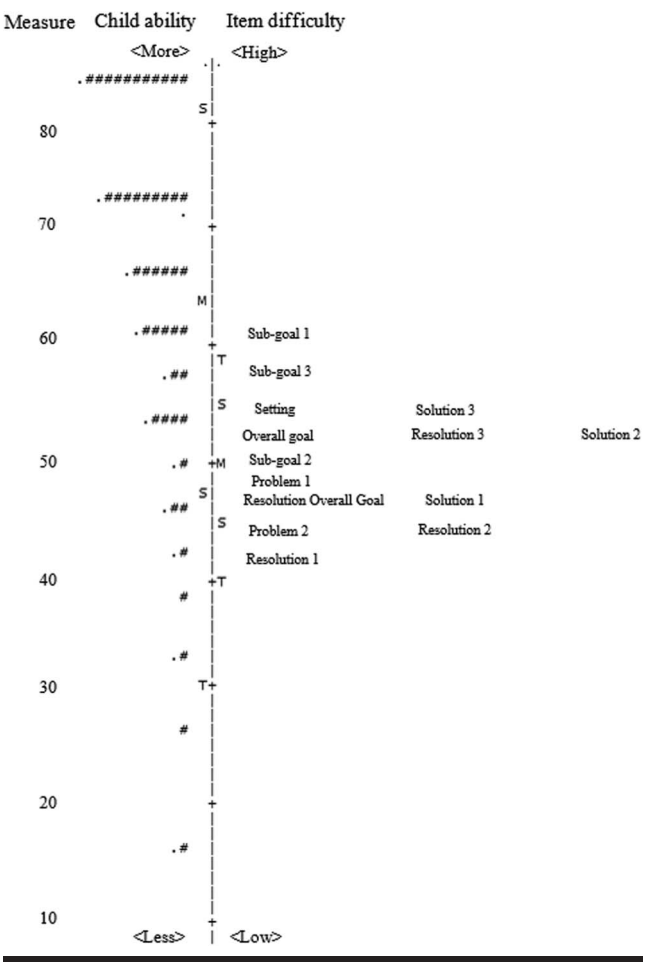
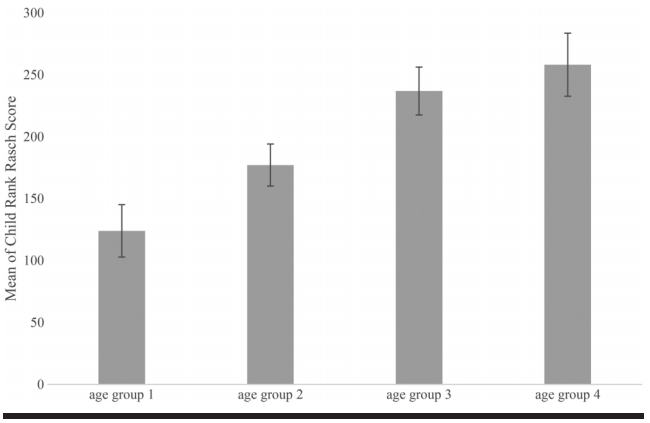


Figure 3. Story-structure ability differences by age group. The four age groups correspond to the following age ranges: 36–47 months, 48–59 months, 60–71 months, and 72–83 months, respectively. Bands around each data point indicate 95% confidence intervals.



Age-Related Trends on Individual Story-Structure Items

Table 2 shows the percentage of children by age group who included each individual story-structure component in their narratives. Examination of the order of emergence of story-structure items by age group revealed

Table 2. Percentage of children producing each individual story-structure component in each age group.

Component	All children (N = 386)	3-year-olds (n = 87)	4-year-olds (n = 135)	5-year-olds (n = 104)	6-year-olds (n = 60)
1. Setting	70	55	68	76	83
2. Overall goal	70	49	68	82	83
3. Subgoal 1	62	39	54	77	87
4. Subproblem 1	73	59	69	85	82
5. Subsolution 1	73	56	71	82	87
6. Subresolution 1	76	53	75	88	92
7. Subgoal 2	72	48	71	83	88
8. Subproblem 2	75	55	77	80	93
9. Subsolution 2	70	47	69	81	85
10. Subresolution 2	76	56	77	87	83
11. Subgoal 3	65	40	62	75	90
12. Subproblem 3	73	49	70	86	88
13. Subsolution 3	64	47	67	84	82
14. Subresolution 3	70	54	65	82	85
15. Completion goal	64	46	62	76	77
16. Resolution goal	73	60	71	80	83

some consistencies in terms of structures that proved particularly difficult for children. Age-related trends on individual story-structure components are detailed next.

Story-structure ability between 36 and 47 months. Three-year-olds had the most difficulty with establishing subgoals (only 39% included the first subgoal, 48% included the second subgoal, and 40% included the third subgoal), followed by completion of the overall goal (46% included this structure in their narratives), solutions (both the second and third solutions in the stories were correctly identified by only 47% of children), and the overall goal of the story (49% correctly identified this component).

Story-structure ability between 48 and 59 months. More 4-year-olds were able to correctly identify each individual story-structure component compared with the 3-year-olds; however, an analysis of their relative performance across the different story-structure components reveals that 4-year-olds also exhibited the most difficulty with identification of subgoals (only 54% identified Subgoal 1, 62% identified Subgoal 3) and completion of the overall goal in the story (62% correctly identified this component).

Story-structure ability between 60 and 71 months. At least 70% of the 5-year-olds achieved mastery in identifying and including all of the story-structure components in their narrative retellings. Similar to the first two age groups, subgoals appeared to pose the most difficulty for this age group, with 75% of children correctly identifying Subgoal 3 and 77% identifying Subgoal 1. The second most difficult item was completion of the overall goal in the stories (76% correctly identified/included this structure).

Story-structure ability between 72 and 83 months. The vast majority of 6-year-olds (more than 80%) were able to correctly identify and include all story-structure components in their narratives, with the exception of completion of overall story goal (only 77% included this component). These descriptives show that story structure, as represented by the 16 items assessed in the present study, is mastered by most 6-year-olds.

Narrative Episode–Structure Development

Children's ability to include episode components in their narratives was also tracked across the four different age groups. Each of the three episodes in the Narrative Assessment Protocol stories consisted of four story-grammar components, that is, a subgoal, subproblem, subsolution, and subresolution. A developmental trend emerged such that more complete episodes were produced as age group increased for all episodes; episode sequence No. 1, $\chi(12) = 72.66$, $p < .001$; episode sequence No. 2, $\chi(12) = 53.91$, $p < .001$; and episode sequence No. 3, $\chi(12) = 72.12$, $p < .001$ (see Table 3). The significance levels held true after adjusting for multiplicity.

Overall, the pattern of emergence of episode-related story-grammar components was similar across the three

Table 3. Percentage of children producing 0–4 episode components (subgoals, subproblems, subsolutions, subresolutions) for each of three episodes sequences in the four different age groups.

No. of episode components	3-year-olds	4-year-olds	5-year-olds	6-year-olds
Episode sequence No. 1				
0	28	13	7	8
1	8	8	7	0
2	17	13	5	3
3	24	27	13	13
4	23	39	70	75
Episode sequence No. 2				
0	30	13	8	5
1	12	4	2	2
2	11	11	10	5
3	19	19	14	15
4	29	53	66	73
Episode sequence No. 3				
0	31	17	10	5
1	13	4	3	3
2	12	16	4	9
3	24	22	19	9
4	21	41	64	75

different episodes. Nearly one third of the 3-year-olds produced zero of the four episode-related components in their narratives. In contrast, only 13% of 4-year-olds, 7% of 5-year-olds, and 8% of 6-year-olds were unable to produce even a single episode-related component in their retells. It is interesting that 3- and 4-year-olds were fairly evenly matched for proportion of children producing two and three episode-related components in their narratives, 13% and 22%, respectively. The most striking age-related differences were observed, however, when comparing the proportion of children successfully producing complete episodes. These proportions for the four age groups are as follows: about 25% of 3-year-olds versus 45% of 4-year-olds, 66% of the 5-year-olds, and 75% of 6-year-olds.

Discussion

As part of three main research questions, this study examined whether items assessing narrative story-structure abilities in young children reflect a unidimensional latent construct. It also explored the order of difficulty on individual story-structure components identified as assessing the construct of story structure. Last, and most important, the study considered whether age-related progressions could be observed on individual story components at ages 3, 4, 5, and 6 years. Results are discussed in the next paragraphs and add to our knowledge of how typically developing young children proceed through various stages of narrative competence.

Story Structure as a Unidimensional Construct

The present study is the first, to our knowledge, to examine whether a set of theoretically derived narrative structural components assessed in young children's oral narratives represent a unidimensional latent construct. Children's narratives were assessed for inclusion of the following: conventional opening, title, story abstract, setting, overall goal, three series of subgoals, subproblems, subsolutions, and subresolutions, completion of overall goal, resolution of overall goal, conventional ending, and a coda. These components were selected on the basis of their inclusion in theoretical models of story grammar (e.g., Stein & Glenn, 1979), in narrative assessments such as the Test of Narrative Language (Gillam & Pearson, 2004) and the Strong Narrative Assessment Procedure (Strong, 1998), in intervention studies (e.g., Petersen et al., 2008), and in previous studies examining narrative macrostructure in young children (e.g., Boudreau & Hedberg, 1999; McCabe & Rollins, 1994; Price et al., 2006; Ukrainetz, 2006). Results from PA and EFA indicated that 16 of the original 21 items loaded on to a single dimension, the underlying construct representing knowledge of story structure. It is interesting that items constituting the unidimensional construct of story structure were all directly related to the plot and described discrete events in the story. This finding lends credence to theoretical models of story grammar that identify both orientation information and events associated with the development of plots as being central components of story grammar (e.g., Stein & Glenn, 1979). Overall, the findings best align with Trabasso and colleagues' (Trabasso & Nickels, 1992; Trabasso, van den Broek, & Suh, 1989) causal network model, which specifies goal-directed action plans and includes goals, attempts, goal failures and reinstatements, and ultimate successes. Our analyses further revealed that some narrative components did not show significant coherence with story-structure items. These items included conventional openings and endings, referencing the title, providing an abstract for the story, and summarizing the lesson (coda) or theme in the story. None of these items described individual, causally related events in the story, indicating that processing and/or producing story structure may recruit a distinct set of processes involved in establishing and monitoring both local and hierarchical goal-based connections between story events. In addition, the items that did not cohere with story-structure items are typically included in conversational or personal narratives and thus may not be useful when analyzing fictional narratives.

Story-Structure Item Difficulty Levels

A parallel aim included in the present study was to examine the order of difficulty for items identified as representing story structure. Results indicate that items related to the formation of subgoals and tracking of higher order goals were particularly challenging for 3- to 6-year-olds to identify and include in their narrative retells. In contrast, resolutions of episodes embedded in the stories were the easiest story items for children in this sample and for which the highest levels of accuracy were observed.

The item difficulty patterns are consistent with prior research showing that most 3- and 4-year-olds have difficulty encoding goal-based or purposeful actions (Trabasso & Nickels, 1992; Trabasso et al., 1992), and, in the rare event that they do conjoin attempts with a purpose, these are typically not related to the central goal of the story. Five-year-olds, on the other hand, relate more purposeful attempts in their narratives, demonstrating an emerging knowledge of goals and plans. However, even 5-year-olds exhibit difficulty in identifying superordinate goals (i.e., larger goals that motivate the formation of subsequent goals in the story) in their narratives. An analysis of children's elicited narratives using wordless picture books indicated that only 25% of 5-year-olds included the superordinate goal in their narratives compared with about 80% of 9-year-olds (Trabasso & Rodkin, 1994). In comparison, second-order goals were relatively easier to identify but still do not appear until about 4 years of age (Trabasso & Nickels, 1992), with only about a fifth of 4-year-olds correctly identifying and including this in their narratives compared with a third of the 5-year-olds.

On the other end of the spectrum, subresolutions and subproblems embedded in episodes were easiest to identify. These components have mostly been examined as parts of episodes in prior research (e.g., Muñoz et al., 2003) rather

than being studied in isolation. However, there is some evidence that around 4 years of age, children begin to transition from producing incomplete episodes in their narrative, containing initiating events and consequences (of attempts) only, to "minimally complete" episodes containing initiating events, attempts, and consequences (Liles, 1993; Orsolini, 1990). Subresolutions, or consequences of attempts, are therefore evident in children's narratives even when the organization of events in the episodes is incomplete. In general, episode-related story items—other than subgoals—tended to be easier items for children to include in their narratives relative to establishing superordinate and subordinate goals in the stories.

Age-Related Progressions in Story Structure

A major goal of the present study was to examine age-related progressions in story structure across early childhood. Results indicate a developmental pattern for story-structure abilities, such that 5- and 6-year-olds demonstrate superior story-structure abilities compared with 3-year-olds and 4-year-olds. Furthermore, story-structure ability levels improve dramatically between ages 3 and 4 years, and again between 4 and 5 years. Mean story-structure abilities across ages 5 and 6 years, on the other hand, were not significantly different, with the majority of children at these ages including all story components in their narratives.

A cross-sectional exploration of performance on individual story components across the four age groups revealed clear age-related progressions. Generally, children improved in their ability to include each individual story-structure component across the four age groups. However, individual component analyses showed that children experienced particular difficulty with establishing subgoals and resolving the overall goals in the stories.

Children's relative difficulty on story items related to goal formation and monitoring is consistent with theoretical accounts of the order of emergence of story schema (e.g., Applebee, 1978; Stein & Glenn, 1979) that place goal-based narratives at later stages of narrative development. Another possible model for the emergence of story structure is based on empirical work on the number of causal connections associated with each individual story component (van den Broek et al., 1996). If processing events with a greater number of causal connections is more difficult, then the following order of difficulty on story components should be observed: goals > initiating events > outcomes and actions > settings > reactions and endings. The results of the present study are compatible with this framework, given that the order of difficulty on items observed was as follows: subgoals > main goal > setting > resolutions.

Children's abilities to include complete episodes in their narrative retells were also examined across the four age groups. Three major findings regarding age-related progressions in narrative episode structure warrant further discussion. First, a clear developmental pattern was evident in children's episode-related narrative abilities, such that all four episode components (subgoals, subproblems, subsolutions, subresolutions) were produced more frequently with age. These results are compatible with theoretical accounts of how children develop knowledge of narrative-based goal plans (Trabasso & Nickels, 1992; Trabasso et al., 1992). It is predicted that an increasing knowledge of goals and plans increases the likelihood of not only detecting goals in a story but also encoding each subsequent action and referencing these against the goal plan to determine whether the overall goal has been fulfilled. Thus, successful encoding of goal plans should result in a greater number of episode components being encoded and produced.

Second, substantial individual differences were observed in children's abilities to produce episode-related story components, particularly at younger ages. For example, a third of the children in the youngest age group (36–47 months) were unable to produce even a single episodic event in their narratives. However, about one-fourth of the 3-year-olds produced complete episodes, suggesting that age-related constraints on story grammar may not be as rigid as implied by stage-based models of narrative development.

The third major finding concerning narrative episode-related growth is that a dramatic shift in production of complete episodes is observed between ages 3 and 5. For instance, when considering the first episode in the story, a dramatic shift is observed from 23% of 3-year-olds to 39% of 4-year-olds and 70% of 5-year-olds producing all four episode-related components in their narratives. If this increase in episode-related story components is attributed to an improved ability in organizing higher order goals, then this pattern of change resonates with Applebee's (1978) stages of story schema development, which theorizes that goal-based narratives should emerge between 4 and 5 years of age. There was a nearly 30% increase in the proportion of children producing complete episodes in our sample at this developmental juncture.

Limitations and Future Directions

Two limitations are worth noting. First, a ceiling effect was observed on our measure of story structure in 6-year-olds, with more than 80% of children at this age correctly identifying all story components in their narratives. Item difficulty analyses further confirmed that children's mean story-structure ability levels exceeded the mean item difficulty level on the narrative assessment. The elicitation technique used in the present study may partially explain this finding because picture-supported retells tend to be less challenging for children compared with story recall from memory (Morris-Friehe & Sanger, 1992, as cited in Fiestas & Peña, 2004). However, the retell technique was chosen over story generation because the latter has been shown to yield floor effects on many indicators of narrative ability (e.g., McCabe & Rollins, 1994) for this age group. Future research should examine children's story-structure understanding using narratives that are more complex, possibly with more embedded episodes and character perspectives.

Second, the present study utilized cross-sectional data to examine age-related progressions in story-structure abilities. Although this approach allows for an estimation of the average child's ability at different ages, a longitudinal analysis of individual children's growth in story-structure abilities is warranted for a more detailed understanding of how children progress in their narrative abilities. Future research should also examine what accounts for individual differences in children's narrative skills, in that some children struggle with and others exceed age-appropriate norms. Some possible candidates suggested by prior research include cognitive skills such as working memory and processing speed (e.g., Montgomery et al., 2009), executive function skills such as inhibitory control (e.g., Friend & Bates, 2014), and theory-of-mind skills (e.g., Kim, 2016).

Overall, the present study adds to the extant literature on narrative development by providing a detailed account of the order of emergence of individual story-structure components—empirically validated as representing a unidimensional construct of story structure—across 3-, 4-, 5-, and 6-year-olds. A developmental pattern was observed in that children's story-structure ability increased significantly across the four age groups. Individual story-structure item analyses further revealed that establishing subgoals and tracking the overall goals in the stories were particularly challenging for all children, but especially so for 3- and 4-year-olds. Children's abilities to establish goal plans and include episode-related story components in their narratives also showed clear age-related trends, with the steepest growth occurring between ages 3 and 4 years and again between 4 and 5 years. In general, although age-related progressions were observed on all story components, even the youngest children showed fairly high levels of story-structure ability (approximately 40% correctly identified each individual story-structure component; about 25% produced complete episodes). These findings hold implications for potential refinement of theoretical models of narrative development, which may have underestimated young children's story-structuring abilities.

In addition, the results have implications for items that may be targeted in narrative intervention work. The present research helps identify essential components of story structure and provides information about which structures are typically included in young children's narrative retells as well as which items are challenging for children at different ages and may require additional support and scaffolding. This information can in turn be used to help guide developmentally appropriate practices surrounding narrative instruction, assessment, and remediation in early childhood education settings.

Acknowledgments

The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A110293 awarded to Michigan State University (Ryan Bowles, Lori Skibbe) and The Ohio State University (Laura Justice, Shayne Piasta). The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

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Appendix A

Wolf Cleans His Bedroom Story Script

1. Willy Wolf woke up one cold, rainy morning. He was yawning in his bed and glancing at the mess on the floor. He realized it was time to clean his room.
2. Soon, Willy's mom came into his bedroom. "Willy, you need to clean this filthy room right now," she said unhappily.
3. While his mom went downstairs, Willy came up with a plan. "First, I need to take care of these clothes," he said to himself.
4. Willy tried to gather all of the clothes, but there were too many. He couldn't pick them up! Willy wondered how he could move all of the clothes.
5. Willy was excited when he remembered the toy shopping cart in his closet. "Perfect," he thought. He grabbed the cart and began to fill it with clothes.
6. Willy pushed the cart across the room and carefully emptied the clothes into the laundry basket.
7. Then, Willy looked up in the corner and noticed some cobwebs.
8. Willy stretched to get those high, sticky cobwebs with a rag, but he couldn't reach them. "They're too high!" he said. But Willy had a plan.
9. First, Willy walked downstairs, and then he retrieved the broom from the closet.
10. Then Willy returned with the broom and knocked down the cobwebs. Bang! Bang! "All right!" he said happily.
11. Then Willy very carefully looked around his room. There were still toys scattered everywhere. "Hmm. Where should I put these?" he asked himself.
12. He went over to his toy box, but it was completely full. Where else could he put the toys?
13. While Willy thought about this, he remembered there were boxes somewhere in the garage. He went to the garage, where he found two boxes sitting on a shelf, plain as day.
14. Willy brought the boxes upstairs, so he could fill them with his toys. He dropped the toys in one after another. Kerplunk! Kerplunk!
15. Finally the room was clean! Just then, Willy's mom came in and looked happily and proudly around the room.
16. "Thank you for cleaning your room! It looks great!" his mom exclaimed. Willy's mom smiled and they gave each other a big, warm hug.

The End

Appendix B

Sample Narratives by Age Group

Sample narrative by 3-year-old

Umm she was playing basketball. Then her friends come by. She needed a pump. She couldn't reach it. She got a big ladder. She got the pump. Her mom said she gotta wear a helmet. But it couldn't fit with her bow on. She go into her bathroom. She was ready. It was too high. She remembered the screwdriver in the…She did it on her bike. She was ready. She said let's go!

Sample narrative by 4-year-old

It's hot and they're playing soccer. They had…they had…and then they got lemonade. He went inside and he got and… and lemonade was too high. And he couldn't reach it. He stepped on a stepstool stool under the…He carefully grabbed down the lemonade. He took a drink of it. And it was too sour. So he poured some salt in it and he took another sip. He drink it again and it tasted very good. He took it out to his friends. With no cups. She went inside to get the cups. And then he came out with a tray of cups. And then they…then he carefully poured…um…the same amount. And then. Then it was time to drink!

Sample narrative by 5-year-old

Once there was a rain day. There was a…there was a name a…Wolf. And he tried to clean his room. It was a rainy day. His mom walked in. And his mom said, "Clean up your room." He…he…he…got out the clothes but he didn't…he couldn't pick them up. Well, it was a bad idea. He remembered he had a-a-a chart in his, uh…bedroom. Then, he put the clothes in there. He dumped his clothes into the laundry bin. There was a spider web on his…wall. He tried to reach it with a rag, but he couldn't. He found a broom downstairs in the closet. Then, he put the rag downstairs. He got the spider web off from hitting it really hard. Bang, bang, bang! There was toys by his room. There was too many toys in his box, "How many it will it fit?" He got some box downstairs and he down…he went downstairs where the car was and found two boxes. He put them into each box, so they can clean their room. Her-her mom walked into the room. It was so clean. They gave each other a hug. The end.

Sample narrative by 6-year-old

Um, he's looking outside and the moon and the stars are out. And he thought he wanted to put his pajamas on to go bed. And then he yawned, and then, um, he thought to put on his bed the pajamas. I think, um, he put on his shirt. And then, he opened the drawer and he looked and there's no pajamas. Then he went downstairs, looked in the laundry room and then he found them in the laundry room. And then he put on his pajamas. And then he, um, got his toothbrush out and…to brush his teeth. And then got the toothpaste and then tried to squeeze it on and there's none coming out. And then he found a new, um, toothpaste bottle and squirted onto his toothbrush. And then he brushed his teeth and they were shiny clean. And then he went to get a glass of water. And when he dumped it out, there was no water. And then, then he's gonna get…go to the bathroom to get some water. And then…um, when he was done, he walked to his room. And then he drank all of it the whole cup. And then he climbed into bed and went to sleep. He went so fast asleep.