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Story Processing Ability in Cognitively Healthy Younger and Older Adults

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Abstract

Purpose—The purpose of the study was to examine the relationships among measures of comprehension and production for stories depicted in wordless pictures books and measures of memory and attention for 2 age groups.

Method—Sixty cognitively healthy adults participated. They consisted of two groups—young adults (20–29 years of age) and older adults (70–89 years of age). Participants completed cognitive measures and several discourse tasks; these included telling stories depicted in wordless picture books and answering multiple-choice comprehension questions pertaining to the story.

Results—The 2 groups did not differ significantly for proportion of story propositions conveyed; however, the younger group performed significantly better on the comprehension measure as compared with the older group. Only the older group demonstrated a statistically significant relationship between the story measures. Performance on the production and comprehension measures significantly correlated with performance on the cognitive measures for the older group but not for the younger group.

Conclusions—The relationship between adults' comprehension of stimuli used to elicit narrative production samples and their narrative productions differed across the life span, suggesting that discourse processing performance changes in healthy aging. Finally, the study's findings suggest that memory and attention contribute to older adults' story processing performance.

Keywords

aging; discourse; cognitive processing

Successful narrative discourse processing requires a variety of cognitive processes and includes linguistic comprehension and production abilities. Successful discourse *production* requires combining units of information in a coherent manner to convey a meaningful message. Discourse stimuli *comprehension*—such as comprehension of a story, procedure, event, and so forth—is necessary for producing a coherent message. Research on comprehension of stimuli used to elicit narrative discourse production samples and its relationship to production and cognitive processes is lacking. Investigating this relationship in cognitively healthy adults across the life span serves several purposes. Findings may have implications for how cognitive processes interact with discourse processes. For example, findings may shed some light on why age-related differences are found for amount and type

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of informative content provided (e.g., Juncos-Rabadán, Pereiro, & Rodríguez, 2005); for example, younger and older participants may comprehend the pictured stimuli differently and/or attend to different aspects of the pictured stimuli. In practical terms, pictured stimuli are commonly used to elicit narrative discourse production samples. It would be useful to know whether participants demonstrate comprehension of particular aspects of the stimuli that they are expected to produce (e.g., characters, actions, relations among characters, etc.) and that are subsequently measured. Finally, discourse production and comprehension measures may be useful for investigating the relationship among discourse and cognitive processes in clinical populations.

Discourse can be defined as any language that is "beyond the boundaries of isolated sentences" (Ulatowska & Olness, 2004, p. 300) and "a set of utterances aimed at conveying a message among interlocutors … [it] may be the most elaborative linguistic activity" (Ska, Duong, & Joanette, 2004, p. 302). *Narratives* are one type of discourse genre. There are several forms of narrative discourse, including *event casts* (explaining an activity scene; a picture description), *recounts* (verbal reiterations of an event), *accounts* (spontaneous sharing of experiences), and *stories* (fictionalized, highly structured forms; Heath, 1986). Stories were the focus of the present study. Story processing requires comprehending the story characters and events—including temporal and spatial shifts as well as the goals and internal responses of the characters—and producing these story components in a structured, coherent framework. In the present study, wordless picture books were used to elicit stories from cognitively healthy adults. Wordless picture books "tell" stories through pictures and include very minimal text. This process of making meaning from pictures is termed *visual literacy* (Froriep, 2007; Harris & Hodges, 1995). As suggested by Wingfield and Stine-Morrow (2000), a "very tight theoretical and conceptual bond between the production and comprehension of language" (p. 372) exists. Thus, one of the goals of the study was to examine this "bond" for comprehension and production of stories depicted in wordless pictures books.

Story Comprehension

Comprehending a narrative stimulus is necessary to produce meaningful output (Chapman et al., 2002). Although comprehension of pictured stimuli has not been readily investigated, several researchers have investigated comprehension performance in cognitively healthy adults for stories that they heard. North, Ulatowska, Macaluso-Haynes, and Bell (1986) read a story to middle-aged (M = 45.6 years of age) and older (M = 76.2 years of age) cognitively healthy adults. After listening, participants retold the story and then answered five verbally presented probe questions. The middle-aged group answered more questions correctly (mean correct = 4.1) than did the older group (mean correct = 2.3). The authors concluded that age-related declines in cognitive function experienced by the older group may have contributed to their poorer performance on the comprehension task; however, no statistical analyses were performed to add empirical support to this conclusion.

Ulatowska, Hayashi, Cannito, and Fleming (1986) found similar results with similar tasks and different participants. Participant groups included an old-old group (M = 82.5 years of age), a young-old group (M = 70.3 years of age), and a middle-aged group (M = 44.6 years of age). Participants listened to a story, retold it, and then answered five probe questions that varied in the degree of inference required: factual information (n = 1); factual information plus inference (n = 1); purely inferential but based on specific components of the story (n = 2); and inferential based on the story as a whole and the moral of the story (n = 1). The middle-aged group performed significantly better than the old-old group on the factual question, the two purely inferential questions, and the inference question that probed the moral of the story. The young-old group performed more poorly than the middle-aged group

on only one question—the inference question that probed the moral of the story. Ulatowska et al. (1986) administered general measures of cognitive function; however, the relationship among participants' performance on these measures and performance on the probe questions were not determined. Further, participants retold the story prior to answering the questions, but any relationship between comprehension and production of the story was not explored.

An extensive body of work exists in the area of text comprehension (e.g., Kintsch, 1998; Kintsch & van Dijk, 1978). Although this work does not translate specifically to comprehension of stimuli without text, conceptually there are ideas worth noting. For example, according to Kintsch and van Dijk (Kintsch, 1998; Kintsch & van Dijk, 1978) and Stine-Morrow (2007), building text comprehension includes three levels: surface, textbase, and situation model. The *surface level* involves encoding the exact wording. The *textbase level* involves extracting meaning from the semantic/propositional content. The *situation model* involves integrating the text information with one's background/real-world knowledge to encode the text's gist—that is, the reader's representation of what the text describes (Mar, 2004). Formulating a story from a picture book would require two of these levels—that is, storytellers would need to extract meaning from the pictured elements (i.e., textbase) and integrate that information with their own knowledge and experience (i.e., situation model) to successfully describe the characters, events, states, goals, and actions that are pictured in the story (Zwaan, Langston, & Graesser, 1995).

Age-related differences in constructing surface, text-base, and situation model representations of text and determining the cognitive processes that contribute to these representations have been investigated. Of importance here is the fact that across studies, researchers have found that older and younger adults who are cognitively healthy do not differ from one another in terms of forming situation model representations (Ferstl, 2006; for a review, see Thornton & Light, 2006). Stine-Morrow (2007) suggested that older adults make adjustments and allocate their attention to situational features and discourse structures. However, the older adults typically perform more poorly on measures assessing surface- and textbase-level representations (Ferstl, 2006; Radvansky, Copeland, & Zwaan, 2003; for a review, see Thornton & Light, 2006), and this has been attributed to their documented decline on measures of episodic memory and working memory (e.g., Chapman et al., 2002; Ferstl, 2006; Radvanksy et al., 2003). Because of memory decline, cognitively healthy older adults are believed to be less sensitive to the details presented in the text and subsequently perform more poorly on measures of surface- and textbase-level representations. Clinically, it is important to understand how these processes relate to one another when text is removed.

Story Production

Story production ability in cognitively healthy adults has been readily investigated. Stimuli have included asking participants to retell familiar stories (e.g., Cinderella) and stories that they listened to as well as stories depicted in cartoon strips, short filmstrips, and wordless picture books. Measures of story production ability have been equally wide ranging. To explore age-related changes in narrative discourse production, measures of lexical, syntactic, cohesion, coherence, and story grammar performance have been analyzed. The performance of younger and older, cognitively healthy adults has varied across studies, with results dependent on the linguistic measure as well as the task stimulus.

Kemper, Rash, Kynette, and Norman (1990) compared narrative discourse performance in cognitively healthy adults grouped in 10-year age cohorts from 60 to 89 years old and investigated the relationship among participants' performance on cognitive measures. They found that 70- and 80-year-olds told more complex narratives than the 60-year-old group; however, they also reported a decrease in the number of clauses per utterance and use of

cohesive ties with increasing age and narrative complexity. Additionally, they reported a significant, positive relationship among performance on a backward digit span task as well as narrative complexity and use of cohesive ties. Kemper et al. (1990) suggested that the age-related decline in working memory (measured by the digit span task) contributed to the changes on the measures of narrative discourse production.

Juncos-Rabadán and colleagues (2005) asked cognitively healthy adults between 40 and 91 years old to tell a story depicted in a cartoon strip. The authors found that the number of words, number of utterances, and amount of irrelevant content produced significantly increased with age; however, content quality and use of cohesive ties declined with increasing age. They suggested that psychosocial factors, such as personal styles, and age-related decline in cognitive function may have contributed to the age-related differences found on the discourse production measures. However, no cognitive measures were included to provide support to that idea.

Several researchers have used sequential picture scenes to elicit narratives in cognitively healthy adults. Results consistently demonstrate that younger adults yield significantly better scores on measures of informativeness (Capilouto, Wright, & Wagovich, 2005; Marini, Boewe, Caltagirone, & Carlomagno, 2005) as well as on measures of accuracy and completeness (Capilouto et al., 2005; Duong & Ska, 2001; Wright, Capilouto, Wagovich, Cranfill, & Davis, 2005) in their storytellings compared with older adults. Although not always measured, it has been suggested that age-related changes in cognitive processes may partly account for age-related differences on measures of narrative discourse production.

It is generally accepted that narrative production performance reflects narrative comprehension (Chapman et al., 2002); however, this assumption has not been specifically explored. Moreover, the relative influence of cognitive processes known to be susceptible to aging, such as memory and attention, may influence discourse comprehension and production differentially (see Figure 1).

Purpose of the Study

The purpose of the present investigation was to examine the direct and indirect relationships among measures of comprehension and production for stories depicted in wordless pictures books and measures of memory and attention for two age groups (20–29 years of age and 70–89 years of age). As a result, we can begin to systematically evaluate narrative discourse processing ability in cognitively healthy adults. The aims of the study were threefold. The first aim was to determine if younger and older adults differ in the production of stories generated from depictions in wordless picture books. It was expected that the younger group would convey a greater proportion of story propositions than the older group. The second aim was to determine if younger and older adults differ in comprehension of the stories depicted in the wordless picture books. It was expected that the younger group would perform better overall on the comprehension task. The third aim was to determine if there is a relationship among cognitive processes and storytelling production and comprehension for younger and older adults. We expected that the influence of memory and attention on comprehension would be greater than on production for both groups.

Method

Participants

Sixty cognitively healthy adults participated in the study and consisted of two groups—young adults (20–29 years old) and older adults (70–89 years old). The young adults group included 30 participants with a mean age of 23.67 years (SD = 2.70). The older adults group

included 30 participants with a mean age of 76.90 years (*SD* = 4.51). All participants met the following study inclusionary criteria: (a) aided or unaided visual acuity within normal limits, as indicated by passing a vision screening (Beukelman & Mirenda, 1998); (b) aided or unaided hearing within functional limits as measured by the Central Institute for the Deaf List of Everyday Speech (Davis & Silverman, 1970); (c) no presence of depression at time of study participation, as measured by performance on the short form Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986); (d) normal cognitive functioning as indicated by performance on the Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh 1975); (e) no history of stroke, head injury, or progressive or acquired neurogenic disorder per self-report; and (f) English as their first language per self-report. See Table 1 for groups' demographic data.

Cognitive Measures

Several measures of memory and attention were administered to study participants. These measures included the Wechsler Memory Scale—Third Edition (WMS–III; Wechsler, 1997), Comprehensive Trail Making Test (CTMT; Reynolds, 2002), and Stroop Color and Word Test (STROOP; Golden, 2002). Estimates of participants' episodic and working memory ability were determined from their performance on the WMS–III. The Working Memory Index score was used to estimate working memory ability, and the General Memory Index score was used to estimate episodic memory ability. To address study aims, the Working Memory and General Memory raw index scores were computed and subjected to statistical analyses; scaled scores were not used.

The attention measures included the CTMT and STROOP. For the CTMT, raw data included the time (in s) that it took to complete each trail. Participants' performance on Trail 5, the most difficult trail, was the only data subjected to statistical analyses. The STROOP includes three tasks. The final task, the Color–Word Page, was the most attention demanding, and only raw scores from this task were reported and subjected to statistical analyses. Raw scores included the number of words read in 45 s.

Narrative Task

Participants viewed and told the stories depicted in two wordless picture books and then answered 15 multiple-choice questions about the stories. The books included *Picnic* (McCully, 1984) and *Good Dog Carl* (Day, 1985). *Picnic* is a story about a family of mice who drive to the forest for a picnic. In *Good Dog Carl,* a mother asks the family dog, Carl, to look after the baby in her crib while she is gone (see Figure 2 for story summaries).

Wordless picture books were used as the narrative task stimuli for several reasons. *Picnic* includes no text other than the title, and *Good Dog Carl* has text only on the first and last pages. Because limited to no text is included in the books, the task is a storytelling or story-generation task, rather than a story-retelling task. Storytelling tasks are more difficult tasks; yet, they are also "more representative of spontaneous communication" (Liles, 1993, cited in Hughes, McGillivray, & Schmidek, 1997, p. 19). Additionally, because participants are telling stories from books rather than from shorter pictured stimuli (e.g., single pictures), the result should be more structurally sound stories that include the necessary story grammar elements. Similarly, many optional elements for an ideal story (i.e., Stein & Glenn, 1979) may be included as well.

Comprehension Questions—Following each story, the book was removed from the participant's view and then he or she answered 15 multiple-choice questions pertaining to the story. Participants read each question silently and circled their answer. Each question included four possible choices and only one correct answer. No inclusive (i.e., "all the

above") or exclusive (i.e., "all except A") choices were included. The questions included items about story line details (e.g., "Where do they look for the little one first? [by the lake]"), setting details (e.g., "What is little one holding? [a pink stuffed toy]"), and items that require inferencing (e.g., "Mom is ___ when she comes home [content]").

Development and validation: The comprehension questions were developed using several steps to create and validate them prior to use in the experimental study. Approximately 40 questions were initially developed for each wordless picture book. Five respondents who were unfamiliar with the wordless picture books answered the questions to ensure that no questions had an inherent correct answer, meaning that the questions could not be answered correctly above chance level without viewing the stimulus. The questions were presented randomly to further eliminate possible bias. The respondents discussed their reasoning for selecting each answer. Then, the same five respondents answered the questions after viewing the wordless picture books. Again, questions were presented in random order across participants. Questions with multiple correct answers were revised. Questions answered above chance level before viewing the wordless picture book were eliminated, and questions that gave clues to the answers of other questions were eliminated, thus ensuring that each question was independent of the others. The revised questions were evaluated once again by 10 additional individuals, who were given the revised questions before and after seeing the wordless picture books, and the procedures detailed above were followed. From these results, 15 questions were selected for each wordless picture book (see Appendix A for a sample of the comprehension questions).

Language Measure: Story Proposition Analysis—To address the study's aims, we determined story propositions that were conveyed for each story. Participants' stories were compared to an a priori list of story propositions. The purpose of the story proposition analysis was to measure participants' accuracy and completeness for telling the story depicted in each wordless picture book.

Development and scoring: A priori lists of story propositions were developed for each story. Similar to previous work with story grammar analysis (i.e., Montague, Graves, & Leavell, 1991; Stein & Glenn, 1979), the story propositions included story elements such as setting (i.e., characters and story context), initiating event/problem (i.e., actions/events that set the story in motion or require a solution), internal responses (i.e., character emotions/ thoughts), plans (i.e., idea to address the problem), attempts (i.e., action taken to solve the problem), consequences (i.e., event that follows the attempt), resolutions (i.e., characters' final state in regards to the outcome), and endings (i.e., "The End").

To develop the a priori lists of story propositions, 20 cognitively healthy adults viewed each wordless picture book and then, while viewing the picture book a second time, told the story that was depicted. Their instructions included telling the story depicted in as much detail as possible and to tell it as a story with a beginning, middle, and end. Each language sample was orthographically transcribed and then independently reviewed by two of the authors and a third individual (research assistant) to identify story propositions. Story propositions included elements that were of sufficient importance to the story (i.e., represented a story element such as setting, problem, etc.) and independent from other elements in the story. Lists were compared, and a final list of story propositions was compiled. Only story propositions that were produced by at least 80% of the participants and identified by at least two of the three investigators were included. The number of story propositions includes 23 for *Picnic* and 31 for *Good Dog Carl.*

After the a priori lists were determined, scoring procedures for completing the story proposition analysis were developed. A binary scoring system was used; responses were

compared to the a priori list and were scored as either correct (indicating that all the necessary information was provided) or incorrect. The scoring procedures included comparing each participant's transcript to the list of story propositions for each wordless picture book. On the story proposition scoring sheet, each story proposition was numbered. For each story proposition, the information that was listed included essential information for the proposition, alternative ways in which the story proposition could be stated, and additional information that could have been added to complete the proposition but was not necessary for a correct response. See Appendix B for the list of story propositions for *Picnic*.

To ensure good interrater and intrarater reliability for completing the story proposition analysis, scorers followed a multistep training protocol prior to independently scoring study participants' transcripts. The training protocol included first having the scorer review the wordless picture books, the scoring procedures, and the lists of story propositions. Next, the scorer reviewed two transcripts that had been marked up indicating story propositions that were correct and incorrect. For each story proposition, an explanation was provided indicating why that story proposition was scored as correct or incorrect. For the final step, the scorer completed the story proposition analysis on two transcripts (one for each wordless picture book story). They compared their results to previously scored transcripts for the same stories. Scorers tallied the number of agreements and disagreements. For any disagreements, the scorer was referred to the explanation provided on the previously scored transcript. Once the scorer was in 100% agreement with the previously scored transcript, his or her training was complete (scoring procedures and training protocol are available upon request).

Experimental Procedures

All participants were tested individually in a laboratory setting. Participants attended two sessions, each lasting no more than 2 hr. In the initial session, participants provided consent for study participation, completed the screening measures so that we could ascertain whether they met the study's inclusion criteria, and provided their demographic and medical history information. Next, the participants completed either the cognitive test battery or the discourse tasks, referred to as the *cognitive session* and *discourse session,* respectively. Session order was randomized across participants. For the cognitive session, participants completed the WMS–III, STROOP, and CTMT. Order of test administration was randomized across participants. Each measure's instructions were followed for test administration. For the discourse session, participants completed 11 discourse tasks; only the results of the storytelling task are reported here. Order of discourse tasks was randomized across participants. All discourse language samples were either audio or video recorded.

For the storytelling task, the examiner read the following script: "These are children's books without words—so that a person can make up their own story. First, I will look through the children's book and get an idea of the story. Then, I will start at the beginning and tell you the story that goes with the pictures." Next, the examiner read the scripted storytelling of *The Great Ape* (Krahn, 1978) to show the participant how the task was to be completed. The examiner gave the participant one of the wordless picture books—either *Picnic* or *Good Dog Carl*—and then said, "Now, it is your turn. Look at this book, and when you are ready, tell me the story that goes with the pictures." No additional prompts were provided. The participant was given an unlimited amount of time to look through the book. He or she was also allowed to look at the pictures in the book during the storytelling. After each story, the book was removed, and the participant answered the comprehension questions pertaining to the story that they just told. Participants had an unlimited amount of time in which to complete the comprehension task. Three versions for order of story comprehension questions were created. The version that each participant completed was randomly assigned.

Language Transcription and Reliability

All storytellings were orthographically transcribed from the audio or video recordings by research assistants. Interrater and intrarater reliability for word-by-word agreement and story propositions were determined for 10% of the samples collected from the participants. Agreement for word-by-word transcription agreement was 94.1% and 97.1% for interrater and intrarater, respectively. For the story propositions, point-to-point interrater and intra-rater agreement for coding of story propositions was 91.5% and 96.7%, respectively.

Results

Preliminary Analyses

Prior to performing the statistical analyses for addressing the study aims, groups' cognitive measures as well as production and comprehension measures for the stories were statistically examined using PASW Statistics 18 (SPSS Inc.) for accuracy of data entry and fit between their distribution and the assumptions of multivariate analysis. The variables were examined separately for the two groups. For both groups, the shapes of distributions and pairwise linearity were assessed using scatterplots and were found to be satisfactory. Assumptions regarding within-set multicollinearity were also met.

Participants' scores were converted to *z* scores to identify potential univariate outliers. For the younger group, two univariate outliers with extreme *z* scores (>3.3) were identified and removed. After the univariate outliers were excluded, no multivariate outliers were identified by using Mahalanobis distance with $p < .001$. For the older group, two univariate outliers with extreme *z* scores (>3.3) were identified and removed. No multivariate outliers were identified by using Mahalanobis distance with $p < .001$. With all outliers and the cases with missing data removed (i.e., two participants in the older group), 28 participants remained in the younger group and 26 participants remained in the older group.

To ensure that demographic characteristics were not contributing factors to study results, preliminary analyses were conducted. The younger and older groups did not differ significantly for years of education completed. Further, no significant differences were found between males and females within each cohort on the experimental measures. See Table 2 for group *M*s and *SD*s for performance on the cognitive measures.

Proportion of Story Propositions Conveyed

To determine if the younger group and older group differed significantly for proportion of story propositions, we performed a mixed analysis of variance (ANOVA), with group (young, old) as the between-groups factor and stories (*Good Dog Carl, Picnic*) as the within-group factor. The group main effect was not significant, $F(1, 52) = 1.19$, $p = .28$; however, the stories' main effect was statistically significant, $F(1, 52) = 10.29$, $p < .01$. The Group × Stories interaction was not significant. The groups did not differ significantly for proportion of story propositions; however, participants conveyed a significantly greater proportion of story propositions for the *Good Dog Carl* story than for the *Picnic* story.

The nonsignificant group difference for proportion of story propositions was unexpected. After visually reviewing the transcripts, it appeared that the older adults provided longer stories. Possibly, by telling longer stories, the older adults were able to produce the story propositions similarly to the younger group but less efficiently. Additional analyses investigating story length (measured as total number of words [TNW]) were performed to test this hypothesis. A mixed ANOVA of group (young, old) as the between-groups factor and stories (*Good Dog Carl, Picnic*) as the within-group factor was performed. The results indicated a significant group main effect, $F(1, 52) = 21.55$, $p < .0001$. The older group

produced significantly longer stories compared with the younger group. To further explore this hypothesis, we determined whether participant groups differed for the proportion of TNW per story proposition (i.e., TNW produced/number of story propositions produced) produced across stories. Participants' proportion of TNW per story proposition scores were converted to *z* scores to identify potential univariate outliers. For each group, one univariate outlier with extreme *z* scores (>3.3) was identified and removed. A mixed ANOVA of group (young, old) as the between-groups factor and stories (*Good Dog Carl, Picnic*) as the within-group factor was performed. The results indicated a significant group main effect, $F(1, 50) = 28.13$, $p < .0001$, and stories main effect, $F(1, 50) = 91.69$, $p < .0001$. The older group had a greater proportion of TNW produced per story proposition compared with the younger group. Both groups produced a greater proportion of TNW per story proposition for *Picnic* than for *Good Dog Carl*. The Group × Stories interaction was nonsignificant.

Story Comprehension Performance

Percent correct scores for the comprehension measures were subjected to statistical analysis to determine group differences. A mixed ANOVA with group (young, old) as the between-groups factor and stories (*Good Dog Carl, Picnic*) as the within-group factor was performed. Results indicated a significant group main effect, $F(1, 52) = 10.03$, $p < .01$, with the younger group performing significantly better on the comprehension task compared with the older group. The stories main effect was not significant; however, the Group × Stories interaction was significant, $F(1, 52) = 5.67$, $p < .05$. To investigate the interaction, paired-sample *t* tests were performed for each group. The older group performed significantly better on the comprehension measure for *Picnic* compared with *Good Dog Carl*, $t(29) = 2.33$, $p < .05$. No difference was found for the younger group. See Table 3 for group *M*s and *SD*s for performance on the story measures.

Relationship Between Storytelling Comprehension and Production Measures

To investigate the relationship between proportion of story propositions conveyed and percent accuracy for the comprehension measures, canonical correlation analyses were performed for both groups. These analyses statistically combined the proportion of story propositions conveyed for each story into one and combined the percent accuracy for the comprehension measures for each story into one. During the process, linear combinations of the original variables are created, which are called *variates.* These synthetic variables are equivalent to factors in factor analytic models and otherwise would have been unobservable. In this case, the interpretation of these variates was relatively straightforward. The comprehension measures were combined linearly to create a composite variate that correlated highly with the comprehension measure for *Good Dog Carl* and the comprehension measure for *Picnic*; thus the variate generally reflected participants' comprehension ability for the stories. Similarly, the first production variate reflects the ability to convey story elements for the stories. The canonical correlation expresses the strength of the relationship between the two composite variates and can be interpreted as the correlation between comprehension ability and production ability for the task stimuli.

In canonical analysis, the statistical significance of the canonical correlations is tested using a stepwise process. The maximum number of canonical pairs that could be extracted in this case was two. That is, there were potentially two dimensions along which the two sets of variables could be related. First, an omnibus test assessed whether both dimensions were significant. Then, the second test assessed whether only the second correlation was nonzero.

For the older group, the first canonical correlation was .72. With both canonical correlations included, the *F* value was significant, $F(4, 48) = 5.62$, $p < .001$. With the first correlation removed, the *F* value was not significant, $F(1, 25) = 0.93$, $p = .34$. Therefore, only the first

pair of the canonical variates accounted for the significant relationship between the two sets of variables and was subsequently interpreted (see Table 4 and Figure 3). For the younger group, the adjusted canonical correlation between production and comprehension composite scores was not statistically significant, $r = .46$, $p = .07$ (see Table 4).

Relationships Among Story Processing Measures and Performance on Cognitive Measures

We used canonical correlation analyses to investigate the relative influence of memory and attention on proportion of story propositions conveyed for the younger and older groups. Data from the two groups were analyzed separately. For the older group, only the first canonical correlation was statistically significant, $r = .76$, $p < .01$, and all cognitive measures (i.e., Working Memory raw score, General Memory raw score, STROOP raw score, CTMT Trail 5 raw score) correlated strongly with their first canonical variate (termed *first cognitive variate*). The proportion of story propositions conveyed also loaded strongly on their first canonical variate (termed *first production variate*). In general, older participants with better episodic memory, working memory, and attention abilities produced a greater proportion of story propositions for the *Good Dog Carl* and *Picnic* stories. For the younger group, with both canonical correlations included, the F value was not statistically significant, $F(8, 44) = .40$, $p = .91$. See Table 4 and Figure 4 for the older group's statistical results and Table 4 for the younger group's statistical results.

Canonical correlation analyses were also used to investigate the relative influence of memory and attention on comprehension accuracy for the younger and older groups. Again, data from the two groups were analyzed separately. For the older group, only the first canonical correlation was statistically significant, $r = .71$, $p < .01$, and all cognitive measures (i.e., Working Memory raw score, General Memory raw score, STROOP raw score, CTMT Trail 5 raw score) significantly correlated with their first canonical variate (termed *first cognitive variate*). Comprehension accuracy was also significantly correlated with their first canonical variate (termed *first comprehension variate*). In general, older participants with better episodic memory, working memory, and attention abilities performed better on the comprehension task for the *Good Dog Carl* and *Picnic* stories. For the younger group, the two canonical correlations were not statistically significant, $F(8, 40) = 1.23$, $p = .30$. See Table 4 and Figure 5 for the older group's statistical results and Table 4 for the younger group's statistical results.

Discussion

The purpose of the present study was to investigate the direct and indirect relationships among measures of comprehension and production for stories depicted in wordless picture books and measures of memory and attention in younger and older adults. The two groups did not differ significantly for proportion of story propositions conveyed; however, the younger group performed significantly better on the comprehension measure as compared with the older group. The younger group's performance on the comprehension and production measures for the stories was not significantly related; however, the older group demonstrated a statistically significant relationship between these measures for each story. Finally, the influence of cognitive processes on story processing performance differed for the two groups. Cognitive ability (i.e., memory and attention) significantly contributed to the older group's discourse production and comprehension ability. However, no significant results were found for the younger group. Results of this study extend recent work investigating age-related differences in discourse processing. From these results, it appears that cognitive ability influences discourse processing ability differently for adults at opposite ends of the adult life span. In the following sections, we discuss the results and potential clinical implications.

Conveying Story Propositions

It was hypothesized that the younger group would perform significantly better on the story propositions measure when compared with the older group. It was somewhat surprising that groups did not significantly differ for proportion of story propositions conveyed. These results are in contrast to previous research findings with similar measures but different stimuli. For example, Capilouto et al. (2005) and Wright et al. (2005) found that younger adults conveyed a significantly greater proportion of main events as compared with a group of older adults. Duong and Ska (2001) found that young-old adults produced significantly more main ideas than older adults. Juncos-Rabadán et al. (2005) found that content quality declined with age when telling a story depicted in a cartoon strip. One possible explanation for our finding may be that the measure used was not sensitive to age-related differences. The measure included an a priori list of story propositions; however, the propositions were not coded according to the type of story element (i.e., setting, initiating event, etc.) that they represented. Stein and Glenn (1979) and others (e.g., Montague et al., 1991) have identified common story grammar parts. Hughes et al. (1997) suggested that stories told do not require all of the parts to be ideal stories; rather, they identified story elements that are required and those that can be optional. It may be that more detailed analyses of the story elements conveyed would yield differences among the age groups.

Alternatively, the nonsignificant group differences are also supportive of previous researchers' findings with similar measures but different stimuli. Kemper and Sumner (2001) found that their older and younger groups conveyed a similar number of ideas on a narrative task. The older group, however, had lower P-Density (idea density) scores compared with the younger group. Rather, the older group was effective but less efficient in conveying "ideas" for the narrative task. Further, it may be that the younger and older participants approached the activity differently. James, Burke, Austin, and Hume (1998) suggested that older adults use discourse more for social interaction and self-reflection, whereas younger adults place more value on exchanging information. As indicated by post hoc analyses, the older participants produced significantly longer stories and had significantly greater proportions of TNW produced per story proposition than the younger participants. Possibly, the older participants talked enough to produce the necessary components to receive credit for the story propositions. Moreover, similar to Kemper and Sumner's (2001) findings, the older participants were less efficient in telling the stories than the younger participants. Appendix C includes two story examples: one by a younger adult participant and the other by an older adult participant. These stories received the same score for proportion of story propositions conveyed, yet they demonstrate very different styles in storytelling. As James et al. (1998) and Juncos-Rabadán et al. (2005) suggest, future studies investigating discourse production performance in cognitively healthy adults should consider psychosocial as well as cognitive factors.

Comprehending Wordless Picture Book Stories

As expected, group differences on the comprehension measures were found. The younger group performed significantly better on the comprehension measure compared with the older group. Further, the older group performed significantly better on the comprehension measure for *Picnic* compared with *Good Dog Carl,* but this same difference was not found for the younger group. As shown in Figure 1, the two stories have different story structures. *Good Dog Carl* includes many details, and the story structure is sequential and temporally driven. *Picnic,* on the other hand, has sequential and spatial components. For example, the family of mice is playing at the park, whereas the baby mouse is lost on the side of the road. Because of the nature of the story structure, the comprehension questions for *Good Dog Carl* address more setting details, whereas the comprehension questions for *Picnic* probe a greater variety of story elements. Comprehension questions targeting story setting details depicted

in the wordless picture books may be analogous to surface- and textbase-level representations for building text comprehension. Age-related differences in constructing surface- and textbase-level representations during text comprehension are well documented (e.g., Ferstl, 2006; Radvansky et al, 2003; Thornton & Light, 2006). The results have consistently demonstrated that older adults perform more poorly on these measures. Our findings suggest this may be the case with comprehending stories depicted in wordless picture books—that is, on a visual literacy comprehension task. These comprehension questions tapped a greater variety of story elements that may be more analogous to constructing textbase-level representations for text comprehension.

Story Processing Relationship Across Age Groups

Researchers have not readily investigated how cognitively healthy adults' comprehension of stimuli that are used to elicit narrative production samples relates to their production performance. It was hypothesized that a significant relationship would be found between performance on the comprehension measures and proportion of story propositions conveyed. No significant relationship between measures was found for the younger group; however, a significant relationship was found between the measures for the older group. These findings are informative, as they demonstrate that discourse processing performance changes across the life span. Further, they demonstrate that production measures may not be an appropriate method for predicting comprehension ability for younger adults.

Relationship Among Cognitive Processes and Story Processing

We expected to find significant relationships among the cognitive and story processing measures for both groups. Results partially supported our hypothesis. No significant results were found for the younger group. This group also performed significantly better on the cognitive measures compared with the older group. Tompkins, Bloise, Timko, and Baumagaertner (1994) suggested that if a task does not challenge an individual's cognitive limits, then no relationship between performance on the task and measure of cognitive performance should occur. This may be the case for our younger participants; specifically, the story processing tasks did not tax their cognitive abilities.

Performance by the older group resulted in statistically significant relationships among the cognitive measures and the story production and comprehension measures. In general, older participants who were able to acquire and maintain new information, had good storage and processing abilities, and were able to suppress irrelevant information and shift attention produced better stories and demonstrated better comprehension for the stories. Our findings add statistical support to North et al.'s (1986) conclusions that older participants' poorer performance on a comprehension task and a story retell task may be related to age-related declines in cognitive function. Poorer performance on text comprehension tasks has been attributed to their documented declines on measures of episodic memory and working memory (e.g., Chapman et al., 2002; Ferstl, 2006).

Participants were not familiar with the stories; thus, they were required to learn new information to complete the story tasks. Further, because the stories were depicted via pictures only, they were visually complex and required attention to relevant context and shifting from scene to scene to determine what the story depicted. Thus, completing the story processing tasks was cognitively demanding for the older participants.

Conclusions

Results of the study are promising, as they contribute to the literature and to our understanding of how story processing performance evolves across the adult life span. We have demonstrated that older participants' underlying memory and attention abilities

affected their story processing performance. Although the influence of age-related changes in memory ability on discourse processing has received more attention in the literature, our results suggest that age-related changes in attention contribute to changes in discourse processing as well. The results are informative and extend our understanding of age-related changes in discourse and cognitive processing; however, they include only one type of discourse and one language measure. Future investigations should include different discourse measures, such as vocabulary diversity, syntactic complexity, and cohesion, as well as different types of discourse, such as recounts, picture descriptions, and procedural discourse productions, to systematically document the influence of cognitive processing on discourse processing across the life span. Further, the comprehension and production measures were developed independently of one another. An alternative method for evaluating the relationship between comprehension and production ability would be to match the comprehension questions directly to the story elements that are measured.

James et al. (1998) suggested that psychological factors may influence discourse performance in cognitively healthy adults and should be considered. Our study included only two age groups at opposite ends of the adult life span; it would be useful to replicate the study with cognitively healthy adults in the age ranges between these two age groups to document how and when performance on cognitive measures influences performance on story processing measures.

Further, we found no differences between groups on the story production measure, but we did find a significant difference between groups on the comprehension measure. These findings add to the growing body of literature investigating language processing across the life span. Our results support previous researchers' findings that older adults provide similarly informative discourse production samples but do so less efficiently when compared with younger adults (Kemper & Sumner, 2001). The comprehension task required participants to extract meaning from pictured elements (i.e., textbase-level representations). With text comprehension, older adults typically perform more poorly on similar measures compared with younger adults (e.g., Ferstl, 2006; Radvansky et al., 2003). Consequently, comprehending visually presented stimuli and producing stories from the visually presented stimuli resulted in age-related findings similar to those found with tasks presented in different modalities.

Finally, these results do have implications for clinical populations. First, the story proposition measure was not sensitive to age differences, suggesting that it may be an appropriate measure for documenting change in storytelling ability as a result of language impairment. Second, cognitive ability needs to be considered, as it may have a greater impact on story processing performance depending on the age of the individual with acquired communication disorder (e.g., for reviews, see Murray, 1999; Wright & Shisler, 2005). Based on the results of this study, specific cognitive abilities should be considered, depending on the type of story task (i.e., comprehension or production). For example, episodic memory and shifting attention may have a greater impact on comprehension, whereas shifting attention may have the greatest impact on storytelling ability. Moreover, it is also important to consider story processing performance in clinical populations with cognitive impairments (e.g., traumatic brain injury, dementia, attention-deficit/hyperactivity disorder). Cognitive impairments could potentially contribute to story processing impairments.

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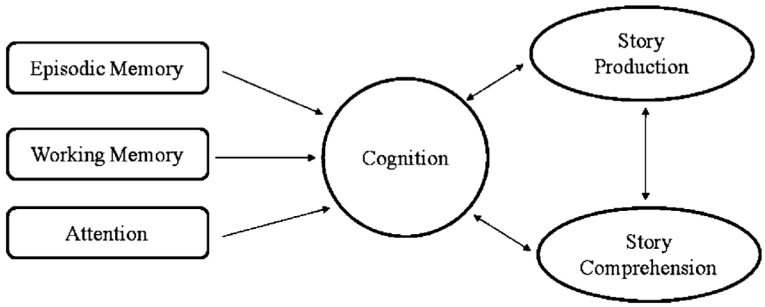

Figure 1.
Schematic of the expected indirect and direct relationships among cognitive and discourse processes.

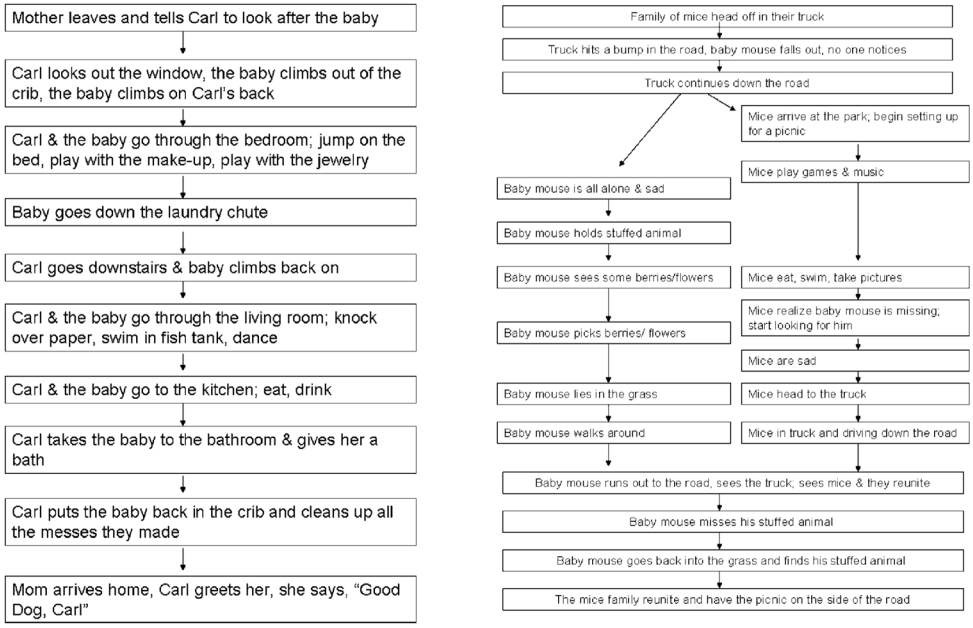

Figure 2.
Story structure for *Picnic* (McCully, 1984) and *Good Dog Carl* (Day, 1985).

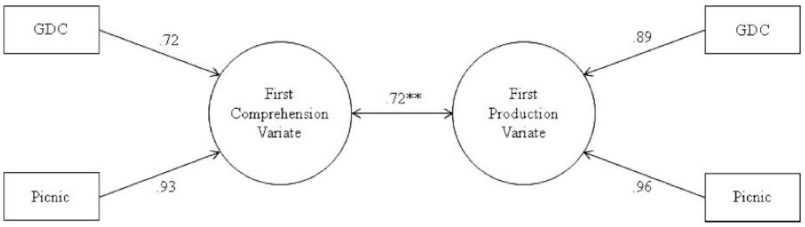

Figure 3.

Correlations between comprehension and production variables, their corresponding canonical variates (i.e., comprehension and production composites), and the first pair of canonical variates for the older adults group. *Good Dog Carl* (GDC) and *Picnic* comprehension measures are combined linearly to create a composite variate that generally reflects participants' comprehension ability (first comprehension variate) for the stories. The first production variate reflects the ability to convey story elements for these stories. Note that some of the data presented here also appear in Table 4. $^{**}p < .01$.

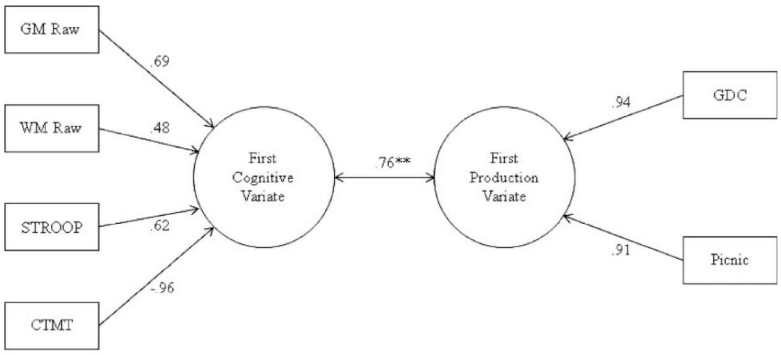

Figure 4.

Correlations between cognitive and production variables, their corresponding canonical variates (i.e., cognitive and production composites), and the first pair of canonical variates for the older adults group. Cognitive measures (i.e., GM Raw, WM Raw, STROOP, CTMT) are combined linearly to create a composite variate that generally reflects participants' cognitive ability (first cognitive variate). The first production variate reflects the ability to convey story elements for the *Good Dog Carl* and *Picnic* stories. Note that some of the data presented here also appear in Table 4. GM Raw = Wechsler Memory Scale—III, General Memory index raw score; WM Raw = Wechsler Memory Scale—III, Working Memory index raw score; STROOP = Stroop Color and Word subtest; CTMT = Comprehensive Trail Making Test. $^{**}p < .01$.

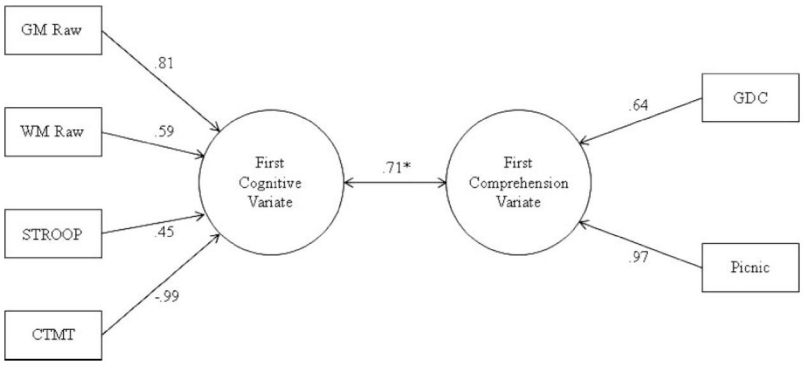

Figure 5.

Correlations between cognitive and comprehension variables, their corresponding canonical variates (i.e., cognitive and comprehension composites), and the first pair of canonical variates for the older adults group. Cognitive measures (i.e., GM Raw, WM Raw, STROOP, CTMT) are combined linearly to create a composite variate that generally reflects participants' cognitive ability (first cognitive variate). The first comprehension variate reflects participants' comprehension ability for the *Good Dog Carl* and *Picnic* stories. Note that some of the data presented here also appear in Table 4. *$p < .05$.

Table 1

Demographic data for the two groups (young adults and older adults).

	Group	
	Young adults (*N* = 30)	**Older adults (*N* = 30)**
	M (SD)	***M (SD)***
Age	23.67 (2.70)	76.90 (4.51)
Years of education	15.67 (2.19)	15.10 (3.41)
Gender	17M, 13F	10M, 20F
MMSE *t* score[a]	55.33 (6.38)	61.73 (9.15)
MMSE raw score[b]	29.57 (.77)	29.13 (1.01)
GDS	1.87 (2.06)	1.23 (1.92)

Note. MMSE = Mini Mental State Examination; GDS = Geriatric Depression Scale—Short Form.

[a] Study inclusion criteria was an MMSE *t* score of 30 or greater.

[b] Maximum MMSE raw score = 30.

Table 2

Young and older groups' means and *SD*s for the cognitive measures.

	Group	
Raw score	**Young adults (*N* = 28)**	**Older adults (*N* = 26)**
WMS–III GM[a]	171.64 (17.62)	148.54 (26.21)
WMS–III WM[b]	30.14 (4.02)	24.12 (5.09)
STROOP C–W	50.57 (9.44)	31.58 (11.70)
CTMT Trail 5[c]	41.25 (9.28)	91.88 (52.62)

Note. Outliers and missing data are excluded from this table. WMS–III GM = Wechsler Memory Scale—III, General Memory index; WMS–III WM = Wechsler Memory Scale—III, Working Memory index; STROOP C–W = Stroop Color and Word subtest; CTMT Trail 5 = Comprehensive Trail Making Test, Trail 5.

[a] Maximum = 224.

[b] Maximum = 53.

[c] Raw score reflects time in seconds.

Table 3

Group means and *SD*s for proportion of story propositions conveyed and comprehension accuracy.

	Group	
	Young adults (*N* = 28)[a]	**Older adults (*N* = 26)[b]**
	M (SD)	***M (SD)***
Story propositions		
Good Dog Carl	.52 (.11)	.52 (.16)
Picnic	.46 (.11)	.48 (.19)
Total	.49 (.09)	.51 (.16)
Total number of words *		
Good Dog Carl	432.07 (150.88)	686.46 (228.65)
Picnic	434.64 (126.07)	662.50 (264.70)
Total	866.71 (261.17)	1348.96 (478.42)
Proportion of TNW/SP[2] ***		
Good Dog Carl	25.66 (6.80)	39.19 (12.62)
Picnic	40.05 (8.99)	58.83 (19.40)
Total	33.43 (14.76)	51.25 (28.58)
Comprehension accuracy *		
Good Dog Carl	.96 (.06)	.86 (.13)
Picnic	.96 (.05)	.93 (.11)
Total	.96 (.03)	.89 (.10)

[a] Outliers and missing data are excluded.

[b] Proportion of total number of words produced per story proposition conveyed (TNW/SP[2]).

* $p < .01$.

*** $p < .0001$.

Table 4

The canonical solution for correlating cognitive, comprehension, and production variables for the two groups (older adults and younger adults).

	Cog vs. comp variates[a]				Cog vs. prod variates[b]				Comp vs. prod variates[c]			
	Correlation		Coefficient		Correlation		Coefficient		Correlation		Coefficient	
	Older	Younger	Older	Younger	Older	Younger	Older	Younger	Older	Younger	Older	Younger
Cognitive set												
WMS–III GM Raw	**.81**	.17	0.15	0.00	**.69**	**−.48**	−0.13	−0.71				
WMS–III WM Raw	**.59**	**.84**	0.11	1.14	**.48**	**.31**	−0.03	0.52				
STROOP C–W	**.45**	**.36**	0.05	−0.79	**.62**	−.07	0.29	0.54				
CTMT Trail 5	**−.99**	**−.50**	−0.80	−0.63	**−.96**	**.55**	−0.95	0.94				
% of variance	.54	.28			.50	.16						
Redundancy	.27	.07			.29	.01						
Comprehension set												
Good Dog Carl	**.64**	**−.82**	0.26	−0.67					**.72**	**.50**	0.40	0.71
Picnic	**.97**	**.76**	0.86	0.60					**.93**	**.71**	0.76	0.89
% of variance	.67	.62							.70	.38		
Redundancy	.34	.16							.36	.10		
Story Prop Set												
Good Dog Carl					**.94**	**−.87**	0.59	−1.01	**.89**	**.69**	0.40	0.48
Picnic					**.91**	.24	0.49	0.51	**.96**	**.89**	0.67	0.75
% of variance[d]					.85	.41			.85	.63		
Redundancy[e]					.50	.02			.44	.16		
Correlation	**.71***	**.51**			**.76****	**.20**			**.72****	**.51**		

Note. The correlation for each original variable and its corresponding variate is used for interpretation of the variate. The standardized canonical coefficients are used to mathematically combine the original variables to form the variates. Variable coefficients that are pertinent to interpretation of the results are indicated in boldface. Cog = cognitive; comp = comprehension; prod = production.

[a] First cognitive variate and first comprehension variate.

[b] First cognitive variate and first production variate.

[c] First comprehension variate and first production variate.

[d] The percent of variance reflects the extent to which the original variables in the canonical analysis were accounted for by their own canonical variates.

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[e]Redundancy reflects how much variance the canonical variates from the sets of variables extract from one another.

*$p < .05$.

**$p < .01$.

Appendix A

Comprehension questions for *Picnic*.

What does the rest of the family do while the parents fix lunch?

- **a.** Get their faces painted and buy balloon animals
- **b.** Take photographs and swim in the lake
- **c.** Play on the swings and slides
- **d.** Visit the reptile house

How does Little One find his family?

- **a.** He hears his name on the loudspeaker
- **b.** The zoo workers take him to his family
- **c.** He sees them coming down the road
- **d.** He finds a map in the grass

Where is the family going?

- **a.** To the circus
- **b.** To a picnic
- **c.** To the beach
- **d.** To the zoo

What has little one forgotten?

- **a.** A pink stuffed toy
- **b.** A leftover berry
- **c.** A blanket and bottle
- **d.** A blue ball

What route do they take to get to the destination?

- **a.** Through the city
- **b.** On a dirt road
- **c.** Over a bridge
- **d.** On a highway

While Little One is waiting for his family, he is by himself…

- **a.** Playing with his toy
- **b.** Watching the monkeys
- **c.** Laying in the grass
- **d.** Singing and dancing

What do the brothers and sisters do while looking for the Little One?

- **a.** Throw up
- **b.** Play hide-and-seek
- **c.** Cry
- **d.** Find a map

Where do they look for Little One first?

- **a.** By the lake
- **b.** By the lion cage
- **c.** By the concession stand
- **d.** By the lawn chairs

Who is Little One?

- **a.** A young child
- **b.** A small mouse
- **c.** A kitten
- **d.** A puppy

What happens on the way to the destination?

- **a.** Little One gets sick
- **b.** Little One falls out after a bump
- **c.** Little One's brother spills a soda
- **d.** Little One jumps out

Who notices what happens on the journey?

- **a.** A boy on a bike behind them
- **b.** The mother
- **c.** No one
- **d.** The grandpa

What is Little One holding?

- **a.** A pink stuffed toy
- **b.** A bottle and a blanket
- **c.** A blue ball
- **d.** A lunchbox and thermos

Where does the family find Little One?

- **a.** Back at the house
- **b.** At the neighbor's house
- **c.** Hiding in the grass
- **d.** Standing in the road

What does Little One's family decide to do when Little One returns?

- **a.** Take Little One to the zoo
- **b.** Go out for ice cream
- **c.** Eat lunch together
- **d.** Take Little One home

What do the brothers and sisters do at the destination?

- **a.** Go swimming and play baseball

b. Eat cotton candy and meet the clowns

c. Play on the swing set and jump on a trampoline

d. Take pictures of animals and look at giraffes

Appendix B

Story propositions for *Picnic.*

Information in parentheses represents alternative ways in which a component of the story proposition could be stated. Information in brackets represents additional information that could have been added to complete the proposition but is not necessary for a correct (+) response. Complete scoring procedures and training protocol are available upon request.

1	A family of mice went for a ride (are riding) (head off) in their truck
2	The road is bumpy (they hit a bump) (rock) & the little (baby) mouse falls out (off) the back of the truck
3	No one notices and the truck continues on (drives off)
4	The mouse who fell out has (is holding) a [pink] stuffed animal (bear) (mouse) with him
5	The family arrives at their picnic spot (pulls over at their destination) (the park)
6	Mice run out of the truck (run into the field) (park) and [others] set up the picnic
7	The mice are playing music (banjo), swinging from the trees, playing baseball
8	A couple is sitting on a blanket watching
9	The little (baby) mouse is sad (crying) and alone (by himself), just holding his stuffed animal (bear) (mouse)
10	He notices (sees) some berries (flowers)
11	[Back at the picnic] the mouse family is playing (having fun) jumping (swimming) in the water (lake) (pond) & taking pictures
12	They have salad, sandwiches, & watermelon
13	They are getting ready to eat (gather around the blanket) (line up), when they notice (realize) one mouse is missing
14	They start searching (looking) (calling) for the mouse
15	The mice are sad (crying) (upset)
16	They pack up (gather) their belongings (things) (picnic stuff) & load (go back to) the truck (car)
17	The little (baby) mouse is lying in the grass (field) [with his stuffed animal]
18	The mouse family drives back in the direction they came from (retraces the road) looking (searching) for the little (baby) mouse
19	The little (baby) mouse is walking around in the grass
20	The little (baby) mouse hears his family (voices) calling (the truck) and he runs (goes) out to the road/voices
21	The family and little (baby) mouse see each other (reunite) & hug (rejoice) (embrace)
22	Little (baby) mouse has forgotten his stuffed animal (something) so he runs back [into the field] to get it
23	The family has (decides to) set up their picnic right there

Appendix C

Example stories from a younger and older adult participant who conveyed the same number of story propositions.

Younger Adult Telling the Story Depicted in *Picnic*

Alright, there is a family of mice. And they're all preparing to go out on a picnic. So they grab all their their equipment like uh baseball bats and things. And they all load into the back of their big red truck. It's a huge family so a lot of them have to sit in the very back and in the truck bed. And then they're climbing a hill in their truck. And they hit a lot of bumps. And so one of the little mice flies out of the back. And no one notices because they're all looking ahead. So this little mouse is stuck on the road feeling sad with his little mouse stuffed animal. As the rest of the family carries on to their destination. The family gets there. And they all unload all their picnic things. And get ready to set up under the tree. So the family starts setting up. Everyone's happy and content. And they're all playing looking at the lake picking flowers. You know, doing their activities. Meanwhile the little mouse that was ejected from the back of the truck. Just sits along the road hugging his stuffed animal and crying. He starts getting confused and a little scared so he sits up hugs his stuffed animal tight. Looks around and sees a raspberry bush. So uh he justs starts wandering over there. And meanwhile the rest of the family is playing in the lake. And getting ready to eat. And all that stuff. And uh the little mouse um was on his own. Starts eating the raspberries. And uh while he waits for his family. When the family sits down to eat. They realize that the other little mouse isn't there. So all the kids are sitting there. And uh the parents are looking around. You know trying to wonder er trying to figure out where he is. So then they they know he's not there. So then the entire family fans out and searches for him. And shouts his name and things like that. Then when they can't find him they all load back into their truck. So they can retrace their route home. The little mouse is just laying in the grass. And um with a couple of raspberries just waiting. The family drives back. Looks all over the place uh comes back down their hill. And uh the little mouse hears something. So he starts coming out of the bushes. And he jumps into the middle of the road. To see his entire family barreling down the road looking and screaming for him. And when they see him everyone's excited. They all start hugging him and everything. But then he realizes that he left his stuffed animal back in the grass somewhere. So he gets all anxious and scared and just starts running back through the grass to find his stuffed animal. And uh he finds it and is relieved. And then the entire family goes back and has their picnic.

Older Adult Telling the Story Depicted in *Picnic*

The mouse family decided one day it would be it would be nice to have a picnic. Well they all got ready. It was a big family. And they left their little house. And they went out to their pickup truck to go on to go have a picnic. Well obviously there was a mama and a papa mouse. There appeared also to be perhaps a grandma uh grandma and grandpa mouse. And of course a baby mouse with his own little with his own little doll. Well all the children were in back of the truck in the in the bed of the truck. And off they went way out into the uh country. And uh they seemed to be having a very nice time. And at one point however of in the middle of this uh country road which was barely a road cause it was full of rocks and gravel and all kinds of things like that. Well they hit a uh a rock which which so so fast and so hard that it the truck went up into the air. And when that happened baby mouse with his little doll mouse went flying off the end of the truck. Nobody noticed. But there he was all by himself in the middle of the road seeing watching the family disappear in the truck on their way to have their picnic. Well they got to where they thought would be a nice place to have a picnic. So they stopped. And everybody was so helpful. And they were having such a nice time. They unloaded their the ah the tablecloth and the picnic basket from the truck. And uh while the grown ups set it up the children went out playing. One went down to the lake and ah took a look in a looked in the water. Others played around danced around cavorted ah picked up uh uh flowers and posies and things like that while ah mom and pop while while the adults set up the picnic. Well they set it up very nicely with uh with the tablecloth and all the goodies on it. Meanwhile uh eh in before the before it was time to eat the uh the children got together for a for a softball game. And uh uh it looked like grandpa and grandma ah went off to the side. Grandpa had a banjo which he played for them to make nice music ah while a waiting for ah waiting until it was time to to go eat. Meanwhile a couple of the little ones were off just playing this that and the other thing and having a wonderful time. But the poor little baby mouse all by himself with his mouse doll was still back in the middle of the road feeling so sorry for himself because he didn't know what to do or where to go. And he was all by himself. They had all gone off and left him. Well he was he was there. He was looking an uh be because he was so small he had a hard time even seeing over the ah the the ah bushes and other ah and other vegetation that was all around him. But then he found what looks to me like a paw paw bush. So he decided well that can't be all bad. Meanwhile ah back with the family they started eating and taking pictures and jumping off the edge of the uh the dock into the water of the lake. And uh one of the mice had a little uh a little sailboat which was sailing away in the in the lake. And they had this lovely looking picnic with sandwiches watermelon uh salads cheese oh all the things that all the things that little mouse mice love love. Well little baby mouse off by himself decided to collect the uh to collect the paw paws from the paw paw bush and uh have himself his own little picnic. But then ah ah the rest of them apparently all of a sudden realized baby is not here what are we going to do? Well they started looking. They started calling. And ah they just looked everywhere they possibly could think of thinking that maybe baby had just wandered off well obviously that's not what happened. And consequently they didn't find him ah that way. But uh they looked every place. They looked under the rock. They looked in the water. They looked uh uh in all the bushes in all the uh in all the vegetation. And finally they decided well we don't know what to do but we do have this time to go home. We need we need to leave. Meanwhile little baby mouse with his with his mouse doll was uh next to the roadway just having himself a nice little nap after eating up almost all those toh toh paw paws. Well as the truck approached ah ah they could see that there was rocks all over the place. So they began to wonder well what happened to little baby. Where did he go? Well they stopped. And they started wandering around looking for him. And all of a sudden there he was right in the middle of the road. They were so happy to see him. You could they were just everybody was just overjoyed. And they had themselves a wonderful time hugging and loving each other because they all loved each other so much. And then spread their blanket they spread their picnic right there and started all over again before they went home.