The Effects of Literate Narrative Intervention on Children With Neurologically Based Language Impairments: An Early Stage Study

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Purpose: This study investigated the effect of a literate narrative intervention on the macrostructural and microstructural language features of the oral narratives of 3 children with neuromuscular impairment and co-morbid receptive and expressive language impairment.
Method: Three children, ages 6-8 years, participated in a multiple baseline across participants and language features study. The 3 participants engaged in 10 individual literate narrative intervention sessions following staggered baseline trials. Assessment probes eliciting picture- and verbally prompted narratives were recorded and analyzed.
Results: All three children demonstrated gains in the use of story grammar (macrostructure) and causality (microstructure), with moderate to large effect sizes based on percentage of nonoverlapping data points. Gains were seen in both picture-prompted narratives that were the direct focus of intervention and in verbally prompted narratives that served as a measure of generalization. Other features of microstructure not explicitly targeted during intervention increased in the narratives produced by the participants. Additionally, follow-up data collected 8 months after intervention indicated the maintenance of some skills over time.
Conclusion: The results of this study suggest that literate narrative intervention may be useful for improving children's functional use of narrative macrostructure and microstructure, including literate language.

KEY WORDS: language impairment, narrative intervention, literate language, storytelling

Narration is a monologic discourse style in which the narrator creates a story context for the listener almost exclusively through the use of language (Snow, 1991). Narratives frequently focus on temporally removed events that are fully understood only by the narrator. This generates a condition where the listener has to rely on the narrator's linguistic proficiency, placing a greater demand on the narrator to use lucid and descriptive language. Narrative proficiency is acquired gradually, following a developmental continuum marked by differing levels of complexity in general organization (macrostructure) and in constituent linguistic features (microstructure).

Narrative Macrostructure

Narratives do not follow a universal organizational construct; they differ due to cultural, informational, and situational factors (cf. Champion,

McCabe, & Colinet, 2003; Gutierrez-Clellen & Quinn, 1993; Michaels, 1981; Okpewho, 1992). The academic culture tends to place a higher value on narratives that follow an organizational pattern (or story grammar) similar to that outlined by Stein and Glenn (1979; Champion, 2002). Stein and Glenn's analysis of *narrative macrostructure* is a framework or schema that delineates the salient elements in fictional narratives. These elements include the setting, initiating event, internal response, plan, attempt, consequence, and resolution. Of these story grammar elements, an initiating event, one or more attempt(s), and a consequence combine to form a minimally complete narrative episode (i.e., *plot*; Peterson & McCabe, 1983). Narratives used in the school curriculum generally contain complete episodic constructs. Story grammar and episodic construct indicate macrostructural complexity that reflects narrative proficiency, especially when viewed from an academic perspective.

Narrative Microstructure

Oral language used for narration often shares a variety of features with written language (R. B. Gillam & Johnston, 1992). The use of causal and temporal subordinating conjunctions, coordinating conjunctions, adverbs, elaborated noun phrases, mental and linguistic verbs, and specific nouns with clearly referenced pronouns mark a more sophisticated language style known as *literate language* (R. B. Gillam & Ukrainetz, 2006; Greenhalgh & Strong, 2001; Nippold, Ward-Lonergan, & Fanning, 2005; Nippold, 1998; Nippold & Taylor, 1995; Strong & Shaver, 1991; Westby, 1999). Literate language is an important aspect of narrative microstructure and can be a good indicator of narrative proficiency (Curenton & Justice, 2004; Eisenberg et al., 2008; Greenhalgh & Strong, 2001; Paul, 1995; Sulzby, 1985, 1994; van Oers, 1998).

Additional features of microstructure, which are not necessarily literate in nature, can be assessed in narratives as well. For example, the *number of utterances* (C-units), *total number of words* (TNW), *mean length of utterance* (MLU), and *number of different words* (NDW) are measures of language productivity. MLU and NDW are useful measures for estimating syntactic (Brown, 1973; R. B. Gillam & Johnston, 1992; Rice, Redmond, & Hoffman, 2006) and semantic (Greenhalgh & Strong, 2001; Miller, 1991) complexity and to differentiate between children with and without language impairments (R. B. Gillam & Johnston, 1992; Klee, 1992; Watkins, Kelly, Harbers, & Hollis, 1995).

The Academic Importance of Narratives

During the elementary school years, children are expected to understand and produce narratives that contain increasingly more complex macrostructure and microstructure. It is common for core curriculum requirements to explicitly delineate narrative instruction that focuses on multiple story grammar elements, episode development, and narrative microstructure. To illustrate this, the core curricula from seven randomly sampled states (Alaska, California, Florida, Georgia, Montana, Oklahoma, and Wyoming) were screened for narrative-related goals or objectives. Features of narrative macrostructure and narrative microstructure were explicitly included as important content of the core curriculum for elementary grades in all seven states. For each state, as the grade level increased, the expectation of narrative complexity increased. As an example, Appendix A outlines a sample of the curriculum pertaining to narratives from the state of California.

Narratives are frequently used to convey information and assess knowledge in the classroom, and language ability is highly correlated with academic success (Mehta, Foorman, Branum-Martin, & Taylor, 2005). Proficient readers generally have good literate language skills and understand and use complex narrative macrostructure. For example, Loban (1976) conducted a 13-year longitudinal investigation of children's narrative and writing ability; this study revealed that children who were the most gifted storytellers and writers used more complex literate language. Mehta et al. (2005) studied 1,342 students in 127 classrooms in Grades 1–4 in 17 high-poverty schools. The investigators found that language competence was highly correlated with reading ability at the classroom level and at the student level. For some time, it has been suggested that the relationship between oral and written language is fundamental and reciprocal (Flood & Lapp, 1987; R. B. Gillam & Johnston, 1992; Snyder & Downey, 1991; Sulzby, 1985, 1994; Westby, 1985).

Because of the strong associations among narrative proficiency, literate language, and academic performance, targeting macrostructural and microstructural aspects of narration in language intervention may have numerous benefits for children who have language and learning disabilities. More specifically, the use of literate narratives that are formally structured by literary conventions containing episodic narrative grammar and literate language features may be an effective method of helping children understand and produce those language features that best support academic development (R. B. Gillam & Ukrainetz, 2006; van Dongen & Westby, 1986). If children have difficulty comprehending and producing complex oral narratives that contain literate language—and if these same children do not have access to written literate narratives because of reading difficulty—then using an alternative method of exposing children to literate narratives above and beyond naturally occurring language interaction and written language could be helpful.

Previous Narrative Intervention Research

In a systematic review by Petersen (in press), eight studies (Davies, Shanks, & Davies, 2004; R. B. Gillam, McFadden, & van Kleek, 1995; Hayward & Schneider, 2000; Klecan-Aker, Flahive, & Fleming, 1997; Peña et al., 2006; Petersen, Gillam, & Gillam, 2008; Swanson, Fey, Mills, & Hood, 2005; Tyler & Sandoval, 1994) were analyzed in order to determine the effect of narrative intervention on the macrostructure and microstructure of narratives produced by children with language impairment. Many of the studies reviewed taught narration in response to single photos or pictures, wordless picture books, drawings, icons, or cue cards during intervention. Repeated narrative retellings were used as an intervention method in all studies. In general, language facilitation procedures included the use of focused stimulation (Leonard, Camarata, Rowan, & Chapman, 1982), vertical structuring (R. B. Gillam & Ukrainetz, 2006; Schwartz, Chapman, Terrell, Prelock, & Rowan, 1985; Scollon, 1976), and incidental teaching techniques (Hart & Risley, 1975). *Focused stimulation* provides children with concentrated exposure to specific linguistic targets (e.g., high-frequency use of the causal conjunction *because* in adult utterances); *vertical structuring* includes the use of adult questioning to facilitate multiword productions (e.g., Adult: *"Who is this?"* Child: *"Mom."* Adult: *"What is the mom doing?"* Child: *"Cooking dinner."* Adult: *"Right, the mom is cooking dinner."*). *Incidental teaching* refers to adult and child interaction that arises in a naturally occurring context in which the adult's aim of the interaction is to convey information or to promote the development of a skill.

The comprehensive review revealed that repeated story retellings with a focus on narrative macrostructure may be sufficient to facilitate a significant improvement in both narrative macrostructure and some aspects of narrative microstructure. However, very little is known about the effectiveness of narrative intervention for the development of literate language features. Further, no research to date has investigated the maintenance of skills acquired during narrative intervention, and only Swanson et al. (2005) examined generalization, with nonsignificant results reported. Also, none of the studies that were reviewed specifically targeted narrative microstructure during intervention and then assessed those microstructural features as dependent variables. The majority of studies had weak experimental control, using a simple pre/post design.

There were no studies in the review that concerned narrative intervention for children with neuromuscular disorders and co-morbid language impairments. These children have been documented as being passive communicators who engage in few child-initiated conversation exchanges and use simplified language (for reviews, see Bishop, 1988; Paul, 1998). This reticent communication profile has historically been difficult to remediate (Berninger & Gans, 1986; Bishop, Byers Brown, & Robson, 1990; Blockberger, 1997; Redmond & Johnston, 2001; Sandberg & Hjelmquist, 1997; Udwin & Yule, 1990). It is essential that clinical practices are not only based on scientific evidence about "what works" but that the evidence specifies what works with whom, in what contexts, and under what circumstances. In other words, researchers and practitioners should be concerned with issues of population validity and ecological validity. To decide if a practice is appropriate for implementation, researchers should validate it with individuals such as those with whom it will be applied. Speech-language pathologists (SLPs) often provide services to children with co-morbid neuromuscular and language impairments. We decided to evaluate the outcomes of narrative intervention procedures with a population of children whose language impairments have been relatively intractable.

The purpose of the study was to investigate the effect of literate narrative intervention on the macrostructural and microstructural features of the oral narratives of 3 school-age children with neuromuscular impairment and co-morbid receptive and expressive language impairments. The design of the study enabled careful experimental control of narrative macrostructural and microstructural aspects of narration as well as an assessment of generalization and maintenance of skills.

Method

Participant Selection Criteria

Three children with neuromuscular impairment and co-morbid language impairments participated. Selection criteria included documentation or confirmation of the following: (a) moderate or severe receptive and expressive language impairment, (b) a moderate-to-severe neuromuscular impairment, (c) a score of 70 or higher on a nonverbal intellectual screening instrument, signifying intelligence above the conventional criteria for intellectual disability (American Psychiatric Association, 1994), (d) monolingual English speakers, and (e) normal hearing.

We recruited participants by dispersing an informational brochure to the parents of children who received speech and language services and/or special education services in local school districts. Those children whose parents expressed interest and provided consent were further evaluated for confirmation of eligibility and entrance-level skills prior to intervention. Each of the 3 participants received a battery of assessments, including the Test of Narrative Language (TNL; R. B. Gillam & Pearson, 2004); the Clinical Evaluation of Language Fundamentals—4 (CELF–4; Semel, Wiig, & Secord, 2003), which resulted in a Core Language quotient; the Matrices

subtest of the Kaufman Brief Intelligence Test (K-BIT; Kaufman & Kaufman, 1990); and an audiological screening. An estimation of speech intelligibility was offered by a naïve listener who was asked to transcribe a sample of recorded narratives produced by each participant.

Participant Characteristics

All 3 participants were European-American children who lived with both parents in Utah. The families' socioeconomic status ranged from low–middle to middle class. The children attended general education classrooms the majority of the school day and received special education services along with speech, language, occupational, and physical therapy. Parents reported that the participants' general education teachers, resource specialists, and SLPs did not use narrative intervention as an approach to improving language ability.

At the time of initial evaluation, Sally, a female with a primary diagnosis of cerebral palsy, was age 6;3 (years;months). Sally was born 2 weeks early and was delayed in speech and language development. She had moderate difficulties with fine and gross motor skills. Sally said her first words at age 2;6 and began walking at age 3;0. She had a moderate-to-severe language disorder, as evidenced by a standard score of 73 on the Core Language quotient of the CELF–4. Because of technological difficulties with the recording equipment, the TNL could not be validly scored. Sally's performance on the Matrices subtest of the K-BIT indicated average intellectual ability with a standard score of 93. Sally had moderate dysarthria of speech, characterized by effortful speech production with moderate articulation difficulty. She had 70% intelligible speech as estimated by a naïve listener. An audiological screening revealed normal hearing.

Mary, a female with spina bifida, was age 6;5. Mary was born via C-section with few complications. She had significantly impaired fine and gross motor abilities and used a wheelchair for primary mobility. Mary's parents reported that she said her first words at 12 months of age and had significant language and memory difficulties. She obtained a standard score of 66 on the Core Language quotient of the CELF–4, indicating moderate-to-severe language impairment. The results of the TNL revealed moderate-to-severe difficulties with narrative comprehension and production, with a Narrative Language Ability Index score of 73. Mary scored slightly below the average range on the Matrices subtest of the K-BIT, receiving a standard score of 83. She had mild difficulties with speech production, as indicated by 98% speech intelligibility and normal hearing.

Tom was age 8;1 and had an unspecified neurologically based speech and language disorder. Tom was born 13 weeks premature; his birth weight was 2 pounds. His parents reported that he had a traumatic birth and was in the neonatal intensive care unit for 10 weeks. MRI scans revealed notable damage to his cerebellum. Tom sat up at age 1;6 and began walking after intensive physical therapy near his 3rd birthday. Tom learned to use some signs at an early age, but his fine motor ability was limited. At age 4;6, Tom spoke his first words. Tom obtained a standard score of 66 on the Core Language quotient of the CELF–4 and a standard score of 67 on the Narrative Language Ability Index of the TNL, indicating moderate-to-severe receptive and expressive language and narrative impairments. His intellectual abilities were within the average range as measured by the Matrices subtest of the K-BIT (standard score of 91). He had speech dysarthria characterized by slow labored speech, but he was 92% intelligible as estimated by a naïve listener. Tom's audiological screening indicated normal hearing.

Design

We used a multiple-baseline design across participants and language features to determine the effect of narrative intervention on macrostructure and microstructure elements of self-generated and verbally prompted stories. Prior to the onset of intervention, we administered assessment probes to elicit baseline narratives. The number of baseline assessment probes were staggered for each participant (i.e., four, six, and eight). Following the baseline periods, intervention focused on all macrostructure targets and on one microstructure target. An additional microstructure target was introduced during the last three intervention sessions, resulting in contrasting baselines across two microstructural language features. The use of an extended baseline design was intended to increase the confidence of a causal relation between the intervention and the measured outcomes.

Intervention

The narrative intervention was adapted from the Functional Language Intervention Program for Narratives (FLIP-N; S. L. Gillam, Gillam, Petersen, & Bingham, 2008). The adapted program, referred to as *Literate Narrative Intervention* (LNI), consisted of 10 steps (see Appendix B) that were addressed in each intervention session. The sequence of intervention steps was designed to withdraw support gradually so participants independently retold a story by the end of each session. Every story modeled and generated during intervention was connected to a picture or a series of pictures from children's literature. Books were selected because they included attractive pictures that allowed the clinician to make up a story containing all of the story grammar elements. Appendix C lists the books used during the intervention sessions.

During Steps 1–3, children retold clinician-generated stories that corresponded to sequential pictures from children's books. In Step 1, the clinician created a model story using pictures from a book. In Step 2, the child looked at icons representing the story grammar elements. Icons consisted of simple color representations of each component. The icons were placed on the table in front of the participant when it was the appropriate time to add that element into their stories. For example, the clinician first laid down the character icon and said, "Who is your story about?" while pointing to the character icon. After the participants identified the character, the setting icon was displayed, indicating what part of the story came next. Verbal prompting was provided as needed. If participants added a story grammar component before the icon was needed, the clinicians laid it down without interrupting the story. In Step 3, the clinician removed the icons and asked the participant to retell the story using the pictures. The clinician supported the participant's retelling with questions, prompts, and cues.

Single pictures of complex scenes depicting an initiating event were used as story prompts in Steps 4 and 5. During Step 4, the participants and the clinicians created a story together using a single picture and the story grammar icons. In Step 5, the icons were removed, and the participant was asked to retell the story using the single picture while the clinician offered support when needed.

Simple-scene pictures with less visual support for initiating events were used in Steps 6 and 7. During Step 6, the clinician played the recording of a probe story that was elicited at the beginning of each session before intervention began. As the child listened to the recorded story, the clinician placed story grammar icons representing the components in the children's stories on the table. After the pre-recorded story ended, the clinician and participant discussed which story grammar icons were missing and co-constructed a revised story that contained all the story grammar elements. Step 7 included the use of the same simple picture, but the child's task was to tell the story without the presence of the story grammar icons.

Steps 8 and 9 involved visual representations of story content. In Step 8, the clinician drew pictures on small yellow sticky notes as the participant generated a story. Each sticky note corresponded to a story grammar element. In Step 9, the participant was asked to retell his or her story using only the clinician-drawn pictures. Clinician prompting was limited to the use of inferential and factual questions. Finally, in Step 10, the participant was asked to retell his or her story without using the clinician-drawn pictures or icons. The clinician provided limited prompting.

Participants attended ten 60-min individual narrative intervention sessions. The first author, an American Speech-Language-Hearing Association (ASHA)–certified SLP with experience working with children in public schools, provided therapy 3 days each week. The third author, a board-certified applied behavior analyst and school psychologist who has had experience working with children in public and private settings, provided therapy 1 day each week.

Each clinician primarily controlled the activities and materials so as to elicit specific targets in the narrative context. The clinicians modeled storytelling; used expansion, repetition, recasting, and cloze procedures; and asked inferential or factual questions to prompt participants to use macro- and microstructural narrative elements. Stories containing literate, complex language were repeatedly modeled, and participants were prompted to repeat the stories multiple times to reinforce the targeted narrative and linguistic structures.

Target intensity. Narrative macrostructure and microstructure targets were emphasized concurrently during intervention. All 10 narrative intervention steps were addressed during each session. However, the rate of clinician support was gradually reduced with each successive step. To illustrate this, we calculated the intensity with which the first author emphasized each macrostructural story grammar component during the first three steps of a randomly selected intervention session with Sally. The clinician modeled an 8-min story for Sally using the pictures from a book (Step 1). Immediately following the modeled story, the clinician introduced the story grammar icons and then helped Sally retell the story using the icons and the book pictures (Step 2). During this phase of the intervention, the clinician taught narrative macrostructure using the procedures cited in the following examples:

Modeling—*"John decided to get away."*
Expansion—Child: *"The boy was eating."* Clinician: *"John was eating in the kitchen."*
Repetition—Clinician: *"One day, David was walking in the street. Now you say it."*
Recasting—Child: *"The girl was crying."* Clinician: *"Was the girl crying? She was sad."*
Questioning—Clinician: *"Why did she want to run?"*
Cloze procedures—Clinician: *"One day, David was _____."*

This phase of the intervention lasted 12 min. During Step 3 of the intervention, which lasted 7.5 min, the clinician withdrew the story grammar icons and provided a lesser degree of support according to the needs of the participant. Steps 1–3 lasted a total of 27.5 min. During that time, the clinician emphasized the character 23 times, the setting 13 times, the initiating event 49 times, the internal response 39 times, the action/attempt 49 times, the consequence 31 times, and the resolution seven times. This resulted in the clinician emphasizing target story grammar elements a total of 211 times during the first three steps of intervention. Those story grammar

elements that constituted a complete episode—namely, the initiating event, internal response, action/attempt, and consequence—were emphasized with the greatest frequency, accounting for 168 of the 211 (80%) story grammar elements highlighted.

In contrast, during those steps in which more independent narration was to be promoted, the clinician emphasized story grammar elements at a much lower frequency. For example, during the same intervention session with Sally, the clinician emphasized the story grammar elements a total of only nine times during Steps 7 and 10. The clinician emphasized the internal response a total of five times, the action two times, and the initiating event and consequence only one time across both intervention steps. The character, setting, and resolution were never emphasized. This reduction in clinician support from the beginning to the end of the intervention session was a direct reflection of Sally's improvement in including target elements in her narratives.

Narrative microstructure targets were emphasized to a similar degree as the macrostructure targets. To illustrate this, we conducted a detailed analysis of the frequency with which the first author emphasized causality during a randomly selected intervention session with Tom. During this intervention session, only causality was emphasized. The second microstructure target (temporal adverbial subordination) was targeted during later intervention sessions. The analysis revealed that the clinician modeled or prompted the use of marked causal relations a total of 62 times in 45 min of intervention. Of the causal relations modeled or prompted by the clinician, 55% were modeled phrases (e.g., *"They're angry because they're sitting at a stoplight."*) and 45% were open-ended questions (e.g., *"Why were they happy?"*). Tom was required to produce the desired target following each clinician prompt. During the session, the clinician reduced the number of models and prompts to elicit causality in the latter intervention steps, although not to the extent noted with narrative macrostructure. It is important to note that although causality was modeled and prompted with high intensity, the second microstructure feature—temporal adverbial subordination—was de-emphasized. That is, the clinician rarely modeled the use of temporal adverbial subordinate clauses during the intervention session and never elicited their use. This pattern of high-intensity focus on causality and diminished emphasis of temporal adverbial subordination occurred during each intervention session until the eight, ninth, and tenth sessions, when both microstructure features were targeted simultaneously.

Measures: Assessment Probes

Stories were elicited the same way across all conditions. Participants were asked to create a story about a simple photograph that did not have an obvious initiating event. Pictures were similar to those used by R. B. Gillam and Johnston (1992) and Swanson et al. (2005). For example, one of the pictures depicted a whale swimming in the ocean, and another picture showed a man playing the drums (a complete list and descriptions can be obtained by contacting the first author). The pictures were printed in color on 8.5" × 11" paper, pasted onto sheets of colored construction paper and then laminated.

Following each intervention session, the clinician randomly showed the participant a picture and said, "I want you to look at this picture and make up the best story that you can." If the participant did not initiate a story, the clinician repeated the direction as many times as necessary to get the story started. During the participant's narrative, if there was a pause for longer than a few seconds, the clinician said, "Is that everything?" No other prompts were provided while the participant produced the narrative.

Measures: Generalization Probes

Verbally prompted narratives were probed twice during the baseline phase, twice during the intervention phase, and once 8 months following intervention. The purpose of these probes was to assess the generalization of skills acquired during intervention. To avoid practice effects, verbally prompted narratives were elicited immediately following the picture-prompted assessment probes in the baseline, intervention, and maintenance phases. Verbally prompted narratives were elicited in one of two ways. First, the clinician asked the participant *"What is one of your favorite movies?"* Then, after the participant responded with the name of a movie, the clinician said, *"Tell me about your favorite part of that movie."* Alternatively, if the participant did not produce the name of a movie or did not want to tell a story about a movie, then the clinician said *"Tell me about a TV show you have seen."* Participants could be prompted several times to produce a narrative. The participants preferred telling stories about a favorite episode in a movie, with Mary, Sally, and Tom narrating about a movie in three out of their four verbally prompted generalization probes.

Because all of the narratives that were retold or generated during intervention were picture based, prompting the participants to generate a story based on a previously viewed movie or TV show offered insight into their ability to generalize skills learned from one narrative elicitation context to another.

Dependent Variables: Macrostructure

As previously outlined, *narrative macrostructure* refers to those features that contribute to the general properties of a narrative such as story grammar (Stein & Glenn,

1979) and episodic format (Peterson & McCabe, 1983). For this study, we judged macrostructure using a modification of the Index of Narrative Complexity (INC; Petersen et al., 2008) in conjunction with an analysis of narrative episodic construct (Applebee, 1978). We derived a combined macrostructure score by adding the modified INC and episodic construct scores, resulting in a total possible score of 29.

INC. The modified INC scoring system comprised nine categories that individually yielded scores ranging from 0 to 2 or 0 to 3, with higher scores reflecting greater complexity or frequency (cf. Petersen et al., 2008, for a detailed description). The total possible INC score was 23. The INC categories used in this study were as follows:

Character (0–3 points): Any reference to an actor (human or animal) in a narrative (e.g., "*There was a boy.*").

Setting (0–2 points): Any reference to a place or time (e.g., "*He went to the park.*").

Initiating event (0–3 points): An event or problem that elicits a response from the characters (e.g., "*The boy saw a scary spaceship and ran.*").

Internal response (0–2 points): Any reference to a psychological state such as feelings, emotions, desires, or thoughts (e.g., "*The boy was scared.*").

Plan (0–3 points): Reference to a cognitive verb that indicated the intention to act on an initiating event (e.g., "*The boy decided to run.*").

Actions/attempts (0–2 points): Actions taken by the main character that were unrelated to the initiating event (1 point) or attempts that were directly related to the initiating event (2 points; e.g., "*The boy ran from the spaceship.*").

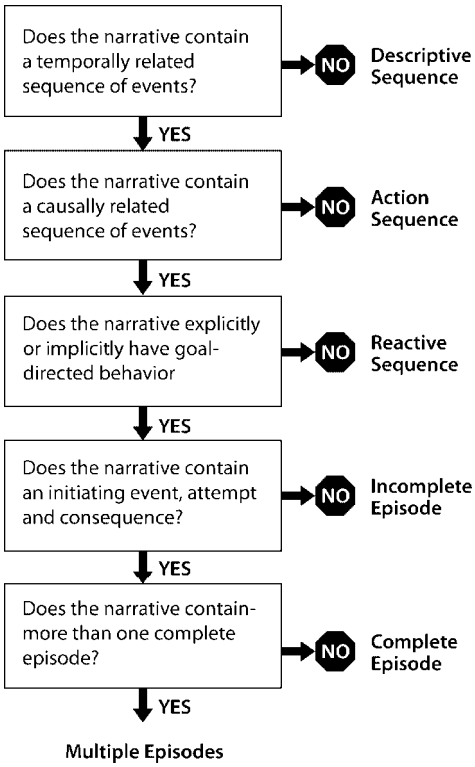
Complication (0–2 points): An event that prohibited the character from executing a plan or action that was related to the initiating event (e.g., "*The boy fell down and hurt his leg, so he couldn't run away.*").

Consequence (0–3 points): The outcome of an action that was related to the initiating event (e.g., "*The boy crawled away and was safe from the aliens.*").

Formulaic markers (0–3 points): Any standard utterance used to mark the beginning or ending of a narrative (e.g., "*Once upon a time.*").

Episodic construct. The participant's narratives were analyzed for episodic construct. A flow chart (see Figure 1) derived from Applebee's (1978) work—as interpreted by Hughes, McGillivray, and Schmidek (1997) and Hayward and Schneider (2000)—was used as a guideline to determine whether a narrative could be episodically characterized as a descriptive sequence, an action sequence, or a reactive sequence, or whether the narrative contained an incomplete episode, a complete episode, or multiple episodes. Narratives that were descriptive sequences received an episodic score of 1, narratives that were an action sequence received an episodic score of 2, and so forth. Points ranging from 1 to 6, reflective of the six levels of episodic construct, were assigned to each narrative and added to the INC score.

Figure 1. Narrative episodic construct. (The information contained in this table is adapted from Applebee, 1978; Hughes et al., 1997; and Hayward and Schneider, 2000.)



Dependent Variables: Targeted Microstructure

Causality. Each C-unit of the narrative was coded for causality, including subordinating causal conjunctions, which are an important feature of literate language and narrative construct (Greenhalgh & Strong, 2001; Nippold & Taylor, 1995; Stadler & Ward, 2005; Weaver & Dickinson, 1982). Causality was first coded by identifying marked causal terms such as *because, so (so that), to (in order to), that,* and so forth. Clause(s) were also examined for causal properties not overtly marked by causal terms. The criteria presented by Hayward, Gillam, and Lien (2007) and Trabasso and Sperry (1985) were used as a guide for determining unmarked causal relations between events. Each potential causal relation was tested with the question "if event A had not occurred, would

event B have taken place?" The total number of marked and unmarked causal relations in each narrative were tallied, and a causal relation score was recorded. For example, if a narrative contained one marked and one unmarked causal relation, then the causal relation score would equal two.

Temporal adverbial subordinate clauses. Temporal subordinating conjunctions (e.g., *when, after, before*) are an important feature of literate language (Westby, 1999). *Temporal adverbial subordinate clauses* consist of an adverbial subordinate clause marked by temporal conjunctions (e.g., (*"When the boy got home he went to bed."*; Hughes et al., 1997; Strong, 1998). The total number of temporal adverbial subordinate clauses in each narrative was recorded.

Dependent Variables: Incidental Microstructure

Due to the nature of the intervention, and based on previous research (Davies et al., 2004; R. B. Gillam et al., 1995; S. L. Gillam et al., 2008) it was deemed possible that the participants would increase their use of microstructural features that were not specifically targeted during intervention. Although causal references and temporal adverbial subordination were purposefully emphasized during the intervention procedures, other major features of literate language including adverbs, elaborated noun phrases, mental/linguistic verbs, and pronomial reference cohesion were, by default, also modeled repeatedly during intervention. The extent to which the participants included those additional literate language features in their narratives along with MLU, NDW, and TNW was calculated.

Adverbs. The total number of adverbs used in each participant's narratives were calculated following the procedures outlined in Curenton and Justice (2008). Adverbs included words or phrases that modified a verb by providing additional information concerning time (e.g., *repeatedly, suddenly, again, once*), manner (e.g., *somehow, quickly, slowly, well*), degree (e.g., *barely, nearly, almost*), place (e.g., *there, here, inside, above*), reason (e.g., *therefore, since, so*), and affirmation or negation (e.g., *really, never, definitely*).

Elaborated noun phrases. Elaborated noun phrases were coded following the guidelines presented in Eisenberg et al. (2008) and Greenhalgh and Strong (2001). Simple noun phrases consisting of a determiner and a noun were not coded (e.g., *the boy, the dog*). Each elaborated noun phrase was given a weighted score ranging from 2 to 4, reflective of the degree of complexity. Noun phrases that consisted of a determiner, a modifier, and a noun (e.g., *a big boy, the rocket ship*) received a score of 2. Noun phrases containing a determiner and two or more modifiers preceding a noun received a score of 3 (e.g., *the small red cup*). Complex postmodification of nouns—including relative clauses, appositives, and prepositions—received a score of 4 (e.g., *the dog that was cold, a hole in the ground*).

Mental and linguistic verbs. Mental and linguistic verbs (Nippold & Taylor, 1995) were tallied following the guidelines in Curenton and Justice (2004). Mental and linguistic verbs included mental verbs such as *think, believe, know, feel,* and *imagine* and linguistic verbs such as *tell, say, speak,* and *reply.*

Pronomial reference cohesion. The percentage of unambiguous pronominal reference cohesion was calculated following the guidelines established by the Strong Narrative Assessment Procedure (SNAP; Strong, 1998). Utterances can be clearly linked through the use of reference cohesive ties (Halliday & Hasan, 1976; Strong; 1998; Strong & Shaver; 1991). *Pronomial reference cohesive ties* include the accurate use of pronouns in reference to subjects previously introduced using definite and indefinite articles. For example, a child who begins a narrative by saying, "There once was *a girl named Maria,* and *she* got a new bike" has properly introduced the subject of the narrative with an indefinite article (*a* girl named Maria) and has referred back to the subject using a clear pronominal reference cohesive tie (*she*).

MLU, NDW, and TNW. Common measures of language include the number of C-units, MLU, NDW, and TNW. Each measure was analyzed using the Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 1998).

Transcription and Training

The first author and one graduate research assistant transcribed participant narratives according to SALT (Miller & Chapman, 1998) conventions. Utterances were segmented into C-units, which consist of the main clause and all clauses subordinated to it. The first author transcribed all of the narratives produced by the participants, and a trained research assistant independently transcribed 30% of the narratives. The first author and the research assistant then compared the narratives that they both transcribed, assessing the overlap of transcribed words and C-unit boundaries. Those utterances on which they disagreed with respect to segmentation and/or transcription were noted. Disagreements were resolved by consensus between the first author and the research assistant. Most of the disagreements revolved around the correct segmentation of C-units. The combined reliability for transcription and C-unit boundary was 90%.

Intervention Fidelity

Twenty percent of the intervention sessions were observed for fidelity. The authors served as the independent

observers for sessions in which they did not provide the intervention. During intervention sessions, clinicians referred to a checklist to ensure completion of each step. A similar checklist was used during fidelity observations to determine the number of steps implemented correctly. The fidelity checklist referenced 32 different aspects of the intervention by which the clinician was to be judged. In addition to the 10 major steps of the intervention, the clinician was expected to use specific narrative elicitation strategies and present and withdraw clinician support (both verbal and visual) during the steps of the intervention. Observers documented 99% intervention fidelity.

Scoring Reliability

Twenty percent of the assessment probes across baseline and intervention conditions were randomly selected for reliability coding. Two researchers, blind to participant and condition, independently analyzed stories for macrostructural elements and microstructural features. We established point-by point agreement for each element and each target by dividing the total number of agreements by the total number of agreements plus disagreements and then multiplying by 100. The reliability of scoring for temporal adverbial subordinate clauses (100%), total number of clauses (91%), and marked and unmarked causality (100% and 98%, respectively) was calculated based on the total number of agreements per C-unit. The INC reliability (98%) and episodic construct reliability (90%) were calculated by comparing the total points awarded for each narrative by two independent raters. Overall, macrostructure interrater agreement was 90%, and microstructure interrater agreement was 97%. Interrater agreements for all measures were excellent.

Social Validity

Social validity refers to the extent that the effects of an intervention have applied value and are actually beneficial in ways that are evident in everyday life (Kazdin, 1980). If a sample of the general public considered narratives produced during intervention as superior to narratives produced before intervention, then the treatment effect could be regarded as meaningful and socially valid. A sample of three narratives produced by each participant during the baseline (one narrative) and intervention phases (two narratives) of the study was given to 15 undergraduate college students. The students were asked to rank order the narratives from lowest to highest quality. The students were blind to the purpose of the study, the conditions under which the narratives were elicited, and the identity of the participants.

Results

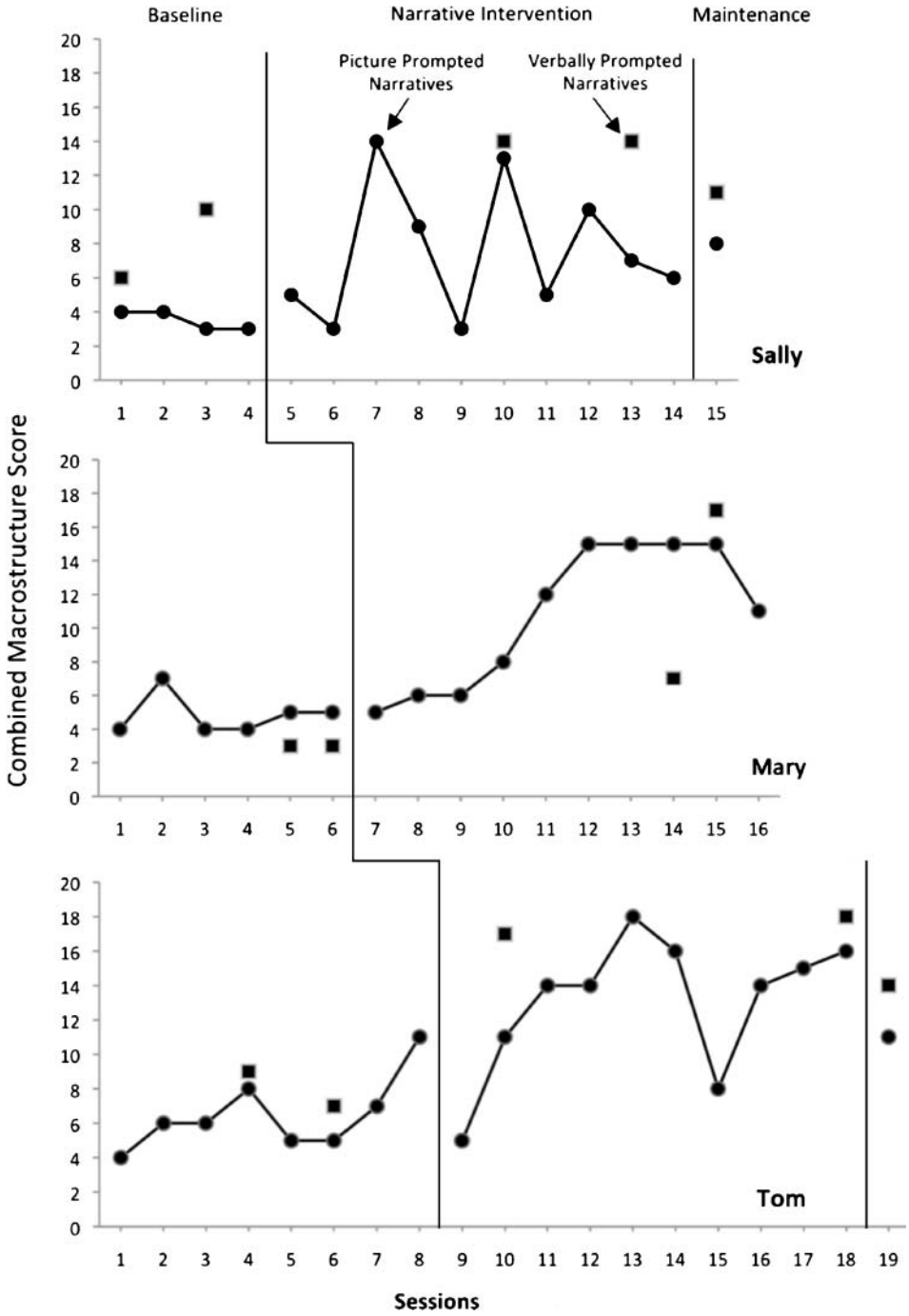
The purpose of this study was to assess the effects of literate narrative intervention on the macrostructure and microstructure of narratives produced by school-age children with neuromuscular impairment and co-morbid language impairment. Because we used a multiple-baseline design, we calculated the percentage of nonoverlapping data points (PND; Scruggs, Mastropieri, & Casto, 1987) to demonstrate the efficacy of the intervention. We determined the PND by calculating the total number of data points recorded during intervention that did not overlap with the highest baseline data point; dividing the nonoverlapping intervention data points by the total number of data points during intervention; and multiplying by 100. Analyses pertaining to changes in additional microstructure features not specifically targeted during intervention were also conducted. The aggregate means for each measure during the baseline and intervention phases were compared as evidence of improvement. We calculated Cohen's d effect size for those measures by subtracting the baseline mean from the intervention mean and dividing by the pooled SD (Cohen, 1988). Effect sizes were considered small if they were .2 or higher, medium if .5 or higher, and large if .8 or higher (Cohen, 1988).

Macrostructure: Picture-Prompted Assessment Probes

We used a combined macrostructure score to assess the story grammar and episodic construct for each narrative produced during the assessment probes. We calculated this score by adding a modification of the INC scoring system, which generated up to 23 total possible points, and an episodic construct score, which generated up to six total possible points, to create the combined macrostructure score. Figure 2 shows the effects of narrative intervention on story grammar and episodic construct for each participant.

Sally. For baseline narratives, Sally's combined macrostructure scores ranged from 3 to 4 (M = 3.5), with all of Sally's baseline narratives classified as descriptive sequences. During intervention, Sally's combined macrostructure scores ranged from 3 to 14 (M = 7.5). Eighty percent of Sally's narratives during intervention were episodically more complex than her baseline descriptive sequences. Sally's picture-prompted combined macrostructure scores had 80% PND during intervention. Although there was an overall level change in Sally's combined macrostructure scores, the data are variable. During maintenance, Sally's combined macrostructure score for the picture-prompted narrative was 8. This score was higher than the mean combined macrostructure

Figure 2. Combined narrative macrostructure.



score of 3.5 recorded during Sally's baseline phase of the study, indicating the possibility of maintenance of skills over time.

Mary. Mary's baseline combined macrostructure scores ranged from 4 to 7 (M = 4.8), with 83% of Mary's baseline narratives categorized as descriptive sequences. During intervention, Mary's combined macrostructure scores improved substantially to a mean of 10.8, with 70% PND and 80% of the narratives containing more complex episodic structure than during baseline. No maintenance data were recorded.

Tom. For Tom, baseline combined macrostructure scores ranged from 4 to 11 (M = 6.5), with a narrative episodic construct ranging from descriptive sequences to abbreviated episodes. Tom's combined macrostructure scores increased sharply after the introduction of

intervention. During intervention, Tom's combined macrostructure scores ranged from 5 to 18 (M = 13.1), with 70% PND and 70% of his narratives containing complete or multiple episodes. Tom's picture-prompted narrative that was elicited during maintenance had a combined macrostructure score of 11, compared with a mean combined macrostructure score of 6.5 from baseline.

Macrostructure: Verbally Prompted Generalization Probes

Verbally prompted narratives were never modeled, elicited, or targeted during the intervention sessions. These narratives were elicited at random times in order to assess the extent to which skills acquired during intervention generalized to more socially valid narration. The combined macrostructure scores for each verbally prompted generalization probe are marked on Figure 2. Two verbally prompted narratives were elicited during baseline and during intervention. For maintenance data, one verbally prompted narrative was elicited 8 months following intervention.

Sally. Sally's baseline sessions 1 and 3 and intervention sessions 6 and 9 were randomly selected for verbally prompted generalization probes. The narratives probed during Sally's baseline received a combined macrostructure score of 6 and 10, respectively, whereas during intervention, both narratives received a score of 14. In addition, verbally prompted baseline narratives were classified as descriptive and action sequences. The verbally prompted narratives during intervention were classified as complete episodes, indicating generalized growth in narrative macrostructure. Sally produced a verbally prompted narrative during maintenance that received a combined macrostructure score of 11, compared with scores of 6 and 10 recorded during baseline, indicating maintenance.

Mary. Mary's baseline sessions 5 and 6 and intervention sessions 8 and 9 were randomly selected for verbally prompted generalization probes. During baseline, both of Mary's verbally prompted narratives were given a combined macrostructure score of 3 and were classified episodically as descriptive sequences. During intervention, Mary's verbally prompted narrative combined macrostructure scores were 7 and 17, respectively. Intervention narratives were episodically classified as a reactive sequence and a complete episode. The verbally prompted narratives that were elicited during the intervention phase had a higher number of story grammar elements and were more complex episodically than the verbally prompted narratives elicited during baseline. These findings suggest that skills learned during intervention generalized from picture-prompted narratives to verbally prompted narratives. No maintenance data were collected for Mary.

Tom. Tom's verbally prompted narratives were randomly probed during baseline sessions 4 and 6 and at the end of intervention sessions 2 and 10. During baseline, Tom's verbally prompted narratives received combined macrostructure scores of 9 and 7 and were both episodically classified as reactive sequences. At the end of intervention sessions 2 and 10, Tom's verbally prompted narratives received combined macrostructure scores of 17 and 18, respectively. Both of Tom's verbally prompted narratives were classified as complete episodes. The verbally prompted narrative that Tom produced during maintenance received a combined macrostructure score of 14, compared with combined macrostructure scores of 9 and 7 recorded during baseline. As with Sally and Mary, Tom's verbally prompted narratives improved during intervention, suggesting the transfer of newly acquired narrative skills from picture-prompted elicitation to verbally prompted elicitation.

Microstructure: Picture-Prompted Assessment Probes

Causal relations. Figure 3 presents the frequency of causal relations for each narrative during the baseline and intervention phases. The causal relation score is a direct reflection of the number of marked and unmarked causal relations included in a narrative.

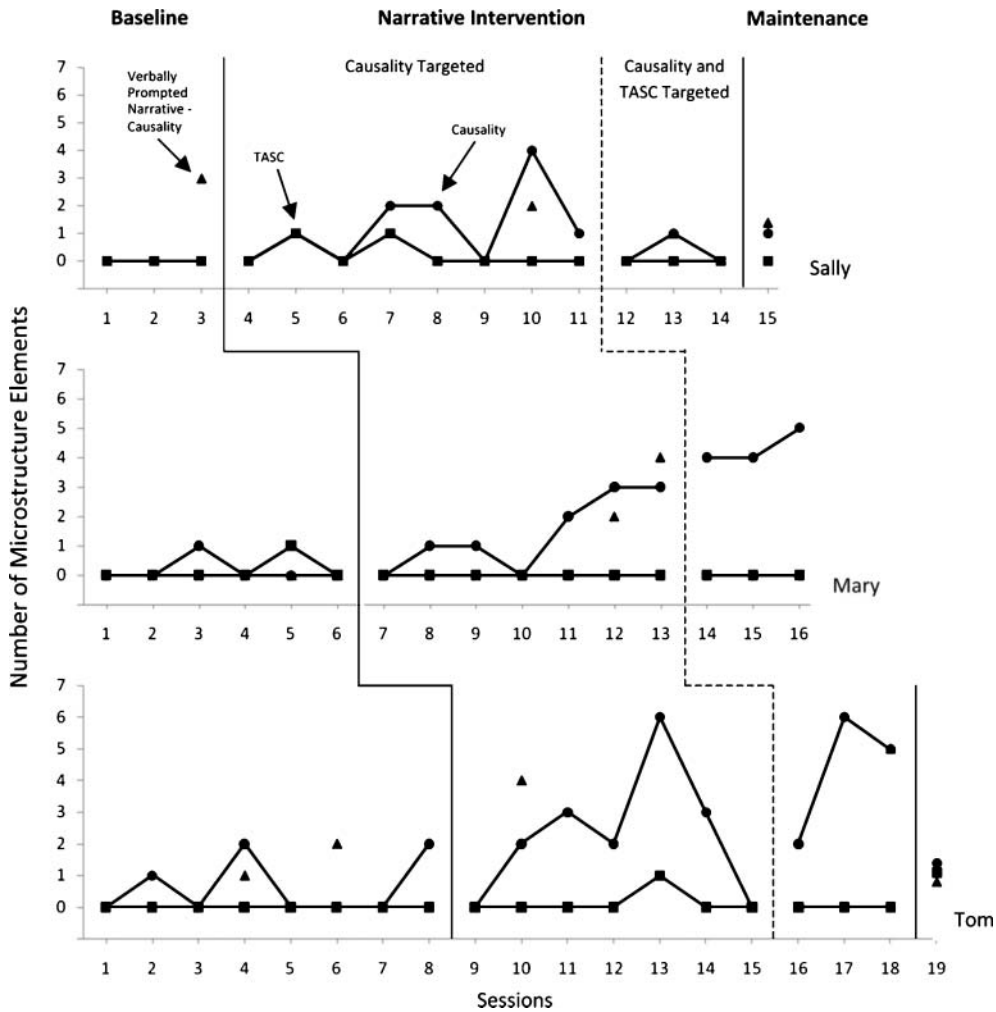
During baseline, Sally produced narratives that contained no marked or unmarked causal relations (M = 0). During intervention, Sally's narratives contained anywhere from 0 to 4 causal relations (M = 1.1) with 60% PND between baseline and intervention phases. The picture-prompted narrative collected during the maintenance phase contained one causal term, suggesting some maintenance over time.

Of the 6 baseline narratives produced by Mary, only 1 contained a causal relation (M = 0.17). During intervention, Mary's picture-prompted narratives contained 0 to 5 causal relations (M = 2.3), with 60% PND between baseline and intervention phases. No maintenance data were collected.

Tom's baseline narratives contained from 0 to 2 causal relations (M = .63). During intervention, his narratives contained from 0 to 6 causal relations (M = 2.9), with 50% PND. Tom's picture-prompted narrative that was collected during maintenance contained 1 causal relation. As with the other 2 participants, Tom's use of marked and unmarked causal relations improved as a result of intervention.

Temporal adverbial subordinate clauses. Figure 3 presents the frequency of temporal adverbial subordinate clauses. Recall that this microstructure feature was not targeted until intervention sessions 8, 9, and 10 for all 3 participants. Therefore, all 3 participants had an

Figure 3. Narrative microstructure. TASC = temporal adverbial subordinate clauses.



extended baseline for this measure. Sally had 11 baseline data points, Mary had 13 baseline data points, and Tom had 15 baseline data points. Sally, Mary, and Tom each produced one temporal adverbial subordinate clause in one of their baseline narratives (M = 0.09, 0.08, and 0.07, respectively) and produced no temporal adverbial subordinate clauses in their three intervention narratives. Intervention for temporal adverbial subordinate clauses did not result in improvements.

Microstructure: Verbally Prompted Generalization Probes

Causal relations. The number of causal relations for each verbally prompted generalization probe is marked on Figure 3. During baseline, Sally's verbally prompted narratives contained 0 and 3 causal relations. During intervention, Sally's verbally prompted narratives contained 2 and 1 causal relations, with 0% PND. Sally's verbally prompted narrative that was collected during maintenance received a causality score of 1, compared with her verbally prompted baseline narrative causality scores of 0 and 3. Mary's verbally prompted narratives contained no causal relations during baseline. During intervention, Mary's narratives contained 2 and 4 causal relations, with 100% PND. Tom's baseline verbally prompted narratives contained 1 or 2 causal relations. During intervention, his narratives contained 4 or 5 causal relations, with 100% PND. Tom's verbally prompted narrative, which was elicited during maintenance, contained 1 causal relation.

Temporal adverbial subordinate clauses. The number of temporal adverbial subordinate clauses for each verbally prompted generalization probe are depicted in Figure 3. Sally, Mary, and Tom did not produce any temporal adverbial subordinate clauses in their randomly probed baseline or intervention narratives. This finding was expected because these kinds of clauses

were only taught during the last three intervention sessions.

Microstructure: Nontargeted Microstructure

Although not explicitly targeted during intervention, the use of additional literate language microstructure (i.e., adverbs, elaborated noun phrases, mental/linguistic verbs, and pronomial reference cohesion) and measures of microstructure reflective of narrative length and complexity (i.e., mean number of C-units, MLU, TNW, and total NDW were analyzed for the picture-prompted narratives. Table 1 provides the means, standard deviations, and effect sizes of the incidental microstructure measures collected during baseline, intervention, and maintenance phases. The data in the table represent the means from narratives collected during baseline, intervention, and maintenance phases.

Sally demonstrated an increase in her use of adverbs and elaborated noun phrases with large effect sizes ($d = 0.88$ and $d = 0.87$, respectively). Her MLU increased to a moderate degree ($d = 0.62$), and her ability to use clear pronominal reference cohesion improved. Results for maintenance were mixed.

Mary increased in her use of several microstructure features with moderate to large effect sizes. She improved her use of adverbs ($d = 1.50$), elaborated noun phrases ($d = 0.89$), mental and linguistics verbs ($d = 0.70$), mean number of C-units ($d = 1.17$), TNW ($d = 1.52$), NDW ($d = 1.36$), and MLU ($d = 1.22$). Mary also improved her ability to use clear pronominal reference cohesion.

Tom increased in his use of multiple microstructure features as indicated by large effect sizes. He increased his use of adverbs ($d = 1.25$), elaborated noun phrases ($d = 1.29$), mental and linguistic verbs ($d = 1.15$), mean number of C-units ($d = 1.27$), TNW ($d = 1.30$), and number of different words ($d = 1.53$). Tom increased his use of clear pronominal reference cohesion in his narratives.

Social Validity

A sample of three narratives produced by the participants during baseline (one narrative) and intervention phases (two narratives) of the study were given to 15 undergraduate college students. The undergraduate students identified the participants' baseline narrative as the poorest quality narrative 67% of the time for Sally, 93% of the time for Mary, and 100% of the time for Tom. These findings suggest that the literate narrative intervention had a meaningful effect on overall narrative quality.

Discussion

Narrative discourse often contains decontextualized, literate language that is temporally organized, causally related (Labov, 1972; Peterson & McCabe, 1983), and structurally patterned around goal-oriented actions (Stein & Glenn, 1979). In school, children are expected to read and produce narratives and use oral and written language that is literate in nature (Paul, 1995). Because of their academic importance, narratives should be the direct

Table 1. Incidental microstructure: Mean baseline and mean postsession picture-prompted narratives, effect sizes, and maintenance data.

Participant data	Adverbs	Elaborated noun phrases	Mental/linguistic verbs	Pronomial reference cohesion (%)	C-units	MLU	TNW	NDW
Sally								
Baseline	2.0 (1.42)	4.0 (1.16)	1.0 (.81)	17	6.8 (3.77)	5.6 (.97)	31.8 (12.1)	22.0 (5.4)
Intervention	3.8 (2.53)	5.3 (1.77)	0.4 (.52)	45	6.1 (3.47)	6.5 (1.70)	32.1 (16.9)	23.1 (8.15)
Effect size	0.88	0.87	−0.88	n/a	−0.18	0.62	0.02	0.16
Maintenance	3.0	4.0	2.0	0.0	5.0	6.4	26.0	32.0
Mary								
Baseline	1.8 (1.33)	3.0 (1.67)	1.3 (.82)	45	6.3 (2.25)	5.6 (.86)	33.8 (10.4)	23.3 (6.62)
Intervention	7.0 (4.69)	6.9 (5.95)	2.5 (2.22)	86	11.5 (5.84)	6.7 (.84)	68.2 (30.2)	35.8 (11.1)
Effect size	1.50	0.89	0.70	n/a	1.17	1.22	1.52	1.36
Maintenance	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Tom								
Baseline	1.5 (1.31)	1.8 (2.25)	0.8 (1.03)	50	6.6 (2.32)	6.3 (1.32)	35.4 (9.2)	22.9 (2.9)
Intervention	5.3 (4.11)	6.6 (4.84)	2.8 (2.3)	78	12.5 (6.11)	6.5 (.90)	76.3 (43.5)	38.2 (13.8)
Effect size	1.25	1.29	1.15	n/a	1.27	0.10	1.30	1.53
Maintenance	3.0	0.0	0.0	33	6.0	5.3	20.0	32.0

Note. Values in parentheses indicate *SD*s. C-units = communication units; MLU = mean length of utterance; TNW = total number of words; NDW = number of different words; n/a = not applicable.

target of language intervention for school-age children with language impairment (R. B. Gillam & Ukrainetz, 2006). At the same time, narratives could be useful as a language intervention modality used to promote literate, complex language that is embedded in a functional, generalizable format. The narrative intervention procedures used in this study treated narration as both a direct intervention target (e.g., macrostructurally related episodic construct) and as a modality to introduce complex language features (e.g., microstructurally related causality). Findings were generally favorable for both narrative macrostructure and narrative microstructure.

The purpose of this study was to determine the effect of literate narrative intervention on the macrostructure and microstructure of narratives produced by school-age children with neuromuscular impairment and comorbid language impairment. The participants received ten 60-min individual intervention sessions. The intervention and data were administered and collected according to a multiple-baseline design. Participants' narratives were elicited using two different elicitation procedures: Picture-prompted narratives were directly reflective of the practice and instruction the children received during intervention; verbally prompted narratives were never addressed during intervention and served as a measure of generalization.

Macrostructure

Consistent with previous narrative intervention research (Davies et al., 2004; R. B. Gillam et al., 1995; Hayward & Schneider, 2000; Klecan-Aker et al., 1997; Petersen et al., 2008; Swanson et al., 2005; Tyler & Sandoval, 1994), the complexity of childrens' narrative macrostructure improved as a function of the intervention that was provided. Tom, Mary, and Sally each increased their use of story grammar features and, perhaps more importantly, improved their ability to narrate in complete episodes. There were important differences between Tom's first baseline, picture-prompted narrative and his postsession, picture-prompted narrative elicited at the end of intervention session 10 (see Appendix D). Tom's first baseline narrative contained the story grammar elements of character and action and was coded as a pre-episodic action sequence (2 points). The final combined macrostructure score was 4. In contrast, Tom's final postsession narrative (Session 10) contained references to a character, setting, initiating event, internal response, plan, action/attempt, consequence, and formulaic utterance. This narrative was coded as a complete episode (5 points). The final combined macrostructure score was 16. Sally and Mary demonstrated similar changes in narrative macrostructure during intervention.

During each session, the clinician modeled narratives that included macrostructural elements and complete narrative episodic constructs. Narrative macrostructure was specifically targeted and emphasized during the ten 60-min intervention sessions in several ways. Modeling, imitation, pictures, icons, drawings, inferential and factual questions, and cloze procedures that highlighted narrative macrostructure were purposefully used at a high rate to promote acquisition, then were eventually withdrawn to a large degree to promote independence. This cyclical pattern of intense stimulation followed by a decrease in clinician and extraneous support occurred during each intervention session. Recall that a randomly sampled narrative intervention session with Sally revealed that the clinician emphasized each of the story grammar elements a total of 211 times during the first three steps of the intervention. Those story grammar elements that constituted a complete episode were emphasized with the greatest frequency, accounting for 168 of the 211 (80%) story grammar elements stressed. This analysis of the frequency of clinician support for macrostructural development is informative because it offers insight into the level of intensity offered during the intervention sessions and provides detail for the replication and application of this research. Also, recall that during Steps 7 and 10 of the intervention (see Appendix B), the clinician emphasized story grammar elements only nine times, focusing on the internal response five times, the action two times, and the initiating event and consequence only one time each. The clinician did not emphasize the character, setting, or resolution during either step because no support was necessary. This strong emphasis on narrative macrostructure coupled with the systematic withdrawal of clinician and material support is likely causally related to the increase in narrative macrostructure used by the participants in their narratives.

Microstructure

Although some research has focused on aspects of narrative microstructure during the narrative intervention process (Hayward & Schneider, 2000; Peña et al., 2006; Petersen et al., 2008; Swanson et al., 2005), no research to date has targeted narrative microstructure during intervention and then measured narrative microstructure as a dependent variable. Interestingly, two studies (Davies et al., 2004; R. B. Gillam et al., 1995) did not specifically target narrative microstructure in the intervention procedures yet included microstructure as a dependent variable. Both of those studies reported moderate effect sizes of .78 and .75, respectively, for microstructural features.

The present narrative intervention study was the first to explicitly focus on microstructure during intervention and then subsequently assess those same narrative microstructure features as dependent variables. The results of this study suggest that narratives may be

useful as a means whereby structures associated with literate language can be advanced.

One aspect of narrative microstructure, causality, was specifically targeted throughout all 10 narrative intervention sessions. All 3 participants improved their ability to include causal relations in their picture-prompted narratives. Again, using Tom's first baseline narrative and last intervention narrative as an example (see Appendix D), it can be seen that Tom used no marked or unmarked causal references during his first baseline picture-prompted narrative. However, Tom's last narrative intervention picture-prompted narrative contained four unmarked and one marked causal reference. Sally and Mary, likewise, showed improvement in their use of causal references. This growth in the use of causality across all participants is likely due to the highly intensive emphasis of that target during intervention. A careful analysis of the frequency with which one of the clinicians emphasized causality during an intervention session with 1 of the participants revealed that the clinician modeled marked causality or asked open-ended questions with the purpose of eliciting a causal term a total of 62 times in 45 min of intervention.

Although causality was targeted during all 10 intervention sessions, temporal adverbial subordination was purposefully not modeled or emphasized until the last three intervention sessions. That is, the clinician avoided the use of temporal adverbial subordinate clauses during intervention sessions 1 through 7. By delaying the introduction of temporal adverbial subordinate clauses, we obtained an extended baseline phase for that microstructure feature. The language feature (causality) that we targeted during the first seven intervention sessions increased, whereas the nontargeted language feature (temporal adverbial subordination) remained stable. Therefore, the increase in the use of causal structures can be reasonably attributed to the intervention.

The participants' use of temporal adverbial subordinate clauses did not increase even when these clauses were targeted (during the last three sessions). This is likely due to the linguistically complex nature of temporal adverbial subordination and the limited time spent on that microstructure feature. Three, 60-min intervention sessions were not sufficient to improve temporal adverbial subordination for the participants in this study.

In contrast to temporal adverbial subordination, other features of literate and complex language were recurrently embedded in the narratives modeled by the clinician during each intervention session, leading to the expectation of incidental learning. These features were measured in picture-prompted narratives produced by the participants. Sally, Mary, and Tom increased their inclusion of adverbs and elaborated noun phrases as signified by large effect sizes (ds = 0.88, 1.50, and 1.25, and .87, .89, and 1.29, respectively) and showed an increase in their use of pronominal references. Mary and Tom increased their use of mental and linguistic verbs (ds = 0.70 and 1.15), the mean number of C-units (ds = 1.17 and 1.27), TNW (ds = 1.52 and 1.30), and NDW (ds = 1.36 and 1.53) as evidenced by moderate to large effect sizes. Sally and Mary increased their MLU with moderate and large effect sizes (ds = 0.62 and 1.22). These findings are important because they demonstrate the utility of the literate narrative intervention procedures in fostering complex language development.

Social Validity

There was high agreement across 15 college students that the narratives produced by the participants during intervention were better than those narratives produced during baseline. That a sample of college students rated the narratives produced during intervention better than those produced during baseline is important because it lends validity to the narrative scoring procedure used for this investigation and the subsequent results. Not only were the scoring methods sensitive to changes in the participants' narratives, but they were also sensitive to what a sample of the general population considered to be important aspects of narration.

Generalization

One of the primary purposes of language intervention is to effect a lasting change in language behavior while communicating in a naturally occurring context (Paul, 1995). Narrative intervention using story retelling, photos, wordless picture books, and additional scaffolding should be considered only a first step in the achievement of generalized language skills. If narrative intervention is to be deemed effective, it must be demonstrated that the skills acquired during intervention will transfer to natural situations such as verbally prompted narration.

This study examined two different types of generalization: (a) incidental generalization via repeated exposure to language features and (b) contextual generalization of language features from one context (e.g., picture prompts) to another (e.g., verbal prompts).

Incidental generalization. Because of the promising results reported by Davies et al. (2004) and R. B. Gillam et al. (1995)—and because the stories used during intervention included literate narration, which exposed the participants to a wide array of literate language features and complex language—microstructural features not specifically targeted during intervention were evaluated in the narratives of each of the participants. Results indicated that literate narrative intervention influenced

literate and nonliterate language microstructural growth above and beyond those specifically targeted features. Examples of narrative microstructure produced during baseline and during intervention can be found in Tom's narratives transcribed in Appendix D. In this example, Tom used more words (i.e., increased his TNW), used a greater number of different words (i.e., increased his NDW), improved his use of adverbs and mental/linguistic verbs, and used clearer pronomial reference cohesion. When the aggregate mean of Tom's baseline narratives was compared to that of his intervention narratives, it was clear that his utterances were longer and he used more elaborated noun phrases at the end of intervention than at the beginning. Sally and Mary also improved their ability to include many of those same incidental microstructural features in their narratives.

Contextual generalization. Sally, Mary, and Tom demonstrated generalization of narrative macrostructure from picture-prompted to verbally prompted narratives. Results of microstructure generalization were mixed. Sally showed no generalization in her use of causality, whereas Mary and Tom increased their use of causality in verbally prompted narratives. An examination of the data displayed in Figure 3 revealed that Sally's use of causal terms in picture-prompted narratives was much more variable during intervention than that of the other 2 participants. Because Sally's use of causality was not well established in picture-prompted narratives, it was not surprising that causality did not appear in her verbally prompted narratives.

Sally's, Mary's, and Tom's generalization of macrostructure, and Mary's and Tom's generalization of causal terms, could be attributed to several factors. The present study focused on the same narrative macrostructure goals and one narrative microstructure goal (causality) throughout the ten 60-min intervention sessions. Specific targets were highlighted by the clinician during intervention at over twice the rate reported in other narrative intervention studies (cf. Swanson et al., 2005). This high intensity of intervention may have contributed to the generalization of skills. It is also possible that the generalization of some skills found in the present study occurred because of the systematic, purposeful introduction and removal of supports and prompts that led to independent narrative retellings at the end of each intervention session.

Future Research and Limitations

No narrative intervention studies with children who have language impairment have investigated the maintenance of skills over time. In this study, some maintenance was evident 8 months after intervention, although experimental control was limited. Mary refused to produce any narratives during follow-up testing, most likely due to her unfamiliarity with the clinician, the different setting in which narrative elicitation was attempted (at home instead of at the clinic), or regression in narrative ability. Further research is needed to determine the degree in which narrative and language skills acquired during literate narrative intervention can be maintained over time.

Narrative intervention is just beginning to receive attention from researchers. Consequently, there is a considerable amount that is not understood about the efficacy and effectiveness of clinical techniques to promote narrative skills. As demonstrated by a systematic review by Petersen (in press), narrative intervention has a relatively small amount of evidence supporting it, although what little evidence there is reflects favorably on clinicians' abilities to influence narrative development. Although this is the first narrative intervention study to include children with neuromuscular impairment, a number of other populations may benefit from narrative intervention, including children with specific language impairment, intellectual impairments, autism, and Down's syndrome. More information is needed about the populations that respond best to this type of intervention and what modifications are necessary to help all children with language impairment improve their narratives and use more literate language.

External validity of the results of this research is limited because of the small number of participants. Future research should include a greater number of participants, thereby increasing confidence that any results derived from a narrative intervention study are applicable to a diverse population.

Because literate narrative intervention is founded on narratives that contain literate language features and complete episodic macrostructure, there may be numerous ancillary benefits. Research in the area of literate narrative intervention need not only focus on the improvement of narrative macrostructure and microstructure. It might be useful to consider if receptive narrative skills increase, if transfer to writing occurs, or if reading comprehension improves after literate narrative intervention. Based on the theoretical underpinnings of literate narrative intervention—that is, that language and reading skills are reciprocal—such an academic impact may be a reasonable directional hypothesis.

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Appendix A. Sample of California state curriculum standards related to narration (California State Board of Education, 2007).

Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
2.4 Retell familiar stories.	2.7 Retell the central ideas of simple expository or narrative passages.	3.1 Compare and contrast plots, settings, and characters presented by different authors.	3.2 Comprehend basic plots of classic fairy tales, myths, folktales, legends, and fables from around the world.	3.2 Identify the main events of the plot, their causes, and the influence of each event on future actions.	3.2 Identify the main problem or conflict of the plot and explain how it is resolved.

Appendix B. Steps of literate narrative intervention.

(Pre-intervention narrative: Participant looks at a simple picture that does not depict an obvious initiating event and is asked to tell the best story they can. The story is recorded.)

1. Clinician models storytelling using pictures in a book (clinician does not read the story; instead, clinician tells the story emphasizing macro/microstructure).
2. Clinician and participant co-tell the story using pictures in a book and appropriate story grammar icons.
3. Participant retells the story with clinician support (focused stimulation, vertical structuring and expansion, repetition, recasting, cloze procedures, and inferential/factual questions) as needed. Pictures of a book are present to prompt story retelling, but story grammar icons are not.
4. Clinician and participant co-tell a story using a single complex scene picture and story grammar icons.
5. Participant retells the story while clinician uses support (listed in step 3) as needed. A single complex-scene picture is present to prompt story retelling, but story grammar icons are not.
6. Clinician and participant look at same picture used to elicit the pre-intervention narrative while listening to the recorded narrative produced by the participant. Clinician places icon on table when corresponding story grammar element is produced in the recorded narrative. After listening to the story, clinician and participant identify missing story grammar elements and co-tell the story using the same single simple-scene picture, story grammar icons, and support (listed in step 3).
7. Participant retells the story while clinician uses support as needed. A single simple-scene picture is present to prompt story retelling, but story grammar icons are not.
8. Participant makes up a story using story grammar icons with simultaneous picture prompts drawn by the clinician on separate sticky notes as participant tells a story. Clinician uses support as needed.
9. Participant retells the story using the pictures on the sticky notes but without story grammar icons. Clinician uses minimal support (inferential/factual questions).
10. Participant retells the story without using sticky notes or story grammar prompts. Clinician uses minimal support.

(Postsession, picture-prompted assessment probe: Participant looks at a simple picture that does not depict an obvious initiating event and is asked to tell the best story he or she can. The story is recorded.)

(Postsession, verbally prompted generalization probe: Participant is asked to tell about a recent television show or to tell about his or her favorite part of a movie. These stories are elicited and recorded at random.)

Note. All 10 literate narrative intervention steps were addressed sequentially in every intervention session.

Appendix C. Books used during narrative intervention.

Brett, J. (1997). *The hat*. New York, NY: Putnam Juvenile.
Brett, J. (1989). *The mitten*. New York, NY: Putnam Juvenile.
Brett, J. (1992). *Trouble with trolls*. New York, NY: Putnam Juvenile.
Farber, E. (1996). *Critters of the night: No howling in the house*. New York: NY: Random House Books for Young Readers.
Lobel, A. (1979). *Frog and toad together*. New York, NY: HarperCollins.
Mayer, M. (1999). *Just lost!* New York, NY: Golden Book.
Mayer, M. (1976). *Hiccup*. New York, NY: Dial.
Mayer, M. (2000). *Baby sister says no*. New York, NY: Golden Books.
Munsch, A., & Martchenko, M. (2002). *Andrew's loose tooth*. New York, NY: Cartwheel.
Peet, B. (1983). *How Droofus the dragon lost his head*. New York, NY: Houghton Mifflin.
Peet, B. (1980). *The ant and the elephant*. New York, NY: Sandpiper.
Simmons, J. (1999). *Daisy and the egg*. New York, NY: Little Brown Young Readers.
Sykes, J., & Warnes, T. (2001). *I don't want to go to bed*. New York, NY: Tiger Tales.
Waber, B. (1975). *Ira sleeps over*. New York, NY: Sandpiper.

Appendix D. Tom's first baseline picture-prompted narrative and last postsession picture-prompted narrative following 10 literate narrative intervention sessions.

Baseline Picture-Prompted Narrative 1

The lady giving her a slide board.
And the people playing x.
And they're talking to each other.
And (this guy) this woman comes up and give her a slide board.
And people playing with slide board.

Postsession Picture-Prompted Narrative 10

A guy was going sledding in a sled race.
And he was going.
And he was racing up the hill.
(And then) and then he was in the lake.
But suddenly he brought his gas.
And out of gas.
And then he hurried to fixed it.
But it wasn't fixed.
And then he decided to fix it.
And (then) so he fixed it and hurried back.
And he got past the other people.
And he won.
And he felt happy.
The end.

The Effects of Literate Narrative Intervention on Children With Neurologically Based Language Impairments: An Early Stage Study

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