

## Research Article

# Systematic Individualized Narrative Language Intervention on the Personal Narratives of Children With Autism

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**Purpose:** The purpose of this study was to investigate the effect of an individualized, systematic language intervention on the personal narratives of children with autism.

**Method:** A single-subject, multiple-baseline design across participants and behaviors was used to examine the effect of the intervention on language features of personal narratives. Three 6- to 8-year-old boys with autism participated in 12 individual intervention sessions that targeted 2–3 story grammar elements (e.g., problem, plan) and 3–4 linguistic complexity elements (e.g., causal subordination, adverbs) selected from each participant’s baseline performance. Intervention involved repeated retellings of customized model narratives and the generation of personal narratives with a systematic reduction of visual and verbal scaffolding. Independent personal narratives generated at the end of each

baseline, intervention, and maintenance session were analyzed for presence and sophistication of targeted features.

**Results:** Graphical and statistical results showed immediate improvement in targeted language features as a function of intervention. There was mixed evidence of maintenance 2 and 7 weeks after intervention.

**Conclusion:** Children with autism can benefit from an individualized, systematic intervention targeting specific narrative language features. Greater intensity of intervention may be needed to gain enduring effects for some language features.

**Key Words:** autism, intervention, language, school-based services, language disorders, efficacy, children

**N**arration, the telling of real or imaginary past events, involves many language, cognitive, and social skills. Narrative competence is an important part of success at home and school. Children with autism, even those with high levels of function, are likely to have difficulties handling the complex linguistic and psychological landscape of narration. This is the first study to investigate the effect of a systematic, individualized narrative intervention on story grammar and linguistic complexity of the personal narratives of children with high-functioning autism.

## *The Linguistic and Psychological Landscape of Narration*

*Narrative* is the verbal recapitulation of past experiences or the telling of what happened (Labov, 1972; Moffett, 1968). Narratives encompass much of our daily discourse—such as reporting on, evaluating, and regulating activities (A. McCabe, 1991)—and are part of our ways of conceptualizing the world (Bruner, 1986; Nelson, 1991). Narratives reflect emotional and psychological underpinnings of human interactions, providing an account not only of what happens to people, the “landscape of action,” but also what those involved in the action (and those telling it) know, think, or feel about what happens, the “landscape of consciousness” (Bruner, 1986, p. 99).

Narratives tend to follow a predictable pattern of organization or story grammar. Out of many different organizational schemas (e.g., Applebee, 1978; Labov, 1972; Stein & Glenn, 1979), Stein and Glenn’s (1979) concept of story grammar is the most widely used in research, practice, and classroom instruction. Story grammar analysis deals with goal-directed, problem-solution units called *episodes*. Episodes describe a protagonist’s motivations and goals, the efforts to achieve the

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goals, and the outcomes of such efforts. Episodic elements include setting statements, an initiating event (commonly called a complication or problem), a motivating state (or emotional internal response), a plan (or cognitive internal response), attempt(s) to resolve the problem, the consequence, and an emotional reaction. Multiple episodes and multiple protagonists can be coordinated or embedded to create complex plots and intrigues.

Preschoolers do not generally show episodic organization in their stories. Instead, their ideas are linked thematically or temporally (C. Peterson & McCabe, 1983). Some young children manage causal links but without a sense of goal-directed agency (such as a dog in the road causing a car to crash). Stories containing problems that agents seek to resolve emerge around kindergarten and are clearly established by 8 years of age (Botvin & Sutton-Smith, 1977; C. Peterson & McCabe, 1983). Episodic elements of internal responses, attempts, and consequences continue to develop in frequency and variety after 8 years of age (C. Peterson & McCabe, 1983). The frequency with which complete and embedded episodes occur in stories and personal narratives continues to increase through the age of 14 years (Roth & Spekman, 1986).

A narrative, like any other discourse unit, is built from the microstructural aspects of language. An event can be recounted using very basic vocabulary and grammar, but more successful narratives involve clear, detailed, interesting, and more complex word choices and sentence structures (McFadden & Gillam, 1996). This collection of language structures and organization that goes beyond the basic can be referred to as *elaborated language* (Kernan, 1977; Ukrainetz & Gillam, 2009; Ukrainetz et al., 2005). Elaborated language helps add emphasis and climactic shape to stories (Kernan, 1977; Labov, 1972). Some words specifically cue that a story is being told, such as story starters and endings; others provide information about characters and temporal and causal relationships. By 9 years of age, children can use a variety of elaborative language structures, resulting in artful and appealing stories (Ukrainetz et al., 2005). Some elaborative linguistic features that have been identified as important for a literate style of narration are coordinating conjunctions that are used to connect words, phrases, and clauses (e.g., *and*, *but*, *or*); elaborated noun phrases that provide additional information about a noun (e.g., *the dog that was dirty*); causal and temporal subordinate clauses that provide information about the causal or temporal relationship between an independent clause and a dependent clause (e.g., *because he was tired he went to sleep; he felt better after he ate dinner*); adverbs that are used to modify verbs or adjectives (e.g., *quickly ran; really tall boy*); metalinguistic verbs (e.g., *tell, ask, say*); and metacognitive verbs (e.g., *believe, think, know*; Greenhalgh & Strong, 2001; Nippold, 2007; Nippold, & Taylor, 1995; Nippold, Ward-Lonergan, & Fanning, 2005; Strong & Shaver, 1991).

### ***Narratives and School***

Narrative is a familiar and engaging discourse genre. However, it is also a complex, multilayered unit of

communication. Its oral and literate features allow it to serve as a bridge between the informal conversational language of home and the abstract expository discourse of school (Westby, 1985). Well-formed narratives that follow an expected structure and that contain elaborate language are valued in academic settings. Most elementary school core curricula include objectives for narrative development (Petersen, 2011). Competence in narrative comprehension and production is a fundamental part of the U.S. Common Core State Standards (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010). As of 2012, Common Core State Standards had been adopted by all but five states (Ehren, Erickson, Hatch, & Ukrainetz, 2012). These kindergarten–12 academic standards specify that in the elementary grades, students must comprehend and analyze the structure of literary texts and recount experiences using effective techniques, well-chosen details, and well-structured event sequences. Kindergartners should be able to tell a story in time order; second graders should be able to give details of actions, thoughts, and feelings; and fourth graders should be able to effectively recount subtleties of narrative events. Students must be able to meet these rigorous expectations that are now guiding instruction and evaluation across the United States.

Narration is frequently an area of difficulty for children with language impairment (Boudreau & Hedberg, 1999; Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; Gillam & Carlile, 1997; Gillam & Johnston, 1992; Griffin, Hemphill, Camp, & Wolf, 2004; Liles, 1985, 1987; McFadden & Gillam, 1996; Newman & McGregor, 2006; Ukrainetz & Gillam, 2009). For example, in a large-scale, longitudinal study, Fey et al. (2004) found that children with language impairment, when compared with typically developing peers, produced narratives with less developed story grammar and linguistic complexity, including limited episodic structure, less diverse vocabulary, and less complex syntax. Language measured in narrative tasks is a better predictor of persistent language impairment and future academic difficulties than language measured in word and sentence tasks (Bishop & Edmundson, 1987; Fazio, Naremore, & Connell, 1996; Wetherell, Botting, & Conti-Ramsden, 2007).

In addition to academic success, narration plays a role in children's social competence. When narrative performance is weak, as in the case of children with poor language skills, children may be at risk for developing social and behavioral problems because of their limited ability to interact with others (Dickinson & Snow, 1987; Snow, Burns, & Griffin, 1998). Storytelling is a skill that contributes to being well liked and leads to increased opportunities to practice language (P. C. McCabe & Marshall, 2006). Children with language impairment tend to have increased difficulty expressing themselves during social interactions (Hart, Fujiki, Brinton, & Hart, 2004). According to Redmond and Rice (1998), children with language impairment often adapt to their linguistic difficulties by avoiding situations that may stress their language system. This avoidance causes children to have fewer opportunities to interact socially with others, which intensifies their limited social skills.

## *Narration of Children With Autism*

Children with autism demonstrate unusual profiles of social interaction, communication, and behavior (Horner, Carr, Strain, Todd, & Reed, 2002). Differences in social interaction include abnormal play, a limited desire to develop peer relationships, and a disinterest in activities that require joint attention and emotional reciprocation. Communication disparities can include limited oral language and difficulty maintaining conversation, as well as stereotyped and idiosyncratic language. Unusual behaviors include restricted patterns of interest, inflexible adherence to routines, stereotyped and repetitive motoric movements, as well as preoccupation with details and parts of objects. Children with autism have difficulty understanding context, connecting new information to previously stated information, and organizing topics and subtopics (Landa, 2000). Children with autism also have difficulty understanding what other people think and need to know—a skill often referred to as *theory of mind* (Baron-Cohen, Leslie, & Frith, 1986; Tager-Flusberg, 2001; Twachtman-Cullen, 1998). Although characteristics can vary greatly, significant and pervasive pragmatic deficits are consistently present across communication domains (Horner et al., 2002; Tager-Flusberg, 2001).

The characteristics of autism just described can manifest in the structure and content of children's narratives. In a series of studies, Loveland and colleagues found that when children with autism and Down syndrome matched on mental age or verbal ability were asked to produce narratives, all of the children had difficulty producing story grammar elements, but the children with autism embedded more irrelevant language that disrupted the episodic structure of the narratives (Loveland, McEvoy, Kelley, & Tunali, 1990; Loveland & Tunali, 1993; Loveland, Tunali, Kelley, & McEvoy, 1989). The children with autism also tended to treat the characters of the narratives as objects instead of people, were less disposed to perceive the narratives as representing meaningful events, and produced narratives with a greater focus on minute details as opposed to a coherent gestalt. When narrative and theory-of-mind performances were compared for children with autism, children with intellectual disability, and typically developing peers matched by age, results showed that the children with autism who performed poorly on theory-of-mind tasks produced less coherent story grammar when compared with peers who were typically developing and peers who had an intellectual disability (Tager-Flusberg, 1994; Tager-Flusberg & Sullivan, 1995). Capps, Losh, and Thurber (2000), using similar groups of children and similar narrative elicitation procedures, also found significant correlations between narrative proficiency and theory-of-mind tasks. These story grammar difficulties can be variably manifested, which is not surprising, given the heterogeneity of this disorder (Frith, 1989; Mesibov, Adams, & Klinger, 1997): Narratives produced by children with autism have been found to be similar to both those of children with speech-language impairment (Norbury & Bishop, 2003) and those of children with typically developing language (Diehl, Bennetto, & Young, 2006).

Research has also revealed relative weaknesses in other aspects of narration for children with autism. Norbury and Bishop (2003) analyzed and compared narratives produced by children with autism and children with speech-language impairment and found that the children with autism were significantly more likely to produce narratives with unclear references. Tager-Flusberg and Sullivan (1995) found that children with autism produced shorter stories with fewer causally related events than typically developing children. Diehl et al. (2006) compared narrative length, syntactic complexity, and causal connections produced by children with high-functioning autism and typically developing children matched on age, gender, language ability, and cognition. The results indicated that the children with autism produced narratives that included significantly fewer causal elements.

## *Narrative Intervention*

Children with autism often show narrative weaknesses that would benefit from intervention. The nature of their learning styles often requires intensive, systematic intervention (Rogers, 1996). The heterogeneity of autism would suggest that individually tailored language intervention is important. Children with high-functioning autism present a particular challenge because they are beyond the functional communication level addressed by conventional interventions, such as picture exchange communication and discrete trial instruction.

Narrative intervention has many possibilities for addressing the language and social needs of children with high-functioning autism. Narration involves "people problems" and the story grammar, syntax, and vocabulary associated with social interactions, causal relations, thoughts, and feelings. There is evidence that narrative intervention is effective for treating the language of children with other types of communication disorders. Petersen (2011) conducted a systematic review, locating nine controlled studies of interventions employing oral story retelling or generation with children 3–21 years of age with language or learning disabilities. The studies used narratives to teach story grammar and linguistic complexity. The procedures included vertical structuring (Schwartz, Chapman, Terrell, Prelock, & Rowan, 1985; Scollon, 1976), focused stimulation (Leonard, Camarata, Rowan, & Chapman, 1982), and modeling (Petersen, Gillam, Spencer, & Gillam, 2010). Many studies used repeated retellings and generations, along with sequenced pictures and wordless picture books, cue cards, role-plays, and story drawing. Although the studies varied in experimental design and quality, the overall evidence suggests that narrative intervention is effective for children with language impairment.

There is increasing evidence that such effective language treatments are marked by a small array of critical features or quality indicators, cutting across intervention approaches, procedures, skills, and disorders (Gillam, Loeb, & Friel-Patti, 2001; Gillam et al., 2008; Torgesen et al., 2001). These can be summarized as repeated opportunities for learning and practice within a session, an intense schedule

of session delivery, systematic interactive and structural support, and explicit attention to specific skills (Ukrainetz, 2006). Interventions that involve these critical indicators of quality can take very different approaches. Discrete skill or trainer-oriented approaches employ a hierarchy of increasingly complex tasks to teach isolated language skills, culminating in complex, naturalistic contexts. Contextualized skill or hybrid approaches teach specific language skills within naturalistic discourse activities, with interactive learning support decreasing over time (Ukrainetz, 2006). There is evidence that both approaches can work for children with language disorders, including autism (Delprato, 2001; Goldstein, 2002; P. Peterson, 2004).

An intervention procedure that takes the best of both approaches involves hierarchical levels of task complexity and decreasing levels of scaffolded support, with the entire progression occurring entirely within the discourse unit of narrative. In this procedure, a set of steps involving customized model stories that highlight targeted language features is used for retelling and generating narratives. The steps move a child from listening to model stories to eliciting highly supported retells, independent retells, highly supported generations, and finally independent generations. Within each step, interactive scaffolding is provided through hierarchical prompts, corrections, and imitations in order to maintain attention, produce complete stories, and use intervention targets correctly. Structural scaffolding is additionally provided through the visual support systems of simple pictures, story grammar icons, and pictographic sketching, which have been found to be helpful in narrative instruction (e.g., Graves & Montague, 1991; Hayward & Schneider, 2000; McFadden, 1998; Swanson, Fey, Mills, & Hood, 2005; Ukrainetz, 1998).

Swanson et al. (2005) used narrative-based intervention similar to this to teach ten 7- to 8-year-old children with language impairments. The 6-week intervention involved a cyclical goal-attack strategy for three syntactic and three narrative goals with repeated retellings of customized stories and generations of stories from pictures. Posttest performance was compared with normative data sampled in the same way in another study. Results showed that although the children's syntactic complexity did not improve, eight of the children made significant improvements on a narrative quality rating that assessed complexity of episodic structure and character, setting, and ending.

Petersen et al. (2010) applied narrative intervention procedures to three 6- to 8-year-old children with neuromuscular impairment and comorbid language impairments in a single-subject experimental design. In this study, investigators based the intervention stories on sequenced illustrations taken from children's literature. In addition to the targeted features, Petersen et al. tracked the effect of simply modeling other language structures (adverbs, elaborated noun phrases, metalinguistic and metacognitive verbs, and pronominal reference cohesion) without requiring the child to produce them or systematically supporting productions. Immediate and maintained gains were found for the targeted story grammar and linguistic complexity.

Additional improvements were observed in the structures that were only repeatedly modeled.

Spencer and Slocum (2010) implemented narrative intervention with five at-risk preschool children, again in a single-subject experimental design. This version included narrative practice with both story retells and personal narrative generations. During the intervention phase, all five children produced more complete (e.g., more story grammar elements) and more linguistically complex retells and personal narratives than in the baseline phase. The increases in narrative performance were maintained following a 2-week, no-intervention period.

### ***The Current Study***

Currently, there are no controlled investigations of narrative intervention with children with high-functioning autism. Similar to Petersen et al. (2010) and Spencer and Slocum (2010), the intervention procedure designed for this study employed carefully constructed narratives, story grammar icons, and pictographic sketching in a simple, systematic eight-step progression that was repeated during each intervention session. The repetitive, predictable intervention procedure, along with the visual supports and systematic scaffolding, were expected to be particularly helpful for teaching children with autism. This study investigated the efficacy of this narrative intervention procedure on the story grammar and linguistic complexity of personal narrative generations for three children with autism. In a single-subject, multiple-baseline design across participants and language features, the following research questions were investigated:

1. Does individualized narrative intervention have an effect immediately after intervention on the story grammar of personal narratives produced by children with autism?
2. Does individualized narrative intervention have an effect immediately after intervention on the linguistic complexity of personal narratives produced by children with autism?
3. Do improvements in story grammar and linguistic complexity in personal narratives produced by children with autism maintain after intervention has been withdrawn?

## **Method**

### ***Participants***

Three boys with autism served as participants: Luke, Daniel, and Travis (pseudonyms). Prior to inclusion in the study, all three boys had been diagnosed with autism spectrum disorder by an independent examiner using criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; American Psychiatric Association, 2000). Each of the participants met qualifying criteria for special education services in their public school under the classification of autism.

The participants were recruited through convenience sampling. Luke and Daniel were the only school-age children with autism receiving language services at the university speech clinic. They were being treated by the fourth and sixth authors, and they presented as appropriate for this particular language intervention. Travis was recruited from the community by the second author through personal contact with his parents because his communication skills appeared suitable to this intervention approach. All three boys evidenced a language impairment based on parent and teacher report and an existing Individualized Education Program that specified language services. The participants were recruited after obtaining approval from the university's institutional review board. Informed consent was obtained from the parents of the participants, and verbal assent was obtained from each participant each day he interacted with the clinician.

The participants were English monolingual Caucasian children from middle socioeconomic status backgrounds. At the time of intervention, Luke was age 8;5 (years;months) and had just completed third grade. Daniel was age 6;4 and was in kindergarten at the outset of the study. Travis was age 6;6 and was in the second grade at the outset of the study. None of the participants had attended specialized autism programs prior to or outside of school. Luke had received individual language intervention at the university clinic and at his public school since beginning school at 6 years of age. During the school year, Luke received speech-language intervention twice per week for 20-min sessions. Daniel had received language intervention from both a developmental preschool and a university clinic approximately 3 days per week since he was 2 years of age. Travis had received language intervention twice per week for 30-min sessions at his public school. None of the participants had received narrative intervention at school or in the clinic.

The three boys had delayed language and other markers of autism as toddlers, and they continued to have significant difficulties in communication and social interaction. At the time of testing, the boys were verbal communicators. All three maintained meaningful yet often pragmatically inappropriate conversational exchanges with adults and children across daily life settings. All three could sit at a table, maintain attention, and participate in didactic learning events for 20 min at a time, with moderate adult support.

To obtain additional information about the participants' language ability, we collected a play-based conversation sample and two narrative retell samples from each participant prior to collecting baseline. The conversation and narrative retell samples were used only to provide descriptive participant information. The conversation sample was elicited while the clinicians played an interactive game with the participants. The first 10 min of the sample was transcribed and analyzed. The two narrative retells were elicited using the first two kindergarten benchmark probes from the Test of Narrative Retell (TNR; Petersen & Spencer, 2010). The TNR includes several personal-themed stories

that are equivalent in length, linguistic complexity (e.g., clausal subordination), and story grammar (Petersen & Spencer, 2012). The kindergarten TNR stories have an average mean length of utterance (MLU) of 10.80 and an average subordination index (SI) of 1.8.

The conversation sample and the narrative retells indicated that Luke's MLU was 2.63 and 3.25, respectively, and his SI was 0.63 and 0.83. Daniel's MLU was 2.88 and 5.48, and his SI was 0.38 and 0.94. On the basis of these data, Luke and Daniel's expressive language was significantly below developmental expectations in conversation and in narrative retells, with neither child producing age-appropriate MLU or clausal subordination. Travis's MLU was 4.16 in conversation and 7.20 in narrative retells, and his SI was 0.90 and 1.22. This indicated a lack of age-appropriate syntax in conversation. For a retell of a linguistically complex model narrative, Travis's MLU was age appropriate. He produced only two of the 14 modeled subordinate clauses (i.e., one causal adverbial subordinate clause and one nominal subordinate clause). Thus, all three participants showed some weaknesses in expressive language—weaknesses that likely would be amplified in a discourse context involving the generation of personal narratives.

### *Experimental Design*

A combination of two single-subject designs was used in this study. A multiple-baseline design across participants was the primary design. This study design controls for threats to internal validity, such as maturation and history, and provides evidence of replication across participants. The multiple-baseline design across participants does not evaluate intrasubject replication, and for this reason, we also used a multiple-baseline design across behaviors (Gast & Ledford, 2010; Trent, Kaiser, & Wolery, 2005). The combination of these two designs provides greater experimental control, with the staggered baselines across participants and across behaviors within the participants demonstrating that changes in the outcome measures were due to the intervention.

For each participant, two to three story grammar elements and two to four linguistic complexity elements that were absent or emerging from baseline performance were chosen as intervention targets. The story grammar elements were the primary outcome variable and drove decisions regarding stability of baseline and when to introduce intervention. During the baseline phase, the participants were only measured on the outcome variables and did not receive intervention. The intervention targets were introduced into intervention sessions in a staggered pattern after story grammar data indicated a stable baseline for each participant. This resulted in three, eight, or 12 baseline sessions across participants. Our secondary research design examining multiple baselines across behaviors resulted in three, eight, 12, or 16 baseline sessions. The baseline phases for the story grammar data were long enough to reveal patterns of performance and change in that performance as a function of the intervention.

The intervention phase consisted of up to 12 intervention sessions. The initial intervention sessions treated one story grammar target and one linguistic complexity target. The other language features remained in extended baselines of varying lengths until they were added to intervention. As new features were added, other features were retained, resulting in progressively more targets for each intervention session. Participants were administered maintenance probes at 2 weeks and at 7 weeks post intervention.

All baseline, intervention, and maintenance sessions were conducted individually at the university clinic. Three graduate students in speech-language pathology conducted the assessment and intervention sessions. Each participant was assigned to one graduate student clinician who delivered the intervention and who obtained the narrative assessment data. These clinicians were not blind to the purposes of the study or blind to when their clients were in baseline or intervention phases. However, fidelity of intervention implementation and scoring reliability were carefully monitored, and assessment procedures were standardized.

### ***Narrative Skills Assessed and Taught***

***Narrative generations.*** During baseline, intervention, and maintenance sessions, the clinician modeled a personal story to elicit an independent personal story from each participant. Personal story elicitation procedures were patterned after A. McCabe and Rollins's (1994) conversation elicitation technique. Model stories reflected realistic situations that many children have experienced. After the clinician told the model story, the child was then asked, "Has anything like that ever happened to you?" This question prompted the child to generate a personal narrative that was thematically related to the model story (e.g., about a time when he or she got hurt). The story elicitation procedures were standardized, and each model story, developed on the basis of a template, contained the same structural features: seven main story grammar elements and the same number and type of linguistic complexity features (Petersen & Spencer, 2012). This narrative structure aligned with the available information on typically developing 7- to 8-year-old children's narrative abilities (see Hughes, McGillivray, & Schmidek, 1997; A. McCabe & Rollins, 1994; C. Peterson & McCabe, 1983). The elicitation procedure, model narratives, and scoring procedure are collectively referred to as the Test of Personal Generation: School Age (TPG; Petersen & Spencer, 2010).

***Narrative scoring.*** Each story generation was scored using the TPG scoring guide (see Appendix A). Earlier work in the assessment of narratives (Petersen, Gillam, & Gillam, 2008) informed the development of the scoring guide. The scoring guide is divided into two major sections: story grammar and linguistic complexity. Each of the scored elements can receive 0–3 points, with higher scores reflecting more advanced usage. Story grammar elements that comprise a complete episode are interrelated on the scoring guide. For example, for there to be a 3-point problem, an attempt to solve the problem must be clearly stated. Thus,

higher story grammar scores reflect more advanced use of episodic narrative structure.

Some modifications were made to the TPG scoring guide for the purposes of this study. Although the TPG scoring guide shown in Appendix A has ceiling frequencies for linguistic complexity (e.g., 0–3 points for causal subordinating conjunctions), we removed this ceiling. Thus, there were no maximum linguistic complexity points possible. In addition, we scored for the story grammar elements of location and plan. Location was assigned scores ranging from 0 to 2, with 0 indicating no location specified in the setting, 1 point indicating that there was a general location provided (e.g., *in the car*; *at a park*), and 2 points indicating that there was a specific and proper noun provided for the location (e.g., *at central park*). Plan was assigned scores ranging from 0 to 3, with 0 indicating no plan, 1 point indicating an implied plan (e.g., *I said "I better get out of here"*), 2 points indicating an incomplete or unclear plan with a metacognitive verb (e.g., *I decided to do something*), and 3 points indicating a complete and clear plan with a metacognitive verb (e.g., *I decided to run away*).

***Selecting intervention targets.*** Intervention targets were selected from an analysis of baseline TPG data for each participant. Story grammar and linguistic complexity elements that were low and stable across baseline were initially chosen as intervention targets. Although Luke's clinician originally selected three story grammar targets (*action*, *problem*, *consequence*) and three linguistic complexity targets (*temporal conjunctions*, *causality*, *adverbs*), his progress was not sufficiently consistent on the first two story grammar and linguistic complexity targets during intervention to warrant the introduction of the final targets. Thus, Luke's story grammar targets were *action* and *problem*, and his linguistic complexity targets were *temporal conjunctions* and *causality*. Travis's story grammar targets were *emotion*, *ending emotion*, and *plan*, and his linguistic complexity targets were *causality*, *adverbs*, and *temporal adverbial subordinate (TAS) clauses*. Daniel's baseline stories revealed that he consistently generated stories that included all major story grammar elements except for *plan* and the setting subelement *location*. These two elements were selected as story grammar targets. Because Daniel only had two story grammar targets, an additional linguistic complexity target was selected. Daniel's linguistic complexity elements were *causality*, *TAS clauses*, *adverbs*, and *adjectival subordination*.

***Baseline and maintenance phases.*** The baseline sessions were designed to be as similar as possible to the intervention sessions, other than the intervention variable. Baseline sessions were composed of 15–20 min of structured play followed by a clean up time and then the elicitation of a personal story. During structured play, the clinician and the participant played games or drew pictures. The games did not involve narrative language, and the clinician only modeled simple utterances pertaining to the activity (e.g., "Awesome!" or "You beat me!"). During this time, the participants received attention from the clinician but no language intervention. The clinicians elicited three baseline generations from Luke, eight baseline generations from

Travis, and 12 baseline generations from Daniel. All participants were administered maintenance probes at 2 weeks and 7 weeks post intervention. The clinicians elicited data during the maintenance phase using the same procedures as in baseline.

*Narrative elicitation and scoring reliability.* The first author observed 100% of the baseline sessions, 78% of the intervention sessions, and 67% of the maintenance sessions. The extent to which clinicians elicited a personal story with fidelity was evaluated using a nine-item procedural checklist. Narrative elicitation fidelity was averaged across all three participants and all phases, yielding a mean accuracy of 95%. An undergraduate student in communication disorders, who was blind to the purpose of the study and the narrative elicitation phase (baseline, intervention, or maintenance), was trained to transcribe, segment, and code the narratives using the TPG scoring guide. The first author provided 6 hr of training on transcription, segmenting, and coding of 50 stories elicited from other children using the TPG. This research assistant transcribed, segmented, and coded all the narratives. The first author independently transcribed a random sample of 25% of the participants' narratives and independently scored 100% of the elicited narratives to calculate transcription and scoring reliability. Mean word-to-word interrater transcription agreement was 93%, and mean point-to-point interrater agreement for coding was 91%.

### **Intervention Procedure**

*Intervention phase.* Twelve intervention sessions were conducted during the intervention phase. Intervention sessions for Travis and Daniel lasted 40 min, and those for Luke lasted 30 min. Travis's and Daniel's interventions occurred four times per week for 3 weeks, and Luke's intervention occurred two times per week for 6 weeks.

In the intervention phase, the clinician sequentially targeted story grammar and linguistic complexity elements according to their individual needs. For Travis and Daniel, a story grammar target and a linguistic complexity target were introduced simultaneously at the beginning of intervention, and then two additional targets were introduced after determining evidence of experimental control for the story grammar targets, which resulted in new targets being introduced every four intervention sessions. For Luke, a story grammar target and a linguistic complexity target were introduced at the beginning of intervention, but the other two intervention targets were maintained in an extended baseline phase until the last four intervention sessions, after which they were introduced into intervention. For all participants, previous targets were maintained when new targets were added. While some elements were being targeted during each week of intervention, the elements that were not yet introduced into intervention were monitored in an extended baseline phase. While elements were still in baseline, they were de-emphasized by removing them from the clinician's modeled story. Additionally, the clinician did not reinforce the child's use of those elements, and the clinician

did not prompt the production of those elements. During the last four intervention sessions, all of the intervention targets were taught.

*Model intervention stories.* We randomly preselected 12 stories from the corpus of model assessment stories to use during intervention. These stories were used to teach individualized story grammar and linguistic complexity targets. These model stories were modified during intervention so that when they were the focus of intervention, story grammar targets were represented three to six times, and linguistic complexity targets were represented six to ten times. Linguistic complexity and story grammar were modified according to each participant's needs (see an example for each participant in Appendix B). At the end of the intervention session, the model story was presented to the child in its unmodified form (with story grammar and linguistic complexity identical to that modeled in the stories used in baseline and in maintenance), and the child was asked to generate a personal story that was related to the model story. These personal stories elicited at the end of each intervention session were used as the outcome measure.

*Visual supports.* Three visual support systems were provided. A five-picture sequence corresponding to five major story grammar elements (character, problem, emotional state, action, and consequence) accompanied each story presentation. Simple color-coded icons representing the story grammar elements (e.g., a thumb-down in red for a problem and a pink heart-shaped happy face for a reaction) were printed on individual 3-in. × 3-in. cards. These icons—representing the seven elements of character, location, problem, emotional state, action, consequence, and ending emotion, which have been found to be helpful in story grammar intervention—were used during the child's story retells and generations. Pictography, consisting of a few simple sketches depicting the main events of the story, has been shown to improve the quality and length of children's narratives. The pictographs were drawn on sticky notes by the clinician. These sticky notes were subsequently manipulated by the child and clinician as the child retold his narrative generation.

*Intervention steps.* Each intervention session consisted of eight intervention steps (see Table 1). The first four steps focused on narrative retelling, and the last four steps focused on narrative generation. The steps began with a model narrative that contained multiple exemplars of the participant's story grammar and linguistic complexity targets. The steps systematically reduced visual support and verbal support so participants independently retold and generated a story in each session.

In the first step of the narrative intervention, the story was modeled while the clinician referred to the five sequenced pictures. While modeling the story, the clinician placed the eight story grammar icons on the left corner of each corresponding picture. Linguistic complexity elements did not have pictorial or iconic representations, but the clinician modeled and prompted the target features at least once per minute or whenever the child omitted the target feature.

**Table 1.** Eight steps of narrative intervention performed every session; the eighth step is also the outcome measure.

Step	Clinician	Child
1. Story model with visual supports	Models story and places story grammar icons under sequenced pictures	Listens attentively
2. Story retell with full support	Provides verbal scaffolds of episode sequence, visual supports, and language targets	Retells story with pictures and icons
3. Story retell with partial support	Provides fewer prompts and scaffolds	Retells story with only icons
4. Independent story retell	Listens attentively	Retells story without visual or verbal supports
5. Thematically related personal narrative	Sketches pictography on sticky notes	Generates a personal narrative
6. Retell of generation with full support	Provides verbal scaffolds of plot, support use, and targets	Retells narrative with pictographic notes and icons
7. Retell of generation with partial support	Provides fewer scaffolds of plot, support use, and targets	Retells narrative with icons
<i>[Pause with material cleanup]</i>		
8. Independent personal narrative retell	Listens attentively	Retells narrative without visual or verbal supports

In the second step, the child was prompted to begin retelling the story, and the clinician provided support by referring to the pictures and icons and by responding with prompts and models. Elements in baseline were not prompted, depicted, or modeled. For the third step of intervention, the clinician removed the pictures and prompted the child to retell the story using only the icons. The clinician continued to provide verbal support as needed. During the fourth step, the clinician removed the icons, prompting the child to produce the story retell without visual support.

For the fifth step of intervention, the clinician prompted the child to generate a story by asking him, “Has anything like that ever happened to you?” The child then independently generated a personal story. If a participant was reluctant to generate his own story, the clinician allowed the participant to tell the previously modeled retell story in first person. During Step 5, while the child generated a story, the clinician covertly sketched in pictography any of the five story grammar elements of the story independently produced by the child. For the sixth step, the pictographs were placed in front of the child along with the corresponding icons. Any of the story grammar elements not generated by the child (and consequently not depicted in pictography) were brought to the child’s attention. Any missing story grammar elements were rapidly sketched by the clinician and were placed in the correct sequence with the other pictures. During Step 6, the child retold his generated story as prompted by the pictograph on each sticky note and the corresponding story grammar icons. For the seventh step, the sticky notes were removed, leaving the story grammar icons. At this point, the clinician provided as little scaffolding as possible. Just as in Steps 2 and 3 of the retell phase of intervention, Steps 6 and 7 of the personal generation phase entailed the systematic removal of visual support.

In the final step of intervention (Step 8), the clinician paused in the process, removed the icons, and cleared all materials off of the table. The clinician then modeled a personal story similar to procedures used during baseline and during maintenance, then asked the child to generate his

story independently of visual or verbal support. The story told during this final phase of intervention was analyzed for the outcome measures.

*Systematic support.* Systematic support was aimed at maintaining attention, producing complete stories, and using the intervention targets correctly. The sessions were designed to provide considerable structural support that was gradually reduced across the intervention steps. Each session was structured with a predictable, repeated pattern of gradually reduced support and increasing task demand over eight distinct steps. The model stories were a primary source of structural support because each story was specially customized to highlight each participant’s intervention targets. Structural support was also present through pictures, icons, and pictographic sketches illustrating the event progression and story grammar elements.

The clinicians aimed to challenge but not frustrate the children. Interactive support occurred through expectant pauses, requests for imitation, inferential and factual questions, response expansions, and cloze utterances. An explicit skill focus was maintained throughout the sessions by only providing the repeated opportunities and systematic learning support to the intervention targets. No attention was directed to the features chosen during baseline, but not yet targeted, until they became the targets of intervention.

*Clinician training and treatment fidelity.* The graduate students had prior clinical hours but had very limited prior experience with children with autism. The first author trained all three clinicians for approximately 3 hr, using review of other videotaped intervention sessions and practice sessions. During the data-collection period, the first author held weekly meetings in which the clinicians received feedback and supplemental training as needed. The treatment formed part of the clinicians’ practica, so a clinical supervisor also provided ongoing supervision and guidance.

The first author observed 78% of the intervention sessions and used a checklist to calculate treatment fidelity (see Appendix C). The checklist had specific procedures for each intervention step. There were a total of 80 items on

the checklist. For example, during Step 2, the first author noted whether the clinician used the pictures, the icons, and the correct story grammar and linguistic complexity targets; determined whether the linguistic complexity targets were modeled or elicited at least one time per minute; and determined whether the clinician de-emphasized the story grammar and linguistic complexity elements in extended baseline. Similar detailed analyses were conducted for each step of the intervention procedure. Mean treatment fidelity across all clinicians was 98%.

## Results

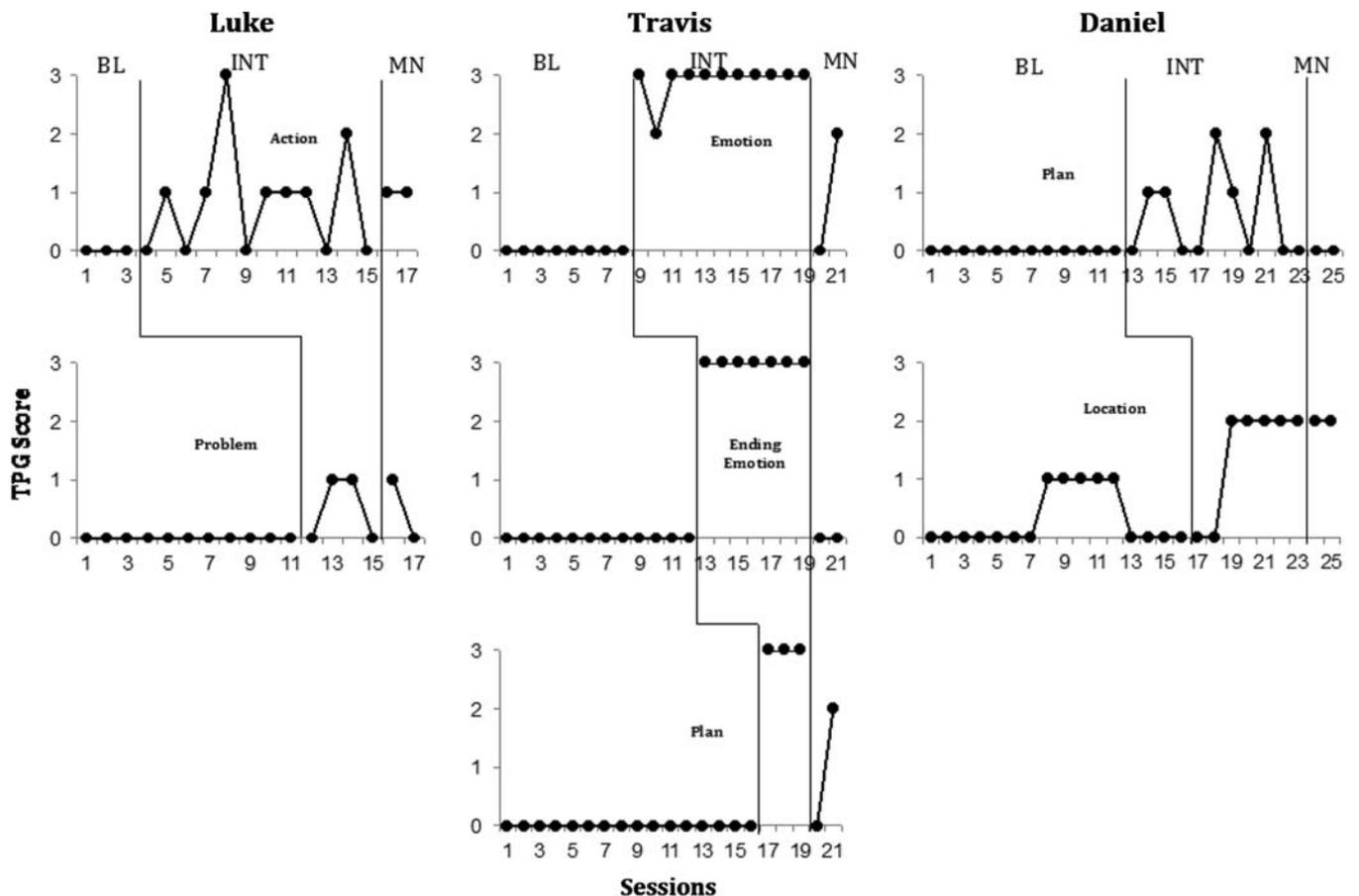
### *Effects on Story Grammar Immediately After Intervention*

The first research question addressed whether intervention would have an effect on the story grammar of independent narrative generations obtained immediately after each intervention session. The multiple-baseline results across participants and story grammar elements are displayed in Figure 1. Results show low and flat baseline

performance for all seven elements, with improvement occurring and remaining only when the element was an intervention target for that participant. Scores for each story grammar element were derived from the TPG scoring guide and the appended scoring guidelines for location and plan. All story grammar elements were scored on a scale of 0–3, with the exception of location, which was scored on a scale of 0–2. Table 2 shows mean total scores for baseline and intervention phases, gain from baseline to intervention, and percentage of nonoverlapping data (PND) for each story grammar element. We calculated gain by computing the difference between intervention and baseline mean scores. We determined PND by calculating the percentage of data points recorded during intervention that exceeded the highest baseline data point. All seven variables showed PNDs ranging from 45% to 100%. Travis showed the greatest gain and the largest PNDs.

In sum, the graphical and statistical outcomes showed an overall effect of the intervention. The participant Travis showed the most reliable treatment effects. The elements of plan and combined emotions showed the most reliable treatment effects.

**Figure 1.** Multiple-baseline results for story grammar. BL = baseline; INT = intervention; MN = maintenance; TPG = Test of Personal Generation: School-Age.



**Table 2.** Effects for story grammar: Phase means and PNDs.

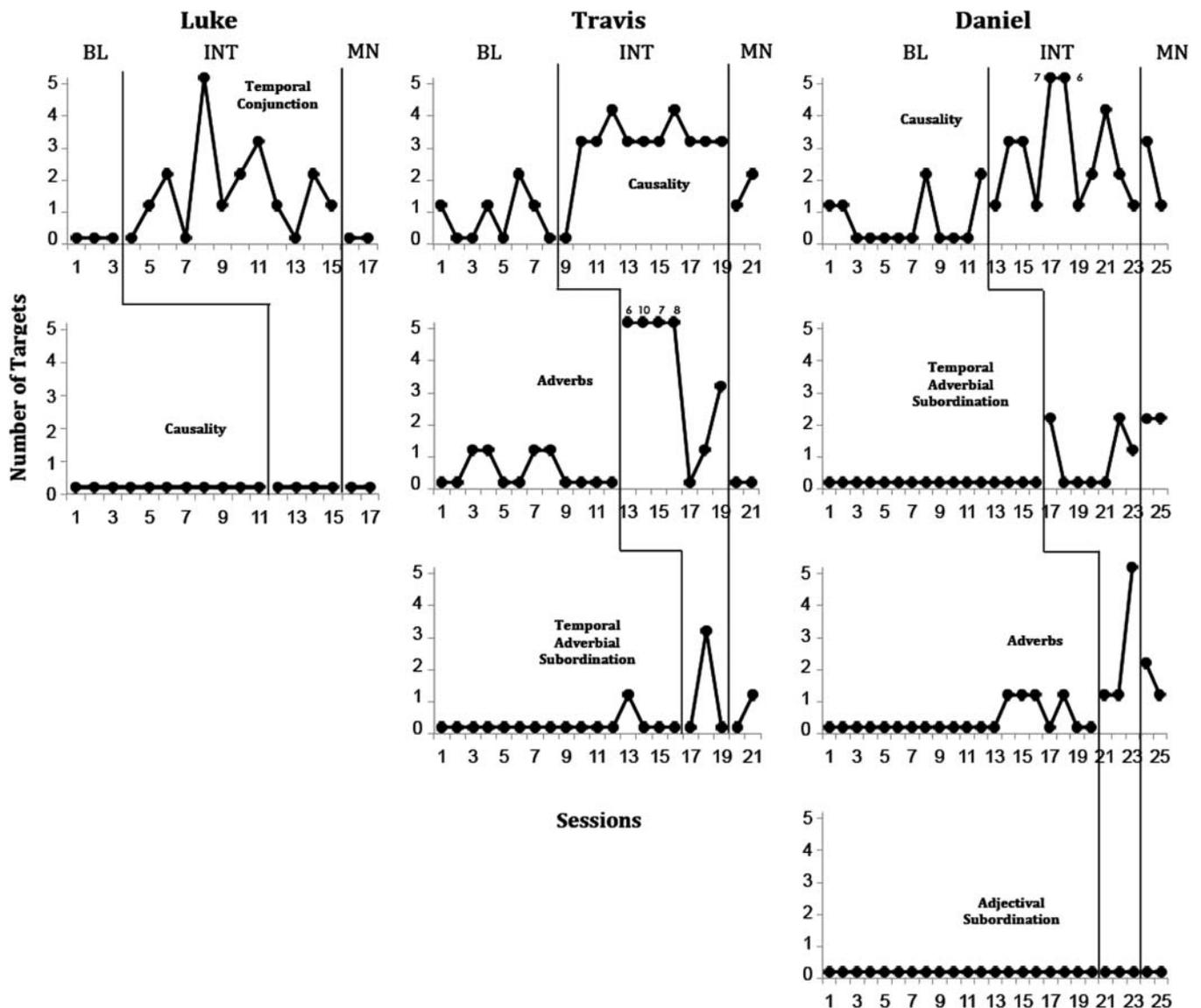
Participant	Target	Baseline	Intervention	Gain	PND
Luke	Action	0.00	0.83	0.83	58
	Problem	0.00	0.50	0.50	50
Travis	Emotion	0.00	2.91	2.91	100
	End emotion	0.00	3.00	3.00	100
	Plan	0.00	3.00	3.00	100
Daniel	Plan	0.00	0.64	0.64	45
	Location	0.31	1.43	1.12	100

Note. Percentage of nonoverlapping data (PND) = the percentage of intervention data points greater than the highest baseline data point; Gain = the difference between intervention and baseline mean scores, with a maximum possible gain of 3 points.

### Effects on Linguistic Complexity Immediately After Intervention

The second research question addressed whether intervention would have an effect on the linguistic complexity of independent narrative generations immediately after intervention. The multiple-baseline results across participants and elements of linguistic complexity are displayed in Figure 2. Results show low and generally stable baseline performance with limited range, with changes occurring during intervention for seven of the nine variables (Luke—temporal conjunctions, Travis—causality, Travis—adverbs, Travis—TAS, Daniel—causality, Daniel—TAS, and Daniel—adverbs), indicating a possible treatment effect for these variables. The other two variables showed low and

**Figure 2.** Multiple-baseline results for linguistic complexity.



generally stable performance in baseline but no improvement in intervention.

The largest mean gains and PNDs are shown for four of the variables with reliable graphical treatment effects (see Table 3). Daniel–TAS, for whom the graphical improvement was inconsistent but greater than baseline, showed a PND of 43% and a mean gain of 0.71. The largest mean gains were obtained on Travis–adverb, Daniel–causality, Travis–causality, and Travis–adverbs; yet, mean gains were obtained on all linguistic complexity targets with the exception of Luke–causality and Daniel–adjectival subordination.

In sum, the graphical and statistical outcomes showed some effect of intervention on elements of linguistic complexity. Travis, in general, and the elements of causality, adverbs, and temporal conjunctions showed the most stable treatment effects.

### ***Maintenance Effects for Story Grammar and Linguistic Complexity***

The final question addressed maintenance of gains 2 and 7 weeks after intervention. For story grammar, Luke–action, Travis–emotion, Travis–plan, and Daniel–location showed evidence of maintenance. For linguistic complexity, three out of the nine elements showed graphical performance at maintenance greater than that of baseline performance (Daniel–causality, Daniel–TAS, and Daniel–adverbs). Thus, the intervention showed mixed maintenance effects.

### **Discussion**

This study investigated the effect of a systematic, individualized intervention on personal narratives of three boys with high-functioning autism. Intervention targeted two to three story grammar elements and two to four linguistic complexity elements for each participant, selected from their baseline performance. Key features of the

intervention included personal-themed stories with embedded and individualized targets, repeated opportunities to practice narrative targets, structured visual prompts, interactive verbal prompts, and systematic fading and correction procedures (Petersen et al., 2010; Spencer & Slocum, 2010; Ukrainetz, 2006). An experimental design across participants and behaviors resulted in cumulative improvements in the story grammar and linguistic complexity of personal narratives generated immediately following intervention sessions.

All three participants in this study demonstrated weakness in linguistic complexity in conversation and in personal story generation, with consistent difficulty connecting narrative elements causally and temporally. This finding aligns with Tager-Flusberg and Sullivan (1995) and Diehl et al. (2006), who noted that their research participants with autism had trouble with causal aspects of narration. In terms of story grammar, the participants demonstrated different strengths and weaknesses. Luke required help with story grammar elements that directly contributed to a minimally complete episode (action and problem), whereas Travis primarily needed help with elements related to internal states (plan, emotions), and Daniel needed help with providing more detailed information for his listeners (location) and producing a plan. This degree of heterogeneity was expected, and an individualized approach to their intervention was necessary. This systematic narrative intervention—using customized model stories, visual supports, structured interactive scaffolds, and a high level of structure and predictability—appeared to be an effective means to address both the participants’ individual needs and their unique learning styles.

### ***Analyzing the Intervention Approach***

Our narrative intervention approach utilized a contextualized skill or hybrid approach in which specific language skills were explicitly targeted within the natural context of narration (Fey, 1986; Ukrainetz, 2006). The teaching procedures—including repeated opportunities for learning and practice, systematic interactive and structural support, and explicit attention to specific skills—were adequate for addressing each participant’s language targets. Clinicians were able to withdraw prompts within sessions so that independent storytelling was possible at the end of every session, and, across sessions, clinicians were able to use less restrictive prompting with reduced frequency.

*Effect of intervention intensity.* Previous studies have employed similar narrative intervention procedures with at-risk preschoolers (Spencer & Slocum, 2010) and children with neurologically based language impairments (Petersen et al., 2010). The number of sessions necessary to make meaningful improvements was approximately the same as in the current study. We did not know what the optimal intensity of intervention was for children with autism because of the lack of prior research.

Our participants made quick gains on personal stories probed during intervention. Immediate effects on story grammar and linguistic complexity targets were detected, but not

**Table 3.** Effects for linguistic complexity: Phase means and PNDs.

Participant	Target	Baseline	Intervention	Gain	PND
Luke	Temporal conjunctions <sup>a</sup>	0.00	1.50	1.50	75
	Causality	0.00	0.00	0.00	0
Travis	Causality <sup>a</sup>	0.63	2.91	2.28	91
	Adverb <sup>a</sup>	0.33	5.00	4.67	71
	TAS	0.06	1.00	0.94	33
Daniel	Causality <sup>a</sup>	0.50	2.81	2.32	45
	TAS	0.00	0.71	0.71	43
	Adverbs	0.20	2.33	2.13	33
	Adjectival subordination	0.00	0.00	0.00	0

*Note.* Gain = the difference between intervention and baseline mean scores, with no maximum possible gain; Temporal conjunctions = “then”; Causality = causal adverbial subordination; TAS = temporal adverbial subordination.

<sup>a</sup>Dependent variables for which graphical analysis showed a clear treatment effect.

all of those effects were long lasting. The maintenance data revealed that 12 sessions once or twice a week was not enough to produce lasting improvements in some features of the children's personal narratives. Gains were at least partially maintained in the use of action, emotion, plan, and location as well as the linguistic complexity elements of causal subordinating conjunctions, temporal subordinating conjunctions, and adverbs. Other story grammar and linguistic complexity targets had more limited evidence of maintenance. It is likely that greater numbers of individualized narrative intervention sessions are necessary to maintain global gains for children with autism.

Twelve sessions for language learning compose a fairly low total treatment dose, even more so because generative, flexible language is particularly difficult to obtain in children with autism. In a dose-response meta-analysis, Virués-Ortega (2010) found that heavy (e.g., more than 100 hr), long-term (e.g., 30 hr per week) intervention was required to obtain large effects on language outcomes of children with autism. Despite the lack of maintenance, the intensity was sufficient to achieve the primary aim of the study, which was to show a causal relationship between the intervention and participants' narrative language.

*Intervention steps.* Initially, the retell phase of each intervention session was planned as a simple low-effort context for teaching narrative structure and linguistic features. The logic was that participants would first learn and practice their individualized targets using a story that had several targets embedded in them and then be primed to use those specific targets in their own personal stories. We are not certain that both phases (retell and personal) were necessary. It is reasonable that the model stories were helpful demonstrations of what a story sounds like with the important components and linguistic complexity. Alternatively, children may have benefitted from more practice telling personal stories. During baseline, Luke, Travis, and Daniel showed stronger skills in story retelling. An abbreviated retell phase might have been sufficient and would have allowed more time to work on personal narratives.

*Intervention targets.* Another dimension of intervention that should be examined further is the number of language skills that can be effectively addressed within a short period of intervention. The research design employed in this study involved adding new targets while maintaining previous targets, resulting in four to six targets for each participant in each of the final four sessions. Our number of targets was partially driven by the need to establish experimental control with replications of effect across several targets and seemed a reasonable way to maintain performance on all skills targeted. It may have been more effective to first address story grammar structure until participants consistently produced each component and then to add the linguistic complexity targets. Alternately, the same number and array of skills could have been introduced, but when a skill reached criterion, it could have been dropped from attention.

The visual support system may warrant reconsideration. The visual supports were very helpful for teaching the

story grammar targets. However, there were three systems of visual support for the story grammar targets but none for the linguistic complexity targets. Simply adding an additional visual system for linguistic complexity might be confusing, but how to optimally support all the intervention targets merits further consideration.

*Attention and engagement.* The effectiveness of intervention is fundamentally affected by children's attention and interest in what they are being taught (Warren, Fey, & Yoder, 2007). It can be difficult to maintain children's engagement in tasks designed to improve language proficiency. This can be especially so with clinician-directed procedures in which children are required to participate to the degree and in the manner prescribed by the clinician, thus often necessitating artificial motivators. However, such predictability and structure can lend itself well to the learning style of children with autism. At the same time, even children with autism can enjoy listening to and telling narratives about events that are familiar to their lives. Anecdotal observations indicated that Luke, Travis, and Daniel enjoyed the intervention procedures and were attentive most of the time. The level of challenge was appropriate, and the activities and procedures maintained their attention, so relatively few problem behaviors disrupted the sessions. Travis, Daniel, and Luke were able to productively participate in their full sessions. Travis was the least cooperative and attentive, but he still participated well until the last 10–15 min of his 40-min sessions, when closer direction and more structure were required.

### *Reflections on the Participants' Storytelling*

Luke's story grammar and linguistic complexity were severely limited at the outset of the study. Because of this, we focused on early emerging story grammar elements that were episodically relevant (i.e., attempts and problems) and early developing linguistic features that were important to narration (i.e., temporal and causal ties). Luke did not use any of the target features prior to intervention, and then he began producing all the language targets except causality. Thus, Luke produced stories that were considerably improved from baseline but that still did not contain all of the elements necessary for a minimally complete episode (i.e., problem, attempt, and consequence) or consistent use of temporal or causal ties. Luke's narratives remained in a developmentally delayed state and were still difficult to understand.

Daniel's personal stories at baseline included several important story grammar elements, including all of the elements necessary for a minimally complete episode. Because of his relative strength in story grammar, we chose only two story grammar targets for the intervention. The first target of location was selected to improve the setting information of his stories. Although he included location in some of his stories during baseline, it was minimal. In contrast, Daniel showed no evidence of using the second story grammar target (plan) in his personal stories during baseline. During intervention, Daniel made notable improvements incorporating both location and plan in his personal stories, which resulted in clearer

narration. As a function of baseline performance, four complexity features were targeted: causal subordination, adverbs, temporal subordination, and adjectival subordination. Daniel showed improvement in all of these except adjectival subordination. This improvement in linguistic complexity contributed to clearer, more complex, and more interesting narratives.

Travis showed the most rapid and stable improvement in both story grammar and linguistic complexity in his narration. With intensive instruction and heightened awareness, Travis was able to consistently implement language features in his personal stories that were previously only evident in more scaffolded narrative retells. It is possible that Travis was a faster learner whose fading attention was not a problem but rather an indication that Travis had internalized the intervention objectives of the day. Travis's clinician may have been better at supporting his learning, but that is only speculation: All three clinicians were 1st-year graduate students who did well in graduate clinical experiences and academic coursework.

There is a wide range of language, intellect, and social abilities for which this narrative language intervention is appropriate, from preschool through to the early elementary grades (Petersen et al., 2010; Spencer & Slocum, 2010). Specific intervention targets should be individualized to each child, but the procedures and activities suit a range of communicative abilities. Despite the considerable differences in language ability at the outset of the study, the intervention had a positive impact on all three boys' narrative language: They were generally attentive and engaged over a sustained period, and they became much more comfortable with story retelling and generation activities over time. These behaviors, in addition to the language improvements, will help with functional communication and academic success.

A particular challenge in improving narratives of children with autism is the intersection of narrative and autism. This intervention was directed at improving some of the language skills involved in narration. In terms of that, it was successful. However, such a deeply social activity as storytelling may not hold the same attraction or understanding for children with autism. The fundamental purposes of narrative—transmission of personal perspective and the connection with an audience through story performance (Labov, 1972; Ukrainetz et al., 2005)—may have eluded the participants, as possibly evidenced in two narratives produced by Daniel:

**Daniel: Baseline**

E: Has something like that ever happened to you?

C: I lost my green shoes because I lost them.

**Daniel: Intervention**

E: Has anything like that ever happened to you?

C: Because (I) I'm playing Starfall because it was fun.

E: Uhuh.

C: (Because) because (I don't) I couldn't get the pumpkin.

C: And (because I'm) because I was so mad because I wanted to change another one.

C: I decided to change another one, but not pumpkin.

C: Uh I wanna do calendar, to click on calendar because I'm happy.

C: I clicking in the calendar of the 2nd.

C: Is that the end?

In this example, Daniel demonstrated meaningful changes in the quantity and quality of the language of his narrative. However, even his intervention story has an informational feel to it. A sense of story engagement and performance is lacking. It was beyond the scope of the current study, but it would be beneficial to investigate what additional intervention dimensions might better help children with autism more fully meet the demands of narration.

### *Clinical Implications*

This study provides preliminary evidence of a narrative intervention that can be effective with children with high-functioning autism. The approach to language intervention used in this study can be easily adapted for use in schools. The semimanualized procedures allow for both structure and flexibility on the basis of individual needs, which is very much needed for school-age language intervention (Ukrainetz, 2009). Essentially, the intervention steps and the provision of visual prompts are prescribed, but the nature and degree of verbal prompting depend on clinician judgment. This mix is suitable for clinicians who desire steps to follow without overriding their own clinical expertise.

Although the overall procedures worked well for improving the language of these children with high-functioning autism, we recommend that clinicians consider modifying the number or sequence of story grammar and linguistic complexity targets to reduce the attentional demands in the latter part of intervention. In addition, longer or more frequent intervention is likely needed to secure enduring change in some features of narrative language. It is promising, however, that some gains in story grammar and linguistic complexity were maintained after only 12 intervention sessions. Maintenance of acquired skills supports the robust, flexible knowledge needed for academic activities and social activities.

This approach could be applied to other discourse types, such as fictional story generation and written narrative tasks. Also, to promote generalization and maintenance, children should receive practice with their newly acquired language in contexts that more closely resemble academic tasks. Extension activities could include retelling stories that children have read or watched on TV, using classroom material in intervention sessions, and contriving opportunity for spontaneous personal stories during lunch or snack time.

### *Limitations and Future Directions*

This investigation is an early efficacy study. Despite its strong experimental design, future studies should overcome a number of limitations. First, the dependent variable (personal story generation) was measured immediately following intervention sessions. There was a pause with material cleanup to disrupt the "therapy set," but the outcome measure

was still very close in time to the teaching period. This has two ramifications: (a) The participants were likely fatigued after 30–40 min of narrative intervention and were potentially less motivated to produce a quality narrative, and (b) the performance was less indicative of functional, communicative use after that much priming and practice. Future research should include the measurement of novel narrative productions on the same day but after an intermission following the intervention. These delayed outcome measures may better inform the extent to which sustained learning has occurred.

A second issue deals with balancing manualized interventions with clinical judgment. The clinicians were graduate students who did not have a deep repertoire to inform clinical decisions regarding use and fading of verbal support. The scripts and guidance from clinical supervisors compensated to some degree for this, but at a cost in the other direction: Interventions that are closely scripted reduce the naturalness of the verbal interaction and the reason for using narratives in the first place. Even though this is a limitation, the clinicians' lack of experience and high treatment fidelity suggest that the procedures are not overly complicated to implement and are practical for clinical use.

Third, the study investigated the efficacy of a package of procedures, techniques, and targets. Thus, it did not reveal the relative benefits of each of the components. For example, informal observations suggested that there might have been too many intervention targets in the latter portion of the intervention, and improvement in the linguistic complexity targets might have been compromised by the absence of visual supports. Additionally, the linguistic complexity targets were under less than optimally controlled conditions because decisions on when to implement intervention were based on the story grammar data. This was a negative consequence of the combination of single-subject research designs. Future research should have a more exclusive focus on the effects of narrative intervention on linguistic complexity, perhaps using only one single-subject research design. The narrative intervention used in this study was assembled on the basis of both the best available research evidence and judgments from experienced clinicians; however, there are likely many acceptable ways to produce the desired behaviors.

Finally, this preliminary study indicates that further investigation with group experimental designs is warranted. Further single-subject designs could be used to investigate modifications to the procedures. Children with autism are diverse and present with various combinations of characteristics and ability levels that may differentially respond to aspects of the intervention.

## Conclusion

This combined single-subject experimental design across three participants and 16 language targets investigated the effect of a systematic, individualized intervention on personal narrative generations of three 6- to 8-year-old boys with high-functioning autism. Intervention targeted

two to three story grammar elements and two to four linguistic features selected from their baseline performance. Key intervention components included personal-themed stories with embedded targets, repeated opportunities to practice narrative targets, visual support systems, interactive verbal prompts, and systematic fading and correction procedures. Results indicate that intervention resulted in noticeable improvement in the language of personal narratives immediately following intervention sessions, with some evidence of maintenance 2 weeks and 7 weeks after intervention.

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Appendix A

Test of Personal Generation: School Age (TPG:SA) General Scoring Guide

TPG:SA / General Scoring Guide

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SETTING	PROBLEM/Initiating Event	EMOTIONAL STATE	ACTION	CONSEQUENCE	ENDING EMOTION
0 No character, only a pronoun for a character, no location (e.g., <i>She</i> was roller skating)	0 No problem or implied or unclear problem with no attempt to solve it	0 No emotional state	0 No action	0 No consequence	0 No emotional state
1 Non-specific character (e.g., <i>The girl</i> was roller skating) or (e.g., <i>Her brother</i> was roller skating.)  General location (e.g., She was playing in the <i>driveway</i> .)  Personal Story: "I" = Named Character with no location (e.g., <i>I</i> was roller skating.)	1 Problem stated but no attempt to solve the problem (e.g., She hit a bump and fell down.)	1 Specific or general emotion or emotional behaviors not related to the problem (e.g., Today Sydney was a <i>happy</i> girl skating in her driveway.) or (e.g., Sydney was <i>smiling</i> .)	1 Action by main character that is <b>not an attempt</b> to solve the problem (e.g., Sydney was roller skating.)  An action that appears to be an attempt to solve a problem, but no problem was stated (e.g., She stayed away from the bump.)  Action by secondary character(s) that is <b>not an attempt</b> to solve the problem or the problem was missing (e.g., Her brother was roller skating.)	1 Consequence from modeled story without an action or a problem (retell only) (e.g., Sydney and her brother had fun together.)	1 Specific or general emotion or emotional behaviors implying a consequence (e.g., Today Sydney was a <i>happy</i> girl skating in her driveway.) or (e.g., Sydney was <i>smiling</i> .)
2 Named character with no location (e.g., Sydney was roller skating.)  Non-specific character AND general location (e.g., <i>The girl</i> was roller skating in her driveway.)  Personal Story: "I" = Named Character with general location (e.g., <i>I</i> was roller skating in my driveway.)	2 Implied/unclear problem (including emotion) with an attempt to solve the problem (e.g., She got back up on her skates and didn't go near the bump again.) or (e.g., She got back up on her skates and her brother asked "Are you OK?") or (e.g., Sydney was sad and didn't go near the bump again.)  Stated problem with related consequence, but no attempt to solve the problem (e.g., She hit a bump and fell down then she felt better and skated again.)	2 Emotional behaviors related to problem (e.g., She was <i>crying</i> because her hand hurt.) or (e.g., She hurt her hand and was <i>crying</i> .)  Implied/general emotion related to problem (e.g., She hurt her hand and it was <i>terrible</i> .) (e.g., She felt bad because she fell.)	2 Action by secondary character that was an attempt to solve a stated or implied problem (e.g., Sydney scraped her hand on the ground and her brother asked "Are you OK?").	2 Consequence related to a 1-point action (e.g., Sydney was roller skating. She had fun.)  Consequence related to a stated problem, without an attempt to solve the problem.	2 Emotional behaviors related to consequence (e.g., He got a bandaid and he wasn't crying anymore.)  Implied/general emotion related to consequence (e.g., She got a bandaid and was <i>glad</i> .) (e.g., She got a bandaid and felt <i>better</i> .)
3 Named character AND general location (e.g., Sydney was roller skating in her driveway.)  Personal Story: "I" = Named Character with general location and reference to time (e.g., Yesterday, <i>I</i> was roller skating in my driveway.)	3 Stated problem with an attempt by any character to solve the problem (e.g., She hit a bump and fell down. After that she stayed away from the bump.) or (e.g., She hit a bump and fell down. Her brother said, "Are you OK?")	3 Specific emotion related to problem (e.g., She was <i>sad</i> because her hand hurt.) or (e.g., She hurt her hand and was <i>sad</i> .)	3 Action by main character that was an attempt to solve the stated or implied problem (e.g., Sydney scraped her hand on the ground and after that she stayed away from the bump.)	3 Consequence related to a 2-point action (e.g., Sydney scraped her hand on the ground and her brother asked "Are you OK?" And then they had fun roller skating.)  Consequence related to 3-point action (e.g., Sydney scraped her hand on the ground and after that Sydney stayed away from the bump. Then they had fun roller skating together.)	3 Specific emotion related to consequence (e.g., She got a bandaid and was <i>happy</i> .)  COMPLETE EPISODE 3 Includes a 3-point problem, 2 or 3-point action, and a 3-point consequence.
OPENING / DIALOGUE	CAUSAL / ADVERSATIVE	TEMPORAL MARKERS	MULTIPLE SUBORDINATION	ADVERBS	ADJECTIVES
0-1 1 pt for an opening to the story. Personal Story: 1 pt for opening not referencing time (e.g., That happened to me.)  Dialogue 1 point per speaker (e.g., 1 point = <i>he</i> said "Are you OK?"; 2 points = <i>he</i> said "Are you OK?" and <i>she</i> said "I'm fine.")	0-3 1 point for each use of a causal subordination (e.g., she was sad <i>because</i> her hand hurt.)  1 point for using <i>but</i> (e.g., she wanted the candy <i>but</i> it was gone.)	0-2 1 point for using <i>then</i> (up to two times). (e.g., Then Sydney had fun.)  1 point for each use of temporal subordination (e.g., <i>After</i> she got hurt she stayed away from the bump.)	3 Multiple subordination (e.g., <i>After</i> he got home, he got a bandaid <i>because</i> his knee was bleeding.)	0-3 1 point for each unique adverb* (e.g., <i>quickly</i> asked.)  adverb = a word describing a verb  *See scoring guide	0-3 1 point for each unique adjective (e.g., <i>big</i> bump.)  1 point for each use of adjectival subordination (e.g., He saw the house <i>that</i> was big.)

NLM TOTAL SCORE:

Note. NLM = Narrative Language Measures. Reprinted with permission from Language Dynamics Group, LLC.

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## Appendix B

### Sample Model Stories With Embedded Intervention Targets

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#### **Luke Intervention Model Story**

Targets: “Action” embedded 6 times & “**Then**” embedded 6 times. Causality removed, dialogue removed, adverbs removed, adjectives removed, ending emotion removed, location removed.

Maria and her mom went shopping. They needed fruit. **Then** Maria was in the cart. **Then** Maria was mad. She did not like the cart. **Then** Maria asked her mom to get out. Maria wanted to fix her problem. She talked to her mom. She asked her mom. That was Maria’s action to fix her problem. **Then** Maria’s mom said it was OK. **Then** Maria got out. **Then** Maria helped her mom shop.

#### **Daniel Intervention Model Story**

Targets: “Plan” embedded 5 times, “**Causality**” embedded 8 times, “*Temporal Subordinate Clauses*” embedded 8 times, “**Location**” embedded 5 times, no adverbs, no adjectival subordination.

Once, *When it was bedtime* Joseph was playing a video game with his sister in her **bedroom**. *When Joseph’s mom saw him*, she told him to go to sleep in his **bedroom because** it was late. *When he heard his mom*, he was sad **because** he wanted to play the game with his sister in her **bedroom because** they were having fun. Joseph thought about what to do. He needed an idea. Joseph decided to ask his mom if he could finish the game then go to his **bedroom**. Joseph thought “*When I ask my mom, she might let me finish the game with my sister.*” This was Joseph’s plan. So Joseph said “Mom, *when I finish the game* with my sister can I go to my **bedroom because** we are playing together?” Joseph’s mom said “*When you finish the game* you can go to bed **because** you are playing together, but remember, *When you finish the game* you have to go to bed **because** it is late.” *When Joseph and his sister finished playing the game*, he went to bed **because** he listened to his mom. He was happy **because** he did what his mom asked.

#### **Travis Intervention Model Story**

Targets: “Emotion” embedded 5 times, “**Causality**” embedded 8 times, “*Ending Emotion*” embedded 3 times, “**Adverbs**” embedded 8 times. Plan removed, Temporal Adverbial Subordination removed.

One day, John was riding his new red bike **because** he **really** wanted to play with his friend. He was **swiftly** riding and his bike hit a big rock. He crashed **because** he hit the rock. This **really** made him sad. John **badly** cut his knee **because** he fell off his bike. Then he **really** was sad because the cut hurt. He was sad. Then John **quickly** ran home. He sadly asked his mom for a band-aid **because** his knee was bleeding. He asked **because** he was sad. Then his mom **quickly** said “Oh my, you do need a band-aid.” She said he needed a band-aid **because** he was bleeding. Then she put a band-aid on his knee **because** it was bleeding. This made him *happy*. John got a band-aid on his knee and it stopped bleeding. Then, John was **really** *happy*. John was **so** *happy*!

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**Appendix C** (p. 1 of 2)

Narrative Intervention Treatment Fidelity (Travis)

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**RETELL PHASE OF INTERVENTION**

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**Step 1: Model**

Reads Model Story       Pictures       Icons

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**Step 2: Co-Tell**

Pictures       Icons

Correct Story Grammar Produced by Child (+) or Modeled (✓) Prompted (✓) by Clinician

Character       Emotional State

Initiating Event       End Feeling

Attempt       Plan

Consequence

Correct Linguistic Complexity Produced by Child (+) Modeled (✓) Prompted (✓)

Causality       Adverbs       Temporal Adverbial Subordinate Clauses

De-emphasized Story Grammar and Linguistic Complexity used as extended baseline

Location       Multiple Subordination

---

**Step 3: Icon Retelling**

Removes Pictures       Leaves Icons

Correct Story Grammar Produced by Child (+) or Modeled (✓) Prompted (✓) by Clinician

Character       Emotional State

Initiating Event       End Feeling

Attempt       Plan

Consequence

Correct Linguistic Complexity Produced by Child (+) Modeled (✓) Prompted (✓)

Causality       Adverbs       Temporal Adverbial Subordinate Clauses

De-emphasized Story Grammar and Linguistic Complexity used as extended baseline

Location       Multiple Subordination

---

**Step 4: Independent Retelling**

Removes Pictures       Removes Icons

Correct Story Grammar Produced by Child (+) or Modeled (✓) Prompted (✓) by Clinician

Character       Emotional State

Initiating Event       End Feeling

Attempt       Plan

Consequence

Correct Linguistic Complexity Produced by Child (+) Modeled (✓) Prompted (✓)

Causality       Adverbs       Temporal Adverbial Subordinate Clauses

De-emphasized Story Grammar and Linguistic Complexity used as extended baseline

Location       Multiple Subordination

Only inferential and factual questions used as clinician support

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**Appendix C** (p. 2 of 2)

Narrative Intervention Treatment Fidelity (Travis)

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**PERSONAL GENERATION PHASE OF INTERVENTION**

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**Step 1: Child-Generated Story**

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- Clinician asks: "Has anything like that ever happened to you?"  
 Clinician draws pictures reflecting story grammar on sticky notes:  
Correct Story Grammar Produced by Child (+) Modeled (✓) Prompted (✓)  
 Character  Emotional State  
 Initiating Event  End Feeling  
 Attempt  Plan  
 Consequence
- Correct Linguistic Complexity Produced by Child (+) Modeled (✓) Prompted (✓)  
 Causality  Adverbs  Temporal Adverbial Subordinate Clauses
- 

**Step 2: Co-Tell**

---

- Pictures (sticky notes)  Icons  
Correct Story Grammar Produced by Child (+) Modeled (✓) Prompted (✓)  
 Character  Emotional State  
 Initiating Event  End Feeling  
 Attempt  Plan  
 Consequence
- Correct Linguistic Complexity Produced by Child (+) Modeled (✓) Prompted (✓)  
 Causality  Adverbs  Temporal Adverbial Subordinate Clauses
- De-emphasized Story Grammar and Linguistic Complexity used as extended baseline  
 Location  Multiple Subordination
- 

**Step 3: Icon Retelling**

---

- Removes Pictures (sticky notes)  Leaves Icons  
Correct Story Grammar Produced by Child (+) Modeled (✓) Prompted (✓)  
 Character  Emotional State  
 Initiating Event  End Feeling  
 Attempt  Plan  
 Consequence
- Correct Linguistic Complexity Produced by Child (+) Modeled (✓) Prompted (✓)  
 Causality  Adverbs  Temporal Adverbial Subordinate Clauses
- De-emphasized Story Grammar and Linguistic Complexity used as extended baseline  
 Location  Multiple Subordination
- 

**Step 4: Independent Retelling**

---

- Removes Pictures (sticky notes)  Removes Icons  
Correct Story Grammar Produced by Child (+) or Modeled (✓) Prompted (✓) by Clinician  
 Character  Emotional State  
 Initiating Event  End Feeling  
 Attempt  Plan  
 Consequence
- Correct Story Grammar Produced by Child (+) Modeled (✓) Prompted (✓)  
 Causality  Adverbs  Temporal Adverbial Subordinate Clauses
- De-emphasized Story Grammar and Linguistic Complexity used as extended baseline  
 Location  Multiple Subordination  
 Only inferential and factual questions used as clinician support
-

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