

Individualized Narrative Intervention for School-Age Children with Specific Language
Impairment

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Abstract

Purpose: This study extends the research on narrative intervention by evaluating the effect of a standard treatment protocol, *Story Champs* (Petersen & Spencer, 2012), on personal narrative generations of school-aged children with specific language impairment (SLI).

Method: Four second grade, 8- to 9-year-old boys with SLI participated in this multiple baseline across behaviors single case design study that was repeated across participants. Each one-on-one intervention session involved eight steps across two intervention segments: story retell and personal story generation. The interventionist provided systematic scaffolding (visual and verbal supports) that was faded within each session. Three individualized story grammar elements per participant were targeted sequentially across the weeks of intervention based on each participant's needs identified in baseline. The dependent variable probe (personal narrative generation) was administered at the beginning of each twice-weekly session and individualized story grammar elements were scored on a four-point rubric (dependent variable).

Results: In this single case research design study, a functional relation was evaluated for each participant (i.e., replication of an effect across three story grammar elements). A functional relation between *Story Champs* intervention and the dependent variable was observed for two participants.

Conclusions: Results provide preliminary evidence for the efficacy of individually administered *Story Champs* intervention for children with SLI.

Individualized Narrative Intervention for School-Age Children with Specific Language Impairment: A Single-Case Research Study

Narrative production is an authentic and developmentally appropriate context for increasing language productivity and complexity (Bliss & McCabe, 2012). Children with specific language impairment (SLI) can have impaired narrative skills among a myriad of other language deficits (e.g., Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004). Thus, they may benefit from narrative intervention as an academically relevant context for learning narrative language skills (Gillam, Gillam, & Reece, 2012; Ukrainetz, 2006). To optimize child outcomes and intervention efficiency, validated standard treatment protocols are important for evidence-based practice; standard treatment protocols provide structure for clinicians and support implementation of an intervention with fidelity. The *Story Champs* intervention (Spencer & Petersen, 2012) may be particularly valuable because it is a well-designed, research-principled intervention that clinicians can implement easily. However, additional evidence is needed to support the utility of *Story Champs* for children with SLI. SLI is the term for a subgroup of developmental language disorder in which children present with oral language deficits but nonverbal intellectual ability within normal limits (i.e., standard score ≥ 85 ; Leonard, 2014).

Narrative Production in Children with SLI

Narrative production is defined as orally presenting causally-related events or experiences in temporal order (Peterson, 1990). School-age children with SLI have reduced narrative proficiency as compared to their typically developing peers. They produce less complex, less complete, and less organized narratives (i.e., macrostructure; e.g., Boudreau & Chapman, 2000). At the same, they produce

narratives with fewer total words, fewer different words, and more syntactic errors (i.e., microstructure; e.g., Strong & Shaver, 1991; Gillam & Johnston, 1992). Although intervention may lead to gains on norm-referenced language measures, narrative weaknesses may persist for children with SLI (Fey et al., 2004; Wetherell et al., 2007). Persistent difficulties with narrative production are argued to have a negative effect on children's academic and social success (e.g., Fey et al., 2004).

The Academic and Social Landscape of Narrative Production

Narrative tasks include story retell and story generation and more broadly, narrative production is a type of discourse that occurs across home and school environments. Increasingly complex story retell and comprehension skills are included in the kindergarten through fourth grade U.S. Common Core State Standards (National Governors Association Center for Best Practices and Council of Chief State School Officers [NGAC], 2010). For example, kindergarten students are expected to retell a story containing concrete story grammar elements given some support, second grade students are expected to independently connect events and describe thoughts and feelings, and fourth grade students are expected to produce retells wherein story grammar elements are sufficiently detailed (NGAC, 2010; Petersen et al., 2014). Further, research suggests that children's oral narrative skills support reading comprehension as well as the transition from oral to written communication (e.g., Peterson, 1993).

Whereas story retells are an academically-relevant narrative task, personal story generations are an ecologically-valid narrative task that children engage in regularly to relate experiences to others and to establish relationships. Narrative skills are often at

play in social contexts. Children produce narratives to recount events, establish and maintain friendships, and express thoughts and feelings about events. Conversing and sharing with peers is a narrative skill that contributes to being well liked and can lead to increased opportunities to practice language. Enhancing children's narrative production skills may facilitate positive peer relationships particularly for children with SLI, by facilitating sharing of personal events for example (e.g., McCabe & Marshall, 2006).

Story Champs Standard Treatment Protocol and Evidence Base

Commercially-available narrative standard treatment protocols must be validated with populations that may benefit from them. *Story Champs* is an intervention designed to improve academic language outcomes for all children by targeting macrostructure (story grammar) and incidentally targeting microstructure (linguistic complexity inherent in the macrostructure) through narrative production. *Story Champs* lessons can be implemented in large group, small group, or one-on-one settings. *Story Champs* relies on established principles to optimize learning such as frequent opportunities to respond, systematic scaffolding, and immediate corrective feedback (Archer & Hughes, 2011). To support high intervention fidelity, *Story Champs* provides guidelines for scope, intensity, and duration within and across sessions. Intervention materials include stories with pictures and story grammar icons used as additional visual support.

Each *Story Champs* intervention session consists of eight steps across two intervention segments, the retell segment (Steps 1 through 4) and story generation segment (Steps 5 through 8). Throughout the narrative intervention process, verbal and visual scaffolding is provided to the extent necessary (individualized) and systematically withdrawn to foster independence (i.e., removal of visual supports across steps). When

a child does not produce a story grammar element, the interventionist provides individualized verbal scaffolding by first asking a question (e.g., “*How did John feel when he fell of his bike?*”). If the child requires additional support to fully provide the grammar element, the interventionist provides a verbal model.

Auditory memory and verbal working memory demands differ across story retell and story generation tasks. Story task demands is an important consideration because children with SLI, in addition to deficits in language, often have deficits in auditory memory and verbal working memory (e.g., Duinmeijer, de Jong, & Scheper, 2012). Children with SLI recall less information as processing demands increase (Gillam, Montgomery, & Gillam, 2009). The inclusion of story generations, in addition to the repeated story retells within the *Story Champs* intervention allows children with SLI to rely on auditory and attentional capacities to a lesser degree. Therefore, children may be able to recall and retell stories more easily in the first intervention segment and rely on story generations that are represented more strongly in memory in the second intervention segment. Thus, the structured systematic supports contained in the *Story Champs* standard treatment protocol may be particularly beneficial for children with SLI.

Researchers evaluating the effectiveness of *Story Champs* have consistently explored three ecologically-valid outcome variables – story retells, story comprehension, and story generations (personal or fictional). See Table 1 for a summary of the evidence base for *Story Champs* with preschoolers and school-age children. Summary findings are reported only for those variables that were measured in an experimentally-controlled manner (i.e., conclusions could be drawn). Review of the literature demonstrates that implementation of *Story Champs* has resulted in improved story retelling, personal story

generation, vocabulary acquisition, and reading comprehension for preschoolers with low language skills, school-age children with and without autism, and bilingual children (Spencer & Slocum, 2010; Weddle, Spencer, Kajian & Petersen, 2016; Spencer, Petersen, Slocum & Allen, 2015; Petersen et al., 2014; Spencer, Kajian, Petersen & Bilyk, 2013). However, *Story Champs* has yet to be validated with school-age children with SLI.

Research Question and Measurement of Change

The current study aimed to determine whether *Story Champs*, administered as an individualized narrative intervention, is effective for second grade children with SLI. Individualized here refers to one-on-one intervention with three story grammar elements for each participant selected based on his baseline performance. That is, the participants did not receive intervention on the same three story grammar elements. The study findings add to the evidence base on the validity of *Story Champs* in four distinct ways. First, children with SLI have not been represented in the intervention studies reported above. An intervention that has been shown to work effectively with children of a particular phenotype must nevertheless be validated with children of another phenotype. Thus, it is essential to build a body of evidence regarding the efficacy of *Story Champs* for children with SLI before recommending the intervention protocol for children with SLI. Second, only one study to date (Petersen et al., 2014) has measured the effect of *Story Champs* on individualized story grammar elements rather than the effect of the intervention on all story grammar elements collectively. Validation of interventions that can be individualized is critical due to evidence-based best practices emphasizing the importance and value of adapting interventions to a child's

children's individualized area of need (ASHA; 2005). Third, studies to date have not adequately evaluated the effects of *Story Champs* on personal story generations, and instead have evaluated an intervention effect on improved story retells. Although story retells are ecologically valid in an academic setting, we were interested in evaluating how *Story Champs* intervention related to improvements in children's personal story generations which are important for everyday communication. Lastly, the school-age studies included a proximally-timed dependent variable measure that was administered at the end of each intervention session. Similar to the method employed in many of the preschool studies, we opted to conduct the probe at the beginning of each intervention session as a more stringent test of the effects of the intervention. Any change in the child's skills realized within a session had to be sustained to the beginning of the following session (1 to 5 days later) to be captured as evidence of learning (i.e., improved performance on the probe measure).

To address this gap in the evidence base, we asked the research question: Is there a functional relation between the *Story Champs* intervention and individual changes in targeted story grammar elements in personal story generations for second grade children with SLI? We hypothesized that participants would increase their score for targeted story grammar elements as a result of introduction of the *Story Champs* narrative intervention. We based our hypothesis on a theory of change (Buckley & Doolittle, 2013) that suggests that the active ingredients in *Story Champs* intervention result in improved narrative language, at the macrostructure level and incidentally at the microstructure level. Although not empirically tested in this study, these improvements are in turn hypothesized to improve spoken language and the development of

decontextualized and academic language skills in school-age children with SLI (see Figure 1).

Method

The study procedures were approved by the Vanderbilt University Institutional Review Board. Parents provided written consent; children provided verbal assent before each research session.

Research Design

We employed a multiple baseline across behaviors design (Gast, Lloyd, & Ledford, 2018) with four participants to explore the relation between individualized narrative intervention and narrative language outcomes. Multiple baseline designs are appropriate for irreversible behaviors, including most academic skills such as story generations, the behavior of interest in this study. The use of a single case research design (SCRD) allowed for individualized intervention and controlled for many threats to internal validity (e.g., history, maturation, and testing). The multiple baseline across behaviors design allowed for a functional relation to be observed with a single participant, demonstrating intra-subject replication and weak evidence of a causal effect. However, the combined multiple baseline across behaviors design repeated across four participants also allowed inter-subject replication. Thus, a functional relation observed across behaviors for multiple participants is argued to provide stronger evidence of an intervention effect and greater external validity. The combined multiple baseline design also allows for distinctions to be made about why children with certain characteristics may or may not respond to the intervention.

Participants

Participants were recruited from a large, urban, public school district with a diverse student population (e.g., 42% African American, 28.8% Caucasian, 24.6% Hispanic; 43% free/reduced lunch). Speech-language pathologists in four of the district's elementary schools sent recruitment packets home with five second grade students on their caseloads who were eligible for special education under the category of language impairment¹ and who did not have comorbid disabilities (e.g., autism spectrum disorder, intellectual disability). A signed consent form to participate in the study was returned for each child.

To ascertain study eligibility, parents provided demographic background information and participants completed an eligibility testing session. Four male second graders participated because each met the traditional SLI inclusionary criteria and the study specific criteria: (a) performance at least one standard deviation below the normative mean (i.e., standard score < 85) on an omnibus oral language measure and on a norm-referenced narrative measure, (b) nonverbal intellectual ability within the average range (i.e., standard score \geq 85), and (c) monolingual English speaker (see Table 2). Additionally, each participant satisfied the exclusionary criteria: (a) did not meet additional eligibility conditions (e.g., autism spectrum disorder, deaf/hard of hearing) and (b) did not have uncorrected visual impairment. One consented child was ineligible because she did not meet the norm-referenced narrative measure criteria. Eligibility criteria align with the criteria for SLI, the most common subset of

¹ The Tennessee Department of Education does not use speech or language impairment as a single eligibility category but rather uses two separate eligibility categories, speech impairment and language impairment.

developmental language disorder; thus, the term SLI is used to describe the children in this study.

Dependent Variables

We were interested in child changes in narrative macrostructure in personal narratives, as this skill is of high ecological validity. Thus, the dependent variables were derived from personal story generations. Each participant had three dependent variables derived from each personal story, one variable for each targeted story grammar element. The story grammar elements were scored on a four-point scale adapted from Peterson et al. (2014; see Appendix A), with changes made to the plan element. Higher scores reflect more advanced performance. See Table 3 for operational definitions and examples of each story grammar element.

Procedures

All research sessions were led by the first author (heretofore, interventionist), a female graduate student and certified speech-language pathologist. Each one-on-one session took place in a small room at the participant's school. All sessions were video recorded. Across all phases, sessions were planned to take place two times per week at the participant's school, with a maximum of five days between sessions. Given school holidays and weather-related school closures, time between sessions occasionally reached ten or more days ($M = 5.4$ days, $SD = 4.8$, range: 1-23; see participant graphs). The personal story generation dependent variables were used to make decisions regarding stability of baseline and introduction of intervention.

Probe task. The probe task was administered at the outset of each research session as a measure of learning across sessions. The distal timing in administration of

the probe task (relative to intervention) is important in academic settings and reflects the child's ability to demonstrate skills that were targeted across previous intervention sessions.

The interventionist placed story pictures on the table, modeled a fictional story (see Appendix B), and prompted the participant to independently generate a personal story using an initial prompt, (a) *Tell me about a time when something like this happened to you*. Each administration of the probe task involved a unique modeled fictional story. Across all sessions (baseline, intervention, maintenance), if the participant did not generate a personal story following the initial prompt, the interventionist progressed through a hierarchy of additional prompts to elicit a personal story: (b) *Tell me about a time when you ____ (state problem, e.g., got hurt)*, (c) *Tell me about a time when someone else ____ (state problem, e.g., got hurt)*. If these prompts did not result in a personal story, the interventionist used a fourth prompt to elicit a narrative (d) *Tell me the story you just heard; start from the beginning* (i.e., a retell of the fictional story rather than the personal story generation).

In the intervention phase, the probe task involved the modeled fictional story that had been used in the immediately preceding intervention session. In that preceding session, the participant had progressed (with visual and verbal prompts) through the intervention steps of retelling the fictional story and generating a personal story on the fictional story's topic (i.e., *Tell me about a time when something like this happened to you*). Figure 2 illustrates how the stories were organized across sessions. The expectation was that the child would generate the same personal story from the

previous intervention session, but the probe task procedures did not confine the child to tell that story. In individual instances, children generated a new personal story.

Story Champs Intervention Targets. Story grammar intervention targets (referred to as separate tiers) for each participant were selected based on the participant's probe task performance in the initial five baseline phase sessions. Three story grammar elements that were absent (scores of zero) or consistently below the top of the scale (with a minimum of five data points demonstrating stability or a contra-therapeutic trend) were selected as intervention targets. Thus, each participant had three individualized targets.

The interventionist sequentially intervened on the three story grammar intervention targets for each child. Providing intervention sequentially for individualized story grammar intervention targets enabled us to demonstrate experimental control as the elements that were not yet introduced into intervention were monitored in an extended baseline phase. Until they were introduced into intervention, these extended baseline story grammar elements were de-emphasized in modeled stories and the associated picture icons were not used. The individualized sequence of moving targets into intervention was driven by developmental order: character and setting → problem → consequence → action/attempt → feeling → plan → ending emotion (Justice, Kaderavek, Ukrainetz, Eisenberg, & Gillam, 2006; Stein & Glenn, 1979).

As an example of target selection, in baseline probe data Reed demonstrated character and setting scores near the top of the 4-point scale and problem, consequence, and action/attempt scores that were not consistently below the top of the scale. Feeling was the first story grammar element that met criteria for introducing

intervention given that stability of the scores was not observed for many of the other elements. Following the developmental order, the final two story grammar intervention targets, plan and ending emotion, were monitored in extended baseline and introduced sequentially in intervention.

For individual children, specific story grammar elements that were not selected as intervention targets (because the element was not a prioritized need or because the child scored at or near top of the scale [score of 4] on the element) were brought online when associated elements were introduced in intervention. For example, to target the story grammar element feeling, the character/setting element was introduced (visual icon used, instruction provided on as needed basis, although not emphasized) because the feelings in a story are inherently related to the character element. See Figure 3 for the individualized intervention targets and associated story grammar elements that were simultaneously introduced for each participant. Our methods for sequentially targeting three story grammar intervention targets according to each child's individual needs are similar to how *Story Champs* was evaluated in Petersen et al. (2014). As a multi-tiered intervention the *Story Champs* developers promote lesson differentiation based on the child's needs (Spencer & Petersen, 2012). Thus, two versions of the intervention include—(a) targeting all story grammar elements which may be most appropriate in the context of a whole class intervention or a small group intervention or (b) targeting individualized story grammar elements in one-on-one intervention settings.

Baseline phase. Baseline phase sessions involved only the administration of the probe task. The interventionist did not provide any narrative instruction or narrative language. The average length of a baseline session was four minutes.

Intervention phase. Intervention phase sessions began with the probe task followed by implementation of the eight *Story Champs* intervention steps as described above (see Figure 2). The length of the intervention sessions freely varied ($M = 18$ min; $SD = 3$ min) because the session continued until the child had progressed through all eight intervention steps.

Maintenance phase. Once weekly maintenance phase sessions occurred 1- and 2-weeks post cessation of the intervention phase. These sessions were identical to baseline sessions, consisting only of the probe task. The maintenance session average length was four minutes.

Measurement Systems

Visual analysis. Visual analysis of data, via objective evaluation of the impact of an intervention on the dependent variable across baseline and intervention phases, is the standard analysis for SCRD studies (Horner, Swaminathan, Sugai, & Smolkowski, 2012). To determine whether a functional relation between the intervention and dependent variables had been demonstrated, data were analyzed for a number of features. As shown in Table 4, data were analyzed for level, trend, and stability within phases (baseline and intervention) as well as immediacy, consistency, and overlap across phases (baseline to intervention; Kratochwill et al., 2010). Additional analytic measures (e.g., phase means) are reported in instances where the initial analysis yielded somewhat equivocal evidence in support of a functional relation.

Experimental control. For each participant, one story grammar element became the intervention target at the outset of the intervention phase, and all other elements remained in an extended baseline phase. Story grammar elements still in baseline were

deemphasized in intervention procedures. Once evidence of experimental control for the treated story grammar element was demonstrated by a stable increase in score (i.e., at least 3 consecutive scores above baseline), an additional story grammar element was added as an intervention target. The previous intervention target remained in intervention. This same process was followed for the third intervention target. Intervention was discontinued for all participants a few weeks before the school year ended to allow for maintenance data collection.

Interobserver agreement and procedural fidelity. An independent, trained observer used the video recording to calculate interobserver agreement for at least 25% of baseline and intervention sessions and one of the two (50%) maintenance sessions for each participant. The observer scored all seven story grammar elements produced in the dependent variable probe to allow for blinding each participant's story grammar intervention targets; however, the observer was not blind to the study phase (baseline, intervention, maintenance). We established point-by-point agreement for each story grammar element by dividing the total number of agreements by the total number of agreements plus disagreements and then multiplying by 100. The observer completed an initial training led by the first author that included review of the coding manual, a question and answer session, practice coding, and discussion about videos of probe task administration. The observer independently coded non-participant sessions until she reached criterion of 90% agreement with the first author. On average, the two scorers demonstrated 92% agreement for narrative scoring of study data (see Table 5).

The same independent observer conducted procedural fidelity checks on the probe task and intervention procedures for 25% of sessions across all phases for each

participant via direct systematic observational recording using video recordings (Ayres & Ledford, 2014). Sessions coded for procedural fidelity were chosen at random and the interventionist was blind to which sessions were coded for procedural fidelity. The observer completed training led by the first author on coding fidelity data by scoring practice intervention videos and scoring the intervention procedures as correct or incorrect as outlined in the study's procedure manual. To calculate procedural fidelity values, the number of steps completed correctly was divided by the number of steps that should be completed according to the procedures outlined above and multiplied by 100. Fidelity was 94% for the probe task across each participant in each phase and 95% for the intervention sessions across each participant.

Results

The purpose of this study was to evaluate whether *Story Champs* narrative intervention was functionally related to increased story grammar element scores in personal story generations for second grade children with SLI. In this multiple baseline across behaviors design with four participants, a functional relation was evaluated across behaviors for each participant. As such, a functional relation between the intervention and changes in story grammar element score is established when three demonstrations of the intervention effect are observed across behaviors. Thus, it was possible to observe four functional relations in this study. Figures 4 through 8 display results for each participant and Table 6 includes phase means. Phase means are reported as supplemental analyses to support the primary visual analyses of data (i.e., high proportion of nonoverlap suggests strong evidence of functional relation; see Table 4).

Evaluation of Functional Relation

A functional relation between *Story Champs* intervention and changes in targeted story grammar elements was established for two participants. Based on visual analysis of the results, a functional relation with strong evidence of change in level from baseline to intervention reflecting an intervention effect was observed for Reed. A functional relation evidenced by change in level from baseline to intervention also was observed for James, although visual analysis of other data features (i.e., immediacy) was not as clear. An intervention effect was observed for only two out of three (character/setting and consequence) story grammar elements for Adam and only one out of two (character/setting) story grammar elements for Grant. Thus, fewer than three replications of the intervention effect preclude us from concluding that a functional relation was demonstrated for Adam or Grant.

Narrative Performance for Each Participant

Reed. A functional relation between the *Story Champs* intervention and story grammar element scores in personal story generations was observed for Reed. Feeling, plan, and ending emotion were intervened upon in this order. Baseline for feeling revealed some skill (range 0 – 3 points) and despite variability across probe sessions, there was no ascending trend. Once intervention began, an immediate intervention effect was observed in that the first three intervention points revealed consistently better performance as compared to baseline performance. After intervention was introduced for feeling, probe scores for the remaining story grammar elements (plan and ending emotion) remained consistently at 0. Next, intervention was introduced for plan (developmentally precedes ending emotion). An immediate change in level was not

realized, but after 11 intervention sessions, visual analysis supported a conclusion of a change in level. There was a 2-point increase in phase mean from baseline to intervention, 68% nonoverlap in the intervention phase, and the last five intervention phase data points were above baseline and at the top of the scale. Ending emotion continued to be at 0 points during the extended baseline phase. When intervention began for ending emotion, immediate change was observed. However, we continued intervention because although the immediate change in level was observed, ending emotion scores were not at the top of the scale. As intervention continued, 6 out of 11 scores reflected an increase in level over baseline (i.e., greater than 0).

James. A functional relation between the *Story Champs* intervention and story grammar element scores in personal story generations was observed for James. Character/setting, plan, and ending emotion were intervened upon in this order. The decision to intervene on character/setting was based on the rationale that character/setting details are foundational to producing a complete narrative and thus, mastery (consistent scores of 3) is expected for second grade children. Baseline for character/setting revealed some skills (range 2 – 3 points) followed by an immediate intervention effect after intervention was introduced. As intervention continued, visual analysis supported a conclusion of a change in level (16/23 scores at the top of scale). Plan and ending emotion probe scores remained consistently at 0 during the extended baseline phase. Next, intervention was introduced for plan. An immediate change in level was not realized, but after 8 intervention sessions, visual analysis supported a conclusion of a change in level. There was a 1.63-point increase in phase mean from baseline to intervention, 58% nonoverlap in the intervention phase, and the majority of

data points were at the top of the scale. When intervention began for ending emotion, immediate change was not observed. Intervention scores were variable, but nonetheless a change in level was demonstrated. There was a 2-point increase in phase mean from baseline to intervention, 36% nonoverlap in the intervention phase, and the final two intervention phase data points were near the top of the scale.

Adam. A functional relation between the intervention and story grammar element scores in personal story generations was not observed for Adam. Character/setting, consequence, and ending emotion were intervened upon in this order. Baseline for character/setting revealed some skills (range 2 – 3 points) followed by an immediate intervention effect once intervention was introduced. As intervention continued, visual analysis supported a change in level (16/21 scores at the top of scale). Consequence and ending emotion probe scores remained consistently at 0 during the extended baseline phase. Next, intervention was introduced for consequence. An immediate change in level was not realized, but after four intervention sessions, visual analysis supported a conclusion of a change in level. Probe scores in baseline and at the beginning of intervention were inconsistent (see Figure 6), suggesting minimal skill at best. There was a 0.75-point increase in phase mean from baseline to intervention, 50% nonoverlap with baseline data at 0, and the last two intervention phase data points were at the top of the scale. When intervention began for ending emotion, immediacy of intervention effect was observed. However, the immediate change in level was not maintained as intervention continued, with ending emotion scores returning to baseline levels of 0 in Adam's final four intervention sessions.

Grant. A functional relation between the intervention and story grammar elements was not observed for Grant. Character/setting and plan were intervened upon in this order before intervention was discontinued due to lack of change in level and character/setting scores returning to baseline levels. Baseline for character/setting revealed some skill (scores of 2) and after one intervention session, an immediate intervention effect was observed. However, character/setting scores returned to baseline levels once intervention was introduced for plan. As intervention continued for character/setting concurrent with intervention for plan, visual analysis did not support a consistent change in level (only 7/19 scores at top of scale) for character/setting. Baseline for plan revealed some skills (range 0 – 1 points). Once intervention was introduced for plan, an immediate change in level was not realized. After 16 intervention sessions, a consistent change in level was not established for plan. Thus, intervention was discontinued for Grant.

Narrative Performance Across Behaviors

Beyond each participants' individual narrative performance, some consistencies across behaviors were observed. The character/setting story grammar element was selected as an intervention target for three participants (James, Adam, Grant), even given relatively high scores (2 or 3) in baseline. We chose to intervene on character/setting details because character/setting details are foundational to producing a complete narrative and thus, mastery (consistent scores of 3) is expected for second grade children. In the intervention phase, the participants often fluctuated between scores of 2 and 3, which are differentiated in the scoring rubric by the inclusion of specific setting (e.g., location) information. Because children did not consistently include

setting information in their narratives, variability was observed in the data for the character/setting story grammar element.

The three participants (Reed, James, Grant) who received intervention on the plan story grammar element demonstrated low and stable scores in the baseline phase. Throughout the intervention phase, substantial variability in scores for the plan element was observed across participants. Recall that we did not implement a third target for Grant, due to lack of change on targeted elements. Lastly, the ending emotion story grammar element was selected for two participants following demonstration of low and stable performance in baseline. Immediate increase in level followed by variable performance was observed for and slightly delayed, yet also variable performance was observed for James. Although change in level was demonstrated in the intervention phase, a stable pattern in performance was never observed for this story grammar element for any of the participants.

Discussion

Narrative intervention is effective for children with a variety of disabilities (e.g., Gillam et al., 2018; Petersen et al., 2014; Petersen et al., 2010; Weddle, Spencer, Kajjan & Petersen, 2016). Narrative macrostructure language intervention facilitates academically and socially relevant language skills (Petersen, 2011). This study was designed to evaluate whether a commercially-available, standard treatment protocol, *Story Champs*, is effective for improving narrative skills for second grade children with SLI. Validation is important for standard treatment protocols, which provide structure for clinicians through provision of guidelines for scope, intensity, and duration. These

features lead to increased implementation fidelity, critical to achieving change for individual children with disabilities.

We employed a multiple baseline across behaviors SCRD with four second grade boys with SLI. The participants received twice weekly *Story Champs* intervention. The dependent variable to assess learning outcomes reflected the rubric score for each story grammar intervention target produced in participants' personal story generations. Data were collected and analyzed using visual analysis and additional analytic methods according to multiple-baseline SCRD standards. The design executed for the first three participants met design standards without reservations (Kratochwill et al., 2010).

Treatment Effects

Changes in level (above baseline performance) concurrent with the introduction of intervention were demonstrated for two out of three story grammar elements for three participants; however, visual analysis of probe data revealed some performance variability. Given the distal-timed outcome measure of the skills learned across sessions, it is not surprising that participants scores varied from session to session (e.g., Petersen et al., 2014; Spencer & Slocum, 2010). This variability demonstrates that the participants were not consistently successful at consolidating the targeted narrative skills. Researchers have found memory consolidation and longer-term learning to be problematic for children and adults with SLI (Desmottes, Meulemans, & Maillart, 2016; Hedenius, et al. 2011; McGregor, 2014). We may have observed more consistent performance had we chosen a more proximal-timed outcome measure (e.g., at the end of each intervention session) or had greater control over the number of days between sessions. However, we chose this more stringent assessment of a functional relation

because by second grade, our expectation is that children maintain the benefits of intervention across school days. Future efforts may compare proximal-timed outcomes (i.e., at the end of an intervention session) to distal-timed outcomes (i.e., on subsequent school days) to better understand the effects of memory consolidation.

Thus, this study provides initial evidence that *Story Champs* intervention, a commercially-available, standard treatment protocol, leads to at least modest gains in individualized story grammar targets for second grade children with SLI. The children's increased story grammar element scores supports a conclusion of improved narrative abilities. The participants who had the poorest narrative language abilities (James and Adam) as measured by the TNL-2, demonstrated the greatest gains over baseline performance, but nevertheless, they still had room for growth at the end of intervention. Compared to children with only slightly below average narrative abilities, children who demonstrate narrative language abilities in the poor range may demonstrate the greatest gains and a more rapid rate of progress from the *Story Champs* intervention. However, they may also need continued support to facilitate narrative skill consolidation and mastery (Petersen et al., 2014; Spencer et al., 2013). Whether evaluated using a SCRD or group design, a single intervention is unlikely to be equally effective for all children; so in the future, clinical advancement will be realized by consideration of child characteristics that relate to treatment effect magnitude.

Intervention procedures. Previous research evaluating the effectiveness of *Story Champs* intervention included analysis of the personal story generations produced in the final step of intervention as the outcome measure (e.g., Petersen et al., 2014). Narratives scored and analyzed in those studies represent a more proximal-timed

measure of learning in which the participants received instruction immediately leading up to the narrative probe task. Contrastively, the probe task outcome measure used in this study, a personal story generation elicited at the beginning of the subsequent session, represents a more distal-timed measure of participant learning.

We believe there are at least four potential sources for data variability. First, the increased time between intervention and probe outcome measure (i.e., at the beginning of the subsequent intervention session vs. in other studies at the end of the intervention session) may explain the increased variability observed in our data when compared to studies which used proximal-timed measures (e.g., Petersen et al., 2010). Additionally, participants may have performed better on the probe measure when the probe was administered only a few days later rather than the times when five or more days passed between sessions. However, long gaps between sessions is not entirely uncommon given scheduling challenges in the public-school setting.

Second, data variability may relate to the extent to which children retold the same personal stories from session to session. Recall that the child was prompted (but not confined) to tell his/her story based on the topic introduced in the prior session. The proportion of probe sessions in which the child generated the same personal story from the previous intervention session varied greatly—Reed = 76%, James = 4%, Adam = 0%, and Grant = 24%. Supporting this hypothesis, Reed demonstrated far less variability than the other three children. Where children did not maintain the topic, they instead generated a new personal story and thus were not incorporating the repeated practice and feedback they engaged in during the previous session.

Third, the level of prompting required to generate the probe task story may have contributed to variability (e.g., Weddle, Spencer, Kajjan & Petersen, 2016). Reed and Adam often generated personal stories following the initial prompt, whereas James and Grant often required additional prompting. In three instances, James retold the model story rather than generating a personal story. Visual analysis of the graphs supports this conclusion.

Lastly, we presume that at least some variability in participants' dependent variable scores is attributable to child interest in story prompt topic (Warren, Fey, & Yoder, 2007). Not surprising, we observed anecdotally that participants responded more positively to some story prompts contained within the *Story Champs* intervention, but for other story prompts, they found it difficult to produce a personal story related to the prompt. For example, a story about a child going to the grocery store with his or her parent may not be as interesting as a story about the one, distinct time they were allowed to pick out a special treat at the store or restaurant. The latter story prompt may be more salient to the child and thus, result in higher story grammar element scores (e.g., includes emotions because the child remembers how excited he/she was to get the special treat).

In sum, we hypothesize that had we scored personal story generations produced in step eight of the intervention, we would have observed less probe task data variability. Future exploratory analyses of the study data will evaluate within session change in performance and inform clinicians and researchers of multiple ways to capture outcomes. Also, researchers may want to consider using multiple measurement occasions to generate a single data point to more accurately estimate narrative

performance by increasing stability. Averaging performance across sessions routinely happens in clinical practice and might be considered in the context of research as well (Tiger et al., 2013). Averaging may result in data that are more representative of the child's true performance and could result in overall increased reliability of measurement (Yoder, Lloyd & Symons, 2018).

Intervention targets. Not only were intervention targets introduced sequentially and then maintained throughout intervention, the associated story grammar elements were also maintained throughout the intervention. Thus, although the graphs display each participant's progress on three specifically chosen story grammar element targets, the participants were in fact receiving intervention on five to six intervention targets in the final intervention sessions. Once story grammar elements were introduced into intervention, visual and verbal supports were provided for all story grammar elements in the appropriate intervention steps as outlined in the standard treatment protocol. This study simply focused on a subset of individualized *Story Champs* intervention targets for each participant. We will conduct additional exploratory analyses to analyze participant performance on all story grammar elements as well as possible microstructure effects. However, consideration of these possible treatment effects goes beyond the scope of this paper that instead focuses on consideration of a functional relation. For the probe task data reported here, the cognitive load required to independently produce narratives containing nearly all of the story grammar elements was substantial in the final tier (i.e., all three story grammar elements in intervention) of the intervention phase for all participants. Review of Adam and Grant's data reveals that the increased cognitive load

of adding story grammar elements may have caused a return to baseline performance and substantial variability when each additional target was introduced.

Some trends specific to the plan and ending emotion story grammar intervention targets warrant further discussion. Scores for the plan element were highly dependent on specific vocabulary usage, resulting in considerable variability in performance. Explicit instruction focused on the use of the verbs that would have received a score of 3 (e.g., *decided*, *planned*) with less emphasis on the use of other acceptable, albeit weaker, cognitive state verbs that reflected the characters' plan (e.g., *wanted*). Thus, participants typically produced narratives containing the plan element in its most sophisticated form (receiving a score of 3) or not at all. Substantial variability in performance for the ending emotion story grammar element also was observed. However, the ending emotion element may not have been consistently necessary to complete the narrative. In other words, although the narratives lacked the characters' emotion at the end of the story, the participants often produced high-scoring and complete narratives with strong endings.

Clinical Implications

Language intervention for school-age children should be contextually based, educationally relevant, and collaborative (Ukrainetz, 2006). These features are all characteristic of narrative interventions that seek to change outcomes in narrative macrostructure and microstructure as well as to improve basic language skills. Participants in this study demonstrated change in levels for some narrative macrostructure skills concurrent with the introduction of the *Story Champs* intervention.

This individualized narrative protocol is easily implemented in the school setting and provides support for positive change in narrative skills for children with SLI.

Story Champs (Spencer & Petersen, 2012) was designed as an intervention that can be implemented by speech-language pathologists as well as general and special educators for all children who may benefit from explicit oral language instruction. Standard treatment protocols are valuable as they reduce the labor required for planning and executing intervention through controlled provision of treatment scope, intensity, and duration (e.g., Gillam et al., 2018; Warren, Fey, & Yoder, 2007). Further, the use of standard treatment protocols provides structure for clinicians and yet is flexible so that the intervention can be manipulated to meet each child's individual needs as demonstrated in this study. School speech-language pathologists can integrate evidence supporting the *Story Champs* intervention, their own clinical expertise, and the individual child's needs to implement an effective intervention for narrative outcomes. For a similar effort, see also the *Supporting Knowledge in Language and Literacy* intervention (SKILL; Gillam, Gillam, & Laing, 2014).

Given the combination of the structured systematic supports yet overall flexibility of the *Story Champs* standard treatment protocol, some adaptations may be warranted to best meet the needs of individual students. For example, clinicians might consider incorporating classroom materials or personal narrative prompts that could be more meaningful for the students than those contained in the intervention. Story-specific lapses in performance were observed throughout this study. So, it is important to select narrative prompts that are relevant for each individual child. To promote engagement,

the selection of academically or socially relevant narrative prompts may also improve progress, generalization, and maintenance.

Limitations and Future Directions

This study is the first to examine distal timing of the outcome measure to evaluate the effectiveness of an individualized narrative intervention using a standard treatment protocol for school-age children with SLI. Despite a strong SCRD implemented in this investigation, a number of limitations should be addressed in future studies. First, the scoring rubric presented many challenges as evidenced by the participants often scoring “all-or-nothing” for story grammar elements. Although a variety of narrative language measures are available (e.g., Narrative Scoring Scheme [NSS; SALT; Miller & Chapman, 1990], Monitoring Indicators of Scholarly Language [MISL; Gillam, Gillam, Fargo, Olszewski, & Segura, 2016]), most measures are designed as rubrics, and thus similar limitations may arise. A more sensitive measure (that extends beyond a four-point scale) of narrative macrostructure might allow for distinctions to be made among varying levels within the scale. Second, many story grammar elements were interrelated, and thus not entirely independent of one another on the study scoring rubric (e.g., a score of 3 for consequence required there to be a 2-or 3-point action in the narrative). The interdependency of the intervention targets complicated establishing a functional relation in our SCRD design.

Although not graphed and intervened on systematically, bringing additional targets online may result in improved overall narrative performance due to the interrelatedness of many of the story grammar elements. Thus, intervention should be adapted for each individual child—intervening on related story grammar elements or

intervening on a single element at a time—to optimize outcomes. Lastly, intervention only focused on explicit instruction for macrostructure elements, and not microstructure elements. Admittedly, intervening for change in macrostructure may also yield change in microstructure. In a secondary analysis, we are evaluating this question – whether changes in microstructure were observed for our participants over the course of *Story Champs* intervention (Hessling, Teller, & Schuele, 2019). Understanding the many ways in which an intervention can improve a child’s language skills is critical to the implementation of efficient intervention.

Conclusion

This study provides preliminary evidence for the use of *Story Champs* intervention for children with SLI to improve narrative language performance. Study replication is warranted as well as studies that examine longer-term and broader effects and maintenance of change for children with SLI.

Conflict of Interest

The authors have no conflicts of interest to disclose.

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Appendix A

	Character and setting	Problem/Initiating event	Feeling	Plan	Action/attempt	Consequence/ending	Ending emotion
Score							
0	No character, only a pronoun for a character, no location <i>(e.g., She was roller skating.)</i>	No problem or implied or unclear problem with no attempt to solve it	No emotional state or feeling	No plan	No action	No consequence	No emotional state or feeling
1	Non-specific character <i>(e.g., The girl was roller skating.)</i> or <i>(e.g., Her brother was roller skating.)</i> General location <i>(e.g., She was playing in the driveway.)</i>	Problem stated but no attempt to solve the problem <i>(e.g., She hit a bump and fell down.)</i>	Specific or general emotion or emotional behaviors not related to the problem <i>(e.g., Today Sydney was a happy girl skating in her driveway.)</i> or <i>(e.g., Sydney was smiling.)</i>	Statement of plan that does <u>not</u> contain a <u>cognitive verb</u>, but appears to indicate the intention to act on the problem <i>(e.g., Sydney wanted to go home because she was hurt.)</i> or <i>(e.g., After she fell, Sydney needed to go home.)</i>	Action by main character that is <u>not an attempt</u> to solve the problem <i>(e.g., Sydney was roller skating.)</i> An action that appears to be an attempt to solve a problem, but no problem was stated <i>(e.g., She stayed away from the bump.)</i> Action by secondary character(s) that is <u>not an attempt</u> to solve the problem or the problem was missing <i>(e.g., Her brother was roller skating.)</i>	Consequence from modeled story without an action or a problem <i>(e.g., Sydney and her brother had fun together.)</i>	Specific or general emotion or emotional behaviors implying a consequence <i>(e.g., Today Sydney was a happy girl skating in her driveway.)</i> or <i>(e.g., Sydney was smiling.)</i>
2	Named character with no location <i>(e.g., Sydney was roller skating.)</i> Non-specific character AND general location <i>(e.g., The girl was roller skating in her driveway.)</i>	Implied/unclear problem (including emotion) with an attempt to solve the problem <i>(e.g., She got back up on her skates and didn't go near the bump again.)</i> or <i>(e.g., She got back up on her skates and her brother asked "Are you okay?")</i> or <i>(e.g., Sydney was sad and didn't go near the bump again.)</i> Stated problem with related consequence, but no attempt to solve the problem <i>(e.g., She hit a bump and fell down then she felt better and started again.)</i>	Emotional behaviors related to problem <i>(She was crying because her hand hurt)</i> or <i>(e.g., She hurt her hand and was crying.)</i> Implied/general emotion related to problem <i>(e.g., She hurt her hand and it was terrible.)</i> or <i>(e.g., She felt bad because she fell.)</i>	General statement of plan that does not contain an action or a plan that contains a cognitive verb <i>(e.g., Sydney knew what to do. I decided what to do.)</i>	Action by secondary character that was an attempt to solve a stated or implied problem <i>(e.g., Sydney scraped her hand on the ground and her brother asked "Are you okay?")</i>	Consequence related to a 1-point action <i>(e.g., Sydney was roller skating. She had fun.)</i> Consequence related to a stated problem, without an attempt to solve the problem	Emotional behaviors related to consequence <i>(e.g., She got a band aid and he wasn't crying anymore.)</i> Implied/general emotion related to consequence <i>(e.g., She got a band aid and was okay.)</i> or <i>(e.g., She got a band aid and felt better.)</i>
3	Named character AND general location <i>(e.g., Sydney was roller skating in her driveway.)</i>	Stated problem with an attempt by any character to solve the problem <i>(e.g., She hit a bump and fell down. After that she stayed away from the bump.)</i> or <i>(e.g., She hit a bump and fell down. Her brother said, "Are you okay?")</i>	Specific emotion related to problem <i>(e.g., She was sad because her hand hurt.)</i> or <i>(e.g., She hurt her hand and was sad.)</i>	Explicit statement of plan that includes an action using one of the following verbs such as: decided, figured, hoped, or planned <i>(e.g., Sydney decided to go home to get a band aid.)</i>	Action by main character that was an attempt to solve the stated or implied problem <i>(e.g., Sydney scraped her hand on the ground and after that she stayed away from the bump.)</i>	Consequence related to a 2-point action <i>(e.g., Sydney scraped her hand on the ground and her brother asked "Are you okay?" And then they had fun roller skating.)</i> Consequence related to 3-point action <i>(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.)</i>	Specific emotion related to consequence <i>(e.g., She got a band aid and was happy.)</i>

Adapted from Petersen, D. B., Brown, C. L., Ukrainetz, T. A., Wise, C., Spencer, T. D., & Zebre, J. (2014). Systematic individualized narrative language intervention on the personal narratives of children with autism. *Language, Speech, and Hearing Services in Schools, 45*, 67-86.

Table 1
Story Champs Evidence Base

Study	Research Design	Participants	Arrangement	Dependent variable(s)	Findings
Preschool Studies					
Spencer and Slocum (2010)	Multiple baseline across participants SCRD	5 Head Start preschoolers ^a with below average narrative abilities	Small group	Story retells: Sum of points assigned for 12 story grammar elements (all explicitly taught in the intervention; e.g., characters) and linguistic structures (modeled in intervention, but not explicitly taught; e.g., adverbial clauses)	Functional relation observed between intervention and preschoolers' story retell improvements
Spencer et al. (2013)	Multiple probe across participants SCRD (Probe data collected on variable schedule averaging once every 5 days)	5 Head Start preschoolers ^a (disability category not specified)	One-on-one	(1) Story retells: Sum of points assigned for 7 story grammar elements and linguistic structures (2) Story comprehension: Total points (out of 12) assigned for answers to 6 comprehension questions	Functional relation between intervention and improved story retells (5 preschoolers) and story comprehension (4 of 5 preschoolers)
Spencer et al. (2015)	Quasi-experimental, pretest/posttest comparison group design	22 Head Start preschoolers ^a	Large group	(1) Story retells (2) Personal story generations	Statistically significant between-group difference for story retells at posttest ($d = 1.05$) and at follow-up (4 weeks; $d = .86$) No significant between-group difference for personal story generations ($d = .58$)
Weddle et al. (2016)	Multiple baseline across participants SCRD	7 Head Start preschoolers*	Small group	Story retells: Sum of points for each of 7 story	Functional relation between intervention and preschoolers' story retells

(Participants received low-intensity, large group [Tier 1] intervention prior to beginning small group [Tier 2] intervention)

grammar elements and linguistic structures

School-Age Studies

Petersen, Gillam, Spencer, and Gillam (2010)	Multiple baseline across participants SCRD	3, 6- to 8-year-old children with neuromuscular impairment and co-morbid receptive and expressive language impairment	One-on-one	(1) Macrostructure: Sum of points (out of 29) assigned based on rubric for 9 story grammar elements and episodic construct analysis (2) Microstructure: Frequency counts	Functional relation between intervention and fictional story generation macrostructure and microstructure causality No functional relation between intervention and children’s story generation microstructure temporal adverbial subordinate clauses
Petersen et al. (2014)	Multiple baseline across behaviors and participants SCRD	3, 6-to-8-year-old children with autism spectrum disorder	One-on-one	(1) Macrostructure: Score for each individual story grammar element based on a 4-point rubric (2) Microstructure: Frequency counts	Functional relation between intervention and the three story grammar elements in personal story generations (i.e., behaviors) for one participant For remaining two participants, the implementation of the study did not provide three opportunities necessary for replication of intervention effect across participants

Note. SCRD = single case research design. * = Head Start preschoolers with diverse cultural and linguistic family demographics represented.

Table 2
Participant Demographics and Assessment Standard Scores.

Participant	Age	Ethnicity	Race	Age of first SPED services	Omnibus language (CELF-5)	Narrative language (TNL-2)	Expressive vocabulary (EOWPVT-4)	Receptive vocabulary (ROWPVT-4)	Nonverbal intelligence (TONI-4)
Reed	8;5	Not reported	More than one	Not reported	82	83	77	79	85
James	8;0	Not Hispanic or Latino	White	3	75	67	87	88	99
Adam	8;0	Not Hispanic or Latino	White	Not reported	71	69	72	79	87
Grant	8;11	Not reported	Black or African American	4	72	80	75	89	85

Note. Participant demographics provided by parent report. Age reflects the participant's age at the time of the eligibility evaluation. Age of first SPED services reflects age at which the child first received special education services. CELF-5=Clinical Evaluation of Language Fundamentals-Fifth Edition Core Language Score (CELF-5; Wiig, Semel, & Secord, 2013); TNL-2=Test of Narrative Language-Second Edition Narrative Language Ability Index (TNL-2; Gillam & Pearson, 2017); EOWPVT=Expressive One Word Picture Vocabulary Test-Fourth Edition (Martin & Brownell, 2010a); ROWPVT=Receptive One Word Picture Vocabulary Test-Fourth Edition (Martin & Brownell, 2010b); TONI-4=Test of Nonverbal Intelligence-Fourth Edition (TONI-4; Brown, 2010). The normative mean standard score for all measures is 100 with a standard deviation of 15.

Table 3
Operational Definitions and Examples for Story Grammar Elements

Story Grammar Elements	Definition	Examples
Character	Any reference to an actor (human or animal) in a narrative	<ul style="list-style-type: none"> • There was a <u>boy</u>. • <u>Sydney</u> was roller skating.
Setting	Any reference to a place or time	<ul style="list-style-type: none"> • He went to <u>the park</u>. • Sydney was roller staking in my <u>driveway</u>.
Problem	An event or problem that elicits a response from the characters	<ul style="list-style-type: none"> • The boy <u>saw a scary spaceship</u> and ran. • <u>She hit a bump and fell down</u>.
Feeling	Any reference to a psychological state such as feelings, emotions, desires, or thoughts related to the problem	<ul style="list-style-type: none"> • The boy was <u>scared</u>. • She was <u>sad</u> because her hand hurt.
Plan	Reference to a cognitive verb that indicates the intention to act on an initiating event	<ul style="list-style-type: none"> • The boy <u>decided</u> to run. • Sydney <u>planned</u> to go home to get a band aid. • Cognitive verb examples: decide, think, plan, etc.
Attempts/action	Actions taken by the main character in response to the stated or implied initiating event/problem	<ul style="list-style-type: none"> • The boy <u>ran</u> from the spaceship. • Sydney scraped her hand on the ground when she fell and after that <u>she stayed away</u> from the bumps.
Consequence	The outcome of an action that was related to the initiating event	<ul style="list-style-type: none"> • The boy crawled away and <u>was safe from the aliens</u>. • Then <u>her brother asked, "Are you okay?"</u> Then they <u>had fun</u> roller skating together.
Ending emotion	Specific emotion related to a consequence	<ul style="list-style-type: none"> • The boy <u>felt safe</u> once he made it back to his house. • She got a band aid and was <u>happy</u>.

Table 4
Data Properties Analyzed Via Visual Analysis

Visual analysis features assessed within phases	
Level	The value of the data on the dependent measure at any point in the series
Trend	The direction the data are moving over time (increasing, decreasing, or remaining the same)
Stability/Variability	Fluctuations from one data point to the next
Visual analysis features assessed across phases	
Immediacy	The change in level between the last three data points in one phase and the first three data points of the next. The more rapid (or immediate) the effect, the more convincing the inference that change in the outcome measure was due to manipulation of the independent variable.
Overlap	The proportion of data from one phase that overlaps with data from the previous phase. Larger separation/smaller proportion of overlap = more compelling demonstration.
Consistency	The extent to which there is consistency in the data patterns within the same phase. The greater the consistency, the more likely the data represent a casual relation.

Table 5
Average IOA Data Across Phases and Participants

	Baseline	Intervention	Maintenance*	Average
Reed	86 (86-86)	93 (86-100)	71 (71-71)	89 (71-100)
James	93 (86-100)	91 (86-100)	100	91 (86-100)
Adam	100	91 (71-100)	100	94 (71-100)
Grant	100	94 (71-100)	—	96 (71-100)
Average	93 (86-100)	92 (71-100)	90 (71-100)	

Note. IOA = interobserver agreement. Ranges are provided in parentheses. If all values were 100, no range is reported. *Maintenance IOA data was only collected on one session per participant.

Table 6
Phase Means for Each Participants Individualized Story Grammar Element Scores

	Baseline	Intervention	Maintenance
Reed			
Feeling	1.17	2.83	1.5
Plan	0	2	0
End Emotion	0	1.36	1.5
James			
Character/Setting	2.20	2.69	2.5
Plan	0	1.63	3
End Emotion	0	1	1.5
Adam			
Character/Setting	2.20	2.77	3
Plan	0.75	1.50	3
Consequence	0	0.38	0
Grant			
Character/Setting	2	2.37	--
Plan	0.38	0.75	--

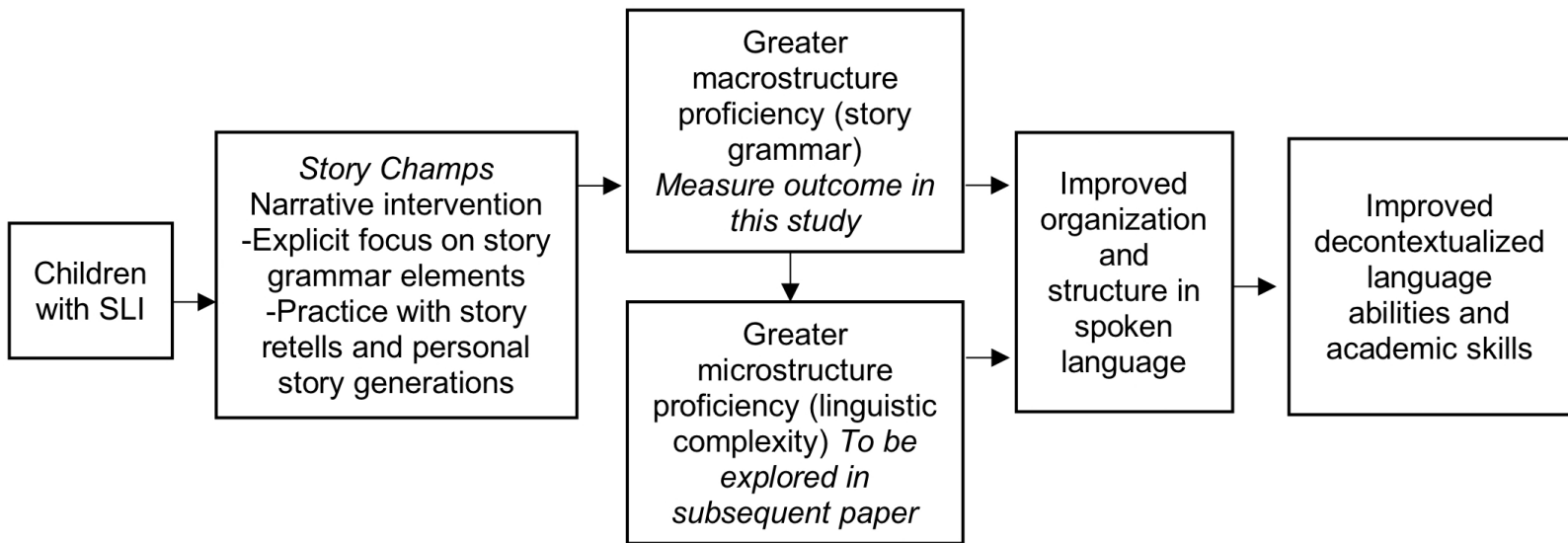


Figure 1. Theory of change.

Intervention Session 1	Intervention Session 2	Intervention Session 3
<p>DV Probe</p> <ul style="list-style-type: none"> • Interventionist models fictional story #1 with pictures • Child generates personal story #1 with pictures <p>Intervention Steps</p> <ol style="list-style-type: none"> 1. Interventionist models fictional story #2 containing multiple exemplars of story grammar target and with pictures and icons <p>Retell Segment</p> <ol style="list-style-type: none"> 2. Child retells fictional story #2 with pictures and icons 3. Child retell fictional story #2 with icons 4. Child retells fictional story #2 without pictures, icons, or interventionist prompting <p>Personal Generation Segment</p> <ol style="list-style-type: none"> 5. Interventionist prompts child to generate personal story #2 6. Child retells personal story #2 with picture sketches and icons 7. Child retells personal story #2 with icons 8. Child retells personal story #2 without pictures, icons, or interventionist prompting 	<p>DV Probe</p> <ul style="list-style-type: none"> • Interventionist models fictional story #2 with pictures • Child generates personal story #2 with pictures <p>Intervention Steps</p> <ol style="list-style-type: none"> 1. Interventionist models fictional story #3 containing multiple exemplars of story grammar target and with pictures and icons <p>Retell Segment</p> <ol style="list-style-type: none"> 2. Child retells fictional story #3 with pictures and icons 3. Child retell fictional story #3 with icons 4. Child retells fictional story #3 without pictures, icons, or interventionist prompting <p>Personal Generation Segment</p> <ol style="list-style-type: none"> 5. Interventionist prompts child to generate personal story #3 6. Child retells personal story #3 with picture sketches and icons 7. Child retells personal story #3 with icons 8. Child retells personal story #3 without pictures, icons, or interventionist prompting 	<p>DV Probe</p> <ul style="list-style-type: none"> • Interventionist models fictional story #3 with pictures • Child generates personal story #3 with pictures <p>Intervention Steps</p> <ol style="list-style-type: none"> 1. Interventionist models fictional story #4 containing multiple exemplars of story grammar target and with pictures and icons <p>Retell Segment</p> <ol style="list-style-type: none"> 2. Child retells fictional story #4 with pictures and icons 3. Child retell fictional story #4 with icons 4. Child retells fictional story #4 without pictures, icons, or interventionist prompting <p>Personal Generation Segment</p> <ol style="list-style-type: none"> 5. Interventionist prompts child to generate personal story #4 6. Child retells personal story #4 with picture sketches and icons 7. Child retells personal story #4 with icons 8. Child retells personal story #4 without pictures, icons, or interventionist prompting

Figure 2. Eight steps of *Story Champs* narrative intervention and illustration of organization of stories across sessions.

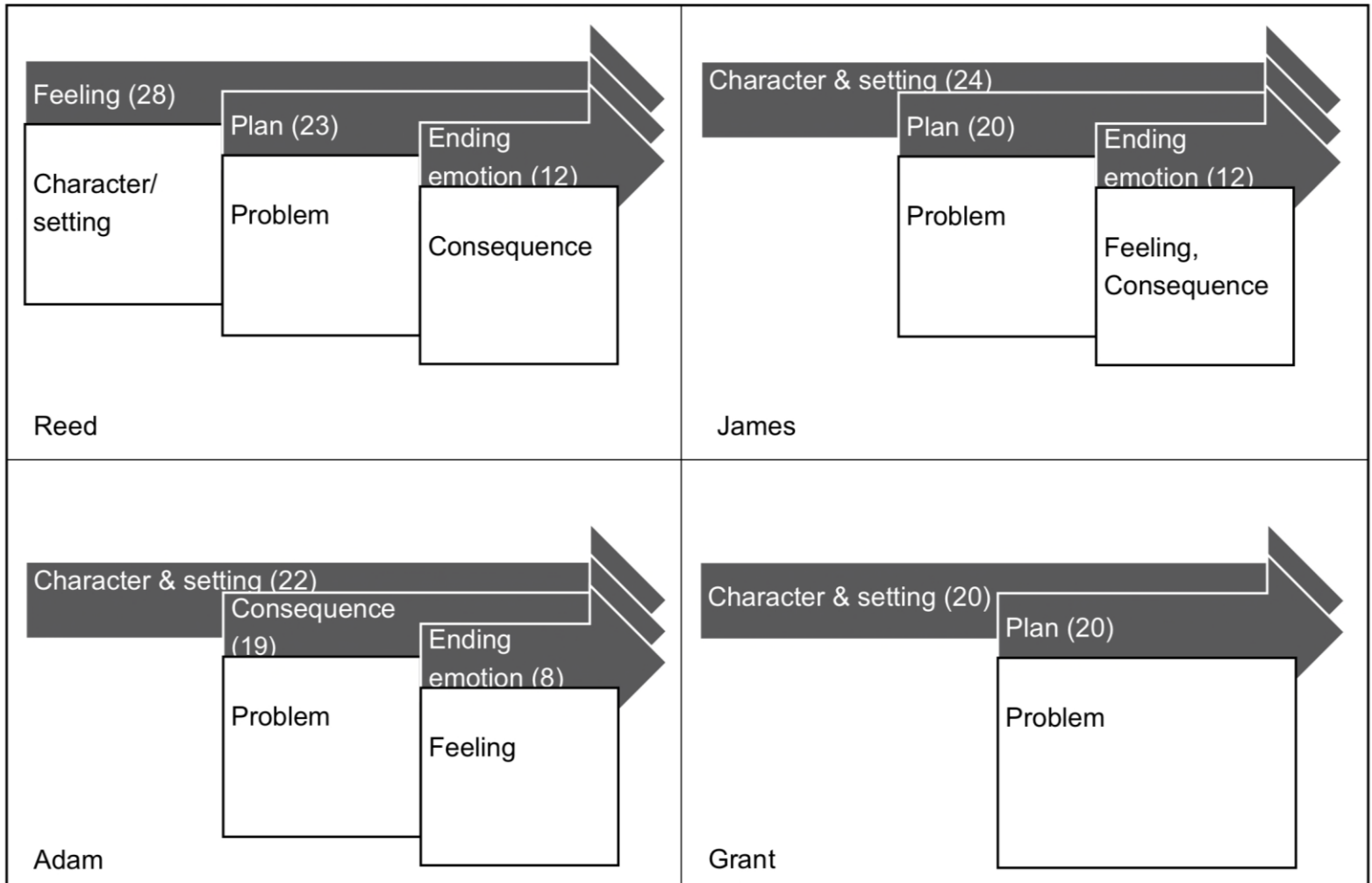


Figure 3. Individualized intervention targets and associated story grammar elements for each participant. Primary intervention targets are contained in the header arrows and associated story grammar elements that were simultaneously introduced are contained in the boxes underneath. Scores for only the story grammar elements shown in the header row were calculated for the dependent variable score. Total number of intervention sessions for story grammar element(s) are listed in parentheses. The arrows indicate how intervention was cumulative as additional story grammar elements are introduced.

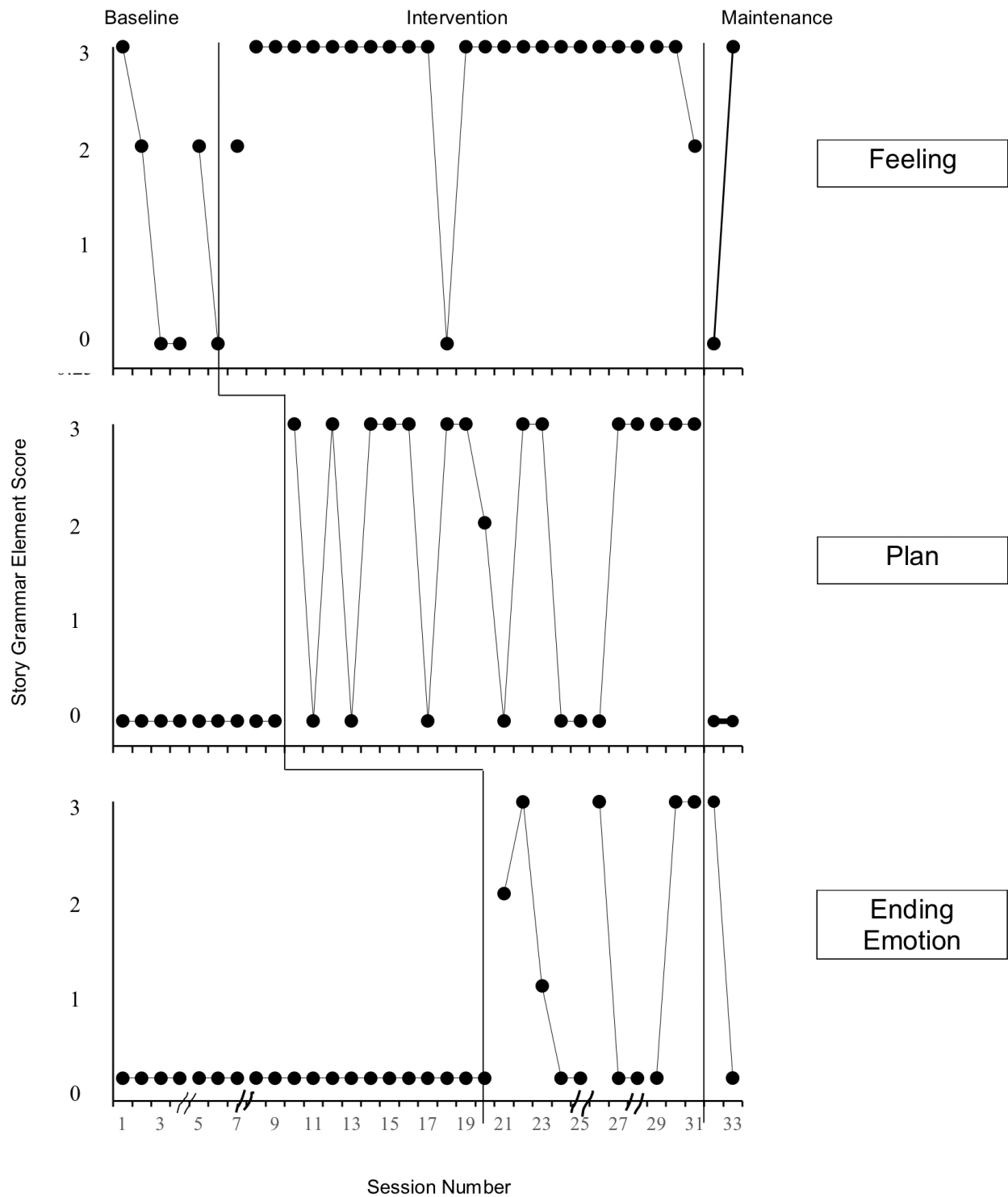


Figure 4. Reed's narrative target behavior performance during baseline, intervention, and maintenance phases. // on x-axis indicates ten or more days between sessions.

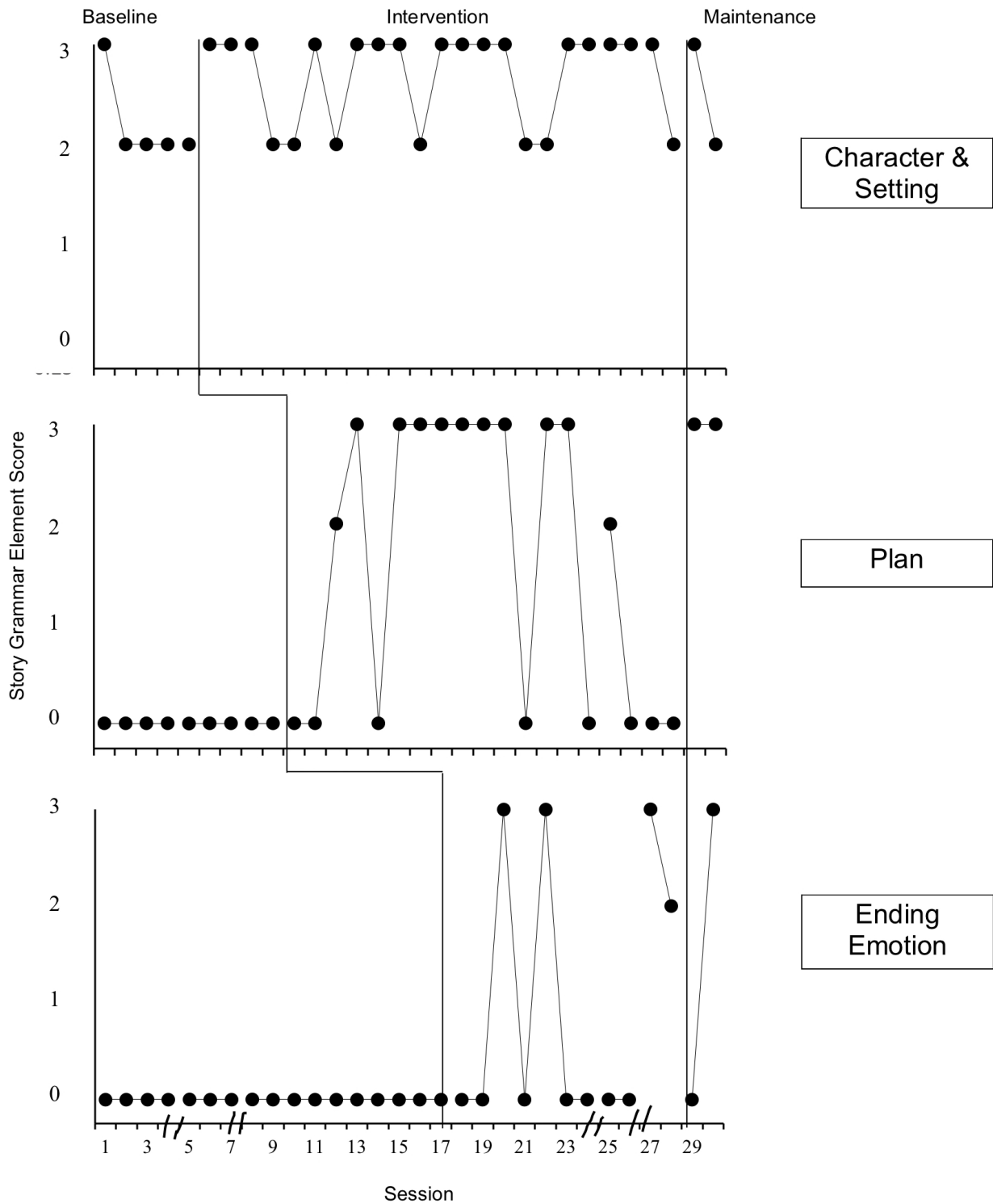


Figure 5. James' narrative target behavior performance during baseline, intervention, and maintenance phases. // on x-axis indicates ten or more days between sessions.

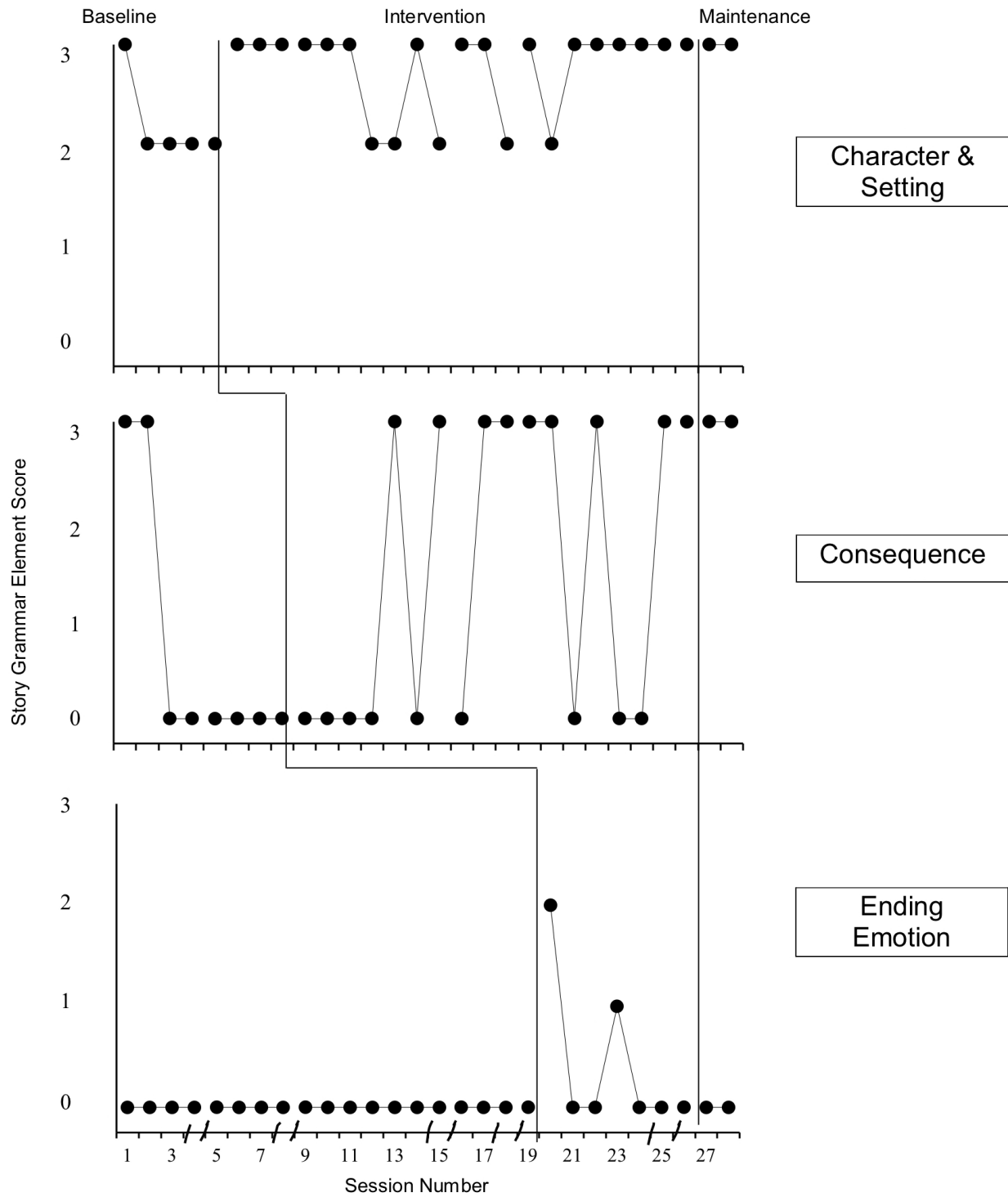


Figure 6. Adam's narrative target behavior performance during baseline, intervention, and maintenance phases. // on x-axis indicates ten or more days between sessions.

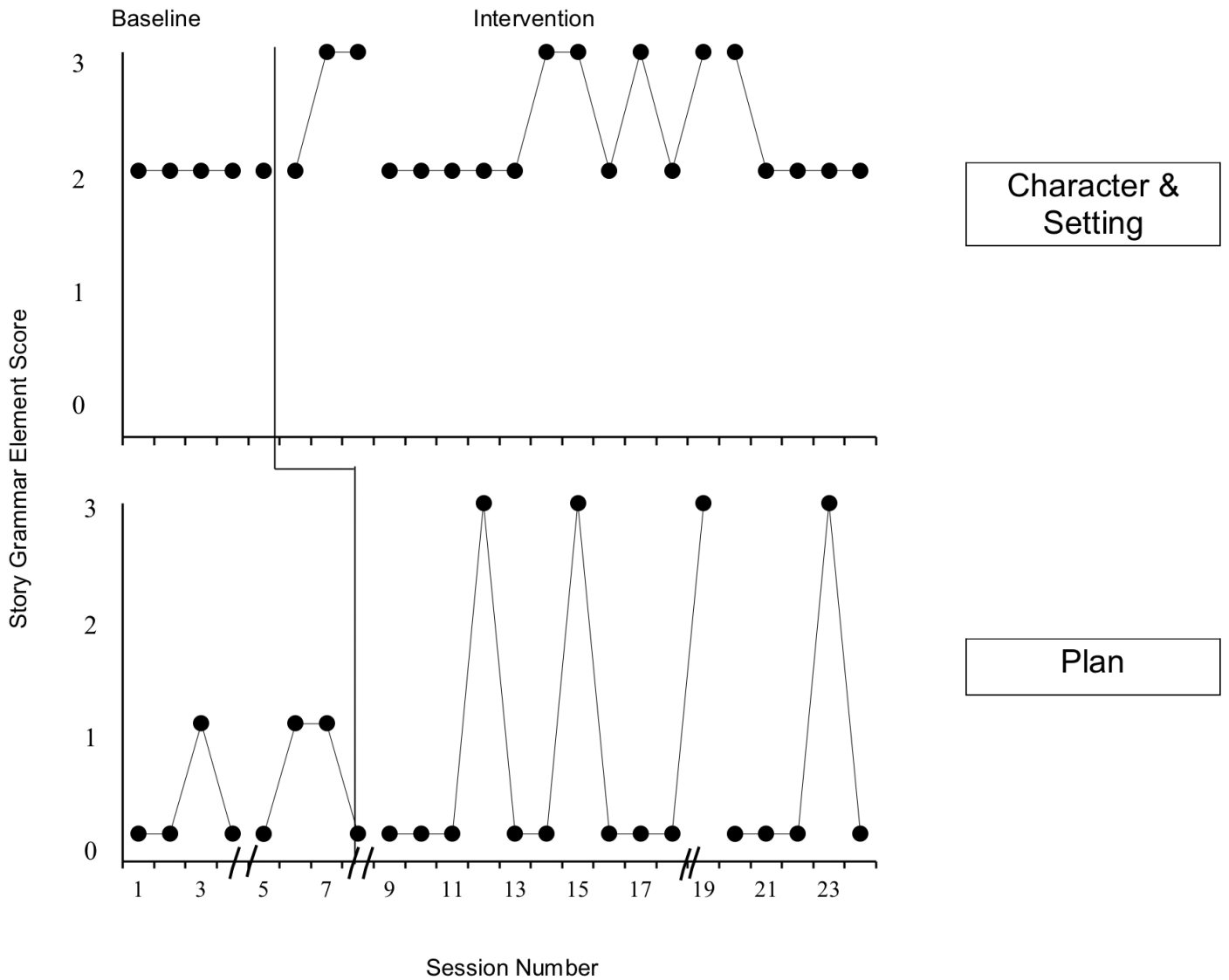


Figure 7. Grant's narrative target behavior performance during baseline and intervention phases. Intervention was discontinued in tier two (plan) due to lack of stability in data. // on x-axis indicates ten or more days between sessions.

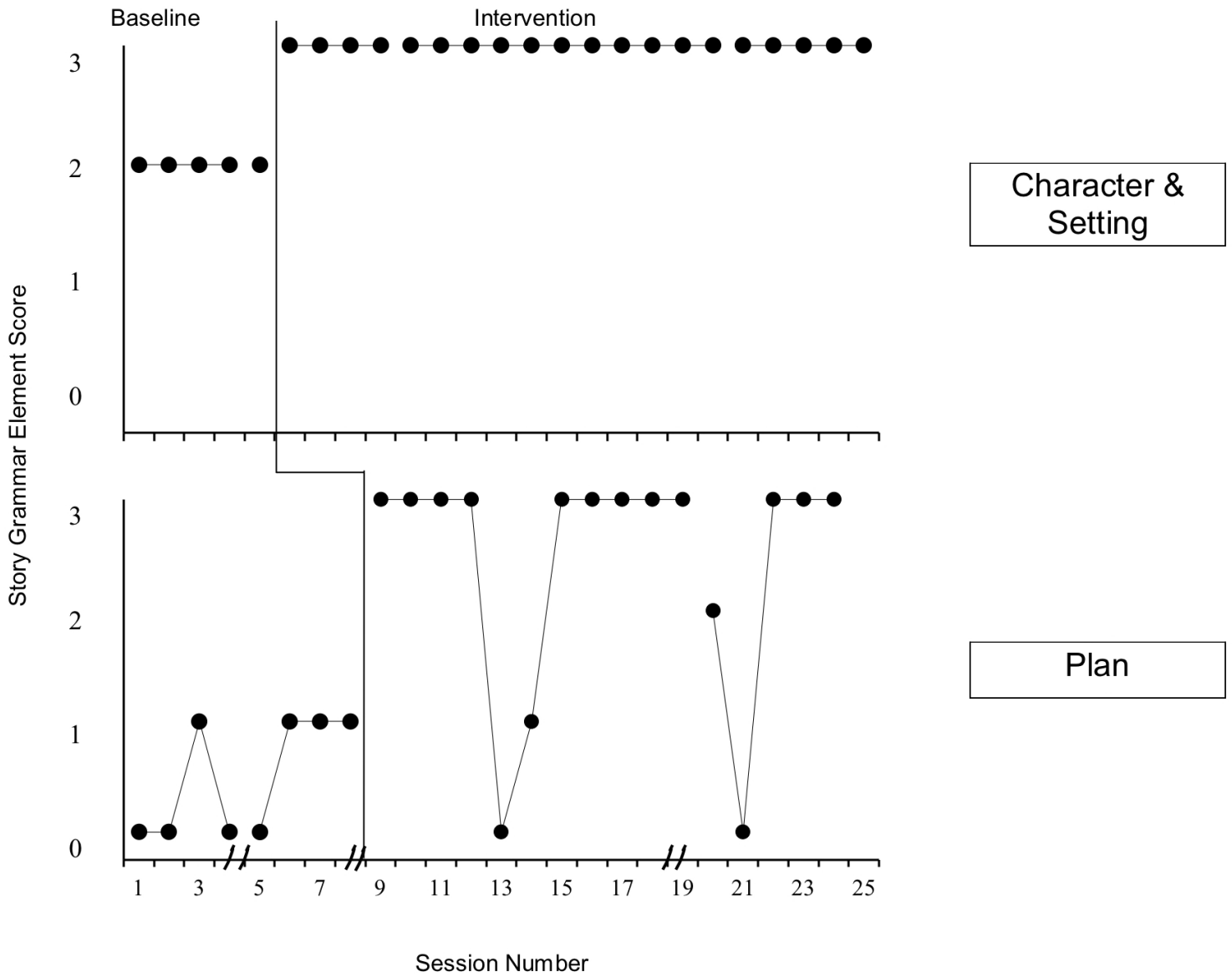


Figure 8. Grant's narrative target behavior performance during baseline and step eight at the end of each intervention session. // on x-axis indicates ten or more days between sessions.