Effects of Modeling, Story Templates, and Self-Graphing in the Use of Story Elements by Students with Moderate Intellectual Disability

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Abstract: There is limited research on teaching narrative writing skills to students with moderate to severe intellectual disability. In the current study, we used a multiple probe across participants single case design to evaluate the effects of an intervention package comprised of modeling, story templates, and self-graphing, on the inclusion of story elements in the written narrative of three middle school students with MSD. The data suggested that the intervention package was effective and resulted in partial maintenance of targeted skills. Implications for future research are discussed.

Teaching students to communicate effectively through writing presents one of the greatest instructional challenges for educational professionals. Data from the National Assessment of Educational Progress (2011) suggest that teachers have struggled to identify and apply effective strategies to develop writing skills to a majority of learners. In fact, the report indicated that over 70% of students in eighth and twelfth grades failed to meet proficiency in the area of written expression. Unfortunately, this bleak narrative worsens for young writers with disabilities as they often fall behind their peers in the development of written language (Mayes & Calhoun, 2007; Myles et al., 2003; Poplin, Gray, Larsen, Bankowski, & Mehring, 1980). This general lack of success in developing competent writers may have broad and deleterious effects, as struggling writers will likely face repeated and daunting writing requirements in higher education and employment settings.

Despite the importance of writing for all students, there has been little attention paid to the development of written expression by persons with moderate to severe intellectual disability (MSD; Joseph & Konrad, 2008; Pennington & Delano, 2014). Students with MSD may be at greater risk for failing to acquire written language skills due to differences in memory, learning rates, attention, and communication functioning (Heward, 2012). These differences may hinder students’ efforts in organization, vocabulary usage, and adherence to syntax and grammar conventions during writing. The resulting inability to generate cohesive written products may reduce students’ participation in general education settings, as teachers often expect the demonstration of knowledge through written expression. Furthermore, writing instruction may have a positive impact on communication in that the expansion of written responses may produce gains in vocal expression. For example, Pennington, Collins, Stenhoff, Turner, and Gunselman (2014) demonstrated that following instruction on how to construct simple story narratives, elementary-aged students with autism spectrum disorder (ASD) and MSD were able to vocally tell stories.

Fortunately, researchers have identified a collection of research-based practices for improving the writing of students from kindergarten to high school (Graham & Harris, 2016; Graham & Perin, 2007), including the provision of (a) frequent opportunities to write, (b) opportunities for students to increase comprehension by writing about text or information, (c) highly motivating routines for daily writ-
ing, (d) prewriting activities, (e) supports for students writing as they compose, (f) models and explicit instruction to teach writing skills and processes, (g) setting specific product goals, and (h) assistive technology supports. Several research teams have employed these practices in teaching writing to students with MSD. For example, Collins, Branson, Hall, and Rankin (2001) used explicit instruction to teach young adults, ages 16–19, with MSD to write letters containing four elements: (a) heading, (b) greeting, (c) content body, and (d) closing. During instruction, a peer used the system of least prompts (SLP) procedure to teach participants to include each letter element. During SLP, the peer applied a prompting hierarchy in response to student errors or a failure to respond that included (a) an opportunity to respond independently, (b) a verbal prompt, (c) a gesture prompt, (d) a model prompt, and (e) physical guidance. All three participants generated a letter that included the targeted components but demonstrated only partial maintenance of skills at 2 and 4 weeks after instruction. Similarly, Pennington, Delano, and Scott (2014) employed explicit instruction and setting product goals in teaching three young adults, ages 18–21, with MSD to include targeted components within resume cover letters to potential employers. During instruction, the researchers used modeling, the SLP procedure, and taught students to evaluate and graph their daily performance. During instruction, the three participants learned to use all six components and maintained the use of components several weeks after the termination of intervention.

A few researchers have targeted story writing for students with MSD. Story writing is an important skill for young learners as it provides an opportunity to access attention from the listener or reader. It also provides a rich context for refining communication skills and writing conventions. In fact, the generation of a cohesive narrative has been targeted for students across grade levels by the Common Core State Standards (CCSS; National Governors Association & Council of Chief School Officers, 2010). These standards emphasize (a) writing for multiple purposes, (b) producing well-organized text, (c) writing to recall and extend knowledge about a topic, and (d) using short and extended writing across a range of audiences (Graham & Harris, 2013). In a series of studies (i.e., Pennington, Ault, Schuster & Sanders, 2011; Pennington, Stenhoff, Gibson, & Ballou, 2012; Pennington, Collins et al., 2014), researchers taught nine children, ages 6–10, to construct simple stories using prompting and assistive technology. In these investigations, the researchers used predictable story patterns (e.g., [character] lived in the [locale], [character] [action], [character] was [emotion]) and simultaneous prompting (Gibson & Schuster, 1992) to teach participants to select whole words from an array to complete a story. Participants acquired the skills, demonstrated maintenance, and some responded across untrained topographies (i.e., speaking, handwriting). These studies suggest that students with MSD can learn to construct simple stories when given a model and the vocabulary from which to choose. Unfortunately, they provide little direction on teaching students to generate their own stories.

In the current investigation, we sought to build upon the previous work in teaching story writing to students with MSD by targeting the generation of stories in the absence of computer-based arrays (e.g., Pennington et al., 2014). The instruction of generative responses is critical in that it frees the writer from those responses pre-programmed into a word array and provides the opportunity for the writer to tell their own story. To date, there is a dearth of research on how to develop a generative repertoire for students with MSD.

In addition, we targeted the instruction of middle school students with MSD. Only one other research team has addressed writing instruction for middle school students with MSD. Mims, Lee, Browder, Zakas, and Flynn (2012) targeted writing as a part of a comprehensive literacy package and used a time delay procedure to teach students to complete sentence fill-ins to “write” an opinion statement about a passage. In the current investigation, we employed strategies consistent with recommendations for teaching writing to middle school students with MSD (Graham & Perin, 2007). First, we used prewriting and modeling strategies by presenting opportunities to practice a writing structure in the context for motivating video-based stories. Researchers have employed videos in teaching a wide range of
skills to students with MSD. In most cases, videos were used to model the accurate performance of participant responses (Bellini & Akullian, 2007); we used video clips to show students the story elements within a narrative and as stimuli about which to model story writing responses. Second, we used an explicit response prompting strategy (SLP) during instruction. The SLP procedure has been used to teach a wide range of skills to students with MSD (Doyle, Wolery, Ault, & Gast, 1988), including several in the area of written expression (Collins et al., 2001; Pennington, Delano, & Scott, 2014; Pennington, Flick, & Smith-Wehr, in press). Finally, we taught students to graph their progress towards product goals. Recently, two research teams included self-graphing as a part of an effective instructional package for teaching writing skills to students with MSD (Pennington, Delano, & Scott, 2014; Pennington, Saadati, Scott, & Welch, 2014). In light of this proposed extension of the current literature, we sought to answer the following research question: Is there a functional relation between an intervention package comprised of video models, story templates, and self graphing on the number of story elements included in the written narratives three middle school students with MSD?

Method

Participants

Three males, ages 12–13, with moderate intellectual disability participated in the study. All three students performed at the low or very low range of performance on standardized writing and language assessments. Ryan was a 12-year-old white male with moderate intellectual disability and ASD and in the seventh grade. His most recent evaluation indicated a full-scale IQ score of 41 (WISC-IV), a written expression score of 40 (KTEA), and a core language score of 71 (CELF-5). Jay was a 12-year-old white male with moderate intellectual disability and in the sixth grade. His most recent evaluation indicated a full-scale IQ score of 52 (WISC-IV), a written expression score of 49 (KTEA), and a core language score of 72 (CELF-V). Duncan was a 13-year-old white male with moderate intellectual disability and in the sixth grade. His most recent evaluation indicated a full-scale IQ score of 40 (WISC-IV), a written expression score of 66 (KTEA), and an expressive language score of 40 (CELF-V). Duncan received free and reduced lunch. Their special education teacher recommended the students for participation in the study because of their deficits in the production of cohesive narratives. All three students had basic spelling skills and could produce simple written sentences about picture or a single event (e.g., I went to the movies).

The student’s special education teacher conducted all baseline and intervention sessions. She held a bachelor’s degree and teaching certification in Moderate to Severe Disability (MSD) and had 2 years of teaching experience in a middle school.

Settings and Materials

We conducted all sessions in a self-contained special education classroom for students with MSD that served students in sixth-eighth grade. Students moved in and out of the classroom as they spent part of their day in general education classrooms. Sessions were conducted in a one to one instructional arrangement, whereas the teacher sat across from the student at a small semi-circle shaped table. Other students received instruction from paraprofessional in other areas of the classroom. Each session lasted approximately 15 to 20 min.

Across all sessions, two students used pencil and paper to generate narratives. One student, Ryan, typed his responses on a computer tablet using a word processing software program (i.e., Spell Better). During intervention sessions, students were presented with five brief video clips selected from YouTube and displayed on a computer tablet. We selected each video vignette based on the following criterion: (a) contained all targeted story elements, (b) lasted less than 4 min, and (c) contained what the researcher and teacher perceived as a potentially engaging ending (e.g., high level of action, humor). We also randomly presented two story templates to model simple story writing (see Figure 1).
Each template contained sentence starters followed by blank spaces (e.g., once there was ______________). In addition, we used a histogram in which students plotted their daily progress by coloring the number of blocks that corresponded with the number of correct responses. Above the graph, we created and placed a checklist of the five story elements (see Figure 2). The graph and list were presented after the student had finished independent writing.

**Data Collection**

We collected data on responses during independent writing practice and on the occurrence of five story elements within each student’s written narrative. Story elements were scored as occurring if it was present and related to the rest of the narrative. Furthermore, each element must have been included within a phrase or sentence (i.e., minimum subject + verb) and errors in punctuation or capitalization were ignored. Story elements included (a) character, (b) setting, (c) a first event, (d) a related second event, and (e) an emotion. A character was defined as a person or animal that performed an activity in the story. A setting was defined as a statement of a place or time in which the story takes place. The first and second events were defined as something the character did or something that happened that affected the character. Finally, an emotion was scored as a statement of how the character felt. We assigned a single point for the inclusion of each element. Therefore, participant scores could range from 0 to 5 points. Data were reported and graphed as number of story elements included during writing probes.

**Reliability.** The first author, a university researcher, collected both dependent and independent reliability data. For dependent variable reliability data, he independently scored students’ products and compared his score with that of a second rater.

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**Figure 1. Sample Story Template.**

One day ______________ was at the ______________. First, ______________

Then, ______________

______________ felt ______________.

The end.

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**Figure 2. Self-graphing histogram and checklist.**

<table>
<thead>
<tr>
<th>Character</th>
<th>Setting</th>
<th>Event 1</th>
<th>Event 2</th>
<th>Emotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<td>2</td>
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<td>2</td>
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<td>2</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

How many parts did I use today?

Date
against that of the teacher. He then calculated interobserver agreement (IOA) by dividing the number of agreements by the sum of agreements and disagreements and then multiplying by 100. For Ryan, we collected IOA data for 75% of baseline sessions and 100% of intervention sessions. IOA was 90% across sessions. For Jay, we collected IOA for 50% of baseline and 100% of intervention sessions. IOA was 100% across sessions. For Duncan, we collected data for 42% of baseline and 100% of intervention sessions. IOA was 96% across sessions.

We also collected procedural integrity data across all baseline, intervention, and maintenance conditions. During sessions, the first author sat behind the teacher and student dyad and recorded the teacher’s adherence to the planned instructional steps. For Ryan, we collected data for 25% of baseline sessions, 60% of intervention sessions, and 40% of maintenance probes. For Jay, we collected data for 50% of baseline sessions, 50% of intervention sessions, and 66% of maintenance probes. For Duncan, we collected data for 57% of baseline sessions, 50% of intervention sessions. We calculated procedural integrity to be 100% across all sessions.

Experimental Design and Procedures

We used a concurrent multiple probe (MP) across participants (Horner & Baer, 1978) to evaluate the effects of a writing intervention package on the participants’ use of story components in their writing samples. We used the MP design for its capacity to demonstrate experimental control while reducing the need for students to repeatedly engage in difficult writing tasks without intervention. First, we collected baseline data across all three participants. Subsequently, we introduced the writing package to the first participant and continued until he met a predetermined criterion (i.e., 5 elements for 3 consecutive sessions). This criterion was selected based on a previous study involving generative writing for students with MSD in which students maintained responses following intervention (Pennington, Delano, & Scott, 2014). We then introduced the intervention to the next participant and continued until he met criterion. Finally, we introduced intervention to the final participant and again continued until criterion was met. Following the termination of each participant’s intervention condition, we conducted probes to assess maintenance.

Teacher Training

Prior to baseline and intervention conditions, the researcher trained the special education teacher to implement procedures. Prior to training, the researcher sent a sequenced list of teacher behaviors via email for review. At the onset of a single day of training, the researcher reviewed the steps and modeled implementation of the steps. Finally, the teacher was asked to implement the steps with the researcher until she demonstrated performance with 100% accuracy. The researcher sat across from the teacher and scored her performance using a researcher develop checklist. Furthermore, the teacher was permitted to reference the written list of steps during instruction.

Baseline Condition

During baseline sessions, the teacher presented writing materials and obtained the participant’s attention. Subsequently, she delivered the directive to write a story and directed the participant to vocally indicate when he was finished writing. She also informed the participant that they could ask for help in spelling. If the participant discontinued writing for 3 min, the teacher asked the student if he/she is finished. If the student indicated “no” they were permitted to continue until they indicated completion or another 3-minute pause elapsed at which time the teacher termination the session. Once the student indicated completion or the session was terminated, the teacher delivered praise for on-task behavior.

Writing Intervention Package

Each intervention session involved three instructional segments including (a) a story model and checklist review, (b) independent student practice, and (c) feedback plus self-graphing. The teacher conducted sessions 3 to 4 days a week.

Story video model and checklist review. At the beginning of each intervention session, the
teacher stated, “It’s time to work on story writing” and displayed a brief video depicting a cartoon short story. After watching the video, the teacher presented a template and stated, “A story has several different parts.” The teacher then directed the student to the template and stated, “A story needs a character and a character is who the story is about. Who was the main character in the story?” If the participant answered the question correctly within 5 s, the teacher provided praise, wrote his response on the story template and read the section aloud. If the student did not respond, indicated that he did not know, or answered incorrectly, the teacher initiated the following prompt sequence. First, the teacher replayed a segment of the video that displayed the targeted elements and then repeated the question. If the student answered correctly, the teacher provided praise, wrote his response on the story template and read the response aloud. If the student did not provide the correct response, the teacher pointed to the video, verbally provided the answer, wrote his response on the story template, and read the response aloud. The teacher repeated the prompting and feedback steps across all of the targeted elements. Table 1 depicts the definitions and questions provided during the instruction of each targeted element. Upon completion of the template the teacher stated, “We wrote a story together” and then read the entire story aloud. She then stated, “Remember your story has several important parts. Let’s review them.” Subsequently, she pointed to each component on the checklist (Figure 2), stated the name of the components and asked the student to identify the corresponding component from the story (e.g., character—Jack-Jack). If the student did not respond within 5 s, or made an error, the teacher provided the correct response.

Independent student practice. After reading the co-constructed story, the teacher removed the template and presented the directive to write a different story. She reminded the participant to include all of the important story elements, request assistance for spelling when needed, and indicate when he was finished. If the student stopped writing for 3 min, the teacher asked him if he was finished. If he indicated that he was not finished, he was permitted to proceed or continue without writing for an additional 3 minutes. The practice session was terminated following 6 consecutive minutes without student writing.

Feedback plus self-graphing. Upon completion of the students’ practice narrative, the teacher presented a checklist, graph, and the statement “OK, let’s see if you have all of the parts.” The teacher then asked the student to identify the occurrence or nonoccurrence of each component. If the student accurately identified the occurrence or nonoccurrence of an element, the teacher provided praise. If the student made an error, the teacher provided the correct answer. The teacher and student then tallied the number of elements included and the student plotted the number of elements on his graph.

Maintenance probes. Following completion of the intervention, the teacher conducted

<table>
<thead>
<tr>
<th>Element</th>
<th>Definition and Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character</td>
<td>First a story needs a character. A character is whom the story is about. Who was the character in the video?</td>
</tr>
<tr>
<td>Setting</td>
<td>Now we need a setting. A setting is where the story happened. Where did the story happen?</td>
</tr>
<tr>
<td>Event 1</td>
<td>Now we need an event. An event is what happened in the story. Can you tell me what happened in the story?</td>
</tr>
<tr>
<td>Event 2</td>
<td>Now we need another event. An event is what happened in the story. Can you tell me what else happened in the story?</td>
</tr>
<tr>
<td>Emotion</td>
<td>Now we need an event. An event is what happened in the story. Can you tell me what happened in the story?</td>
</tr>
</tbody>
</table>
maintenance probes using procedures identical to those used during baseline sessions.

**Results**

Results are displayed in Figure 3.

Ryan. Prior to intervention, Ryan’s performance data were variable and indicated an average of 2.25 elements per session. On session 2, his data show the use of four elements, which reflects his generation of a narrative.
about a recent trick or treating trip. During intervention, Ryan Jay demonstrated a steadily increasing trend and met criterion within five sessions. Immediately following intervention, during maintenance sessions 10 and 11, Ryan included three and five elements respectively. During maintenance session 12, which occurred 3 weeks after intervention, he included a single element. Finally, Ryan used all five elements at 2.5 and 3 months following intervention.

Jay. Prior to intervention, Jay’s performance data were variable and included an average of one element per session. On session 2, he included four elements in a story about a trip to Dollywood. During intervention, Jay demonstrated a steadily increasing trend and met criterion within 6 sessions. During maintenance sessions, Jay included three elements one day following the termination intervention. He included five elements at 5 weeks following intervention and at 9 weeks following intervention, he responded with a request “to go on a cruise during spring break” resulting in the score of 0.

Duncan. Prior to intervention, Duncan included an average of .42 elements per session. Following the introduction of intervention, Duncan’s data reflect an immediate change in responding. He met criterion within eight sessions. At 4 weeks following intervention Duncan used 4 elements during a maintenance probe.

Non-parametric Measure of Effect

We used Tau-U (Parker, Vannest, Davis, & Sauber, 2010) to measure non-overlap between phases and to provide a non-parametric of effect. Tau-U improves upon previous indices (e.g., percent of non-overlapping data points [PND], percent of data exceeding a median trend [PEM-T]) in its integration of overlap and trend (Parker, Vannest, & Davis, 2014). We first measured non-overlap between baseline and intervention conditions for all three participants. We then calculated an overall effect across all participants. For Ryan, Jay, and Duncan we calculated the effect to be .55, .53 and .98, respectively. The weighted average across all participants was .70. These findings reflect small effects (i.e., < .65) of Ryan and Jay, a strong effect for Duncan (> .93–1.00), and an overall medium effect across the three participants (.66–.92).

Discussion

In the current investigation, we addressed the research question: Is there a functional relation between an intervention package comprised of video models, story templates, and self graphing, and the number of story elements included in narratives by three middle school students with MSD? Our findings suggest a functional relation as the package was effective for all three participants in increasing the use of targeted story elements during intervention. Furthermore, the participants demonstrated variable but greater than baseline levels of responding during maintenance probes. These findings add to the limited but emerging body of literature suggesting that students with MSD can benefit from systematic writing interventions and are of little surprise as systematic and explicit instructional strategies have been deemed effective for students without MSD (e.g., Self-Regulated Strategy Development, Graham & Harris, 1989; sentence combining, Saddler, Behforooz, & Asaro, 2008).

In the current investigation, we organized instruction around predictable writing routines. During instruction, students completed sentences within story templates that served as models of the target written product. Sentence completion has been previously been identified as a critical task within the scope and sequence of instruction in written expression (Kame’enui & Simmons, 1990). These tasks have three important instructional features. First, they reduce the complexity of writing tasks, as they require students to have a limited understanding of syntax. Second, they provide intra stimulus models of correct sentence structure. Finally, the sentence stems or frames within these tasks may serve to mediate generalization (Stokes & Baer, 1978) as they can be applied in the generation of multiple sentences. Interestingly, we observed that the students included some of the sentence stems within their own narratives.

In addition, we presented video examples of story narratives to teach students to identify critical story elements. In previous work with students with MSD, Pennington and col-
leagues (2011, 2012, 2014) modeled correct student responses (i.e., selection of words) but did not provide models of complete story narratives prior to instruction. It is plausible that students may have acquired story-writing responses without actually understanding what constitutes a story narrative. This may have contributed to the limited variation within student responses across the studies. In the current study, two of the participants, Ryan and Jay, demonstrated wide variation in their stories. Each of their stories differed from the video exemplar and stories written on previous days. Duncan stories adhered closely to the narrative in the video models. Furthermore, our use of video during writing instruction for this population was somewhat novel as only one other research team has used videos during writing instruction for this population (Kinney, Vedora, & Stromer, 2003).

Finally, it is important to note that Ryan’s use of the particular writing software (i.e., Spell Better) presented challenges during the study. This software included word prediction technology that presented a choice of words above the keyboard display. We observed on multiple occasions that Ryan seemed to “tire” of typing out each word and sporadically selected multiple words from the three choice array of predicted words. Often these brief shifts to selection based responding resulting in syntactically incorrect phrases. Researchers and practitioners might consider the inhibitive effects of predictive software for students without the skills to use it effectively.

**Limitations**

Despite our generally positive outcomes, we must acknowledge limitations to the current analysis. First, as mentioned above, Ryan’s sporadic use of word prediction software questions limited our ability to fully assess his generative performance. Since the feature was available across baseline and intervention conditions, our data suggest the intervention likely contributed to changes in responding but that these effects should be considered with caution. Future research should isolate these effects by avoiding the use of predicative software or ensuring that students can use it discriminately.

Second, we only targeted the inclusion of story elements within their narratives. Though story elements are critical in learning to produce cohesive narratives, they only reflect one set of responses within the complex repertoire required to be a competent writer. In the current investigation, students made frequent errors in spelling and grammar that may have reduced the readability by natural readers (e.g., peers, teachers, parents). Despite this limitation, we purport that these data are a critical early step toward developing more comprehensive writing packages.

Finally, our data reflect the performance of only three participants. We caution practitioners in their interpretation of our results as written expression is a complex construct and its development is highly responsive to individual learning histories. That being said, our findings are consistent with an explicit and systematic approach that has been demonstrated to be effective across a range of individuals (Graham & Harris, 2016).

**Conclusion**

The increased expectation for all students to make progress in the areas academic areas including written expression has served as a catalyst for changes in the educational programming for students with MSD. Unfortunately, teaching these students to write is new territory for researchers and practitioners. The current study adds to the emerging body of literature in this novel area and may reveal to future researchers potential next steps towards the development of more comprehensive programming. We purport that the rationale for the incorporation of writing into the curriculum of persons with MSD goes beyond requirement to meet national or state standards and towards the goal self-determination. At its core, written expression is another form of communication in which individuals use to demonstrate their knowledge, interact with others through electronic media, and express their feelings.

**References**

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