Effects of a Graphic Organizer Training Package on the Persuasive Writing of Middle School Students with Autism

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Abstract: This study examined the effects of a graphic organizer intervention package on the quality and quantity of persuasive writing of three middle school students with Autism Spectrum Disorder (ASD). The intervention included a 3-day training which consisted of explicit instruction on the components of a persuasive essay, modeling and guided practice of graphic organizer completion, and translating graphic organizer notes into a draft. Following training, the students independently completed graphic organizers and wrote persuasive essays throughout the post intervention condition. A multiple baseline across students design demonstrated the intervention package was functionally related to improvements in writing performance as measured by total words written, correct writing sequences, and analytical rubric scores.

Despite the fact that competent writing skills are required by most employers, education in the United States increasingly falls short in preparing students to be successful writers. According to the 2011 NAEP writing report card, only 24% of eighth graders were writing at a proficient level (National Center for Education Statistics, 2012). The NAEP proficient level represents an ability to accomplish the communicative purpose of writing by effectively informing or persuading the audience. These results indicate that writing is an area of need insufficiently addressed by current instructional strategies for a large percentage of U.S. students. In school, weaker writers will have difficulty demonstrating their learning to teachers who assess student progress through writing (Graham, 2006). Students who do not learn to write proficiently are at a disadvantage throughout their education, and without remediation, these deficits persist into adulthood.

In light of new initiatives such as the Common Core State Standards (CCSS), writing has become a focus of educational reform. When states adopt the CCSS, they also assume the responsibility of ensuring student mastery of a variety of writing styles and development of advanced levels of writing sophistication (National Governors Association Center for Best Practices, Council of Chief State School Officers, 2010). For example, students in the eighth grade are expected to write arguments/persuasive pieces, narrative pieces, and informative/explanatory pieces, and these types of texts must include characteristics of refined writing (e.g., formal style, effective technique, varied transitions, and relevant description details).

Students with ASD present unique difficulties in the area of writing (Bieberich & Morgan, 2004; Goldstein, Johnson, & Minshew, 2001; Myles, 2005; Myles et al., 2003). Myles and colleagues (2003) found that students with ASD could produce sentences similar in number to their peers, but sentences generated were brief and not as complex (i.e., fewer morphemes, t-units, and words). Students with ASD may also struggle with abstract thinking and thought processes required for proficient writing such as imagining pretend situations and using figurative language (Myles, 2005). Further, writers with ASD tend to have problems with self-regulation and attention. As compared to their typical peers, children with ASD exhibit lower levels of attention and shorter durations of sustained focus (Bieberich & Morgan, 2004; Goldstein et al., 2001). Writing tends to be an individual activ-
ity requiring sustained attention; therefore, difficulties with focusing in students with ASD may result in lower quality writing than that of their peers.

Graphic organizers are a type of planning tool used with novice writers to help them organize their thoughts and structure their essays correctly. Many studies have used graphic organizers to improve the writing of struggling students (Nussbaum, 2008; Unzueta & Barbett, 2012; Zakas, Browder, Ahlgrim-Delzell, & Heafner, 2013). For example, graphic organizers have been successful in improving counter-argument and argument integration (Nussbaum, 2007), and computer graphic organizers have been used to improve persuasive writing skills (Unzueta & Barbett, 2012).

Research on the use of graphic organizers with students with ASD has been limited to teaching content. For example, Zakas et al. (2013) examined the effects of using a graphic organizer intervention to teach social studies content to students with ASD. In a similar study, Knight, Spooner, Browder, Smith, and Wood (2013) examined the effects of teaching science concepts to students with ASD and intellectual disabilities (ID) using systematic instruction and graphic organizers. Both studies showed that graphic organizers are an effective tool to teach content to students with ASD.

Although research demonstrates that graphic organizers can improve writing and that students with ASD benefit from using graphic organizers in other learning contexts, we could find no published experimental research examining the effects of graphic organizers on the writing performance of students with ASD. The purpose of the current study was to examine the effects of teaching persuasive writing to middle school students with ASD through graphic organizer training. Specifically, this study was designed to address the following research questions. What are the effects of teaching middle school students with ASD to use graphic organizers for writing persuasive essays on the (a) number of correct writing sequences, (b) total number of words written, and (c) analytical writing rubric scores; and what are the students’ opinions of the graphic organizer intervention?

### Method

#### Participants and Setting

The participants in this study were three middle school students diagnosed with ASD who attended a private learning center for students with ASD. All participants had an Individualized Education Program (IEP), and writing/language arts goals were included on two of the students’ IEPs. The students were all male and ranged in age from 12 to 14 years old. Table 1 shows demographic information and standardized writing scores for each participant. These participants were selected for intervention due to writing deficits (e.g., mechanical and content errors) as identified by the teacher’s evaluations of student work samples.

All students in the study had a general understanding of sentence and paragraph structure. Tom and Greg often wrote run-on sentences or fragments, while Oliver more reliably wrote correctly formulated sentences. The participants could all describe the proper structure of a paragraph (i.e., topic sentence, detail sentences, concluding sentence), but none of the participants reliably followed this format in their compositions. Additionally, spelling was a concern for all participants. Prior to this study, none of the participants received instruction on formatting a persuasive essay or writing introduction and conclusion paragraphs.

All baseline, intervention, and post-intervention sessions were conducted in the students’ classroom. The school relocated during the study, and the last three sessions for all participants were conducted in the new classroom. Both classrooms were arranged in a...

<table>
<thead>
<tr>
<th>Participant</th>
<th>Age</th>
<th>Grade</th>
<th>Race</th>
<th>Writing Score*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>14</td>
<td>8</td>
<td>Caucasian</td>
<td>5.7</td>
</tr>
<tr>
<td>Oliver</td>
<td>12</td>
<td>7</td>
<td>Caucasian</td>
<td>4.7</td>
</tr>
<tr>
<td>Greg</td>
<td>13</td>
<td>8</td>
<td>Multi-Race</td>
<td>5.2</td>
</tr>
</tbody>
</table>

similar manner; each student sat at his own
desk, forming a U-shape in the center of the
classroom. Each student had ample space on
his desk for all relevant materials. In addition
to the three participants, there was one other
student in the class and one teacher. All stu-
dents attended school from 9:00 AM to 3:00
PM and received instruction in the same class-
room throughout the day. The teacher served
as the interventionist and primary data collec-
tor. The intervention was implemented indi-
vidually with each participant sitting at the
teacher’s desk with her in the back corner of
the room. While intervention was conducted
with one student, the other students in the
classroom worked independently on a variety
of teacher-assigned writing tasks. All sessions
during baseline, intervention, and post-inter-
vention conditions took place between 11:10
and 11:55 AM.

Materials
Materials included a persuasive writing
graphic organizer, a list of persuasive essay
topics, and an analytical rubric (see Table 2).
The persuasive writing graphic organizer was
developed to guide students through the plan-
ning process and was printed on two sheets of
8[1/2] by 11 inch paper. There were eight
spaces for the students to complete their plan-
ning on the persuasive writing graphic organi-
zator: a brainstorming box, boxes for three
reasons (i.e., the main paragraphs of the es-
say), a counter-argument box, an introduc-
tion box, and a conclusion box. Students were
given the choice of two topics from a list of
topics each session. The topics were ques-
tions that were applicable to the students’ lives such as, “Should students have to wear uniforms?” and “Should students be allowed to have cell phones in middle school?” The analytical rubric was a scale used to judge the quality of students’ writing throughout the study.

Definition and Measurement of Dependent
Variables
Three dependent variables were used to eval-
uate intervention effects: correct writing se-
quencies (CWS), total words written (TWW),
and analytical rubric scores. Dependent mea-
sures were defined and calculated as follows.

Correct writing sequences (CWS). CWS were
defined according to and calculated using the
AIMSweb guidelines (Powell-Smith & Shinn,
2004). The AIMSweb guidelines define a CWS
as “two adjacent writing units (words and
punctuation) that are correct within the con-
text of what is written” (Powell-Smith & Shinn,
2004, p. 11). A caret is used to mark each
correct unit of the CWS and a dash is used to
mark an incorrect writing sequence (ICWS).
AIMSweb also includes guidelines for scoring
contractions, words with reversed letters, story
titles and endings, abbreviations, hyphens,
numbers, and unusual characters. These rules
were all followed by the scorer. There were
three exceptions that the scorer created to
more accurately reflect the grammar and punctuation present in each writing sample. Specifically, where a comma was needed, but
not written, the word sequence was scored as
incorrect; when compound words were incor-
rectly split into two words, each word was con-
sidered an error; and when run-on sentences
were scored, an error was noted where the
period should have been placed as well as
after the first word in what should have been
the second sentence.

Total words written (TWW). TWW was de-
defined as the number of words written in the
student’s persuasive essay in forty minutes.
TWW were calculated by counting the num-
ber of words on each line of student writing
and summing the total for each line. Hyphen-
ated words were counted as one word (e.g.,
daughter-in-law). Words spelled incorrectly,
nonsense words, and illegible words all
counted toward TWW. Story titles and endings
(i.e., “The End”) were not counted as part of
TWW or CWS.

Rubric score. The essays were scored with
an analytical rubric adapted from Alber-Mor-
gan (2010) designed to objectively measure
content and mechanical accuracy (See Table
2). The rubric consisted of six categories in-
cluding introduction, organization, main
ideas and details, sentences, transitions, and
conclusion. Each category was rated on a
5-point scale with each scale increment oper-
tionally defined to distinguish along a con-
tinuum of few elements (1 point) to all cate-
gorical elements addressed (5 points).
### Analytical Rubric

<table>
<thead>
<tr>
<th>Skill</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>First paragraph has an effective attention grabber, strong transition to thesis statement, clear thesis statement that presents main ideas that will be discussed in the essay.</td>
<td>First paragraph has an effective attention grabber, a clear attempt at a transition to thesis statement, thesis statement that presents main ideas that will be discussed in the essay.</td>
<td>First paragraph has a somewhat effective attention grabber, an attempt at a transition to thesis statement, thesis statement that presents some of the main ideas that will be discussed in the essay.</td>
<td>An attention grabber is attempted but lacks clarity. No attempt is made at a transition to thesis statement, thesis statement presents some of the main ideas that will be presented in the essay.</td>
<td>No attention grabber, incoherent or non-existent thesis statement, and no mention of main ideas that will be presented.</td>
</tr>
<tr>
<td><strong>Organization</strong></td>
<td>Essay is presented in logical order with the presentation of arguments in order of most to least important, including a clear counter-argument with refuting evidence.</td>
<td>Essay presents each argument clearly, but not in the correct sequence. The essay also includes an attempt at a counter-argument, but without clear refuting evidence.</td>
<td>Essay presents each argument with some clarity, but not in the correct sequence. The essay includes an attempt at a counter-argument, but is not clearly stated and lacks refuting evidence.</td>
<td>Essay lacks overall organization. Arguments are presented randomly. The essay includes some evidence of a counter-argument.</td>
<td>No organization detected, arguments are unclear, reads like free association. The essay does not include a counter-argument.</td>
</tr>
<tr>
<td><strong>Main ideas and details</strong></td>
<td>Main ideas are clearly stated and supported by at least three supporting details that are either factual or logical.</td>
<td>Main ideas are stated and supported by three supporting details. Some details may not be factual, logical, or supportive of the main idea.</td>
<td>Main ideas are stated and supported by less than three supporting details. Some details may not be factual or supportive of the main idea.</td>
<td>Main ideas are stated, but no supporting details are provided.</td>
<td>Main ideas are unclear.</td>
</tr>
<tr>
<td><strong>Sentences</strong></td>
<td>Interesting sentences, strong statements, and advanced sentence variation.</td>
<td>Sentences are complete, and show some variation of structure. There is at least one example of a complex or compound sentence.</td>
<td>Most sentences are complete and there is at least one example of a complex or compound sentence.</td>
<td>Sentences show little or no variation. Some sentences are incomplete or incoherent.</td>
<td>Most sentences are incomplete or incoherent.</td>
</tr>
<tr>
<td><strong>Transitions</strong></td>
<td>A variety of thoughtful transitions are used. There is a transition to begin each paragraph after the introduction. The transitions clearly show how ideas are connected.</td>
<td>Transitions show how ideas are connected, but there is little variety.</td>
<td>Transitions are present at the beginning of 3 or fewer paragraphs. Most transitions are effective, but some connections between ideas are unclear.</td>
<td>Some transitions are effective, but most connections between ideas are unclear.</td>
<td>The transitions between ideas are unclear OR nonexistent.</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td>Thesis statement is restated and reasons are clearly and persuasively outlined. The conclusion culminates in a strong clear statement of the author’s viewpoint.</td>
<td>Thesis statement is restated and reasons are outlined. The conclusion culminates in a statement of the author’s viewpoint.</td>
<td>The opinion is restated and reasons are mentioned, but lack clarity.</td>
<td>A conclusion is attempted, but the thesis statement and reasons are unclear or missing.</td>
<td>No conclusion is provided.</td>
</tr>
</tbody>
</table>
Inter-Observer Agreement

A second trained observer collected data on student writing samples for 37% of sessions across all baseline and post-intervention conditions. IOA for each measure was calculated by dividing the lower number scored by the higher number and multiplying by 100 to yield a percentage that was then averaged across measures for each participant. Mean agreement for CWS was 84% for Greg, 94% for Tom, and 90% for Oliver. Mean agreement for TWW was 97% for Tom, 97% for Greg, and 98% for Oliver. Mean agreement for rubric score was 87% for Greg, 94% for Tom, and 83% for Oliver.

Procedural Integrity

Baseline, intervention, and post-intervention sessions were audio recorded in order to assess the integrity with which the teacher implemented the intervention. Procedural fidelity was measured by an independent observer using checklists that task analyzed each step of the baseline, graphic organizer training (i.e., intervention), and post-intervention procedures. The baseline and post-intervention procedures each consisted of 17 procedural steps and the intervention training consisted of 22 steps. The observer checked off each step that was accurately followed while listening to a recording of the session. Procedural fidelity was calculated for 34% of sessions, and procedures were implemented with 100% fidelity across conditions.

Social Validity

Following completion of the study, parents and students were asked to complete a survey via paper-and-pencil. A Likert-type scale was used to assess the degree of satisfaction with and perceived efficacy of the intervention. Each student took home a parent survey along with a post-intervention sample of his writing. Written directions instructed parents to read and evaluate the writing sample by responding to survey questions related to the goals of the intervention (i.e., effective writing of attention grabbers, transitions, arguments, counter-arguments, main ideas, and supporting details).

Experimental Design

A multiple baseline across participants design was used to evaluate the effects of the graphic organizer intervention on student writing. The experimental conditions were baseline and post-intervention. Prior to collecting post-intervention data, the students were provided with three training sessions on using graphic organizers to write persuasive essays.

Procedure

Baseline. Baseline sessions alternated between the planning stage and the writing stage. The planning stage was conducted during the first baseline session and every odd-numbered baseline session thereafter. The writing stage was conducted during the second baseline session and every even-numbered baseline session thereafter. During the planning stage, the teacher presented the participants with two persuasive essay topics (e.g., “Should kids have homework?” or “Should students be required to wear uniforms?”). The participants were then told to select their topic and were allotted 40-min to write planning notes. During the writing stage, the teacher gave the planning notes back to the participants and instructed them to do their best to write six paragraphs in 40-min. The teacher did not provide any further guidance and responded to student questions with, “Do your best.”

Graphic organizer training. Graphic organizer training was conducted with each participant individually, and it consisted of three, 40-min sessions. During the first intervention session, the student and teacher read a model essay together with the teacher pointing out and defining important persuasive components of the writing (e.g., attention grabber, thesis statement, counter-argument). The teacher then introduced the graphic orga-
nizer and briefly explained each component. She modeled how to write an essay using the graphic organizer to outline the structure. The teacher demonstrated changing phrases into full sentences, and the student helped with providing supporting details and examples.

On the second day of intervention, she demonstrated how to use the graphic organizer to plan and write a persuasive essay. Then, the teacher provided the student guided practice with the steps. First, the student was given two topic questions to choose from and told to record the questions in the planning box of the graphic organizer. Next the teacher told the student to write a “yes” or “no” response to each question and to brainstorm a list of reasons supporting each response. Once the student had written all of the supporting reasons he could think of, he was instructed to choose the response with the strongest or most supporting reasons as the topic for his essay. The teacher then prompted the student to fill-in a topic phrase and at least three supporting phrases in each of the three reason boxes, the counter-argument box, and lastly, the introduction and conclusion boxes. In the final step of completing the graphic organizer, the teacher helped the student fill out the introduction and conclusion boxes, as well as to add transitions to the graphic organizer. The intervention also included a brief, 5-min lesson during the graphic organizer training on the use of transitions. The mini-lesson was embedded as the last step of the guided practice with the graphic organizer. The teacher provided explicit instruction on transitional terms and phrases and guided practice for the students with revising their essays to include transitions.

The teacher guided the student through the writing of the persuasive essay during the last day of intervention. Before the student began to write, the teacher reminded him to skip lines, indent each paragraph, include transitions, and write the essay one paragraph at a time. As the student wrote the essay, the teacher monitored his performance and provided feedback, prompting the student to refer to the graphic organizer and make corrections when needed.

**Post-intervention.** Post-training sessions were conducted across two days. On the first day of each session, the student was given a blank graphic organizer and told to write a persuasive essay on one of the two questions listed on the board. The student was given 40 min to plan his essay using the graphic organizer. On the second day, the student was given 40 min to write his persuasive essay using the completed graphic organizer. Data on student writing were collected in a manner identical to that described in the baseline condition.

**Results**

**Correct writing sequences.** The results for CWS for each student are depicted in Figure 1, and Table 3 shows mean CWS scores across conditions. During baseline, Tom’s CWS showed a decreasing trend, ranging from 80 to 148 with a mean of 104. There was an immediate increasing trend following the graphic organizer training, then a slight decrease and second increasing trend. CWS during post-intervention ranged from 87 to 167 with a mean of 121. During baseline, Greg’s CWS was low and fairly stable, ranging from 63 to 125 with a mean of 89. There was an immediate change in level with an increasing trend during the first three post-intervention sessions, followed by a slight decrease then increase in CWS. During post-intervention, Greg’s CWS ranged from 100 to 206 with a mean of 150. Oliver’s CWS ranged from 130 to 212 with a mean 157 with a decreasing trend during baseline. Following graphic organizer training, Oliver’s CWS immediately increased and then decreased, yet maintained higher CWS on average than during baseline. During post-intervention, CWS ranged from 195 to 276 with a mean of 225.

**Effects of Graphic Organizer Training on TWW**

Figure 2 shows the results for TWW for each student, and Table 3 displays means across conditions for each student. During baseline, Tom’s TWW was stable, ranging from 117 to 141 with a mean of 121. There was an increasing trend across the first three post-intervention sessions, followed by some variability. Tom’s TWW ranged from 111 to 221 with a mean of 139 during post-intervention. During
Figure 1. Correct word sequences (CWS) across students.
baseline, Greg’s TWW was variable, ranging from 71 to 165 with a mean of 111. There was an immediate change in level during the first three post-intervention sessions, followed by a decrease. Post-intervention TWW ranged from 125 to 218 with a mean of 179. During baseline, Oliver’s TWW had a slow but steady decreasing trend. TWW ranged from 124 to 266 with a mean of 159 during baseline. Immediately following intervention, there was an increase in level with some variability. Oliver’s TWW post-intervention ranged from 183 to 247 with a mean of 216.

Rubric Score

Figure 3 shows results for rubric scores across conditions, and Table 3 shows means across conditions. Tom’s rubric scores were fairly low and stable during baseline, ranging from 8 to 11 with a mean of 9.75. There was an immediate increase in level followed by a steady, increasing trend during post-intervention. Tom’s rubric scores ranged from 15 to 22 with a mean of 18 during post-intervention. During baseline, Greg’s rubric scores were low and stable, ranging from 6 to 10 with a mean of 8.42. There was an immediate increase in level that remained fairly stable during post-intervention. Greg’s post-intervention rubric scores ranged from 20 to 23 with a mean of 21.6. During baseline, Oliver’s rubric scores were consistently low, ranging from 8 to 14 with a mean of 11.55. Oliver’s rubric scores immediately increased following intervention, and remained improved. Across post-intervention sessions, Oliver’s rubric scores ranged from 23 to 24 with a mean of 23.67.

Social Validity Questionnaires

Participant responses on social validity questionnaires were fairly consistent across questions. Two students strongly agreed or agreed, and one student was neutral or in disagreement with most items (e.g., confidence in ability to persuade through writing, transition effectively, provide counter-arguments, and write conclusions, and in the graphic organizer’s ease of use, utility in improving their writing skills, and probability of continued use). Additionally, two students reported that learning to use the graphic organizer made the writing process more enjoyable and that they planned to use it for other types of writing.

Parent responses on social validity questionnaires were generally positive, one parent strongly agreed and two parents agreed that the introduction caught their attention and stated the main idea. Two parents also strongly agreed that the essay presented the argument clearly and provided a counter-argument while one parent disagreed. One parent strongly agreed while two parents agreed that there are clear main ideas with supporting details. All parents agreed that the essay included interesting sentences, strong statements, and varied sentence structure while two parents strongly agreed and one parent agreed that the essay included thoughtful transitions in each paragraph and that the paper flowed well.

Discussion

The study supports the research on graphic organizer training for children with ASD (e.g., Knight et al., 2013; Zakas et al., 2013) and extends those findings to middle school stu-
Figure 2. Total words written (TWW) across students.
Figure 3. Rubric scores across students.
dents with ASD learning written expression. Results of this study demonstrated evidence of a functional relationship of graphic organizer training on improved persuasive writing. After graphic organizer training, all three participants showed immediate improvements on all three writing measures (e.g., CWS, TWW, rubric score). The clearest demonstration of improvement was evidenced by the differences in rubric scores between baseline and post-intervention. All three participants showed substantial increases on their rubric scores on the first post-training session and continued this level of improvement throughout the duration of the study. Improvements on individual categories of the rubric varied across participants. However, all participants showed significant improvement in the introduction and conclusion categories of the rubric. The least amount of improvement for all three students was the sentences category of the rubric. This is not a surprising outcome considering that there was no instruction on sentence structure or variation.

For CWS and TWW, the data patterns were similar for all three participants. In general, there was an immediate increase in CWS and TWW during the first few post-intervention sessions, followed by variable responding and overlapping data (with baseline) throughout the remaining post-intervention sessions. Overall, mean CWS and TWW scores were higher during post intervention than in baseline; however evidence of a functional relationship is weaker for these measures when compared to the rubric scores. Considering that the rubric scores remained high even when TWW was lower on those corresponding sessions may indicate that the students learned to write higher quality essays without necessarily having to increase the number of words they wrote.

Since the number of CWS is directly related to the total number of words written, it is not surprising that these two variables showed similar patterns. With regard to CWS, which is mostly a measure of writing mechanics (e.g., spelling, punctuation), it is interesting that the participants showed some improvement despite the fact that this intervention did not include instruction in writing mechanics. Since all three students had difficulties with spelling, their CWS scores may have shown greater improvement if there was an additional component of the intervention to address spelling.

Although all three students showed improvement in their persuasive writing, their opinions about the intervention and their own writing improvements were mixed. Their parents, however, all indicated “strongly agree” or “agree” on almost all of the quality indicators of writing when examining their child’s post-intervention essay. The social validity assessment for parents would have been strengthened by providing the parents with two essays, one from the baseline condition and one from the post intervention condition, and then asking them to provide an opinion on the extent to which their child’s writing improved. This would provide additional useful information regarding the social validity of the intervention.

Limitations and Future Research

Despite successful outcomes of the current study, there are several limitations that should be addressed in future research. First, due to time constraints, the writing sessions were conducted across two days. It would have been preferable for the students to complete their graphic organizers and then write their essays on the same day; however, adequate time for both aspects (i.e., planning and writing) could not be allotted in one day. When possible, the sessions were conducted across two consecutive days, but there were instances when this was not possible (e.g., weekends, student absences). Future research should examine to what extent a delay between planning and writing influences the intervention’s effectiveness, or whether the sessions could be shortened to yield successful results more efficiently.

Another limitation of the present study was the use of a multiple baseline experimental design. Continued exposure to baseline conditions is not desirable in many educational settings, and it may have fatigued the students. Also, it required implementation of the intervention with each student individually, which may not be practical for teachers in classrooms with more students. It is unclear whether the intervention would be equally effective if implemented with a whole class, or
whether the individualized direct instruction was an essential feature of the intervention. Future research should examine whether the intervention is suitable for class-wide implementation and employ an alternative experimental design.

It should also be noted that the graphic organizer intervention was a treatment package that included explicit instruction on a variety of skills (e.g., using transitions, making arguments with counterarguments and supporting details, using graphic organizers). The effects of individual components are unknown as these variables were not studied in isolation. It is unclear whether all elements are necessary in order for the intervention to be effective, and it is possible that a more parsimonious approach would suffice. Future researchers should conduct component analyses to determine the essential features of the treatment package.

Additionally, IOA on the CWS and rubric measures was lower than on TWW. This discrepancy may have resulted from handwriting idiosyncrasies (e.g., inappropriate capitalization, irregular spacing between words, general illegibility). Teachers implementing this procedure in the future may have students complete writing assignments using computer software to eliminate disagreement in interpretation of the writing. Regarding lower levels of agreement on the rubric scores, it is possible that the raters’ amount of experience in grading student writing influenced their scoring. Specifically, the first observer had teaching experience and was familiar with the students’ writing; in contrast, the second observer had never taught or graded the writing of elementary students. Although the second observer was thoroughly trained in the scoring procedures, it is possible that the differences in their prior experience contributed to the differences in scoring decisions. Future researchers are encouraged to operationalize rubric criteria and provide comprehensive training and ample practice in order to minimize threats to reliability.

Lastly, limitations concerning generalization and maintenance should be discussed and ultimately addressed in future research. For example, although this study supports previous graphic organizer research, the extent to which the findings can be generalized to other populations or environments as well as other types of writing is limited. More specifically, the students were only using graphic organizers to produce persuasive essays, and there was no measure of generalization for different types of writing. Future research should attempt to assess generalization of the writing package to different kinds of written expression such as narrative or expository. In addition, the effects of this intervention with different populations and different age groups should be examined. Furthermore, end-of-year time constraints precluded the collection of maintenance data. It is unclear whether the students would have continued using the graphic organizers, or whether their improved CWS, TWW, and rubric scores would have maintained. Future researchers should examine the durability of intervention effects.

Implications for Practitioners

This study demonstrated the efficacy of using a graphic organizer training package to teach persuasive writing skills. Teachers should use the graphic organizer as a tool for students whose written compositions typically lack focus and for those students who have difficulty initiating the writing process. The graphic organizer prompts the writer to adhere to a structure emphasizing main ideas and to begin the writing process with a brainstorming and planning stage. These functions can be particularly helpful for writers with ASD, because they commonly struggle with writing coherently and getting started (Goldstein et al., 2011).

Practitioners should keep in mind that graphic organizers are tools to supplement instruction, but they are not a substitute for instruction. When teaching students to write persuasive essays, teachers should demonstrate completing the graphic organizer and model how to use it to write an essay. This demonstration should be followed by guided practice during which the teacher and students work together to complete the graphic organizer and compose an essay. This stage of instruction allows the teacher to provide immediate affirmative and corrective feedback as the students take an active role in the planning and writing process. After guided prac-
tice, students should engage in independent practice with the teacher actively monitoring performance—using measures such as CWS, TWW, and rubrics—and providing individualized, specific feedback. In order to support generalization of planning skills to situations in which a graphic organizer is not available, teachers should consider using a fading procedure with the tool. Teachers can set mastery criteria for rubric scores and, once achieved, they can begin to fade elements of the graphic organizer until the students are planning their essays on blank sheets of paper. Further, a variety of graphic organizers are available for all writing genres and all grade levels, and teachers are encouraged to utilize these to facilitate generalization of planning skills.

References


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