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The Impact of Explicit Timing, Immediate Feedback, and Positive Reinforcement on the Writing Outcomes of Academically and Behaviorally Struggling Fifth-Grade Students

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The purpose of this study was to analyze the effects of a multicomponent intervention on the length and quality of stories written by fifth graders who were academically and behaviorally struggling with particular problems during writing demands. Difficulties in text production are often prevalent at the beginning of middle/secondary education as students transition from elementary school. These writing problems need to be addressed to avoid negative long-term consequences in school and everyday life. The intervention in this study included explicit timing, immediate feedback (through a self-scoring procedure), and positive reinforcement (through verbal praise as well as display of high scores and use of charts to illustrate learning progress). Four fifth graders with learning and behavioral difficulties participated in the study. A functional relationship between the treatment and the outcomes (story length and quality) was established using an AB multiple-baseline-across-subjects design with repeated measures in follow-up. These findings and their implications are discussed in the context of improving the writing performance of academically and behaviorally struggling students.

Keywords: **Learning Difficulties, Behavioral Challenges, Writing Problems, Single-Case Design, Explicit Timing, Immediate Feedback, Positive Reinforcement.**

Introduction

Schools in most parts of the world are becoming more diverse than ever before. In countries complying with the United Nations' Convention on the Rights of Persons with Disabilities (CRPD), children and youth with special needs are increasingly being taught alongside their non-labeled peers. Further, greater numbers of "at-risk" students are entering general education classrooms (Alexiadou et al., 2016; Gavish & Shomoni, 2011).

Having to attend to the needs of heterogeneous groups of learners poses major challenges for teachers. A one-size-fit-all approach does not work. Edu-

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cators have to tailor their content and instruction to the personality and skill level of each individual child or youth in their classrooms (Brownell, Smith, Crockett, & Griffin, 2012; Häßler, Burgert, Fegert, & Chodan, 2015; Mitchell, 2014). This need to develop "custom-fit" approaches for a great number of different learners can feel overwhelming to teachers. Indeed, many of them feel overburdened and unprepared to properly meet the needs of their students (Pearce, Gray, & Campbell-Evans, 2010).

Over the past decade, the topic of fostering self-efficacy in practitioners working in inclusive settings has received much attention in the scholarly literature (e.g., Dias & Cadime, 2016; Orakci, Aktan, Toraman, & Çevik, 2016; Sharma & Nuttal, 2016). Developing confidence about one's teaching skills is important. However, focusing on the beliefs about personal capabilities to reach every student in every classroom is not enough. Cognitive knowledge and practical skills are also necessary to provide the needed services (Loreman, Sharma, & Forin, 2013). This applies especially to implementation of interventions that are evidence-based, and at the same time socially valid, easy to implement, and suitable for reaching the individual needs of learners who are unmotivated, inattentive, and academically challenged (Mitchell, 2014).

One area of learning that seems to be especially daunting for both students and teachers is composition writing. Many children and youth, especially those at risk for disability or those who have language-acquisition problems have difficulties putting their thoughts and ideas on paper. Writing is a complex and difficult language-based activity and, as a result, struggling students may display off-task behaviors and engage in escape and problem avoidance, further contributing to their challenges in developing the writing skills needed to succeed in school and adult life (Burke, Hagan-Burke, & Sugai, 2003).

Fortunately, research provide some guidance for teachers faced with the task of teaching various academic skills to diverse and struggling students. Thus, the number of meta-analyses on the efficacy of interventions for academically and behaviorally challenged children and youth has reached a sufficient size to make solid recommendations for practitioners (e.g. Berkeley, Scruggs, & Mastropieri, 2010; Bowman-Perrott, Burke, Zhang, & Zaini, 2014; Forness, 2001; Forness, Kavale, Blum, & Lloyd, 1997; Gersten et al., 2009; Kaldenberg.; Watt, & Therrien, 2015; Kroesbergen & van Luit, 2003; Perelmutter, McGregor, & Gordon, 2017; Swanson & Hoskyn, 1998). According to the general body of findings, to be effective, approaches geared towards teaching basic school-relevant abilities (reading, spelling, math, …) to these students need to include demonstration, controlled practice with prompts and feedback, as well as intense independent practice. However, putting these principles into action (e.g., through a manualized direct instruction program) can be very time-consuming

and not feasible for teachers having to juggle an inclusive classroom full of very diverse learners.

Thus, there has been a heightened interest among professionals working with large and heterogeneous groups of students in simple and easy-to-implement tools that can be used to provide effective and individualized support to all students. Strategies that have been found to be particularly effective include explicit timing, immediate feedback (through self-scoring), and positive reinforcement (through verbal praise as well as display of high scores and use of charts to illustrate the learning progress) (e.g. Leko, 2016; Mercer, Mercer, & Pullen, 2011; Mitchell, 2014; Prater, 2018).

Explicit timing is a procedure that alerts students to a time limit while they are completing an assignment (Rhymer, Skinner, Jackson, McNeill, Smith, & Jackson, 2002). *Immediate feedback through self-scoring*, in turn, involves students in self-monitoring their performance on classroom achievement tests and recording the outcomes (Light, McKeachie, & Lin, 1988). Finally, *positive reinforcement* is a process whereby a stimulus (e.g., verbal praise or displayed high scores) increases the probability that a given behavior (e.g., composing a well-written essay) will occur (Feist, Feist, & Roberts, 2017).

These three instructional components have proven effective for enhancing student performance across a variety of academic outcome measures. For example, Duhon, House, Hastings, Poncy, and Solomon (2015) found that explicit timing, coupled with immediate delivery of accuracy feedback, improved the mathematics fluency of academically struggling second graders. In a more recent study, Grays, Rhymer, and Swartmiller (2017) confirmed these findings with fourth and fifth graders. Specifically, explicit timing helped increase the number of correct digits on a mathematics assessment test.

Frequent feedback through curriculum-based assessment (CBA) has also been found to be very helpful in enhancing performance (Stecker, Fuchs, & Fuchs, 2005). CBA is a standardized and systematic method of formative evaluation for measuring student outcomes by frequently and regularly administering mastery probes selected from the academic material being taught (Burns & Parker, 2014). Further, providing students with a visual display that illustrates their improvements can intensify the effects of feedback (Hattie, 2012). Feedback can be given by a variety of sources, including the teacher (e.g., Voerman, Meijer, Korthagen, Simons, & Robert, 2015), peers (e.g., Schuster, Morse, Griffen, & Wolery, 1996), or through self-monitoring by the student (e. g., Wells, Sheehey, & Sheehey, 2017). Self-scoring seems to be especially useful for implementing monitoring in a way that is relatively uncomplicated and trouble-free for teachers (Light, McKeachie, & Lin, 1988).

Finally, the effectiveness of positive reinforcement is well established (especially in the form of verbal praise). Thus, a large number of studies have documented the benefits of systematically offering desirable consequences for improvements in major academic subjects such as reading (e.g., Billingsley, 1977; Dolezal, Weber, Evavold, Wylie, & McLaughlin, 2007), spelling (e.g., Quick, 1972; Winterling, 1990), and math (e.g., Ross, 1991; Rumberger, 2013).

Purpose and Research Question

The purpose of this study was to determine the effectiveness of a multicomponent writing intervention consisting of explicit timing, immediate feedback, and positive reinforcement on the length and quality of texts written by secondary students, who were academically and behaviorally challenged. Interventions based on explicit timing, immediate feedback, and positive reinforcement have proven to be beneficial in teaching reading, spelling, and math (Clark & Rhymer, 2003; Haydon & Kroeger, 2016; Martin-Chang, 2016; Lawley, 2016; Rhymer et al., 2002; Wells et al., 2017). However, the effects of these instructional variables on writing have only been examined in a few, now dated, studies (see below).This is unfortunate, because the ability to put one's thoughts on paper is equally vital for success in school and in most professional careers (Troia, 2010).

As students progress from elementary to middle and high school, they are expected to move from learning the mechanics of writing to using writing as a method of expressing themselves and synthesizing content (Grünke & Leonard Zabel, 2015). By the time students reach secondary school, they should be able to compose meaningful texts in the form of narratives. Because writing is such a complex task, children and youth with learning and behavioral challenges are at great risk for not acquiring sufficient text production skills to be successful in their academic and occupational careers.

In the 1970s, Van Houten and his colleagues conducted two single-case analyses and a class-based study on the effects on text length and quality of a performance feedback system that included explicit timing, immediate feedback, and positive reinforcement (Van Houten & McKillop, 1977; Van Houten, Hill, & Parsons, 1976; Van Houten, Morrison, Jarvis, & McDonald, 1974). The experiments were rather diverse in terms of the age of the participants, including 10th and 11th grade (Van Houten & McKillop, 1977), fourth grade (Van Houten et al., 1976), and second and fifth grade (Van Houten et al., 1974).

The present study aimed at replicating the research by Van Houten et al. (1974). Specifically, it examined the effects of a multicomponent intervention consisting of explicit timing, immediate feedback, and positive reinforcement on the writing outcomes of four fifth-grade students with academic and behavioral challenges who were having special difficulty with writing tasks. We

decided to replicate this particular experiment with this particular age group, because making sure that students have mastered the skill of writing simple narratives of an acceptable quality at the beginning of their secondary education is vital for their further academic progress (Grünke & Leonard Zabel, 2015).

Method

Setting and Participants

The school participating in this study was an inclusive comprehensive school located in a midsized town in Northrhine-Westfalia (Germany), with an enrollment of approximately 1,100 students in grades 5 to 13. Initially, a teacher of one of the fifth-grade classes approached the first author in hopes of getting suggestions for how to inspire what she referred to as "unmotivated" students to become more proficient writers and compose longer and better essays.

To select participants, the whole class was provided an untimed CBA writing prompt ("Please compose a story about a funny incident that happened in school"). The range of words written was 62 to 425, and the writing duration was 5 to 20 minutes. Four children were selected who produced the shortest texts. According to their classroom teacher, they demonstrated sufficient reading and spelling skills, but were usually reluctant to engage in writing. All four spoke German fluently, but struggled in school in various ways. Specifically, they demonstrated severe difficulty with most of the cognitive skills in grade 5; they performed below their classmates in tasks that required sustained attention, short-term memory, sequential operations, and organizational ability; and their grades in the core subjects of language arts, math, and science were in the "D" range.

The first student, Emre (all names were changed to maintain anonymity), was a 10-year-old male of Turkish decent. According to his classroom teacher, he had attentional problems making it extremely difficult for him to concentrate and stay focused. During the initial writing task before the start of the study, he produced 62 words. The second participant, Felix, was also 10 years old but did not come from an immigrant background. His classroom teacher described him as easily distractible. His CBA writing assessment consisted of 83 words. Greta, the third participant, was a 10-year-old female student whose parents were from Italy. Her classroom teacher described her as a daydreamer, often late for class, and slow to learn new concepts. The text that Greta produced for the CBA contained 62 words. Finally, the fourth participant, Semra, was an 11-year-old female, the daughter of Turkish immigrants. According to her classroom teacher, she had trouble learning new information, completing difficult work, and following directions. In the initial writing prompt, she produced a narrative of 82 words.

Experimental Design

The multicomponent treatment described under *Intervention* below was evaluated using an AB multiple-baseline-across-participants design with repeated measures with follow-up probes (Kazdin, 2016). In total, the baseline and intervention phases lasted for two weeks of school (10 weekdays), followed by three consecutive days for the maintenance phase.

The beginning of the treatment was determined randomly within the constraint that both the baseline and the intervention phases had to consist of at least three probes each. Thus, the intervention could have commenced after the 3rd, 4th, 5th, 6th, or 7th measuring point. According to Tate et al. (2016), randomization of phase starting points is an important feature of single-case research, because it provides control of potential confounders related to time (history and maturation). Due to randomization of the treatment starting points, the training of Emre was launched after the 7th baseline probe, Felix, after the 5th, and for both Greta and Semra, after the 3rd.

Dependent Variables

Total Words Written (TWW). The number of total words written (TWW) by the students in response to different prompts was used as a quantitative measure. TWW is a valid and reliable method of assessing writing performance (Hosp, Hosp, & Howell, 2016). Texts are scored by simply counting the total number of recognizable words excluding digits.

The writing prompts consisted of a list of 45 terms intended to encourage participants' creativity (e.g., *vacation, pirates, Halloween*). The essays were blindly transcribed into typewritten Microsoft® Word documents by two college student assistants, correcting for orthography to prevent scorer bias based on appearance of handwriting and spelling skills. The transcribers were not aware of which text was written by whom at what time. Any ambiguities were discussed concerning the meaning of words that were difficult to decipher until consensus was reached. The final number of TWW was determined for each essay by using the word count function in Microsoft® Word.

Teacher Evaluation of Story Elements (TESE). We used the Teacher Evaluation of Story Elements (TESE; Troia & Graham, 2002) to capture the quality of the essays. This instrument includes five categories that refer to different criteria of a story (setting, a problem, actions, consequences of the actions, and character emotions). Each of them is rated on a scale from 1 to 5, with 1 designating the lowest quality and 5, the highest quality. If a certain category was not addressed at all, no points were awarded. Thus, the overall ratings could vary from 0 to 25.

Scoring. A trained rater, who was blind to the origin of the stories, scored the dependent measures administered. Another rater graded a random sample of 20% of all stories independently. For these texts, each of them

summed up the individual student's essay scores to obtain a total score. Following interrater guidelines (Richard, Taylor, & Ramasamy, 2013), the smaller total score was divided by the larger total score and multiplied to by 100. Using this method, the interrater reliability on essays ranged from 70.59% to 100%, with an average of 88.40%.

Procedures

Baseline. The four participants worked independently under the supervision of a graduate college student at their seats, while the rest of the students in the class engaged in quiet reading activities. Subjects were provided with paper and different-colored pencils. They were asked to randomly draw from a tin can three slips of paper on which the writing prompts were printed (see above). From the three options, participants got to choose one to write a story around. (No topic was allowed to be drawn twice by the same person.) The students were given a plastic folder in which to keep their stories.

During the baseline phase, there was no time limit on the assignment, and students did not receive any further instructions. They completed each task in 2-12 minutes. They received no feedback on their texts.

Intervention. The procedures during this phase were similar to those for the baseline. However, at the beginning of the intervention phase, the participants were told that from now on, all writing tasks would be timed using a time timer and limited to exactly 10 minutes. Further, before each intervention session, we presented the children with a chart, illustrating the number of words they had produced during previous assignments. Their highest level to date was prominently displayed on a 4x6 inch colored card that was inserted into a transparent pocket of the cover page of their plastic folder. At the beginning of each writing task, participants were strongly encouraged to try to beat their own highest score during the upcoming ten minutes.

After the 10-minute writing time was over, the participants were asked to take a pencil (of a color different from the one they had used to produce their stories) and count their words line by line, sum up the results, and enter the total on the top of their paper. The participant's count was compared for accuracy with the college student's count. In all cases, the level of agreement equaled at least 90% (for the charts and for high score displays on the plastic folders, we used the results that the college student determined). Thus, the children were able to accurately determine their performance.

In addition, the college student praised the participants for their effort and – if applicable – for any increases in the number of TWW. The verbal feedback also included an internal attribution (e.g., "I noticed that you tried really hard today and it paid off – you beat your own record"). If a child did not demonstrate any improvements or did not eagerly engage in the task, feedback contained a variable attribution (e.g., "You did not score as high as yesterday,

but still did pretty good. Let us give it another try tomorrow," or "You did not work quite as hard as usual. Next time will be better") (Chinn, 2010). In case the participants beat their personal high score, the college student hanged the card on the folder for the following day, now displaying the new high score.

Maintenance. During the maintenance phase, the same procedures were applied as during the baseline phase: Students were given writing assignments; they had no time limits and did not receive any feedback. They finished their tasks after 4 to 11 minutes.

Results

Descriptive Analysis

The multiple-baseline-across-subjects TWW and TESE results for the four participants are found in Tables 1 and 2, as well as in Figures 1 and 2.

As illustrated, during baseline, the mean number of TWW for the four subjects was 44.68, 63.40, 65.00, and 69.33, respectively. This total increased with the introduction of the performance feedback system (timing, self-scoring, and positive reinforcement) to 90.67, 113.60, 100.43, and 110.86, respectively. Thus, the students wrote on average 2.02, 1.79, 1.55, and 1.60 times more words during the intervention than during the baseline phase. In the maintenance condition, TWW dropped to 66.67, 85.67, 75.00, and 86.33. However, these mean scores were still higher than those of the baseline phase.

During baseline, prior to the introduction of the performance feedback system, the average TESE scores for the four students, were 5.57, 11.20, 6.00, and 8.67, respectively. Upon the onset of the intervention, their scores increased to an average of 13.33, 16.20, 10.14, and 13.43. During the maintenance phase conditions, they dropped to an average of 7.33, 11.00, 7.00, and 9.67. As Figures 1 and 2 illustrate, all children seemed to have benefited from the performance feedback system.

Table 1. **TWW Scores for Each Participant**

		Baseline (A)	Intervention (B)	Maintenance (C)
Emre	*N* (Probes)	7	3	3
	M	44.86	90.67	66.67
	Range	7-64	71-106	45-90
Felix	*N* (Probes)	5	5	3
	M	63.40	113.60	85.67
	Range	41-83	85-126	74-92
Greta	*N* (Probes	3	7	3
	M	65.00	100.43	75.00
	Range	52-74	84-137	70-106
Semra	*N* (Probes)	3	7	3
	M	69.33	110.86	86.33
	Range	43-83	100-127	70-109

Table 2. **TESE Scores for Each Participant**

		Baseline (A)	Intervention (B)	Maintenance (C)
Emre	*N* (Probes)	7	3	3
	M	5.57	13.33	7.33
	Range	1-10	12-15	6-9
Felix	*N* (Probes)	5	5	3
	M	11.20	16.20	11.00
	Range	8-15	14-19	9-13
Greta	*N* (Probes	3	7	3
	M	6.00	10.14	7.00
	Range	4-8	5-13	6-9
Semra	*N* (Probes)	3	7	3
	M	8.67	13.43	9.67
	Range	6-12	10-17	9-11

Figure 1. TWW in the baseline, intervention, and maintenance phase by student.

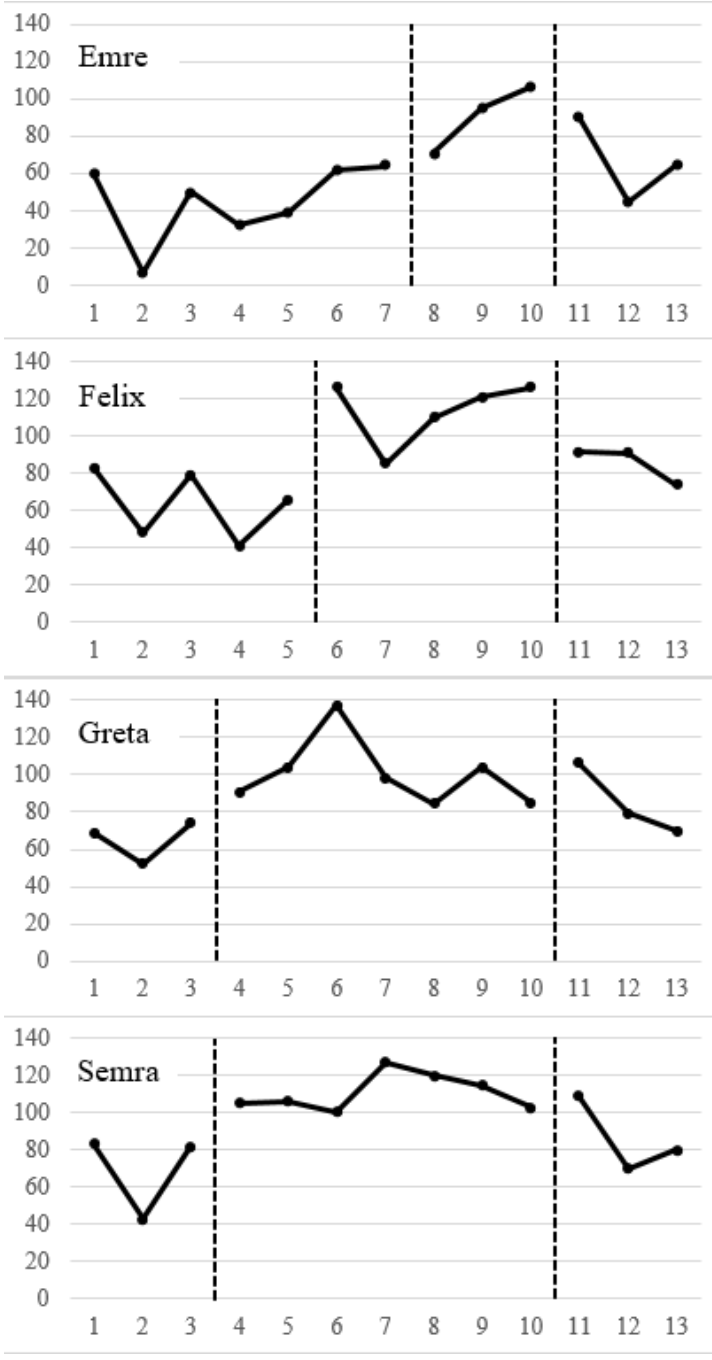
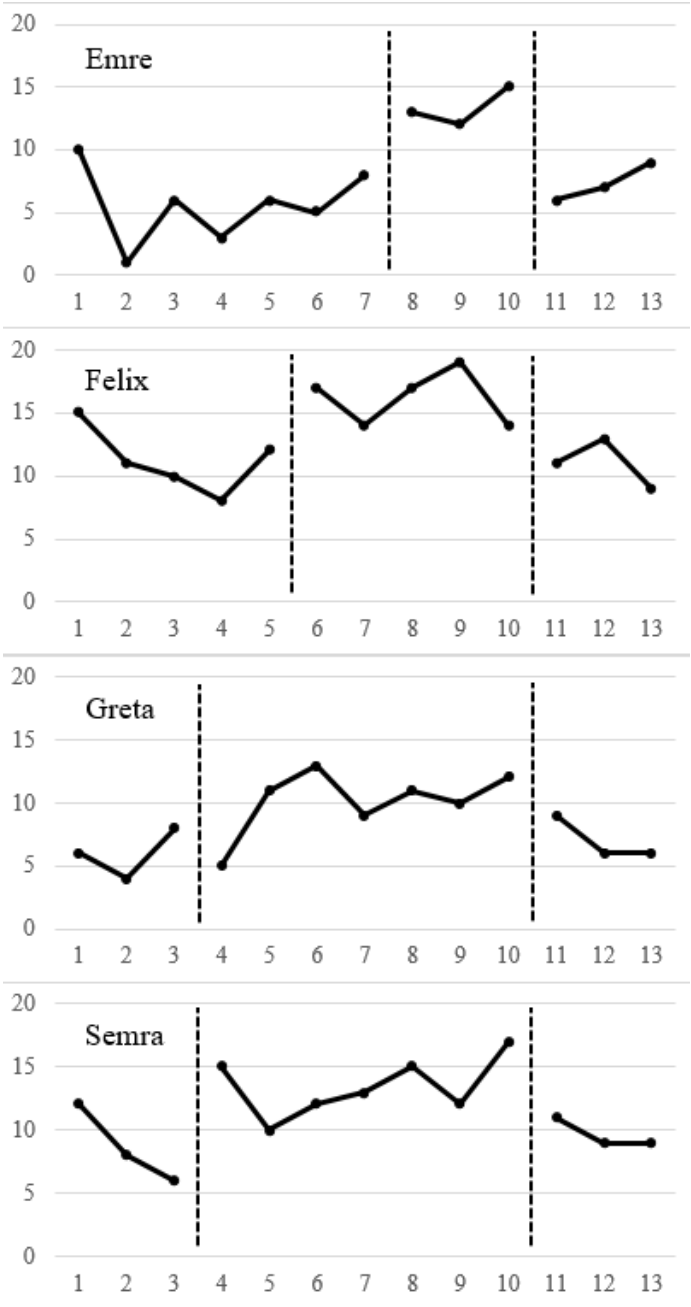


Figure 2. TESE scores in the baseline, intervention, and maintenance phase by student



Statistical Analysis

Pearson's coefficient of correlation between TWW and the TESE scores equaled $r = .72$, which was significant at the .001 probability level (one-tailed). Accordingly, the course of the quality assessments approximately mirrored those of the quantitative measurements.

To quantify the magnitude of the improvements, we calculated effects sizes in the form of mean baseline differences (MBD) between baseline and intervention, as well as between baseline and maintenance phases. MBD is calculated by subtracting the mean of the baseline scores from the mean of the treatment (or maintenance) scores and then dividing by the mean of the baseline scores and multiplying by 100 (Campbell, 2004).

As seen in Table 3, all participants had an MBD above 50 for TWW and above 40 for the TESE scores (baseline vs. intervention). The student who benefited the most was Emre, with an MBD of 102.12 and 139.32, respectively. But all the other participants also showed marked improvements. However, the baseline vs. maintenance MBDs indicated that the performance feedback system did not maintain well at follow-up assessment.

Table 3. **MBD Phase Comparison by Participant**

	TWW		TESE	
	(A vs. B)	(A vs. C)	(A vs. B)	(A vs. C)
Emre	102.12	48.62	139.32	31.60
Felix	79.18	35.13	43.48	- 1.79
Greta	54.51	15.38	69.00	16.67
Semra	59.92	24.52	54.90	11.53

A = Baseline

B = Intervention

C = Maintenance

Even though using inferential statistics with data from single-case designs is still not very common, more and more scholarly papers suggest the application of such methods when trying to draw traceable conclusions from the collected observations and measurements (Manolov & Moeyaert, 2017). Because we expected a sudden increase in performance, we reverted to a randomization (or shuffle) test to analyze the differences between phases A and B. This is an appropriate technique that takes all possible arrangements of the baseline and intervention data into account. One of the greatest advantages of this method is that it does not presuppose the distribution of the population from which the

data are sampled to be known (e.g., Dugard, 2013, 2014; Grünke, Boon, & Burke, 2015).

In our study, the difference between the mean baseline and mean intervention phase data across the four participants was statistically significant with an exact *p*-value of 0.003 for TWW and of 0.010 for the TESE scores. These *p*-values were calculated with the help of a specific Microsoft® Excel macro for AB multiple-baseline designs (developed by Dugard, File, & Todman, 2012; downloadable at www.routledge.com/products/9780415886932).

Discussion

Main Findings

This study analyzed the effects of explicit timing, immediate feedback through self-scoring, and positive reinforcement on the writing performance of four fifth-grade academically and behaviorally challenged students. Our results suggest that the intervention greatly increased not only the length of the texts, but also their quality. All three means of data analysis (visual inspection, calculation of MBDs, and application of a randomization test) speak to the conclusion that our treatment was highly effective. The fact that the start of the intervention was randomly determined and different for each student added to the validity of our experiment. Further, anecdotal reports by the classroom teacher and informal feedback from the four students suggest that the intervention was very well received and fun for the participants. All four children appeared very proud of their work as they told their teacher and the graduate college student about their increases in performance after each session in the intervention phase. However, the effects did not maintain over time. Performance dropped significantly during follow-up, indicating that the behavior did not generalize to circumstances in which the feedback system was no longer implemented. All in all, our findings replicate those by van Houten et al. (1974).

Limitations

A number of limitations to this experiment warrant consideration. As in any single-case study, the low number of subjects is a key limitation for generalizability. Even though we involved four students, our findings can only be generalized with great caution and require additional replications through a synthesis of the literature. The Council for Exceptional Children (CEC) (2014) stipulates that at least five methodologically sound single-case design experiments with positive effects and at least 20 total participants are needed in order to consider an intervention evidence based. Thus, our study has to be viewed as a step towards the goal of establishing our feedback system as an approach that meets these standards.

A second limitation pertains to the description of the sample. We stated that we focused on academically and behaviorally challenged fifth graders. How-

ever, our participants had not been officially diagnosed with a learning disability, a behavioral disorder, or some other kind of special need. Instead, we based our labeling on informal assessments by the classroom teacher and on students' grades. It is beyond question that all four students performed far below average in a number of key subjects and demonstrated some form of learning deficit. In addition, they often showed challenging behavior. Nonetheless, it would have been helpful to also capture information on our participants that was based on standardized tests or structured observation data.

Another restriction concerns the design of the study. The data collection period was brief and did not include a large number of follow-up measures or a second B phase. A longer data collection period with more follow-up measures or a second B phase would have strengthened the internal validity of the findings. However, a multiple-baseline design with randomized intervention starting points is, in itself, already considered as quite solid.

Lastly, we can only use our findings to draw conclusions about our performance feedback system in general. There is no way to determine which feature of the intervention (timing, self-scoring, giving positive verbal feedback, displaying high scores, and using charts to illustrate the learning progress), and to what extent, was responsible for the outcomes. We recognize that the study did not focus on correct diction, grammar, or text composition, instead addressing the essential step of getting students to enjoy writing at all. "Writing ability contributes substantially to general academic success. It is important, therefore, to explore factors affecting motivation to achieve in this specific domain" (Garcia & de Caso, 2004, p. 141). A single experiment cannot go into every research question of interest. Further steps need to be added to help students become proficient writers.

Practical Implications and Conclusion

A performance feedback system involving a number of effective features is certainly not enough to teach academically and behaviorally challenged children and youth proficient text composition skills. However, for students who need some extra support in finding the motivation to try their best when tackling a writing assignment, our intervention has proven to be very useful.

Problems in text production skills are highly prevalent among children and youth, especially among those with learning and behavior problems (Graham, Collins, Rigby-Wills, 2016; Kaldenberg, Ganzeveld, Hosp, & Rodgers, 2016). Being able to compose simple narratives is the first milestone on the way to becoming a proficient writer who is competent to produce different genres of text (e.g., informative, argumentative, expository) (Grünke & Leonard Zabel, 2015). It is vital to provide academically and behaviorally challenged students in fifth grade (or earlier) with adequate support to enable them to clear this hurdle. However, besides focusing on improving content (see, e.g., Baker, Gersten, &

Graham, 2003), interventions must also address the issue of overcoming motivational barriers to engaging in a writing task.

Students with learning and behavior problems are often caught in a downward spiral in which frequent experiences of failure lead to a rising aversion, resistance towards learning, and a lack of feelings of self efficacy. Through the performance feedback system described here, students have good prospects of frequently encountering feelings of success. Being able to provide children or youth with "objective proof" of their learning progress subsequent to their effort to try hard will likely lead to more adaptive attributions (Gonzalez, 2015).

One of the key advantages of our performance feedback system is that it is easy to implement, delivers results, and meets the needs of students with very different skill levels. This type of pedagogical tools are desperately needed by teachers who have to provide appropriate instruction and support for everyone in the challenging environment of inclusive classrooms. We encourage practitioners to use timing, self-scoring, positive verbal feedback, displays of high scores, and charts to illustrate the learning progress when trying to encourage students to attend to writing assignments that they would otherwise avoid. However, more research is warranted on this topic in order to broaden the empirical knowledge base on the benefits of performance feedback systems with academically and behaviorally struggling students trying to improve their written composition abilities.

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