

## Teaching Preschool Aged Children to Write and Affect the Behavior of a Reader

Jennifer Longano and Kieva Hranchuk  
The Fred S. Keller School and Teachers College,  
Columbia University

R. Douglas Greer  
Teachers College, Columbia University

We tested the effects of a writing/spelling instructional package on the emergence of the writing of untaught constant-vowel-constant (consonant-vowel-consonant [CVC]) words and the potential effects of the written word on a reader. Six preschoolers, all male, ranging in ages from 3- to 4-years-old participated. We used a multiple probe design across 3 match-paired dyads for the first dependent measure, writing/spelling of untaught CVC words. We also tested for a secondary dependent measure; the effects of the written word on a reader, using a delayed multiple probe design. The intervention consisted of a writing/spelling instructional package, in which participants were taught to independently write dictated CVC words to corresponding picture cards. We then asked the other participant in the dyad to read and match the written response to a picture from an array of pictures. If incorrect, participants rewrote the word until their peers matched the written response to the correct picture. The results demonstrated that the instructional package was effective in teaching all participants to independently write/spell untaught CVC words and evoke a reader response.

*Keywords:* spelling, writing instruction, affecting reader behavior, preschoolers

Traditional writing instruction has focused on teaching structural components of writing, such as handwriting form, grammar, spelling, and the process of writing. Yet, there seems to be a lack of focus on teaching the actual purpose of writing. The purpose, or rather, the function of

writing is to affect a reader. A series of studies (Broto & Greer, 2014; Helou, Lai, & Sterkin, 2007; Reilly-Lawson & Greer, 2006; Vargas, 1978) have found that by teaching learners the communicative function of writing, structural components were also acquired. Moreover, teaching children to write for functionally is a key component of learning to write for science, technology, engineering, and math (Broto & Greer, 2014). For early writing instruction, it is necessary to teach structural components, such as spelling and writing words, as these are pre-requisite skills for the acquisition of a fluent writer repertoire. But, is it possible for early writing instruction to target both structure and function? Research in the field of behavior analysis has produced several studies that have contributed to developing effective procedures to teach both the structure and function of writing.

Accurate spelling is essential for effective writing (Wirtz, Gardner, Weber, & Bullara, 1996). Alber and Walshe (2004) state traditional spelling instruction utilizes a linguistic approach, which is ineffective for teaching all

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Jennifer Longano and Kieva Hranchuk, The Fred S. Keller School and Department of Health and Behavior Studies, Teachers College, Columbia University; R. Douglas Greer, Department of Health and Behavior Studies, Teachers College, Columbia University.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors. Informed consent was obtained from all individual participants included in the study.

Correspondence concerning this article should be addressed to Jennifer Longano, Department of Health and Behavior Studies, Teachers College, Columbia University, 525 West 120th Street, New York, NY 10027. E-mail: [jml2042@tc.columbia.edu](mailto:jml2042@tc.columbia.edu)

children to become proficient spellers (Wirtz et al., 1996). Evidence-based behavioral procedures derived from principles of self-management have been studied and demonstrated to be more effective methods to teach spelling and writing (Zannikos, McCallum, Schmitt, & Pearson, 2018).

Self-correction procedures have been shown to be more effective to teach children to spell than traditional approaches (McNeish, Heron, & Okyere, 1992; Wirtz et al., 1996). In general, the self-correction procedures included the child hearing the word (on a tape recorder or other device), writing the word, and then comparing his or her written response to a model. The child indicated and marked when responses were correct. If incorrect, the child marked errors and then wrote the word correctly given the model (Alber & Walshe, 2004; McNeish et al., 1992; Wirtz et al., 1996). The findings support the importance of an immediate and direct correction to be an effective tactic for teaching spelling. Although the self-correction procedure was an effective tactic to increase correct spelling responses, all responses had to be directly taught. Procedures that can potentially induce the acquisition of untaught responses may be key to accelerating learning for writing and spelling.

One such procedure, multiple exemplar instruction (MEI) across written and vocal responses, has been shown to be effective to teach spelling and thus induce transformation of stimulus function across writing and spelling (Eby, Greer, Tullo, Baker, & Pauly, 2010; Greer, Yaun, & Gautreaux, 2005). Transformation of stimulus function can be defined as the emergence of an untaught response to a stimulus that previously only evoked a single response that was directly taught (Eby et al., 2010). Prior to MEI, when participants were directly taught to vocally spell words, they were not able write the given word or vice versa. The two behaviors were separate and required direct instruction for both to be learned. During MEI, direct instruction was rotated between spelling words vocally and writing words. Following MEI, when taught one response topography (vocal spelling), the untaught response (written spelling) emerged or vice versa (Eby et al., 2010; Greer et al., 2005). Therefore, MEI was effective to teach participants to spell across written and vocal responses but also established transforma-

tion of stimulus function resulting in the emergence of untaught responses, thus demonstrating MEI not only to be an effective method of instruction but also a more efficient.

Effective procedures and tactics to teach spelling are important to set the foundation for effective writing. As previously stated, accurate spelling is necessary for effective writing (Wirtz et al., 1996). The question then must be asked: What does it mean to be an effective writer? Like other verbal behavior that is mediated by another individual and involves social reinforcement (Skinner, 1953, 1957), various forms of writing can be distinguished by their effect on a reader. Writer immersion protocols (Broto & Greer, 2014; Helou et al., 2007; Reilly-Lawson & Greer, 2006; Vargas, 1978) may be used to teach the relevant motivating operations that are essential for the acquisition of functional writing (Greer, 2002). These procedures (Broto & Greer, 2014; Helou et al., 2007; Reilly-Lawson & Greer, 2006; Vargas, 1978), with some variations, consisted of teaching children to write step-by-step instructions so that a naive reader was able to produce a specific permanent product (i.e., draw a picture, complete a task, solve a math equation). These procedures also included a rewrite correction procedure in which participants had to rewrite their instructions, making necessary changes, until the reader was able to complete the task with 100% accuracy. Findings from these studies support the notion that effective writing instruction not only teaches the correct structural components of writing, but more importantly, the function of writing.

The purpose of the present study was to test the effects of a writing/spelling instructional package, combining components of (a) error correction procedures with rewrites to mastery and (b) multiple exemplar instruction across writer and reader responses on emergence of untaught written CVC words. In addition, we tested for the effects of the written word on reader behavior utilizing a match word to picture operant. Previous research has focused on teaching older children writing and spelling. Our study seeks to expand the findings from a behavior analytic frame for writing/spelling instruction as a kindergarten readiness skill with younger children and to teach and measure how beginner-writing skills can potentially affect the behavior of a reader.

**Method**

**Participants**

Six male preschoolers were selected to participate in the study. Participants were enrolled in an inclusion classroom that implemented the Comprehensive Application of Behavior Analysis to Schooling (CABAS) model (Selinske, Greer, & Lodhi, 1991). Participant A was typically developing. Participants B, C, D, E, and F were classified as preschoolers with disabilities. More specific diagnoses or classifications were not provided at the time of the study due to the age of the participants and the classification requirements for their preschool individualized education plans (IEPs). Also, standardized assessment data were either not available for the participants or were out of date and irrelevant at the time of the study. Table 1 provides a detailed description of each participant and their level of verbal behavior (Greer & Ross, 2004, 2008). Curricula in the classroom setting were arranged and organized by functional levels of verbal behavior rather than just by age or developmental norms alone (Greer & Ross, 2004). Instruction was driven by the learner’s level of verbal behavior, as some levels, such as listener and reader, are verbally governed by other individuals, while other levels of verbal behavior involve instruction that teaches the learner to affect the behavior of others, such as writing (Greer & Ross, 2004). All participants had fluent listener and speaker repertoires, and instruc-

tion focused on teaching reader and writer repertoires.

Participants were selected for this study because they demonstrated the necessary prerequisites for handwriting (used an appropriate pencil grasp, wrote all letters upper and lowercase based on letter names and sounds) and reading readiness skills (textually responded to letter names and sounds for uppercase and lowercase letters). Participants either did not yet write or spell any words or emitted low levels of correct responding for writing simple CVC words. Participants were matched and paired into dyads based on their baseline level responding for writing untaught CVC words. The dyads were as follows: Participants A and B (Dyad 1), Participants C and D (Dyad 2), and Participants E and F (Dyad 3). In the dyads, the participants rotated between writer and reader roles.

**Setting and Materials**

Probe sessions and intervention sessions took place in the classroom during regularly planned instructional time. During pre- and postintervention probes, one participant sat at a rectangular table next to one or two of the experimenters. During intervention sessions, the two participants in the dyad sat adjacent to each other at one of the tables. When necessary, participants in dyads were separated so that they did not hear the dictated words. A divider was also placed between the participants to ensure

Table 1  
*Participants’ Demographic Information, Instructional History, and Number of Intervention Phases Implemented*

Participant	Gender	Age	Classification/level of verbal behavior	Number of intervention phases to mastery
Participant A	Male	3.6 years	<input type="checkbox"/> No classification <input type="checkbox"/> Listener/speaker	1
Participant B	Male	4.11 years	<input type="checkbox"/> Emergent reader/writer <input type="checkbox"/> Preschool with disability <input type="checkbox"/> Listener/speaker	1
Participant C	Male	4.7 years	<input type="checkbox"/> Preschooler with disability <input type="checkbox"/> Listener/speaker	2
Participant D	Male	4.5 years	<input type="checkbox"/> Preschooler with disability <input type="checkbox"/> Listener/speaker	3
Participant E	Male	4.7 years	<input type="checkbox"/> Preschooler with disability <input type="checkbox"/> Listener/speaker	1
Participant F	Male	4.4 years	<input type="checkbox"/> Preschooler with disability <input type="checkbox"/> Listener/speaker	2

the peer reader did not see written responses until the response was completed.

Materials included personal-sized whiteboards (each board had three lines on them, two solid lines with a dash line in between often used for beginner writers), dry erase markers, and an eraser. A variety of picture card stimuli were also used during the intervention sessions. Set 1 stimuli was used for pre- and postintervention probes to test for the emergence of untaught written responses of CVC words. Set 1 included 10 CVC words. Each dyad had similar words sets for pre- and postintervention probes with some variations. Only words that were not in repertoire were selected for each participant. Some example words used for Set 1 stimuli were: wig, map, sun, fan, lip, hug, tip, Sam, rat, fig, and cup. A different set of CVC words and pictures, Sets 2, 3, or 4, were used for instruction. Words were not selected from a predetermined list. Words were selected based on basic CVC words that also had a matching picture and were not in repertoire for each participant. For the secondary dependent measure, pre- and postintervention probes used the same set of stimuli used in intervention phases; Sets 2, 3, or 4 depending on the phase.

### Dependent Measures

Probes were conducted prior to and post intervention on the writing/spelling of untaught CVC words. Writing/spelling was measured as the number of correctly written phonemes/letters in 10 untaught CVC words. Each word written had three responses that were recorded. We asked the participants to write a word when provided with the vocal direction of "Write \_\_\_\_." To ensure the participants heard each phonemic sound, we first said the word as a whole, and then said it slowly to announce each sound, finishing by again repeating the word as a whole. For example, an antecedent went as follows: "Write sun, sss- uhh- nnn, sun." The participants then attempted to write the word. Data were recorded for each letter/phoneme in the targeted word. Correct responses were recorded for a correct letter/phoneme in the CVC word, in the correct order, and legibly written. An incorrect response was recorded for any incorrectly written letters, for letters not in correct order, for illegible letters or marks, or if no response was emitted. We did

not reinforce correct responses or provide corrections for incorrect responses under probe conditions. The same set of stimuli were used for pre- and postintervention probes but were not used during instruction. Therefore, these words were never directly taught. A predetermined criterion of 90% accuracy of writing/spelling was set to determine mastery of the dependent measure.

We also tested for a secondary dependent measure, the effects of the written response on reader behavior. To do so, the participant's written response was given to the peer, the matched paired participant, in the dyad, and the peer was then asked to match the word to a picture. The peer did not hear us deliver the antecedents with the dictated word. The only antecedent for the peer reader's response was the written word and the direction to match the word to the picture. Correct responses were recorded when the peer matched the correct picture to the word, and incorrect responses were recorded if the peer did not match the word to the picture due to inaccurate writing/spelling of the word. If the word was spelled incorrectly but was still phonetically correct and the reader matched the word to picture, a correct response was recorded. For example, if the target child spelled cat as "kat," and the reader matched correctly, then a correct response for match word to picture was recorded, and an incorrect response was recorded for the first dependent measure. If the peer reader was having difficulty with textually responding, we assisted by asking the child to segment the sounds of the word and then blend the sounds. The writer observed if the reader selected the correct picture, but no other consequences were delivered. Prior to each intervention phase, we conducted tests to determine which responses were not yet in repertoire. While doing so, we also tested for if the written responses evoked a reader response (matching the word to the picture). Therefore, the same sets of stimuli, Sets 2, 3, or 4, that were used to directly teach the writing/spelling of words were also used to test for the secondary measure pre- and postintervention sessions.

### Independent Variable

Instructional trials meeting the criterion for learn units (Albers & Greer, 1991; Greer, 2002;

Greer & McDonough, 1999) were used to directly teach participants to write CVC words to corresponding pictures during the implementation of the writing/spelling instructional package. During the instructional sessions, participants rotated between acting as the writer and reader in their dyads, thus presenting stimuli in a multiple exemplar fashion. For each session of the writing/spelling instructional package, each participant wrote a total of 10 CVC words (5 words  $\times$  2); and responded as a reader for the same 10 CVC words (5 words  $\times$  2). CVC words were presented in a rotated fashion so that words were not presented in any particular order. Criterion for mastery was determined by the accuracy of the written response and not by the behavior of the reader. Mastery criterion was set as 100% accuracy for writing all targeted CVC words.

Instructional trials were presented in the following manner. The participant acting as the writer was given a picture card. He was then asked to write the word for the given picture. If the participant was not certain of what the picture portrayed, the teacher whispered the word to the child. We ensured that the other peer in the dyad did not hear or see the word or picture. The participant then attempted to write the word for the picture. Upon completion, the participant acting as the reader was given the written word and an array of pictures; he was then asked to match the word to the picture. The writer observed if the reader selected the correct picture, thus attempting to set an occasion for the writer to observe effects on a reader. A divider was placed between participants so that the reader only saw the written response upon completion. The reader's behavior, the match response, was only evoked by the written word.

Correct and incorrect responses were recorded for each written letter in the targeted words (three responses per word). Correct responses were reinforced with praise and/or tokens. Tokens were exchanged later in the school day for a variety of backup reinforcers including snacks, toys, games, books, and free play. A correction procedure was implemented for any incorrect response. Any incorrect letters were erased from the whiteboard following the reader's first attempt to match the word. The targeted word was sounded out slowly for the child to hear each letter sound. During a correction, the peer reader was asked to go to the free play

area or other table of instruction so that he did not hear the word. The participant was then given another opportunity to emit the response. This rewrite procedure continued until the participant wrote and spelled the word correctly and the reader accurately matched the word to the picture. If the participant did not write the word correctly after three attempts, the correct spelling of the word was dictated, and the participant was required to correctly write and spell the word. No reinforcement followed the correction operation. Data were collected and recorded during the correction procedure on correct and incorrect responses and the number of attempts to spell and write the word correctly. Because data were also collected during the correction procedure, the total number of opportunities varied session to session. Therefore, data were graphed and reported as percent correct.

Data were also collected on how and if the written response functioned to evoke a correct match word to picture response by the reader. Correct responses were recorded if the word was written correctly, and therefore the reader matched the word to picture; or incorrect responses were recorded if the reader did not match the word to picture due to an inaccurate written response. If the peer reader had difficulty textually responding, we again assisted. Reinforcement for correctly writing and spelling the word was the reader correctly matching the picture combined with praise delivered to both participants.

If one participant in the dyad mastered the training set before the other participant in the dyad, postprobes were conducted for the participant who met the criterion for the training set, and instruction was continued for the other participant. If postprobe data did not show significant increases or if the predetermined criterion for the dependent measures were not met, a new set of CVC words was taught using the same procedure.

## Design

A multiple probe design (Baer, Wolf, & Risley, 1968; Cooper, Heron, & Heward, 2007) across participants was utilized to measure the writing and spelling of untaught CVC words, that is, the first dependent variable. A delayed multiple probe design was used to measure the



potential effects the written word had on a reader, the second dependent variable, (Cooper et al., 2007) was used. For all participants, pre-intervention probes were conducted prior to the intervention phase, and postintervention probes were conducted following mastery of the intervention. The sequence of the design for the writing/spelling of untaught CVC words was as follows: (a) preintervention probes for all participants; (b) implementation of the intervention for the Dyad 1 (Participants A and B); (c) postintervention probes for Dyad 1 and preintervention probes for Participants C, D, E, and F; (d) implementation of the intervention for Dyad 2 (Participants C and D); (e) postintervention probes for Dyad 2 and preintervention probes for Participants E and F; (f) implementation of the intervention for Dyad 3 (Participants E and F); and (g) postintervention probes for Dyad 3. The design sequence to test for the potential effects on the reader followed a similar sequence with the exception of the first step and the sets of stimuli used. Preintervention probes were only conducted once prior to the participants entering the intervention phase using the same sets of stimuli for instruction. A predetermined criterion for mastery of the first dependent measure was set at 27/30 (90%) correctly written letters for the 10 novel CVC words. Criterion for the second dependent measure was set at 100% accuracy.

### Interobserver Agreement (IOA)

IOA was conducted using the trial-by-trial method. An agreement consisted of two independent observers agreeing that a participant had emitted a correct response based on the antecedent given. A second independent observer collected data during pre- and postintervention probes across all participants for 100% of the probe sessions for both dependent measures with 100% agreement. During intervention sessions, a second independent observer recorded data for 24% of the sessions for Participants A, B, C, and D with 97% agreement. IOA was conducted for 28% of the sessions for Participant E with 100% agreement and for 22% of the sessions for Participant F with 100% agreement. We calculated IOA by dividing the total number of correct responses recorded by one observer (the less of the two totals) by the total number of correct responses recorded by

the other observer and multiplying the result by 100.

## Results

Results indicate that the writing/spelling instructional package functioned to increase the correctly written responses for untaught CVC words across all participants. The instructional package also sought to teach the participants to write to affect the behavior of a reader. Data showed an overall increase in correct written responses in postintervention probes, which in turn resulted in an increase in accurate reader responses. Figure 1 displays the number of correctly written letters of the 10 untaught CVC words during pre- and postintervention probe trials. Figure 2 displays the number of pictures, out of five possible opportunities, the peer reader was able to correctly select based off their partners' (the writers) written responses for CVC words in pre- and postintervention probes. Data collected during the intervention phases is displayed in Figure 3 for Dyads 1, 2, and 3. Figure 3 shows the number of sessions to mastery per phase and the total number of intervention phases implemented per participant. Also see Table 1 for the number of intervention phases until mastery of the dependent variable.

One preintervention probe was conducted for Dyad 1, Participants A and B. Participant A correctly wrote 24/30 letters from the 10 CVC words presented (see Figure 1). Participant B correctly wrote 10/30 letters in the preintervention probes. For the secondary dependent measure, Participant B was able to read and select one picture correctly given Participant A's written responses (see Figure 2). Participant A read and correctly selected pictures for 0/5 words given Participant B's written words.

Both Participants A and B required one phase of the intervention. Participant A wrote 30/30 letters correctly and Participant B wrote 28/30 letters correctly in postintervention probes. For the second dependent measure, Participant B correctly read and matched words to pictures for 5/5 words written by Participant A, and Participant A correctly read and matched words to pictures for 5/5 words written by Participant B during postintervention probes.

Two preintervention probes were conducted for the second dyad, Participants C and D. Participant C correctly wrote 6/30 and 8/30 letters

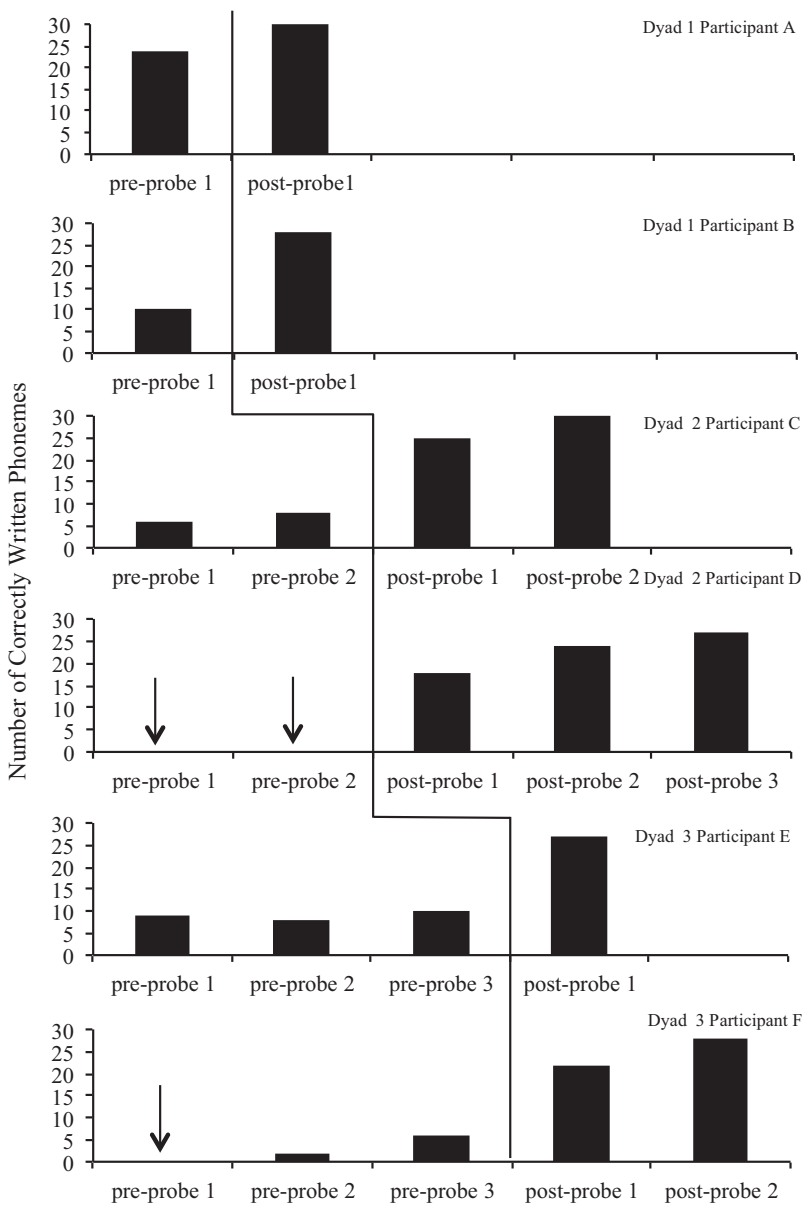


Figure 1. The number of correctly written letters from the 10 untaught CVC words in Set 1 stimuli during pre- and postintervention probes across dyads and participants.

from a list of 10 CVC words for the first and second probes respectively. Participant D emitted 0/30 correctly written letters for both preintervention probes. For the match word to picture task (see Figure 2), both Participants C and D read and selected 0/5 words given their peers written responses.

Participant C required two phases of the intervention. After each phase, a postintervention probe was conducted. Participant C wrote 25/30 letters correctly in the first postintervention probe and 30/30 letters correctly in the second postintervention probe. Participant D required three phases of the

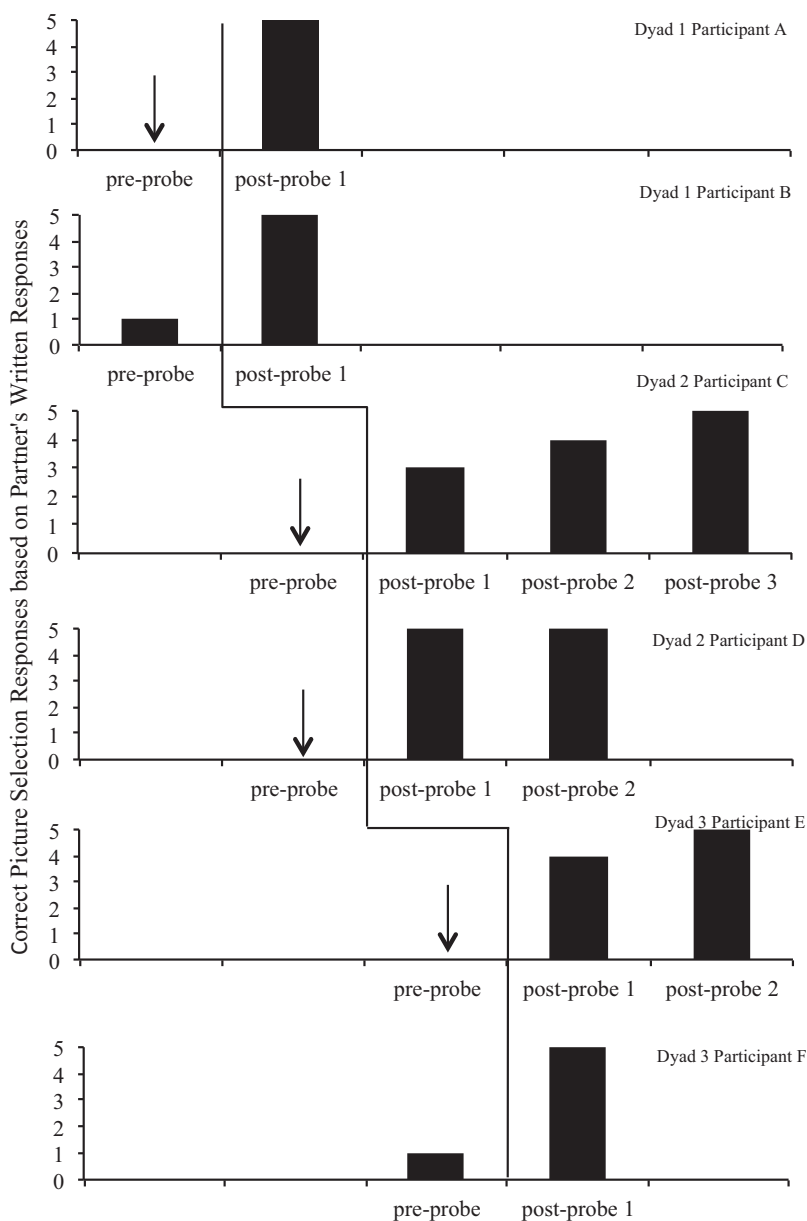


Figure 2. The number of correctly read and matched CVC words to pictures by paired peer participant during pre- and postintervention probes across each dyads and participants.

intervention. Participant D correctly wrote 18/30, 24/30, and 27/30 letters correctly for postintervention Probes 1, 2, and 3, respectively. During postintervention probes for the match word to picture task, Participant D correctly read and matched 5/5 words written by Participant C for both postintervention

probes. Participant C correctly read and matched 3/5, 4/5, and then 5/5 words written by Participant D in the three postintervention probes (see Figure 2).

For Dyad 3, Participants E and F, three pre-intervention probes were conducted. Participant E wrote 9/30, 8/30, and 10/30 letters correctly



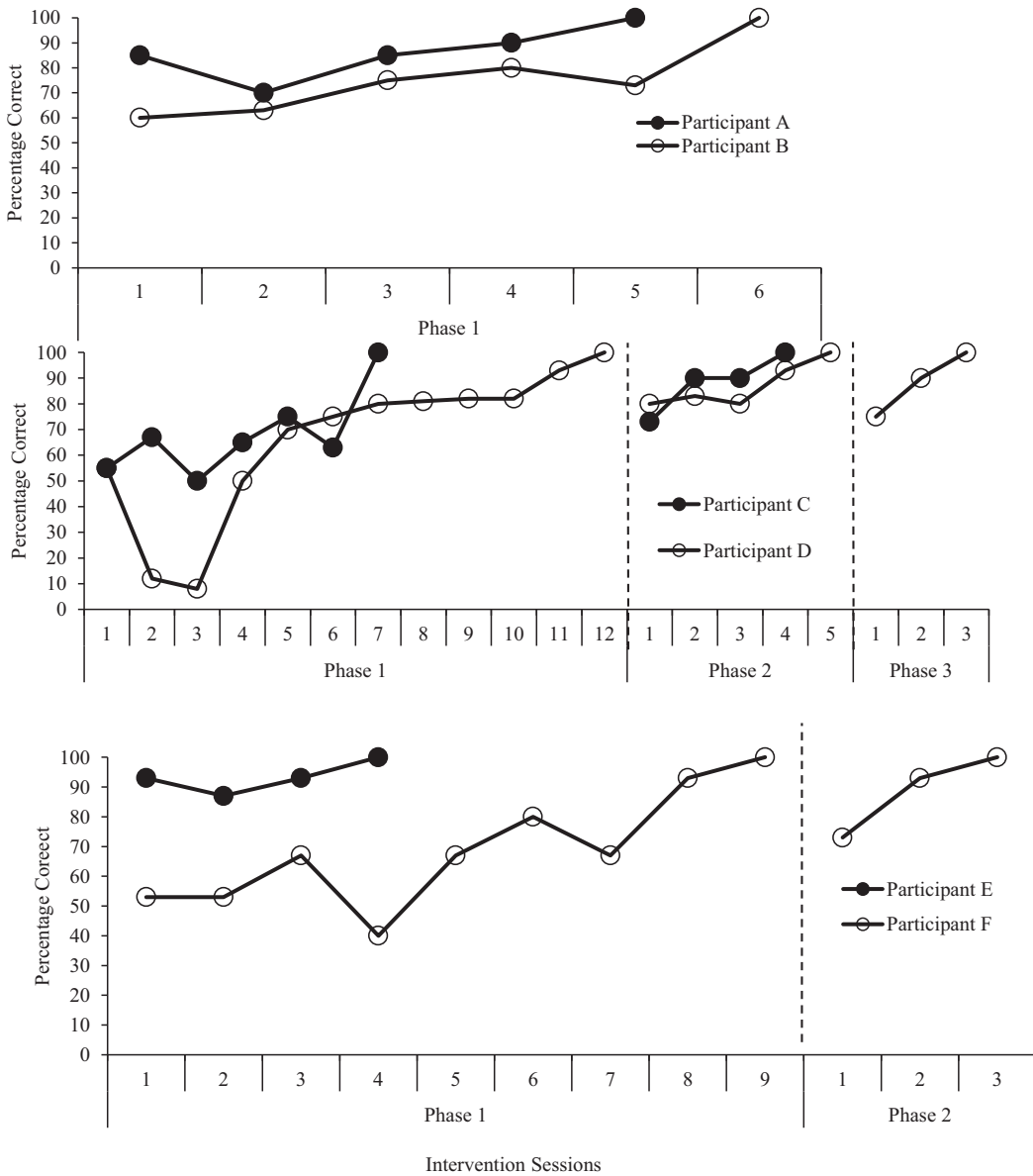


Figure 3. The percentage of correct responses of written letters for CVC words taught during intervention. The graphs show the number of phases and sessions during each phase across participants and dyads.

from the list of set 1 CVC words in preintervention Probes 1, 2, and 3, respectively (see Figure 1).

Participant F wrote 0/30, 2/30 and 6/30 letters correctly for preintervention Probes 1, 2, and 3. Participant F read and matched word to picture for 1/5 words written by Participant E. Partici-

pant E read and matched word to picture for 0/5 words written by Participant F (see Figure 2).

Participant E required one phase of the intervention and Participant F required two phases of the intervention (see Figure 3). During the postintervention probe for Participant E, he wrote 27/30 letters correctly. Two postinterven-

tion probes were conducted for Participant F. He correctly wrote 22/30 letters in postintervention Probe 1 and 28/30 letters in postintervention Probe 2 (see Figure 1). Participant F correctly read and matched words to pictures for 5/5 words written by Participant E in postintervention probes, and Participant E correctly read and matched words to pictures for 4/5 and 5/5 words written by Participant F during postintervention Probes 1 and 2, respectively (see Figure 2).

### Discussion

For all participants, the writing/spelling instructional package functioned to increase the number of correctly written untaught CVC words. Although some participants required several phases of the intervention, all participants learned to write 10 untaught CVC words with 90% accuracy or more following the intervention. As a secondary measure, we also tested for the effects the written words had on reader behavior. Postintervention probe data found that all participants' written responses effectively evoked a reader response, which consisted of the naive reader matching the word to the corresponding picture. The increase in the correct writing and spelling of the CVC words directly related to an increase in correct reader behavior. These data indicate that for preschool-aged children, an instructional package involving both direct teacher feedback for writing CVC words and observation of potential effects on reader behavior can teach younger children beginner writing and spelling repertoires, which is formative as a kindergarten readiness skill. These foundational skills can also be generalized to other academic domains and built upon to teach more complex writer and reader skills.

The correction procedure as an inherent part of the learn unit procedure (Albers & Greer, 1991) allows for the occasion to teach a behavior under a specific set of motivating conditions and stimulus control to evoke and teach new operants. Self-correction procedures to teach spelling were more effective than traditional approaches due to the immediate and direct feedback (Alber & Walshe, 2004; Wirtz et al., 1996). Although our procedure did not directly utilize self-correct procedures from previous research (Alber & Walshe, 2004; McNeish et al., 1992; Wirtz et al., 1996), the rewrite to criterion

procedure provides a similar function. The participants had to write and spell the word correctly without being directly given the answer or told how until the reader was able to select the correct picture. It was only after three unsuccessful attempts of the rewrite procedure that the participants were told how to spell the word directly and then were required to write the word in the correct form. The writer immersion procedures (Broto & Greer, 2014; Helou et al., 2007; Reilly-Lawson & Greer, 2006) also utilized a rewrite procedure to teach the function of writing. It is through this self-correcting trial-and-error process that the participants learn how to spell and write while also learning how to change the behavior of a reader.

Another variable to consider in the writing/spelling instructional package was the rotation of writer and reader roles. All participants were exposed to each set of stimuli during the intervention as a writer and reader. Greer, Yaun, and Gautreaux (2005) and Eby, Greer, Tullo, Baker, and Pauly (2010) found that after rotating response topographies in MEI resulted in the emergence of joint stimulus control for both saying and writing spelling words. We did not test for transformation of stimulus function across reading and writing, but this is an area for future study. The findings from the current study do support the emergence of untaught responses. The word set used in pre- and postintervention sets were never directly taught. The results may be attributed to generalization effects; however, it may also be that the procedure taught and developed a new stimulus control for the writing/spelling of words that was not present before. Participants learned how to combine letter sounds to form words that were not directly taught. There was some overlap between letter sounds in pre- and postintervention probe sets and in the intervention sets, but no words were the same. The overlap was due to the limitation of potential CVC words that could also be matched to a picture. We do not know the effects of the rotation for the writer and reader responses for this study, but we do know that MEI is effective for teaching new skills and for the emergence of untaught repertoires since the process teaches abstraction (Eby et al., 2010; Greer et al., 2005).

The primary dependent measure of the study was the writing of untaught CVC words. We also attempted to test for the potential effects

the written responses had on reader behavior. Previous research (Broto & Greer, 2014; Helou et al., 2007; Reilly-Lawson & Greer, 2006) demonstrated that by teaching the function of writing, the structural components are also learned. Therefore, if writing instruction teaches function from early on, there may be better outcomes for writer behavior. Although we cannot state that we taught the function of writing, the instructional package did begin to teach children that accurate writing can have an effect on an audience or reader.

The writing/spelling instructional package was effective in teaching the writing of untaught CVC words. However, there are several limitations to consider. The lack of fidelity treatment protocols and observations threatens the internal validity of the present study. Future researchers should incorporate the use of a treatment integrity checklist to determine whether the intervention was implemented as intended.

An additional potential limitation concerns the design used and the number of probe sessions prior to intervention. A multiple probe was used to test for writing/spelling of untaught CVC words. With this design, we measured the dependent measures with the same set of stimuli in pre- and postintervention probe sessions. Although the data do show significant increases in correct responses for untaught CVC words only following the intervention, we have to consider the potential of practice effects. Slight increases were observed for Participants C, E, and F under preintervention probe conditions. However, it seems to be quite evident that it was only after the intervention was in place that more significant increases were observed. Additional preintervention probes for Dyad 1 would have provided more evidence for a functional relationship between the dependent and independent variables.

Furthermore, a delayed multiple probe design was used to measure the effects the intervention had on the secondary dependent measure (see Figure 2). We only tested for this on one occasion prior to the intervention phases for each dyad using the set of stimuli that were to be used for instruction. Then, following the completion of the intervention, postprobes were conducted using the same set of words. Writing to affect a reader was built into the intervention to present as a collateral effect while teaching writing/spelling behavior. For future research,

multiple probes to test for this measure can be conducted with sets of stimuli not used during the intervention phases to show stronger evidence of the effects of the writing instructional package on effects the written response had on reader behavior.

For preschool-age children, the writing/spelling instructional package appears to be an effective method for teaching beginner writing and spelling skills. With these findings, there is potential for future studies to strengthen and advance the study of writing instruction. As mentioned previously, future studies can investigate the role and the potential effects on emergent behavior as a result of MEI across reading and writing. Future studies can also study the effects of the rewrite to criterion correction procedure in isolation. And, in future studies, the effects the written response has on reader behavior can be better measured to advance procedures to teach the function of writing.

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