Summary of ABC Pilot Study Results
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Summer, 2020

Background

Alphabet knowledge – knowledge of letter forms, names, and corresponding sounds – is foundational for the acquisition of conventional reading skills. Substantial research indicates that early alphabet knowledge predicts not only later reading success but also the likelihood of experiencing reading difficulties (National Early Literacy Panel, 2008; Scarborough, 1998). Despite its critical importance, we know relatively little about how to best support children's alphabet knowledge development (Piasta, 2014; Piasta & Wagner, 2010). This study represents pilot work necessary for future studies that will identify best practices for promoting children's alphabet knowledge.

In this research, we conducted a pilot study to determine the efficacy of newly developed lessons for improving children's alphabet knowledge. Prior to conducting this study, we iteratively developed a corpus of alphabet lessons and accompanying activities that are appropriate and feasible for use with young children. Each lesson focuses on a particular letter, with additional opportunities for review of letters previously taught. The lessons feature explicit, systematic instruction as well as authentic reading and writing opportunities. More information about the lessons and the iterative development process can be found here.

Research Goal and Design

Our goal in this pilot study was to determine whether the alphabet lessons and activities that we developed improved children's alphabet learning. We used a within-subject research design to address this goal, which is a strong design for answering causal questions because each child participates in both instructional and control conditions. As described below, we used the lessons to teach four target letters selected for each child and did not provide any instruction on four control letters; if the lessons are effective, we expected to see that children learned more target letters than control letters.

Method

Twenty-nine children (62% girls, average age of 52 months) from local early childhood centers participated in the pilot study. Forty-eight percent were Black, 31% were White, 7% were Asian, and 10% were multiracial (4% unreported). Approximately one-third of children came from lower socioeconomic backgrounds (36% had annual family incomes less than $25,000 and 35% had mothers whose highest degrees was a high school diploma). One child was an emergent bilingual.

All children met the following eligibility criteria: (a) parental consent to participate, (b) between 3:5-6 years of age, (c) free of profound disabilities, (d) proficient in speaking and understanding

English, and (d) unfamiliar with the names and sounds of at least 8 letters. To assess the latter, children completed uppercase and lowercase letter name and sound production tasks (e.g., What is the name of this letter? What sound does it represent?).

For each child, research staff selected 8 letters for which they did not know the name or sound for both the uppercase and lowercase forms. For these 8 letters, children completed uppercase and lowercase letter name and sound recognition tasks (e.g., asking the child to point to the letter whose name or sound was provided – Where is letter __? Where is the letter that represents the sound __?) and a letter writing task (e.g., Write the letter __.) to further assess their knowledge of these letters. Research staff also divided the letters selected for each child into four target letters and four control letters, making sure that target and control letter sets were of equal difficulty (see Piasta, 2014). Children received 1:1 alphabet instruction on the four target letters only; this instruction was provided by research staff, consisted of three 15-20 min lessons per letter plus review lessons over the course of approximately 10 weeks, and included progress monitoring. Control letters were not taught.

After instruction, children completed posttest letter name and sound production, letter name and sound recognition, and letter writing tasks to assess their learning of the 8 selected letters. For the production and recognition tasks, children's responses were scored as correct or incorrect, with the number of correct responses tallied for target and control letters. For letter writing, we followed Puranik and Lonigan (2011) and awarded 1 point if key features of a letter were recognizable and 2 points if a letter was written entirely correctly; we then computed averages of these letter writing scores for target letters and control letters.
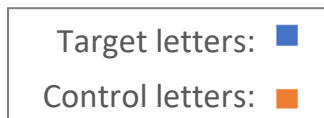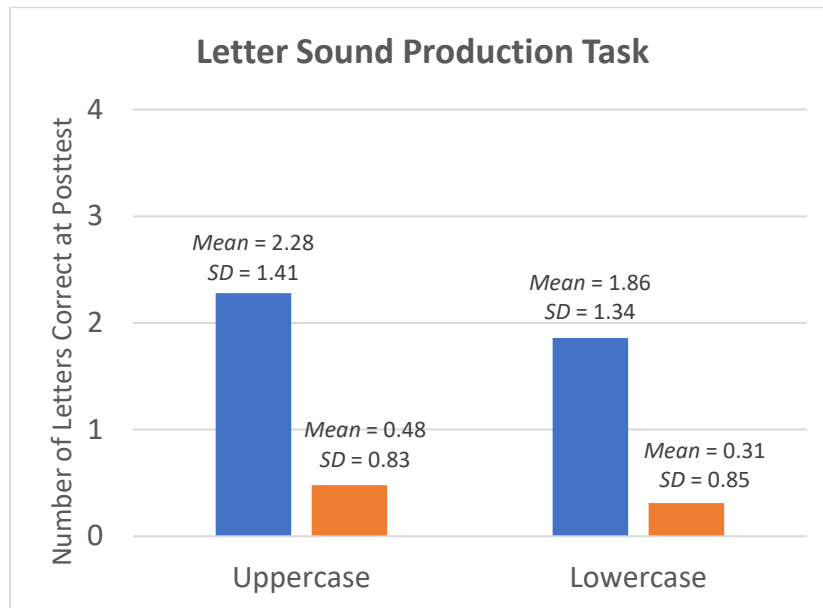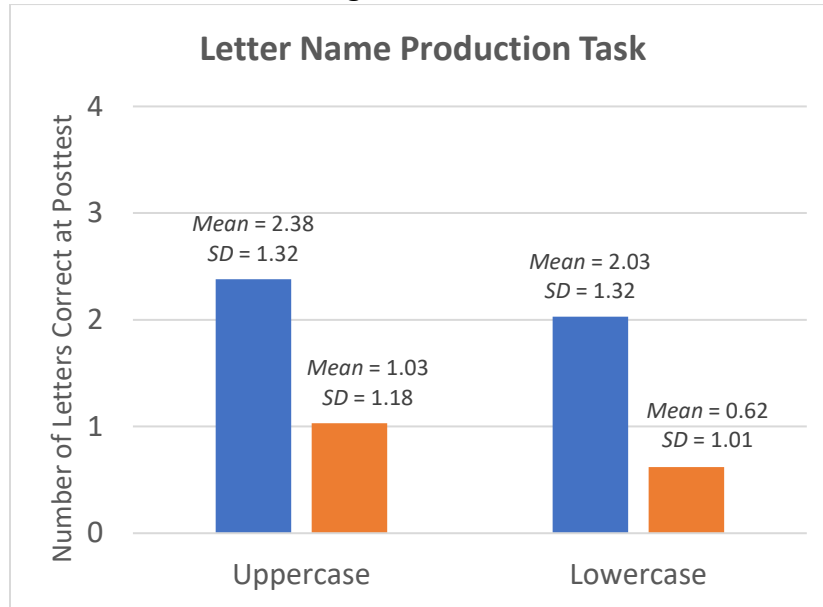
More complete details of the pilot study are reported in Piasta, Park, Fitzgerald, & Libnoch (2021) or are available from the first author.

Results

We analyzed the data using a series of 2 (Time: pretest/posttest) x 2 (Letter type: target/control) ANOVAs. We also controlled for instructor, as one instructor had significantly higher lesson fidelity than others.

Results for letter name and sound production tasks are shown in Figures 1 and 2. At pretest, children were not able to name or produce the sounds for any of the 8 selected letters. At posttest, children had learned more letter names and sounds for both uppercase and lowercase target letters as compared to control letters. These results were statistically significant: uppercase letter name production task, $F(1,27) = 4.88$, $p = .036$; lowercase letter name production task, $F(1,27) = 5.46$, $p = .027$; uppercase letter sound production task, $F(1,27) = 16.53$, $p < .001$; lowercase letter sound production task, $F(1,27) = 13.05$, $p = .001$.
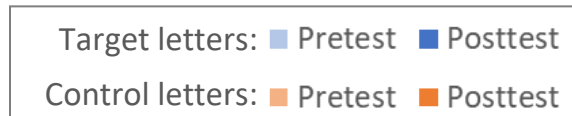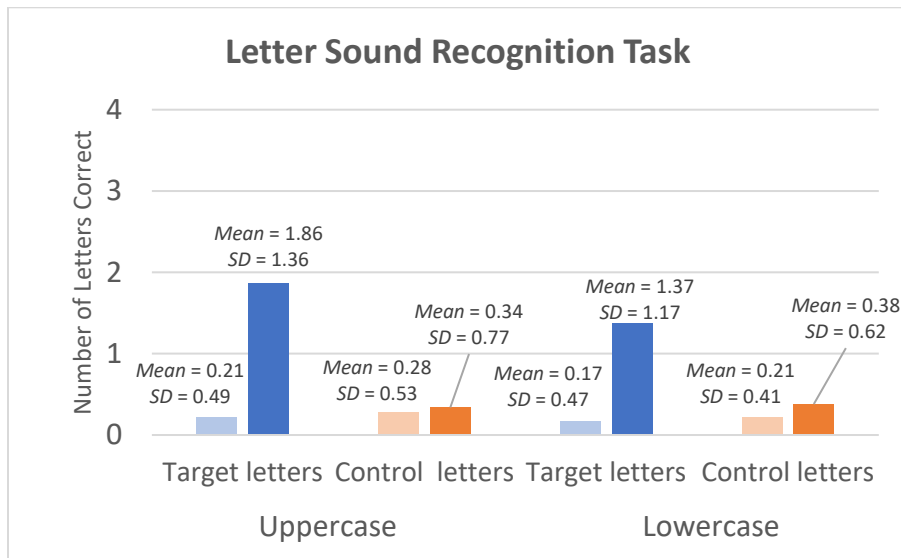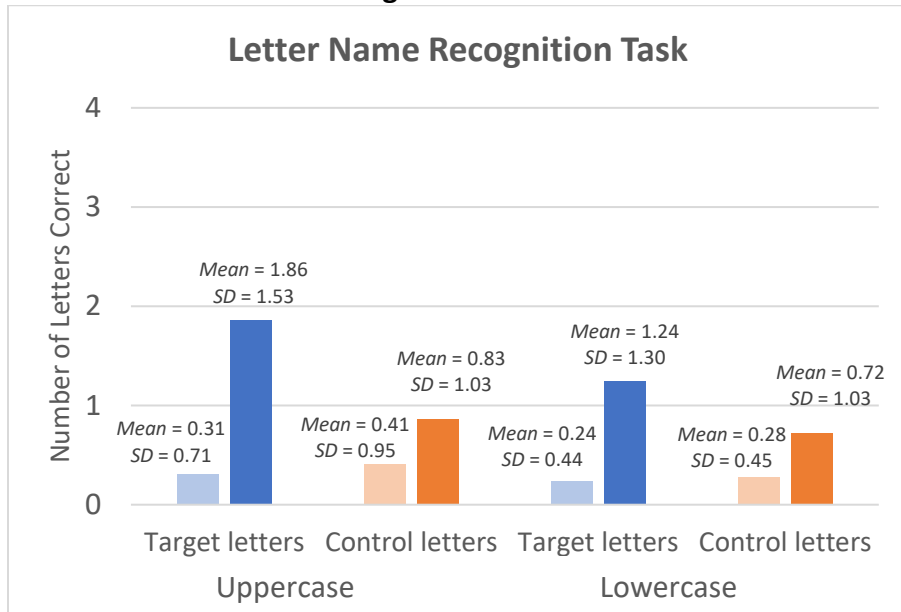
Figures 1 and 2

Letter Name Production Task

Mean = 2.38
SD = 1.32

Mean = 2.03
SD = 1.32

Mean = 1.03
SD = 1.18

Mean = 0.62
SD = 1.01

Number of Letters Correct at Posttest

Uppercase   Lowercase

Letter Sound Production Task

Mean = 2.28
SD = 1.41

Mean = 1.86
SD = 1.34

Mean = 0.48
SD = 0.83

Mean = 0.31
SD = 0.85

Number of Letters Correct at Posttest

Uppercase   Lowercase

Target letters: ■
Control letters: ■

Results for letter name and sound recognition tasks are shown in Figures 3 and 4. At pretest, children were able to recognize very few letters by name and few letter sounds. At posttest, children had learned to recognize more target letters in uppercase form compared to control letters, $F(1,27) = 9.38$, $p = .005$. Children had also learned to recognize more sounds for target letters than control letters, both in uppercase, $F(1,27) = 18.42$, $p < .001$, and lowercase, $F(1,27) = 14.38$, $p = .001$. Although children also had higher lowercase letter name recognition for

target letters than control letters, this difference was not statistically significant, $F(1,27) = .58$, $p = .455$.

Figures 3 and 4

Letter Name Recognition Task

Number of Letters Correct

- Uppercase
  - Target letters: Pretest Mean = 0.31, SD = 0.71; Posttest Mean = 1.86, SD = 1.53
  - Control letters: Pretest Mean = 0.41, SD = 0.95; Posttest Mean = 0.83, SD = 1.03
- Lowercase
  - Target letters: Pretest Mean = 0.24, SD = 0.44; Posttest Mean = 1.24, SD = 1.30
  - Control letters: Pretest Mean = 0.28, SD = 0.45; Posttest Mean = 0.72, SD = 1.03

Letter Sound Recognition Task

Number of Letters Correct

- Uppercase
  - Target letters: Pretest Mean = 0.21, SD = 0.49; Posttest Mean = 1.86, SD = 1.36
  - Control letters: Pretest Mean = 0.28, SD = 0.53; Posttest Mean = 0.34, SD = 0.77
- Lowercase
  - Target letters: Pretest Mean = 0.17, SD = 0.47; Posttest Mean = 1.37, SD = 1.17
  - Control letters: Pretest Mean = 0.21, SD = 0.41; Posttest Mean = 0.38, SD = 0.62

Target letters: ■ Pretest ■ Posttest
Control letters: ■ Pretest ■ Posttest

Results for letter writing are shown in Figure 5. At pretest, children demonstrated very limited letter-writing abilities. At posttest, although children had higher letter writing scores for target letters than control letters, this difference was not statistically significant, $F(1,27) = .03$, $p = .871$ in the ANOVA analysis. We note that a more sophisticated analysis, in which we considered

children's writing of each individual letter on a graded scale, indicated that children were significantly more likely to write target letters at least partially correctly compared to control letters (Piasta, Park, Fitzgerad, & Libnoch, 2021; available upon request from the first author).

Figure 5

Letter Writing Task
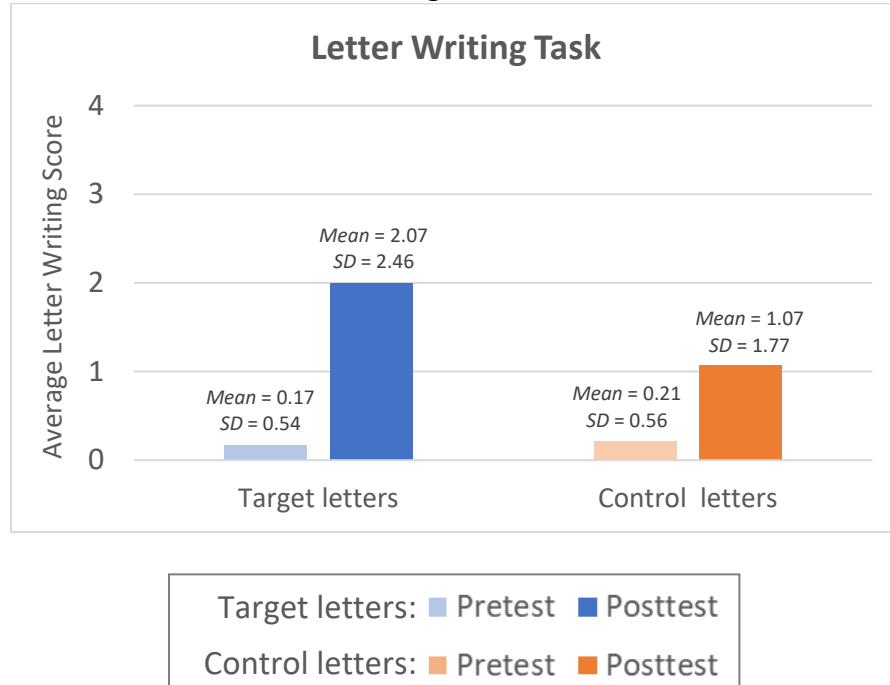
Summary and Conclusion

Children tended to learn more target letters than control letters. This was true for uppercase and lowercase letter name production, uppercase and lowercase letter sound production, uppercase letter name recognition, and uppercase and lowercase letter sound recognition. In these analyses, the alphabet lessons did not increase children's lowercase letter name recognition or letter writing although the trends were in the right direction (but see Piasta, Park, Fitzgerald, & Libnoch, 2021). These results indicate that the lessons successfully increased children's alphabet knowledge.

References

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