THE EFFECTS OF TESTS AND PRAISE ON CHILDREN'S HEAR-WRITE
AND SEE-SAY RESPONSES

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Four elementary school children were tested on 120 words containing the short e (e.g., ten, pen) and short a (e.g., tan, pan) sounds. Words were tested in the hear-write (H/W) and see-say (S/S) channels. No programmed consequences were scheduled during baseline (BL) tests 1-3. After BL, an error analysis categorized words based on channel error and topography of error. Praise was delivered during tests 4-6 for correct responses. Children’s responses were variable within channel and across channels for a majority of words. By the end of the praise phase, there was a decrease in the number of words with errors, for all children in their error word group. Error topographies began to stabilize for some words during praise.
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# TABLE OF CONTENTS

**ACKNOWLEDGEMENTS** ....................................................................................................................... ii

**LIST OF TABLES AND ILLUSTRATIONS** ............................................................................................. iv

## Chapters

1. **INTRODUCTION** ............................................................................................................................... 1

2. **METHOD** ........................................................................................................................................ 9
   - Subjects ............................................................................................................................................... 9
   - Setting ............................................................................................................................................... 9
   - Materials ........................................................................................................................................... 9
   - Measurements ................................................................................................................................. 10
   - Writing ............................................................................................................................................. 10
   - Saying ............................................................................................................................................... 11
   - Interobserver Agreement (IOA) ...................................................................................................... 11
   - Procedures ....................................................................................................................................... 12
   - Baseline (BL) ................................................................................................................................. 12
   - Error Analysis ............................................................................................................................... 14
   - Tests with Praise as a Consequence ............................................................................................. 15
   - Return to BL ................................................................................................................................... 15

3. **RESULTS** ......................................................................................................................................... 16

4. **DISCUSSION** .................................................................................................................................. 40

## Appendices

A. **BASELINE WORD LISTS** .............................................................................................................. 47

B. **BASELINE WORD LIST TEST SEQUENCE** ............................................................................. 49

**REFERENCES** ..................................................................................................................................... 52
# LIST OF TABLES AND ILLUSTRATIONS

## Tables

1. Channel Error Types during BL for the 120 words and Frequency of GFEs ..... 19

## Figures

1. Stan’s baseline results on H/W and S/S tests for the 120-short-e/a-words ..... 16
2. Vince’s baseline results on H/W and S/S tests for the 120-short-e/a-words ..... 17
3. Torrie’s baseline results on H/W and S/S tests for the 120-short-e/a-words ..... 17
4. Lila’s baseline results on H/W and S/S tests for the 120-short-e/a-words ..... 18
5. Stan’s number of errors on H/W and S/S tests for both HW/SS and no errors in BL word groups ................................................................. 21
6. Stan’s error analysis for words with both HW/SS errors and no errors .......... 24
7. Vince’s number of errors on H/W and S/S tests for both HW/SS and no errors in BL word groups ................................................................. 27
8. Vince’s error analysis for words with both HW/SS errors and no errors .......... 29
9. Torrie’s number of errors on H/W and S/S tests for both HW/SS and no errors in BL word groups ................................................................. 32
10. Torrie’s error analysis for words with both HW/SS errors and no errors ........ 34
11. Lila’s number of errors on H/W and S/S tests for hw/ss-only and words with no errors during BL ........................................................................................................... 36
12. Lila’s error analysis for words with HW-only and SS-only errors and no errors ........................................................................................................... 38
Let’s see—how did Rabbit describe the situation with Owl? Oh, here it is: …you can’t help respecting anybody who can spell TUESDAY, even if he doesn’t spell it right; but spelling isn’t everything. There are days when spelling Tuesday simply doesn’t count.

“By the way, Pooh, how do you spell Tuesday?”
“Spell what?” asked Pooh.
“Tuesday. You know—Monday, Tuesday…”
“My dear Pooh,” said Owl “everybody knows that it’s spelled with a Two.”
“Is it?” asked Pooh.
“Oh course”, said Owl. “After all, it’s the second day of the week.”
“Oh, is that the way it works?” asked Pooh.
“All right, Owl,” I said. “Then what comes after Twosday?”
“Thirdsday.” said Owl.
“Owl, you’re just confusing things,” I said. “This is the day after Tuesday, and it’s not Thirds - I mean Thursday.”
“Then what is it?” asked Owl.
“It’s Today!” squeaked Piglet.
“My favorite day,” said Pooh.

– Benjamin Hoff, The Tao of Pooh

In the school setting spelling does count. If it were only as easy as following consistent phonetic rules describing three-term contingencies (i.e., if A then B results in C). A is the teacher saying cat. B is the child’s response when she spells the word cat. C is the consequence for spelling the word. Is it correct or incorrect? Instead the relations are sometimes conditional, given D then A evokes B1 as opposed to B2 or B3, resulting in C. For example, lead (metal) and led (past tense of lead, winning the race) sound the same when spoken. Lead can be said in two ways depending on the context,
is it metal or someone winning the race? *Scent, cent,* and *sent* sound the same, as well as *vein, vane,* and *vain or weight* and *wait, earn* and *urn.* What is necessary in each of these examples is a context (D). Typically during school spelling tests, D is the sentence provided by the teacher. The teacher says something like this, “Number 3-led, the child led the dog to the water bowl, led.”

An additional variable complicating accurate phoneme (sound)-grapheme (symbol) correspondence is that a word can be spelled phonetically accurate but still be misspelled (Boder (1973) in Whiting & Jarrico, 1980; Bruck & Waters, 1988). Boder (1971) in Whiting and Jarrico (1980), labeled these type of errors as good phonetic equivalents (GFEs). GFEs are “written words in which the phonemes of the spoken word are represented by appropriate corresponding graphemes in the same sequence” (p.46). Some examples: for *beef-* GFEs would be *beaf* or *beif,* for *nature - natcher* and *reach - reech; said - sed;* or *wed - waid.* Even for *Owl,* in the introductory quote, the initial phoneme in *Tuesday* is mistaken for *two,* which is a GFE.

Cognitive researchers have described the processes involved when someone spells and reads as if a child’s ability to spell predicts his ability to read or vice-versa (Bruck & Waters, 1988; Di Veta & Speece, 1990; Graham, Harris, & Chorzempa, 2002; Krashen, 1989; Whiting & Jaricio, 1980). Boder (1971) assessed whether children were able to phonetically analyze and visually perceive words as wholes by administering a list of words to read prior to requiring the children to spell the same words. If a child was able to correctly read a word, when presented, then it was said to be in his sight vocabulary. When it came time to spell sight vocabulary words it was claimed the child was doing so, from memory, indicating an ability to see words as units or in visual
gestalts. If the child was not able to read the word quickly upon presentation then phonetic analysis was required on the child’s part, both when reading and spelling. Although Boder was concerned primarily with classifying reading and spelling deficits of dyslexics, she did assert that typical readers could spell 70-100% of their sight vocabulary correctly, which Whiting and Jarrico (1980) replicated with their results.

Bruck and Waters (1988) used similar terms as Boder, Whiting and Jarrico, and Graham, Harris, and Chorzempa, (2002) when defining the supposed processes involved when someone reads and spells.

One is a visual process; in reading, the pronunciation of a word and, in spelling, the orthographic form of a word can be accessed directly out of memory storage. The second process is phonological in nature; pronunciations and spellings of words can be derived on the basis of knowledge of the relationship between spelling and sound in English. Thus in reading, spelling-sound correspondences can be used to derive a phonological code, which is then used to access the meaning of the word; in spelling, the written form of the word can be derived through the application of sound-spelling correspondences. (p.77)

Krashen (1989) summarized three additional hypotheses concerning how humans acquire vocabulary and spell that vocabulary. His concern with spelling proficiency is clear when he states, “Our standards in spelling are 100%; a single spelling error in public can mean humiliation” (p.440). The first hypothesis discussed, which Krashen asserts as superior, is the input hypothesis. By merely comprehending what one is reading one is able to succeed at spelling and vocabulary. Although one may not be aware that she is learning new vocabulary, she is through the language acquisition device. Krashen states that this vocabulary then becomes “acquired knowledge, is represented subconsciously in the brain—it is what Chomsky has termed tacit knowledge” (p. 441). According to the skill-building hypothesis learning transforms into acquisition. What is learned are the single instances and rules that become
immediate through drills and exercise. Examples of techniques resulting in acquisition
are word lists grouped by similar features (e.g., words that rhyme, similar suffixes or
roots), rules governing spelling (e.g., i before e, except after c), and completing
exercises such as drawing a line from a word to its’ definition or filling in the blank.
Finally the output hypothesis predicts that language is learned when one speaks and
writes. Prior to doing either a hypothesis is formed. If our speaking or writing is
successful, the hypothesis is confirmed. If it results in failure or correction, the
hypothesis is modified based on its’ consequences.

In the models above, there is a reliance on an intermediary process, whether it
be a phonological code, memory storage or a language acquisition device. These types
of models have been defined as structuralist. In structuralist models of knowledge,
mental processes act between Skinner’s stimulus-response relationship, producing
stimulus-process-response (Johnson & Layng, 1992). This is the conceptual framework
underlying educational research conducted from a cognitive viewpoint. In contrast, a
selectionist explanation for the repertoires of reading and spelling emphasize
“investigating changes in behavioral repertoires over time” (Johnson & Layng, 1992, p.
1475) and do not attempt to discuss imagined cognitive constructs that mediate
behavior.

Additional features of the selectionist approach to education are generative
instruction and fluency. The generative instruction practice of training component skills
to fluency to establish accurate composite performance without necessarily training
composite performance has been repeatedly observed (Epstein, 1996; Johnson &
Layng, 1992). Fluency is a description of performance (i.e., accuracy is defined as rate
of corrects over time), achieved through repeated practice. Outcomes of fluent performance are endurance, retention, and composite task performance requiring component skills. It is important to state that fluency is not achieved merely by repeating skills. If the program features of the repeated practice are deficient, then fluency will not be achieved (Haughton, 1997).

Defining reading and spelling in the form of stimulus-response relations requires the vocabulary of learning channels. Learning channels precisely define student performance in terms of input/output. Traditional descriptive terms such as "knows," "understands," "is able to" were found to be nebulous (Haughton, 1997). “We do not act by putting knowledge to use; our knowledge is action. Behavior exists only when it is being executed” (Skinner, 1974, pp.151, 154).

Learning channels improve the technical description of what the student is doing. Reading defined in learning channel terms would be see-say. The child sees the visual stimulus (e.g., word, words, sentence, paragraphs) and then says the word aloud. The saying could be at the vocal or sub-vocal level. Spelling could be defined as hear-write, hear-say, or hear-type. In a hear-write task the child hears the auditory stimulus (i.e., the child hears the teacher say the word aloud) and then writes the word. Spelling could also be taught hear-say, if the child vocally spelled the word aloud or hear-type, if the child typed the words on a computer or typewriter (Haughton, 1997).

Behavior analysts (i.e., selectionists) have studied the relationships between reading and spelling. In their studies, they identified words that children could neither read nor spell (De Rose, De Souza & Hanna, 1996; Lee & Pegler, 1992) or words that children could read but not spell correctly (Cuvo, Ashley, Marso, Zhang, & Fry, 1995).
Interventions then evaluated whether training in reading resulted in spelling acquisition 
(Lee & Pegler, 1992), if copying the word affected reading and spelling (De Rose et al., 1996), 
or what types and how much practice resulted in correct spelling or reading 
(Cuvo et al., 1995).

Lee and Pegler (1982) saw acquisition effects in hear-write responses when see-say training 
ocurred. Praise and tokens were delivered for correct responses during see-say training sessions. 
For incorrects, tokens were removed along with a “no” and the correct response was provided. 
No experimental consequences were scheduled during see-say pre/post tests or during hear-write tests. 
When hear-write tests were administered without see-say training sessions there was no improvement in child 
performance. Control for praise and whether the subject had to say the word or merely see it as a visual stimulus occurred in Experiment 4. Comparable effects were seen whether the child said the word or just saw the word, or received tokens and praise or did not receive tokens and praise.

De Rose, De Souza, and Hanna (1996) tested for equivalence class formation on see-say tasks and assessed effects on children’s ability to read generalization words and spell training words. Training consisted of hear word-point to word procedures in addition to see word-construct it from available tiles. Training did result in see-say acquisition, reading of generalization words for 5 of the 7 children, and improved spelling of the trained words.

Cuvo et al., (1995) found no differences between participant’s cover-copy-comparing, writing without covering, or saying the words aloud in the presence of the written word. All children learned to spell the 15 words assigned to each condition at a
similar rate. No differences were found in spelling acquisition when children cover-copy-compared one word 5, 10, or 15 times. Finally, whether children practiced the word missed or a different word 5 times, or the word missed 1 time resulted in similar acquisition rates in spelling and reading.

In each of these experiments the approach was selectionist. Repertoires were measured over time as opposed to a one-time pre-test and post-test. There was an absence of exclusive reliance upon inferred cognitive processes or stages in the description of participant skills or in the discussion of experimental outcomes.

In the previous literature mentioned, whether it was structuralist or selectionist, several weaknesses in experimental design were identified. A one-time pre-test measure seems problematic. How can mastery be defined as a one-time correct performance (Boder, 1971; Cuvo, Ashley, Marso, Zhang, & Fry, 1995; Graham, Harris, & Chorzempa, 2002; Whiting & Jarrico, 2001)? If words are assessed in the see-say channel first versus hear-write, is a possible influential variable. Children have seen each word correctly spelled if see-say tasks are presented first (Boder, 1971; Lee & Pegler, 1982; Whiting & Jarrico, 2001). Finally, the number of words simultaneously trained is a possible source of influential control (Cuvo, Ashley, Marso, Zhang, & Fry, 1995; De Rose, De Souza, & Hanna, 1996; Lee & Pegler, 1982). Cuvo et al. trained one or two words at a time, then added a new word after two consecutive corrects. Lee and Pegler trained one word then added a word after two consecutive corrects. De Rose et al. trained 2-4 words at a time using an exclusion procedure after training the initial 3 words. Finally, the literature mentioned did not discuss the skill deficits present in the participants during assessment or training. Children were described as not being able to
read or spell words. The present experiment was designed to evaluate children’s hear-
write and see-say repertoires and their component sounds, when praise was delivered
contingent on a correct response and when no praise was delivered.
CHAPTER 2

METHOD

Subjects

Four children (2 boys and 2 girls) were participants. They attended the after-school and summer-school programs provided for children residing in the Phoenix apartment complex. The boys were Stan and Vince, the girls were Lila and Torrie. The experiment was conducted across 12 months for Stan; 10 months for Vince and Torrie; and 21 months for Lila. When the study began, Stan was 9 years old and in 3rd grade; Vince was 9 and in 4th grade; Lila and Torrie were 8 years old and in 2nd grade. All children were of Hispanic ethnicity. Two (boys) of the 4 children reported that Spanish was the only language spoken at home. Both girls reported that Spanish and English were spoken at home. All of the children’s reports were consistent with the experimenter’s observations.

Setting

Sessions were conducted at a table with two chairs in various rooms in the building where the after-school and summer-school programs were held or in the child’s home. The experimenter went to the children’s homes when the after-school or summer-school programs were not in session, or when the child no longer attended the program. Attempts were made to keep distracting noise to a minimum.

Materials

One hundred twenty words containing the component short e or a vowel sound
(e.g., send, sand) were chosen from word lists in two texts, *Why Johnny Can’t Read* and *Word Journeys* (See Appendix A). The short e sound was present in 56 words, and the short a sound was present in 64 words.

In writing tests, words were said aloud and children wrote words onto an 8 1/2-inch X 11-inch lined notebook paper with a pen or pencil. In vocal tests, a 2-inch X 4-inch white index card was presented with one word printed in black, 48-point font, Times New Roman Script.

**Measurements**

The experimental tasks were writing spoken words and saying written words.

**Writing**

Responses were classified as *correct, consonant-only error, e/a-only error, long-vowel-sound-only error, consonant-with-e/a error, and e/a-with-long-vowel-sound error*. A correct word consisted of all component letters being present in the child’s written response product (e.g., if *sand* was spoken, child’s written response product was *sand*). A *consonant-only* error consisted of a written response that had an error in any of the consonant positions. (e.g., if *sand* was said and the child wrote *hand* or *sant*). An *e/a-only* error was scored if the child’s response contained an error in the vowel position (e.g., if *sand* and the child responded *send* or *saind*). An *e/a-with-consonant* error was scored if the child’s response contained errors in both the consonant and vowel sound positions (e.g., if *well*, and the child wrote *whale*). An *e/a-with-long-vowel-sound* error was scored if errors were present in the *e/a position* and the child added an e to the end
of the word (e.g., if *met* was said and *mate* was written). A *long-vowel-sound-only* error was scored if all components were correct, except the child added an *e* to the end of the word (e.g., *yap* was said and child wrote *yaped*, or *hang* was said and the child wrote *hange*).

**Saying**

Accuracy of saying responses were determined by the component phonetic features of the response (i.e., all component sounds of the word were present). If one component was absent the response was incorrect. Saying errors were categorized using the identical criteria for analyzing writing response errors (i.e., consonant-only error, *e/a*-only, consonant-with-*e/a*, *e/a*-with-long-vowel-sound, and long-vowel-sound-only).

**Interobserver Agreement (IOA)**

IOA was calculated using the number of agreements divided by the number of agreements + disagreements and multiplied by 100. Hear-write response products were scored against the experimenter’s word list and the two scores were compared on the number of errors recorded.

For Stan, IOA scores were obtained on 31 of 80 (39%) hear word-write word tests. IOA was ≥ 90%. IOA for Vince was obtained on 17 of 40 (43%) hear word-write word tests. IOA scores were ≥ 90%. IOA scores for Lila on 9 of 50 tests (18%) were ≥ 95%. For Torrie, IOA scores were ≥ 95% on 15 of 32 (47%) hear word-write word tests.

During see-say tests the IOA observer was present and recorded errors
simultaneously with the experimenter, or from a digital audio recording. Children’s vocal responses were compared to the experimenter’s word list and the number of errors recorded were compared.

IOA for Stan was obtained on 29 of 80 (36%) see word-say word tests. Scores were \( \geq 80\% \). IOA for Vince was obtained on 19 of 40 (48%) see word-say word tests. IOA scores were \( > 80\% \). IOA for Lila was obtained on 13 of 50 (26%) see word-say word tests, IOA was \( > 90\% \). For Torrie, IOA was \( > 90\% \) on 13 of 32 (41%) see word-say word tests.

**Procedures**

The experiment contained three phases. The first phase, Baseline (BL), consisted of each word being tested three times (i.e., Tests 1-3) in the hear-write and see-say channels. No programmed consequences followed each child’s hear-write and see-say responses. In the second three test phase (i.e., Tests 4-6) praise was delivered as an immediate consequence for correct responses. In the final phase, a return to the initial baseline condition of no programmed consequences occurred.

Children were tested in both channels, each day the experimenter worked with them. Hear-write tests preceded see-say throughout the experiment. Following completion of each day’s tests the child received a small treat. Initially, lollipops were given to the children. As the experiment progressed, fruit rollups were delivered.

*Baseline (BL)*

BL served as a multiple exemplars assessment to determine each child’s ability
to write each word the experimenter said, and say the correct vocal response when shown each word. Although most consonants in the alphabet were present in the words, an emphasis was placed upon the short e/a vowels (e.g., ten, tan, men, man, pen, pan). One hundred twenty words were grouped into 6 lists of 20 words each. Once words were assigned to a list they remained in that list throughout BL (see Appendix A). During BL and throughout the study, lists were not retested until the entire word list had been tested once.

The word lists and order they were presented are summarized in Appendix A and B. In Tests 1 and 2, the same words were tested in the H/W and S/S channels, although the order of the words was randomized. In Test 3, different words were tested each day in the H/W and S/S channels to increase the difficulty of the test (i.e., in one day’s tests the child would not hear and see the same word correctly pronounced and spelled).

Prior to beginning BL tests, the experimenter practiced by saying or showing the word *dog* to verify the participant would respond in the correct channel given the instructions (i.e., produce a written response when the experimenter said *dog* and emit a vocal response when presented with a 2-inch X 4-inch index card with *dog*).

The instructions for each channel test were:

**H/W:** “I am going to say a word. I want you to write that word on your paper. I will not tell you whether you wrote it correctly or incorrectly. Do your best.”

**S/S:** “I am going to show you a word on a card. I want you to say that word out loud. I will not tell you whether you said it correctly or incorrectly. Do your best.”

In H/W tests, if the child wrote a correct or incorrect response the next word was presented until 20 words had been said by the experimenter. If the child did not write a response after 5 seconds the next word was presented. In S/S tests, if the child said a correct or incorrect response the next word was presented on an index card until 20
words had been shown by the experimenter. If a child did not emit a vocal response within 5 seconds the next word was presented. After the completion of the day’s H/W and S/S tests, the child received an edible (e.g., lollipop or fruit rollup).

**Error Analysis**

After BL, the experimenter conducted an error analysis to determine the type of channel error and topography of error for each word during Tests 1-3. For Stan, Vince, and Torrie, words with *both HW/SS errors* were selected to be included in the next condition. Criteria for inclusion were:

1. At least one error in the component short e/a sound in either channel.
2. Errors in both H/W and S/S channels. Errors could be either consonants or vowels.

Lila’s error word group contained words with *HW-only errors* and *SS-only errors*. Criteria for inclusion into this group were:

1. At least one error in the component short e/a sound in either channel.
2. Errors in either the H/W or S/S channel, but not both. Errors could be either consonants or vowels.

In addition, *words with no errors during BL* were selected for all four children to be included in the next condition. Including these words increased the probability that the children would receive praise in the next condition and provided a comparison measure. Based on the aforementioned criteria, 40 words were selected for Stan, Vince, and Torrie from the initial 120 word BL list. For Lila, 20 words were chosen from the BL word list. Her list contained fewer words, due to the lower number of errors, the type of channel errors, and the topography of errors she made during baseline.
Tests with Praise as a Consequence

To evaluate the effects of praise on children’s correct responses, praise was delivered following each correct response in Tests 4-6. The experimenter conducted the test exactly as in BL, except an enthusiastic praise statement was said (e.g., “Right!”, “Yes!”, “Perfect!”, “You got it!”, “Excellent!”, “That’s correct!”, “Hmm-mm!”) when the child said or wrote the word correctly.

The same words were presented in H/W and S/S Tests 4 and 5 in a randomized order for all four children. Stan, Vince, and Torrie were tested on different words each day in the H/W and S/S channels in Test 6 in order to increase the difficulty of the test. This manipulation could not be done with Lila. Her word list contained only 20 words.

Return to BL

Beginning with Test 7, the experimenter reinstated the BL procedure of providing no programmed consequences for correct responses. The words lists remained unchanged from the previous phase. The words tested each day in the H/W and S/S channels differed on Tests 9 and 12 for Stan and Vince. For Torrie, the words tested were different on Tests 7 and 8. This difference was programmed to increase the difficulty of the test. This could not be done with Lila. Her word list contained only 20 words.
CHAPTER 3

RESULTS

Figures 1-4 show BL error results for all children on H/W and S/S Tests 1-3. Data points represent the total number of errors made when participants were tested on 120 words, 3 times.

For Stan (Fig. 1), frequency of H/W errors were 51, 34, and 30 in Tests 1-3 respectively. Frequency of S/S test errors were 22, 18, and 20.

![Figure 1. Stan's baseline results on H/W and S/S tests for the 120-short-e/a-words.](image)

For Vince (Fig. 2), frequency of H/W errors were 37, 37, and 28 for Tests 1-3. Similar to Stan, fewer errors were made on S/S tests compared to H/W tests. Errors on S/S tests were 19, 22, and 12.
**Figure 2.** Vince’s baseline results on H/W and S/S tests for the 120-short-e/a-words.

For Torrie (Fig. 3), H/W errors were 39, 38, and 36 on Tests 1-3. She also made fewer errors on S/S tests compared to H/W tests. The frequency of her S/S test errors were 31, 23, and 28.

**Figure 3.** Torrie’s baseline results on H/W and S/S tests for the 120-short-e/a-words.
For Lila (Fig. 4), H/W test errors were 20, 12, and 5. Her S/S errors were fewer than H/W errors until Test 3 when the data paths intersected. S/S errors for Lila were 4, 3, and 6.

Figure 4. Lila’s baseline results on H/W and S/S tests for the 120-short-e/a-words.

H/W data paths for Stan, Vince and Lila have slight decreasing trends while Torrie’s H/W and S/S and Stan, Vince, and Lila’s S/S test data are stable. In these figures, data appear as if there was no significant variability within children’s test performances and across Stan, Vince, and Torrie’s test performances.

Table 1 summarizes channel error types for all children and frequencies of GFEs (good phonetic equivalents). Of the 120 words that were tested in BL, Stan made both HW/SS channel errors on 29 words, Vince on 24 words, Torrie on 35 words, and Lila on 4 words. HW-only errors were made on 39, 35, 24, and 18 words by the respective participants whereas SS-only errors occurred on 14, 14, 14, and 8 words. No errors were made on 38, 47, 40, and 84 words. For the errors that occurred, GFEs were
emitted 12, 13, 10, and 14 times. Whether errors occurred at least once in the e/a-position (i.e., e/a-only error, consonant-with-e/a, e/a-with-long vowel sound) or in other positions (i.e., consonant-only or long-vowel-sound-only) are listed for each channel error type.

Information in Table 1 provides detail as to the type of channel errors made and whether children made primarily e/a-errors (e.g., e/a-only, consonant-with-e/a, e/a with long-vowel-sound-only) or other kinds of errors (e.g., consonant-only, long-vowel-sound-only). For Stan, Vince, and Lila a majority of channel errors were HW-only. For Torrie, the majority of her channel errors were both HW/SS. Based on the breakdown of channel errors into e/a errors or other errors, most children made a greater number of other errors compared to e/a errors, except for Stan and Vince’s both HW/SS channel errors.

Table 1

<table>
<thead>
<tr>
<th>Child</th>
<th>Both HW/SS</th>
<th>HW-only</th>
<th>SS-only</th>
<th>No errors</th>
<th>GREs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E/a errors</td>
<td>19</td>
<td>17</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>22</td>
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Figures 5, 7, 9, and 11 show each child’s frequency of errors per test and the total number of words with errors in each phase of consecutive tests on H/W and S/S tests. For each child there are four graphs. The two graphs at the top of the page represent each child’s performance in the error word group. The graphs at the bottom represent the no-error (during BL) word group. Graphs on the left side of the page represent Hear-Write tests. Graphs on the right side of the page are See-Say tests.

During BL, for the 19 words in the both HW/SS errors group, Stan made 12, 11, and 9 errors on H/W Tests 1-3 respectively (Fig. 5). On S/S tests, there were 11, 7, and 10 errors. The total number of words with errors across baseline tests was 19 in both the H/W and S/S channels. In the 21 words comprising the no error group, no errors were made on H/W or S/S tests.

When praise was delivered as a consequence for corrects in the 2nd phase, the frequency of errors on H/W tests in the HW/SS errors group decreased from 9 in Test 3, to 3 in Test 4, and remained at 3 on Tests 5 and 6. The total number of words with errors in this phase, decreased from 19 to 5. In the no-error group, frequency of H/W test errors increased from 0 in Test 3, to 1 in Test 4, and returned to 0 in Tests 5 and 6. The total number of words with errors increased from 0 to 1. In S/S tests for words in the HW/SS errors group, frequency of errors on tests decreased from 10 in Test 3, to 2 in Test 4, remained at 2 on Test 5, and increased to 5 on Test 6. The total number of words with errors in this phase decreased from 19 to 7. In the no-errors group, frequency of S/S test errors increased from 0 in Test 3, to 1 in Test 4, remained at 1 on Test 5 and returned to 0 in Test 6. The number of words with errors increased from 0 to 2.
Figure 5. Stan’s number of errors on H./W and S/S tests for both HW/SS and no errors in BL word groups. Data points are frequency of errors per test (closed circle) and number of words with errors in each phrase (X).

In the 3rd phase, when praise was withheld for corrects (i.e., Tests 7-12), error frequencies on H/W tests in the HW/SS group were 3, 5, 2, 3, 4 and 3. The total number of words with errors in this phase increased from 5 to 8. For words with no-errors, H/W
test error frequencies were 3, 0, 0, 1, 0, and 1. The total number of words with errors increased from 1 to 4. On S/S tests for words with HW/SS errors, error frequencies were 4, 2, 0, 1, 2, and 2. The number of words with errors in this phase increased from 7 to 10. In the no-error group, S/S test error frequencies were 0, 0, 0, 1, 0, and 1. The number of words with errors remained at 2.

Figures 6, 8, 10, and 12 are error analyses of H/W and S/S tests. Words with errors are in the upper panel. The words with no errors during BL are in the lower panel. H/W test results are displayed on the left and S/S test results are on the right. Word lists are in the far left column of H/W and S/S test results. Whether praise or no praise (BL) was delivered as a consequence is labeled at the top of the columns. Five types of errors occurred: consonant-only (no color), e/a-only (shaded blue), consonant-with-e/a errors (shaded yellow); e/a-with-long-vowel-sound errors are shaded green. If the child added an “e” to the end of the word and all other components were correct it is shaded pink (i.e., long-vowel-sound-only error). An asterisk (*) indicates when a child changed the topography of an error to a correct response during the praise condition, when there was an absence of praise. An X is recorded when the child changed an error to a correct response during a no-praise (i.e., BL) condition. The test number is labeled at the bottom of each column. The duration of time between tests is shown beneath each test number in weeks. The amount of time is indicated if it was 1 week or longer.

Figure 6 contains Stan’s lists of words with both HW/SS errors in BL (upper panel) and his list of words with no errors during BL (lower panel). In BL (Tests 1-3), there were 19 words with both HW/SS errors. In H/W tests, errors were consonant-only (e.g., child wrote damp on dam); e/a-only (e.g., child wrote ten on tan); consonant-with-
e/a (e.g., child wrote sand on sent) or e/a-with-long-vowel-sound (e.g., child wrote mate on met). Errors were inconsistent in topography for most words (e.g., dam). The same type of errors occurred in S/S tests as H/W tests (i.e., consonant-only, e/a- only, and consonant-with-e/a), except there were no long-vowel-sound-only errors. Topography of errors were inconsistent for some words (e.g. mend). In the 21 word no-error group, no errors occurred during H/W and S/S tests.

In the 2nd phase when praise was delivered as a consequence for correct responses, consonant-only errors completely dropped out in both channels, except for one error on “sent” in the S/S channel, while e/a-only, consonant-with-e/a, and e/a-with-long-vowel-sound errors persisted. Repeated errors on words remained variable, while topography of errors stabilized for most words (i.e., same errors made). In two instances, 1-H/W and 1-S/S Stan changed his error to a correct response when no praise was delivered for an error (recorded as *).

In the no error group, when praise was delivered, errors occurred for the first time in both, H/W and S/S tests when praise was delivered as a consequence. In H/W tests, there was one consonant-only error (i.e., gas). There were two e/a-only errors in S/S tests; when and was presented, end was said, and when flash was presented flesh was said. Stan changed errors to correct responses three times when there was an absence of praise (recorded as *). In H/W tests, this occurred once for gas. During S/S tests errors were changed for bed and ten. The word clap was not tested (recorded as NT) during this phase due to an oversight.

In the 3rd phase, when praise for correct responses was withheld, Stan made errors on 8 words in H/W tests in the HW/SS errors group. Of these 8, errors were
Figure 6. Words with hear-write and see-say channel errors and words with no errors during BL for Stan.
made on 3 in the previous phase. For words with no errors, there were errors on 4 words. Stan made an error on only one of these words (gas) in the previous praise phase. On S/S tests in the HW/SS error group, errors were made on 10 words. Of these 10, 5 had an error in the praise phase. On S/S tests in the no error group, the number of words with errors remained at 2. One of these words (flash), was incorrect in the praise condition.

When praise was withheld, consonant-only errors occurred again. E/a-only and consonant-with-e/a errors continued to occur inconsistently except for two words tan and than. A long-vowel-sound-only error occurred once for dam (participant wrote dame). In S/S tests, similar types of errors were seen (i.e., consonant-only, e/a-only, and consonant-with-e/a errors). Errors were inconsistent in occurrence for all words, and error topographies stabilized for most words (i.e., lend, men, mend, sent, than, wag). For words in the no-errors group, error topographies were e/a-only and consonant-only in H/W tests and e/a-only and consonant-with-e/a in S/S tests.

Vince had 15 words with both HW/SS errors in BL. Only 14 were included for the remainder of the experiment due to an oversight. Similar to Stan’s performance, error frequencies varied across H/W and S/S tests on these 14 words (Fig. 7). In H/W Tests 1-3, errors occurred on 11, 9, and 7 words respectively. On S/S tests there were 7, 11, and 3 errors. The total number of words with errors across BL tests was 14 in both the H/W and S/S channels. During S/S tests, Vince made no errors on the 26 words in the no errors during BL group. In H/W tests, no errors were made except on melt. This word was included in the group due to an oversight.

In the 2nd phase when praise was delivered as a consequence for correct
responses, H/W test error frequencies in the HW/SS error group were 7 in BL Test 3, remained at 7 in Test 4, and decreased to 4 on Test 5 and increased to 8 in Test 6. The total number of words with errors in this phase decreased from 14 to 11. On H/W tests in the no errors group, tests error frequencies were 0 on Test 3, remained at 0 on Test 4, increased to 2 on Test 5 and decreased to 1 on Test 6. The number of words with errors in this phase increased from 1 to 3. On S/S tests, for words with HW/SS errors, the frequency of errors on Test 3 was 3. Errors remained at 3 in Test 4, decreased to 2 on Test 5, and increased to 5 on Test 6. The total number of words with errors decreased from 14 to 8. In the no errors-group, error frequencies were 0 in Test 3, 0 in Test 4, errors increased to 2 on Test 5 and returned to 0 in Test 6. The number of words with errors in this phase increased from 0 to 2.

In the 3rd phase, when praise was withdrawn as a consequence for correct responses (i.e., Tests 7-12), in H/W tests for words with HW/SS errors, error frequencies on tests were within the praise phase range. Frequencies were 6, 5, 5, 6, 7, and 5. The total number of words with errors in this phase decreased from 11 to 10. For words with no errors, error frequencies for each test were 0, 0, 1, 0, 1, and 1. Total number of words with errors remained at 3. On S/S tests for words with HW/SS errors, error frequencies on tests were 4, 4, 2, 5, 4, and 2. The number of words with errors increased from 8 to 10. In the words with no errors during BL, error frequencies on tests were 0, 0, 2, 0, 0, and 1. The number of words with errors in this phase remained at 2.
Figure 7. Vince’s number of errors on H/W and S/S tests for both HW/SS (upper portion) and no errors in BL (lower portion) word groups.

Figure 8 contains Vince’s lists of words with both, HW/SS errors in BL (upper panel) and his list of words with no errors during BL (lower panel). In H/W tests, for the 14 words with both HW/SS errors, errors were consonant-only (e.g., see pen child wrote hen); e/a-only (e.g., see end child wrote and), consonant-with-e/a (e.g., see lend child...
wrote *lean*), and long-vowel-sound only (see *yap* child wrote *yaped*). Errors were slightly more consistent in occurrence and topography compared to Stan (e.g., see *end, pant, rant, tan* errors). In S/S tests, the same types of errors were made (i.e., consonant-only, e/a-only, and consonant–with-e/a), except there were no long-vowel sound-only errors.

In the praise condition for words with HW/SS errors, consonant-only errors occurred once in H/W (i.e., subject wrote *lent* when *lend* was said) and four times in S/S (band, end, hand, and pant). E/a-only and consonant-with-e/a errors continued to occur in both channels. The occurrence of errors remained variable while the topography of errors became stable for most words (i.e., same errors made compared to BL). In one instance, in H/W, Vince changed his error to a correct response when no praise was delivered for an error (recorded as *).

Errors occurred in both, H/W and S/S tests for the words with no errors in BL group when praise was delivered as a consequence for corrects. There were three consonant-only errors in H/W tests (i.e., *met, past, then*). There were two e/a-only errors in S/S tests; *rant* was said when *rent* was presented, and for *then, than* was said.

In the 3rd phase when praise was withheld, Vince made errors on 10 words on H/W tests in the both HW/SS errors group. All 10, were words Vince made errors on in the prior condition. In the no error group Vince made errors on 3 words. Vince did not make errors on these 3 words during praise. On S/S tests, in the both HW/SS errors group, there were 10 words with errors. 6 of the 10 were words Vince made an error on during praise. In the no error group, there were 2 words with errors. Vince erred on one of these words (*rent*) during praise.
Figure 8. Words with hear-write and see-say channel errors and words with no errors during BL for Vince.
In the reversal phase, for words with both HW/SS errors, consonant-only errors occurred in both, H/W and S/S tests. E/a-only and consonant-with-e/a errors continued to occur inconsistently except for three words in H/W (*rant, tan, than*) and one word in S/S (*mend*). The topography of errors in H/W tests remained consistent for four words (*band, rant, tan, than*) and for five words in S/S tests (*am, ant, end, hand, than*). For the words with no errors during BL, errors continued to occur. Error types were consonant-only in H/W tests and e/a-only in S/S tests.

In BL, Torrie had 16 words with both, HW/SS errors. Only 15 words were included for the remainder of the study due to an oversight. Identical to Stan and Vince, error frequencies varied across H/W and S/S tests. In H/W tests 1-3, error frequencies were 10, 7, and 5 (Fig. 9). On S/S BL tests, for the words with both HW/SS errors, error frequencies were 9, 8, and 7. The total number of words with errors across baseline tests was 15 in both the H/W and S/S channels. Torrie did not make any errors during H/W or S/S tests on the 25 words in the no errors during BL group.

In the 2nd phase when praise was delivered as a consequence for correct responses, in H/W tests for the HW/SS errors group, error frequencies on tests were 5 on test 3, decreased to 3 in test 4, increased to 4 in test 5, and returned to 3 in test 6. The total number of words with errors in this phase decreased from 15 to 5. On H/W tests in the no errors group, frequency of test errors were 0 on test 3, errors increased to 2 in test 4, returned to 0 in test 5, and increased back to 2 in test 6. Total number of words with errors increased from 0 to 3. On S/S tests, for words with HW/SS errors, frequency of errors on test 3 was 7, errors decreased to 3 in test 4, increased to 6 in test 5, and remained at 6 in test 6. The number of words with errors in this phase
decreased from 15 to 10. In the no errors group, test errors were 0 on test 3, increased to 3 in test 4, increased to 5 in test 5, and decreased to 4 in test 6. In this phase, the total number of words with errors increased from 0 to 9.

In the 3rd phase, when praise was withdrawn as a consequence for correct responses (tests 7-10), in H/W tests for words with HW/SS errors, frequency of errors per test fluctuated near levels in the praise phase. Errors were 3, 1, 3, and 6 on tests 7-10 respectively. The total number of words with errors in this phase increased from 5 to 7. For words with no errors, error frequencies on each respective test were 1, 0, 4 and 3. Total number of words with errors increased from 3 to 6 in H/W tests. On S/S tests for words with HW/SS errors, the number of errors per test were 3, 6, 2, and 5. Total number of words with errors increased from 10 to 11 in this phase. On S/S tests in the no errors group, error frequencies per test were 3, 3, 1 and 2. The number of words with errors decreased from 9 to 5.
Figure 9. Torrie’s number of errors on H/W and S/S tests for both HW/SS and no errors in BL word groups.

Figure 10 shows Torrie’s list of words with both, H/W and S/S errors and words with no errors. For the 15 words with both HW/SS errors, errors were primarily consonant-only (e.g., see mass, child wrote mas). Few e/a-only errors (e.g., see flesh, child wrote flash) occurred. Errors varied in topography except for three words (flesh,
mass, rant). There were additional types of channel errors in S/S tests compared to H/W tests. Consonant-only, e/a-only, consonant-with-e/a, and e/a-with-long-vowel-sound errors occurred. No errors were made in H/W or S/S tests in the 25 word no-error-during-BL group.

In the praise condition for words with HW/SS errors, consonant-only errors occurred in H/W tests. In S/S tests, consonant-only and e/a-only errors were made. The occurrence and topography of errors remained variable for most words except for band and rant in H/W. Torrie wrote bad and rat respectively. In S/S tests, error occurrence and topography was stable for less and pest. In S/S test 4, Torrie changed an error to a correct response on than (recorded as *).

Identical to Stan and Vince, when praise was delivered for correct responses, Torrie made errors for the first time in both H/W and S/S tests for the words with no errors in BL group. Errors were consonant-only in both channels. For all words with recurring errors, error topography was stable.

In the 3rd phase when praise was withheld, there were 7 words with errors in H/W tests for the HW/SS errors group. 4 of the 7 words were words Torrie erred on during praise. There were 6 words with errors in H/W tests in the no-error group. 2 of the 6 words, Torrie made errors during praise. In S/S tests for the HW/SS errors group there were 11 words with errors. Ten of the 11 words, Torrie made an error during praise. On S/S tests in the no-error group, there were 5 words with errors. 4 of the 5 words Torrie made an error, during praise.
Figure 10. Words with hear-write and see-say channel errors and words with no errors during BL for Torrie.

In the reversal phase, consonant-only errors occurred in H/W tests in the HW/SS errors group. Consonant-only and e/a-only errors occurred in S/S tests. In H/W tests, errors for mass and rant were consistent and the error topography was stable. In S/S tests, errors on less were consistent, and errors on less and pass had stable topographies. For words with no errors during BL, errors continued to occur during the
return to BL phase. Errors were consonant-only in H/W and S/S tests. Error
topographies were stable for chest in H/W and four words in S/S (chest, fresh, hag,
met).

Lila had 10 words in her H/W-only and S/S-only error word group. Of these 10, 7
were words Lila made H/W-only errors. Three were words she made S/S-only errors.
Identical to the other children Lila’s frequency of errors on each test varied in BL. Lila
made 7, 3 and 0 errors on H/W tests 1-3 respectively (Fig. 11). On S/S tests, there were
2, 1, and 0 errors. The total number of words with errors across baseline tests was 10 in
the H/W-only and S/S-only channels. There were no errors made in H/W or S/S tests on
the 10 words in her no-errors during BL group.

When praise was delivered as a consequence for corrects, in H/W tests for the
H/W-only and S/S-only words, error frequencies per test were at 0 in test 3, remained at
0 in test 4, increased to 1 in test 5 and returned to 0 in test 6. The total number of
words with errors in this phase decreased from 7 to 1. In S/S tests, error frequencies
per test were 1 in test 3, increased to 2 in test 4, and dropped to 0 in tests 5 and 6. The
total number of words with errors decreased from 3 to 2. For the no error words, error
frequencies remained at 0 in both H/W and S/S tests.
In the 3rd phase, when praise was withdrawn for correct responses (i.e., tests 7-15), in H/W tests for words with H/W-only and S/S-only errors, error frequencies were at 0 in all tests, except test 13 when Lila wrote *him* when *hem* was said. The total number
of words with errors remained at 1 in this phase. In the words with no errors during BL group, error frequencies were at 0 for all tests, except test 11. Lila wrote *whest* when *west* was said. The total number of words with errors in this phase increased to 1. In S/S tests, in the H/W-only and S/S-only words, no errors occurred during tests 7-15. The total number of words with errors decreased from 2 to 0. In S/S tests in the no errors group, the number of words with errors remained at 0.

Figure 12 is Lila’s list of words with H/W-only and S/S-only errors and words with no errors. In H/W tests for the 10 words with H/W-only and S/S-only errors, errors were consonant-only (e.g., see *lend* child wrote *blend*); e/a-only (e.g., see *men* child wrote *man*), consonant-with-e/a (see *and* child wrote *mend*), and long-vowel-sound-only (see *hang*, child wrote *hange*). During BL in S/S test 1, e/a-only errors were made on two words *bet* and *lest*. No errors occurred in test 2. During test 3, Lila said *bang* when *beg* was presented. Like the other children, Lila did not make any errors on the 10 words in the no errors during BL group.

When praise was delivered for correct responses e/a-only errors occurred on one word in H/W tests and two words on S/S tests in the H/W-only and S/S-only word group. Lila was the only child who continued to respond correctly in H/W and S/S tests on the no-errors during BL words.
Figure 12. Words with hear-write only and see-say only channel errors and words with no errors during BL for Lila.
In the return to BL condition, for H/W-only and S/S-only words, e/a-only errors occurred in H/W tests and no errors were made in S/S tests. Lila was the only child who changed errors to correct responses in this phase. She did this twice, once in H/W test 9 and once in H/W test 13 (recorded as X). In the no-errors during BL group, one, consonant-only error occurred in H/W tests. In S/S tests, no errors occurred although Lila did change an error to a correct response on test 9 (recorded as a X).
CHAPTER 4
DISCUSSION

Baseline results show that children made a variety of errors in both HW/SS, HW-only, and SS-only channels. In general, children made more errors in H/W tests compared to S/S tests. When errors on words occurred in both channels, topographies frequently were different across channels. There were primarily three types of errors in both H/W and S/S channels: consonant-only, e/a-only, and consonant-with-e/a. The types of errors Stan, Vince, and Lila made in both H/W and S/S tests were similar; however, the frequency of errors differed. Torrie made different types of errors in H/W and S/S tests. In H/W tests, a majority of her errors were consonant-only with a few e/a-only errors. In S/S tests her errors were consonant-only, e/a-only, consonant-with-e/a, and e/a-with-long-vowel-sound. The introduction of praise had differential effects on children’s performances. Across children, it reduced the total number of words with errors. With respect to topography of errors, praise seemed to have the biggest effect on consonant-only errors for one child.

Testing alone had an effect upon responding. All children’s data had decreasing trends in their error word groups on H/W and S/S tests during BL. Yet, the frequency of errors remained high for three children. Lila responded correctly on all words in H/W tests by the end of BL in the words with H/W-only and S/S-only errors. This might be due to the implicit teaching present in the procedures. During each test, the child would hear the correct pronunciation of each word and see each word correctly spelled. This minimal teaching might have been enough to improve performance. Alternatively, instruction or correction might have occurred in the school between tests.
Despite the possibility that repeated tests might influence the accuracy of responding they are necessary to accurately depict the child’s presenting component skills and skill deficits. The practice of repeated tests over weeks to accurately assess child responding is supported by these data. Results from one pre-test/post-test measure are questionable. If one pre-test is administered, it is possible that an error might not occur. If an error did occur, it could be of a different type and thus not represent the variability seen in errors. Lee and Pegler (1982) also found variability when measuring the topography of children's spelling responses. The variability in frequency and type also suggest that frequency of errors during testing is not sufficient as a measure. Number of words with errors and type of errors are also needed to accurately represent performance.

The experimental feature of interspersing words with errors with words with no errors, after BL tests (i.e., 4-12), did provide a comparison measure. Errors were less in number in the no-error group compared to the words with H/W and S/S errors or H/W-only errors and S/S-only errors for all subjects, but errors did occur. In this context, one begins to wonder what are the criteria for mastery? For Lee and Pegler (1982) and Cuvo et al. (1995), 2 consecutive corrects were mastery. Neef, Iwata, and Page (1977) defined 3 as mastery. These data indicate otherwise. Binder (1988) discussed the ineffectiveness of accuracy measures as a definition of mastery. Offering instead, the features of fluent performance, which are accuracy combined with speed allowing the performer to respond in the presence of distractions, retain the skill, and apply it in new situations.
Interspersing words with no errors might have affected outcomes. Neef, Iwata, and Page (1977, 1980) found that interspersing known reading and spelling words with unlearned words improved acquisition and retention performance. In addition, when given a choice, students chose the intersperse condition (Neef, Iwata, & Page, 1980).

Praise, as a consequence, had mixed effects upon children's H/W and S/S responses. The two measures used to evaluate the effects of praise were the total number of words with errors in each phase and the frequency of errors on each test. For all children, in the both HW/SS errors or HW-only and SS-only errors groups, the delivery of praise resulted in a reduction of the total number of words with errors in H/W and S/S tests. In the no-errors during BL group, Lila was the only child whose errors remained at 0 when praise was delivered as a consequence. Stan, Vince, and Torrie made errors for the first time in the no-errors word group on H/W and S/S tests during praise. Praise influenced the frequencies of errors on tests to a lesser degree. Stan had a reduction in the frequency of errors per test measure in the both HW/SS error words during praise compared to BL. Vince, Torrie, and Lila remained within a range near the frequency of errors seen in the last BL test in their respective error word groups.

For one child, Stan, consonant-only errors decreased when praise was delivered as a consequence compared to the other types of errors. Not only were the types of errors made, topographically different response classes requiring different skills, they were possibly separate operants. In addition, Torrie made different types of errors in H/W and S/S tests during praise in her error word group. Consonant-only errors occurred in H/W tests, while she made consonant-only and e/a-only errors in S/S tests.
In this experiment, praise as a consequence, increased correct responding up to a point. Other programming variables were needed to fully correct the errors. Similar results have been seen in studies using attention. Additional treatment components other than praise were needed when target behaviors were: increasing the duration of time spent alone or in the presence of a knife (Leitenberg, Agras, Thompson, & Wright, 1968); children's arguing and talking out (Hall, Fox, Willard, Goldsmith, Emerson, Owen, Davis, & Porcia, 1971; O'Leary, Becker, Evans, & Saudargas, 1969); turning around and talking in seat (McAllister, Stachowiak, Baer, & Conderman, 1969), children's study behavior (Hall, Panyan, Rabon, & Broden, 1968), compliance (Wahler, 1969), verbalizations (Reynolds & Risley, 1968), and hitting self (Lovaas & Simmons, 1969).

What is problematic when attempting to specify the effects of praise are the recurrence of errors or their absence then occurrence (e.g., Stan’s performance on than on H/W and S/S tests; Torrie’s responding on band in H/W and fed in S/S; Vince’s responses for end on H/W and S/S tests). Or in rare instances why did Stan, Vince, and Torrie change their errors when there was an absence of praise as opposed to every time there was an absence of praise? Lila did not change an error during praise but began to change errors in the return to BL condition.

What was apparent in this experiment was having a simple reversal with praise for corrects resulted in a reduction of errors and stable data by the end of the study (e.g., Vince’s responses on tan in H/W and S/S tests or rant; Stan’s responses for men in H/W and S/S tests or hem; Torrie’s performance on pest in S/S tests or rant in H/W). An implication of this is, unnecessary interventions to remediate errors can be avoided by initially assessing the effects of tests and praise for corrects. Students must have
opportunities to practice, which is not a feature of classrooms today. Brief-timed practice independent of any other intervention has been shown to improve performance (Binder, 1988). Although, Lee & Pegler (1982) did not show an improvement in hear-write responses when children practiced exclusively in the hear-write channel. In addition, the delivery of praise is a program feature. How will the child immediately know that he responded correctly or incorrectly?

The results of this experiment indicate the behaviors of reading and spelling are separate repertoires. Responding in one channel did not predict performance in the other channel. The response required in a H/W test is different from the response in a S/S test. In one, the child writes the word said. In the other, the child says the word presented as a visual stimulus. This dissimilarity parallels the distinction between receptive and expressive language. In receptive tasks a non-vocal response is emitted following a verbal instruction. Expressive tasks require a vocal response. Training in one repertoire does not necessarily result in acquisition of responses in the other repertoire (Guess, 1969; Guess & Baer, 1973; Lee, 1978, 1981). Another difference between hear-write and see-say tasks is the stimulus controlling the child’s response is different. In a hear-write task the stimulus is auditory. In a see-say task the stimulus is visual.

Although the child, when writing the word said, is producing a visual stimulus that could later be used, if it is correct, there is not necessarily cross channel acquisition from hear-write to see-say unless specific training features characteristic of the equivalence relations paradigm are present. The first two experiments discussed in Sidman (1994) resulted in successful cross-channel performances when 3 DD residents
were taught to hear-word and point-to-word. Hear word-point-to-word training resulted in significant acquisition in see-say word, along with see word-point-to-picture and see picture-point-to-word without direct training. An additional experiment explored what training components were necessary for cross channel transfer. Was it necessary for the participants to emit the same response across separate channels (i.e., see picture-say name and see word-say name) or for the person to hear the same word spoken and respond across channels (i.e., hear word –point-to-picture and hear word-point-to-word)? Sidman found that responding across channels to the same stimulus was necessary for cross channel transfer. If the goal is to improve a child’s see-say responding then the see-say channel needs to be assessed. Similarly, if the goal is to improve a child’s ability to spell then the hear-write channel needs to be evaluated. Inferences made from performance in other channels, might not accurately portray the specific errors present.

Most of the errors made in this study were children writing an e where an a was necessary or vice-versa (e.g., Vince’s responding on tan or rant) or saying the incorrect component vowel sound within the word (e.g., Stan’s saying wahg or weg for wag; or Lila’s bit for bet). Lila, during one hear-write test, began writing e down her page prior to a word being said. Which raises an additional confound, the children had a 50/50 chance of getting the component vowel sound correct, it was either e or a. This possibly explains why tan was in Stan’s words with H/W and S/S errors and ten was in the words with no errors group. He consistently responded ten for tan in H/W tests.

Slight manipulations, if conducted, could have provided additional information.
1) Assess to determine if the child could have chosen the correct word if the experimenter said the word (e.g., the experimenter said dog and the child chose the card with dog printed on it). 2) Instead of delivering praise during both H/W and S/S tests, providing praise in one channel and measuring effects across channels. 3) Having one more 3-test attention phase. 4) Having words in separate or interspersed with no error word training groups. 5) Having hear-write tests without see-say; see-say without hear-write; both hear-write and see-say. 6) Finding a time-effective way to produce the same outcomes (i.e., stable error patterns and a reduction of errors) by controlling for the same number of tests but having tests span a few weeks versus months. Testing a 40-word group over the course of 10 months or a 20-word group over the course of 1 year and 9 months is not practical. It is informative but not time-effective given the constraints present in a typical classroom.

In summary, as a result of Experiment 1, the following conclusions can be made: One, hear-write and see-say repertoires are separate, not only in terms of the response but also in terms of the controlling stimuli evoking each response. Two, repeated tests over a long duration of time to assess child performance are necessary to accurately depict the child’s presenting component skills and skill deficits. Three, it is informative to deliver praise for correct responses, as well as no praise, in order to determine if the child’s performance is due to a skill deficiency. Is it they cannot do the task? Or will not do it? (Mager, & Pipe, 1984).
APPENDIX A

BASELINE WORD LISTS
The 120-word short e/a list, tested three times for each child, during BL.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<td>well</td>
<td>lend</td>
<td>test</td>
<td>wed</td>
<td>dash</td>
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<td>pest</td>
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<td>pant</td>
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<td>bath</td>
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<td>that</td>
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<td>tend</td>
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<td>as</td>
<td>ant</td>
<td>ask</td>
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<td>bet</td>
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Test dates (i.e., month/day) for each of the six word lists during BL tests

1-3 for Stan and Vince.

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Test dates (i.e., month/day) for each of the six word lists during BL tests 1-3 for Torrie and Lila.

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| **See-say tests**        | **See-say tests**      |
| **List**                | **List**               |
| 1                       | 1                      |
| 11/4 2/18 4/14          | 11/11 1/27 2/11       |
| 2                       | 2                      |
| 12/4 2/20 2/13          | 11/18 1/28 2/18       |
| 3                       | 3                      |
| 4                       | 4                      |
| 1/30 3/25 4/15          | 11/21 2/3 2/19        |
| 5                       | 5                      |
| 6                       | 6                      |
| 4/2 4/7 4/17            | 12/2 2/10 3/3         |
REFERENCES


