Measuring Spelling Growth Over Time in Elementary Writing Samples

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MEASURING SPELLING GROWTH OVER TIME
IN ELEMENTARY WRITING SAMPLES

by

Pamela M. Ansell

A Thesis
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in partial fulfillment of the
requirements for the
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MEASURING SPELLING GROWTH OVER TIME
IN ELEMENTARY WRITING SAMPLES

Pamela M. Ansell, M. A.
Western Michigan University, 2004

Developmental spelling stage theories have been proposed and disputed for 30 years. The current study used Gentry’s (1982) model to assign category ratings to narrative writing samples produced by 32 students over two years to observe developmental growth over time. In addition, quantitative measures were obtained from the samples, including an index of control (Laminack & Wood, 1996) and a percentage correct. Analyses were also used to test the effectiveness of using a writing lab approach (Nelson, Bahr & Van Meter, 2004) on spelling development. During the last half of second grade, all 32 students received intervention guided by the writing lab approach. During third grade, only 21 students received intervention. This allowed for a continuous intervention group (n = 21) and a comparison group (n = 11).

Results indicated that a spelling stage model, such as Gentry’s (1982), was able to measure growth over time. Analyses of variance showed a significant effect for time from mid-second grade to the end of third grade for category rating, index of control, and percentage correct. In addition, analyses from paired t-tests revealed that students in the continuous intervention group evidenced a greater change over time than the comparison group, indicating a positive effect of the writing lab intervention model to support spelling growth over time.
I would like to begin by thanking Dr. Nickola Nelson, my advisor, who has
guided me every step of the way. Her research and interest in children’s writing
allowed me to choose an enriching and interesting topic and her experience with
writing has only helped me to improve my own writing by practicing (and practicing
and practicing...). I will never look at misspelled words in the same way.

I would also like to thank my thesis committee, Dr. Brooks Applegate, Dr.
Michael Clark, and Mrs. Adelia Van Meter, who have challenged me to advance my
research and critical thinking skills with their continuous questions and suggestions.

Thank you also to the people who made this study possible, including the
students and teachers who participated in the writing lab from Kalamazoo, Michigan.
They have given me laughter in their stories and insight to the different ways that
children spell words. The data collection for this study was supported by a grant
from the U. S. Department of Education, Office of Special Education Programs
(Grant No. H324R980120 to N. W. Nelson and C. M. Bahr), without which this thesis
would not have been possible.

In addition, I would like to thank three colleagues from the Department of
Speech Pathology and Audiology at Western Michigan University. Kylee Biddle and
Frazier Jordan, first year graduate students, transcribed students’ samples and
deciphered young authors’ handwriting. Kelli Talicska, a second year graduate
student, prepared and randomized the transcribed samples so that I could be blind to
the conditions in the study. Kelli was also my roommate and I thank her for her
continuous love and support.
Finally and most importantly, I would like to offer thanks to my family and friends for tolerating me for the past 15 months. You have witnessed my sacrifices, dedication, and hours of work, so that I may accomplish such a great task. Thank you for the love and acceptance that you gave me, even when I was not always lovable. It will always be remembered.

Pamela M. Ansell
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CHAPTER ONE

INTRODUCTION

Students in the early elementary grades rely on reading and writing skills to achieve success in school. Without these important skills, it is difficult to learn in the classroom. Students need literacy skills that enable them to decode words when they are reading and to encode words when they are spelling. In order to spell, they develop processing skills for connecting print and letter knowledge with word and sound knowledge. Prior researchers have observed that students’ spelling skills progress through a series of stages, and that assessment and intervention techniques should be applied in relation to this progression. Other researchers have disputed the use of such stage theories. The current study was designed to provide information about the progression of spelling skills using one developmental stage theory to measure spelling growth over time in writing samples produced by second and third grade students.

Introduction to Spelling Stage Theories

Literacy Development Related to Spelling Stage Theories

Some researchers have suggested that spelling abilities are reciprocal to reading abilities, in that spelling involves a system of “encoding” words and reading involves a system of “decoding” words (Bourassa & Treiman, 2001; Boyd & Talbert, 1971; Lamme, 1984; Scott & Brown, 2001; Waters, Bruck, & Malus-Abramowitz, 1988). Templeton (1991) stated that a child’s “word knowledge is actual reading, and the primary means by
which this knowledge is exercised and developed is purposeful writing” (p. 187).

Templeton (1991) and others have also argued that spelling skills increase as writing
skills increase (Boyd & Talbert, 1971; Gentry, 1987; Hodges, 1981). Most recently,
spelling has become an interesting topic in research, especially related to how it can be
assessed and improved using reading and writing skills. By analyzing a child’s written
words, researchers and speech-language pathologists can draw inferences about the
child’s ability to spell and the linguistic strategies that underlie that ability.

In 1971, Boyd and Talbert made the extreme statement that “spelling is the basic
element of communication and learning” (p. v). In reference to literacy, they emphasized
that spelling is a foundation upon which other literacy skills can grow. Without strong
spelling abilities, it is difficult to write well, and erroneous spelling can have an impact
on the way others perceive one’s written work. For example, Shaughnessy (1977)
commented that spelling errors in written work often might lead others to perceive the
paper as inadequate and the author as lacking in education or intelligence.

Developmental Spelling Stage Theories

Spelling assessment and intervention decisions used in the writing lab model
approach (Nelson, Bahr, and Van Meter, 2004) are adapted from Gentry’s stage model of
stages of spelling development: (a) precommunicative, (b) semiphonetic, (c) phonetic, (d)
transitional, and (e) correct. These stages were also used for analysis in the current study.
Although Gentry’s research provided the basic model for this study, his work is related to
similar models produced by a number of other theorists who have also written about
spelling development (e.g., Bear & Templeton, 1998; Henderson, 1990; Lamme, 1984; Steffler, Varnhagen, Friesen & Treiman, 1998).

Gentry's (1982, 1987) stages first introduce descriptions of the "emerging speller" and then proceed to descriptions of the more accurate speller. His stages have been based on "following a simple pattern" (Gentry, 1987, p. 19), or the development of "spelling awareness" (Lamme, 1984, p. 139). In describing spelling development, some researchers have focused on growth in the psychological aspects of development, such as long-term memory (Steffler, et al., 1998). Others have observed developing knowledge of "orthographic concepts" (Beers & Henderson, 1977, p. 133) and spelling patterns, in that "trends were also noted in the types of errors children made in representing features at their stage of development" (Ganske, 1999, p. 61). Some researchers have also noted parallels between the developmental acquisition of words when learning to talk and the developmental acquisition of written language for communication (Gentry, 1987; Hanna, P. & Hanna, J., 1966; Hodges, 1981).

Opposition to a Stage Theory Approach

A number of researchers have questioned the application of developmental stage models of spelling (e.g., Apel, Masterson, & Hart, in press; Bourassa & Treiman, 2001; Laminack & Wood, 1996; Steffler et al., 1998). They have made arguments that children's spelling does not always follow a completely sequential process and that the stage theory approach has stage boundaries that are too restricting (Bourassa & Treiman, 2001, Laminack & Wood, 1996). In addition critics have argued that the use of stage theory for assessment has not historically accounted for information gained from observing correctly spelled words. Rather past researchers have only analyzed spelling
errors (Steffler et al., 1998). Still others have questioned the use of a stage model to represent spelling skills of a child that may refer to skills from previously mastered stages in order to spell new and complex words (Apel, Masterson, & Hart, in press).

**Stage Theory Implications for Spelling Assessment**

The controversy over whether or not a stage theory approach is useful for assessment and intervention demonstrates the need for researchers to investigate the usefulness of a stage theory to provide a full description of spelling development. It also addresses whether stage theory might be useful when applied clinically to meet students' specific writing needs. The writing lab model (Nelson et al., 2004) uses a word-level analysis system that is consistent with the Gentry stage model (1982) to address students' individual needs in the area of spelling. Speech-language pathologists (SLPs) collaborate with educators to help students advance in their writing abilities using scaffolding and personalized goals. Based on results from spelling observation and analysis, scaffolding goals are aimed at taking students to the next higher level on the spelling stage model.

In the writing lab approach SLPs collaborate with general education teachers in the classroom to provide writing instruction to the students. All of the students in the class receive this instruction, but additional individualized support is provided for students with special needs or for those that are at high risk for literacy difficulty. Instruction focuses on all language levels—discourse, sentence, and word. At the word level, in the area of spelling, students' baseline samples (spontaneous, informal written narratives) are analyzed and assigned to a single spelling stage or category, based on spelling errors and correct spellings that are observed following Gentry’s stage model (1982). When writing, students are told to spell as best as they can without adult help.
After the students have completed their baseline samples, SLPs and classroom teachers scaffold them to advance from their current level of spelling ability and move to the next higher level of spelling achievement. For example, if the child’s spelling and the correct spelling of a word do not have a strong phonological similarity, the child’s spelling is characterized at the prephonetic or semiphonetic level, according to Gentry’s (1982) model. Scaffolding is aimed at helping the child hear the presence and sequence of sounds and then use letters to represent those sounds on paper. Another example is when a child is spelling most words phonetically, but misspelling derivational morphemes (e.g., -able, -tion) or bound morphemes (e.g., -ed, -ing). In this case, scaffolding would aim at helping the child recognize correct use of morphological patterns. As these skills develop, as well as other orthographic rules (e.g. the use of silent -e, spelling changes with word endings), the uses of more complex skills, such as the correct use of contractions, compound words, and homophones (e.g., there vs. their) is encouraged.

No matter what types of spelling error patterns children produce, educators need to know how to analyze the patterns and modify intervention to meet students’ individual needs. Bourassa and Treiman (2001) noted that “an awareness of the linguistic basis of the misspellings can help researchers and educators better understand young children’s performance” (p. 176).

Research Purposes, Questions, and Hypotheses

This study was designed for two purposes. The first purpose was to measure the effectiveness of using a spelling stage theory to monitor growth in spelling development. A second purpose was to evaluate the effectiveness of the writing lab instructional approach for advancing students’ spelling ability.
Although numerous developmental spelling stage theories have been proposed, the specifications for each stage have not always been clearly defined. For the purpose of this study, a category rating system was created based on Gentry’s (1982) detailed descriptions of his developmental stage theory. The system was used to analyze misspelled words and observe correctly spelled words produced in narratives written independently by second and third grade students.

Two primary questions were addressed in this study:

1. Can a linguistically-based category rating system produce evidence of students’ growth in spelling ability over a period of longitudinal observation during the early elementary years?

   To answer this question, the category rating system based on Gentry (1982) was used to analyze individual spelling errors and observe patterns in correctly spelled words from the students’ narrative samples written during second and third grade. The words were analyzed to determine whether or not a predictable developmental spelling progression could be observed in informal writing samples. The samples were all produced following the same protocol, which invited the students to write a story. The researcher hypothesized that the category rating system would show a developmental spelling pattern across time periods.

2. Does analysis of spelling growth provide evidence for the effectiveness of a writing lab intervention model?

   To answer this question, the researcher analyzed baseline samples and samples produced over the two year time span for two groups of students. One group of students, who is referred to in this study as the “continuous intervention” group, participated in the
writing lab from the middle of second grade until the end of third grade. The other
group, the “comparison group”, participated in the writing lab from the middle of second
grade until the end of second grade, and did not participate in third grade. The effect size
and significance for growth between Time 1 and Time 2 were observed and recorded for
both groups of students to determine if the writing lab intervention was effective during
the time that they both received instruction. Effect sizes and significance for growth
were also measured between Time 2 and Time 5 to determine if a greater effect could be
observed for the students in the continuous intervention group, who were receiving
instruction during that time, than for the students in the comparison group, who were not.
The researcher hypothesized that there would be a greater overall change in spelling
achievement for the group that received the writing lab instruction continuing through
their third grade year (the continuous intervention group) than for the comparison group.
CHAPTER TWO

LITERATURE REVIEW

"Where words are concerned, there is much that, for most children, remains undiscovered" (Templeton, 1991, p. 199).

Spelling errors among child authors are diverse. Errors stem from ideas and functions that may not be clear to an adult observer, but seem sensible to the child. In the 1970s, Read noted that although inexperienced writers produced numerous spelling errors, they often demonstrated similar patterns in the errors they produced. Read described a child’s thinking process as “intuitive,” even at a young age (Allred, 1984, p. 9). Still today, researchers are attempting to describe these thinking processes and to define their linguistic underpinnings. This chapter introduces the history of developmental stage theories in spelling, describes controversy regarding the application of these theories, explains assessment and intervention methods based on a stage theory approach, and describes the role of a speech-language pathologist and educator in spelling assessment and intervention.

History of Developmental Spelling Stage Theories

Varying hypotheses have been proposed about the kinds of spelling errors that students make. These have led to stage theories about developmental spelling abilities. Most research has focused on children’s spelling errors, and each study has attempted a
different approach for doing so. Table 1 summarizes the common categories and
characteristics of the stage theories discussed in this chapter.

The 1970s: A Phonological Perspective

Read first began to observe the way children hear and understand speech sounds
in the early 1970s. He studied the phonological aspect of spelling by focusing on
children’s “invented spelling” (Read, 1975, p. 30). Read’s study included 20 children
between the ages of three and a half and six years who were “allowed to experiment with
writing and encouraged to do so early” (Henderson, 1981, p. 52). After the children
produced writing samples, Read (1975) analyzed their spelling by observing how they
spelled various vowel and consonant sounds. He matched the children’s spelling to
“phonetic categories” (p. 29), such as vowels, nasals, retroflex vowels and sonorant
consonants, intervocalic flaps, and changes with regards to voicing. Read found that
students often used a letter name strategy to represent long vowels, and they used
multiple strategies to represent short vowels, including omitting them altogether. Some
spellings contained more phonetic components, apparently based on a child’s limited
experience with reading. For example, \(dr\) and \(tr\) blends often were spelled with “ch” or
“j” because of the affrication they produced in pronunciation. Many times vowel letters
were omitted when their sound contributed to a consonant sound, such as with “-er” or
“-le” at the end of the word. Henderson (1981) noted that “Read had the genius to see
that a study of children’s invented spellings might make possible certain inferences about
their phonological systems in contrast to that predicted for the mature literate adult” (p.
51). These observations paved the way for further research by Read and others regarding
the progression of skills students acquired as they learned to spell.
<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Letter-name strategy</td>
<td>deviant/ pre-communicative</td>
<td>spelling awareness/ primitive or deviant stage/ pre-phonetic letter name</td>
<td>preliterate prephonetic /</td>
<td>prephonemic spelling (1-7 yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“written language is... symbols (letters) that represent the sounds” (p. 147)</td>
<td>phonetic</td>
<td>phonetic spelling</td>
<td>vowel transition/ within-word pattern</td>
<td>phonetic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“children are beginning to assimilate various funds of information...increasing ... the relationship between syntactic, phonemic, and morphophonemic, constraints as they influence ... orthography” (p. 147)</td>
<td>transitional</td>
<td>transitional spelling</td>
<td>syllable juncture</td>
<td>analogy strategy/ rule strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>correct/ mature</td>
<td>correct spelling</td>
<td>derivational constancy</td>
<td>other</td>
<td>derivational constancy spelling (10 yrs +)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In 1977, at the University of Virginia, Beers and Henderson completed a six-month longitudinal study to observe stage-like progression of spelling skills among first grade students. Like Read, the researchers collected and analyzed informal writing samples. They compared the students’ errors to a grid of several categories of errors, which were more clearly defined than Read’s. Their categories included: “long and short vowel spellings, vocalic r spellings, morphological marker spellings as well as a sampling of several other consonant spellings” (Beers & Henderson, 1977, p. 135). In looking at each child’s progress in these areas, Beers and Henderson derived qualitative phonetic stages to explain their findings: a letter-name strategy, a letter represents sound strategy, and a strategy in which students use information about features of the English writing system. All in all, they continued the work of Read by concluding: “these spelling pattern sequences suggest that children seem to have developed a highly sophisticated knowledge of English phonology” (p. 146).

Also in 1977, Gentry published a dissertation at the University of Virginia titled “A Study of the Orthographic Strategies of Beginning Readers.” Using a classification system that covered 21 phonetic features, including similar features from the Beers and Henderson (1977) study, Gentry administered a spelling test to analyze children’s spelling ability. Gentry’s phonetic features for this research included: five tense vowels, two lax vowels, three pre-consonantal nasals, three syllabic sonorants, three past –ed inflection endings, two retroflex vowels, two affricates, and one intervocalic flap. During Gentry’s research, 250 children between kindergarten and second grade completed formal tests that included words with each of the phonetic features previously mentioned. From the results, a five-stage classification model was more formally introduced,
including these stages: deviant, prephonetic, phonetic, transitional, and correct (Gentry, 1977). Over time, Gentry (1982) edited these stages, and created more distinct features within the stages, which are applied to clinical and educational purposes today. He noted that spelling development “begins with low-level strategies, followed by more complex productions as children self-correct and refine their language” (Gentry, 1987, p. 19). Gentry’s stage model has been used in this study for the writing lab instruction in the classroom. Table 2 and Appendix A offer a more in-depth review of these stages.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Precommunicative</td>
<td>“the earliest of spelling development...where a child first uses symbols from the alphabet to represent words....lack of knowledge of letter-sound correspondence....at this stage spellings do not communicate language by mapping letters to sounds” (pp. 193-194)</td>
</tr>
<tr>
<td>2 Semiphonetic</td>
<td>“invented spellings...represent letter-sound correspondence” (p. 194) ” (initially prephonetic)</td>
</tr>
<tr>
<td>3 Phonetic</td>
<td>“the ingenious and systematic invention of an orthographic system that completely represents the entire sound structure of the word being spelled...letter choices...are systematic and perceptually correct” (p. 195)</td>
</tr>
<tr>
<td>4 Transitional</td>
<td>“great integration and differentiation of orthographic forms take place, marks a major move toward standard English orthography.... The speller begins to assimilate the conventional alternatives for representing sounds...greater reliance on visual and morphological representations” (p. 196)</td>
</tr>
<tr>
<td>5 Correct</td>
<td>“usually viewed from the instructional scheme rather than the developmental scheme” (p. 197)</td>
</tr>
</tbody>
</table>
The 1980s: Psycholinguistic and Cognitive Contributions to the Research

Lamme (1984) used an educational model to observe how young children learn to communicate in print. For her model, she suggested six levels of spelling development. Lamme formulated her model by comparing stages of written language development, including spelling, to stages of spoken language development. In Level I, “spelling awareness,” Lamme compared the earliest forms of babble for speech to the earliest forms of scribbling for writing (p. 139). Also at this stage, Lamme compared how a toddler speaks one word to represent an entire spoken phrase, known as a “holophrase,” to a young child writing one letter to mean an entire written word or sentence, known as “one-letter spelling” (p. 140). Lamme’s Level II, the “primitive or deviant stage,” was similar in label and concept to Gentry’s (1977) initial label for his first stage (p. 140). Lamme’s Level III, the “pre-phonetic (consonant) stage,” is also similar to Gentry’s (1982) next sequential stage (p. 140). Lamme explained that during this stage children first explore initial consonants, then final consonants, then medial consonants, and finally vowels. Her next three levels were also similar to previous stage models, such as Gentry’s (1982). Her Level IV, “phonetic spelling,” included use of consonant blends, word length correlated with number of letters in a word, memorized words, and an extended use of vowels. Lamme described Level V, “transitional spelling,” as a stage when children’s spellings become rule-based, sound-symbol related, and include bound morphemes and overgeneralizations. Her final stage was Level VI: “correct spelling” (p. 140). As in developmental stage theories for any skill, Lamme emphasized that children do not pass through a given stage, or level, at a particular age. Rather, when they have
mastered the majority of the skills in one level, they are considered to have advanced to the next level.

In his later work, Read (1986) understood “spelling to be a psycholinguistic performance” (p. 46). Previously, Read’s (1975) contribution to spelling theories had focused solely on phonological analysis. In the 1980s, he began to attribute spelling strategies to linguistic features as well as phonological features. At this point, Read (1986) described the acquisition of skills as “phonetic representations” until first or second grade; followed by “a reliance on frequent correspondences in standard spelling” (p. 122). Read noted that this occurred almost simultaneous with the developmental abilities described by Piaget in the concrete operations stage. Later in the elementary years, Read observed students using strategies such as “conditional spelling rules,” and “morphophonemic spellings” (p. 122). Lastly, Read indicated that some students may reach a ceiling between fifth grade and adulthood, during which time most of the words they spell are correct. By introducing these strategies, Read was providing general descriptions of students’ progression in their writing abilities. He did not link them directly to a pre-existing timeline or stage model. Henderson (1990) noted that in Read’s later work, he demonstrated an appreciation of developmental stages mentioned by other colleagues, including: pre-reading and understanding of written language; phonetic spellings; letter patterns to sound and meaning; syllable juncture; and derivational constancy.

Also during the 1980s, Frith (1985) began comparing reading to spelling. She hypothesized that “normal reading and writing development proceeds out of step” with each other (p. 310). At that time, a cognitive developmental model was being used to
describe progress for reading. Frith (1985) modified this four-stage model and proposed her own when she introduced three stages that children learn to apply sequentially when they develop early reading skills. The stages included the acquisition of strategies such as: “logographic skills,” “alphabetic skills,” and “orthographic skills” (p. 306). Frith described logographic skills as a visual recognition and awareness of the word. She noted that alphabetic skills corresponded to the strategies from previous models, which included visual letter cues and sequential coding. These strategies are used when children look at each letter and sound to decode a word. Frith’s explanation of orthographic skills included the use of chunking individual word parts and recognizing them without using a letter-by-letter strategy. She saw orthographic skills as being the most mature strategy in acquiring reading skills. Frith described the developmental nature of literacy skills as alternating between these three strategies while growth was also alternating between reading and writing. This led her to propose a six-step model to incorporate the staggered progression of both reading and writing skills. Reading skills are established using logographic strategies (stage 1); followed by writing skills using logographic strategies (stage 2); continuing with reading skills using a “convergence” of logographic and alphabetic strategies (stage 3); followed by writing skills using solely alphabetic strategies (stage 4); continuing with reading skills using a “convergence” of orthographic strategies (stage 5); and concluding with writing skills using a “divergence” of alphabetic and orthographic skills (stage 6) (p. 311). By describing the strategies in this model, Frith hypothesized that although children progress in reading and writing at different paces, they develop three lock-step linguistic strategies that are built up sequentially as children develop reading and writing skills.
The 1990s: Increasing Awareness of Linguistic Influence in Spelling

In 1990, Henderson also labeled developmental stages, which have since been used for research and clinical applications. Henderson, like Gentry (1982), used five stages to represent growth over time. By modifying previous stages, Henderson (1990) suggested five new spelling stages: preliterate, letter name, within-word pattern, syllable juncture, and derivational constancy. “Preliterate,” was broken down into “preliterate prephonetic” and “preliterate phonetic” (p. 71), which is similar to Gentry’s (1982) pre-communicative stage, in that both indicated writing without mapping letters to sounds. Henderson adapted the “letter name” stage from his earlier work with Beers. During this stage, “the child’s growing knowledge of English words is not based on simple letter-sound correspondences but a combination of phonological and syntactic information as it applies to spoken and written language” (Beers & Henderson, 1977, p. 146). The “within-word pattern” stage indicated writing with characteristics of more phonetic features and less reliance on a letter-name strategy. Henderson’s final two stages paralleled previous research but used different names. He used the term “syllable juncture” to describe the use of vowels in each syllable and the term “derivational constancy” to indicate a student’s apparent knowledge and awareness of many of the rules represented in written English language (Beers & Henderson, 1977, pp. 146-147).

Also during the 1990s, Ehri (1997) described the developmental reading process as being similar to the developmental spelling process. The “stages” that she used for both skills are almost interchangeable. In her model, Level 1 for reading is “prealphabetic,” corresponding to the first spelling stage called “precommunicative” (p. 240). In Level 2 Ehri referred to the reading stage as “partial alphabetic,” which
corresponded with the spelling stage “semiphonetic” (p. 240). Ehri’s Level 3 for reading was called “full alphabetic” and for spelling was called the “phonetic” or “phonemic” spelling stage (p. 241). In Level 4, Ehri’s stage for reading was called “consolidated alphabetic,” and for spelling was called “transitional” or “within word pattern” (p. 241).

In the prealphabetic level Ehri described letters and words that children are familiar with because of how they look, and not by how they sound or what they mean, such as the familiar symbol of a McDonald’s restaurant. The partial alphabetic level indicated that children are aware that certain letters create certain sounds, either by their letter name or some other distinguishing feature. These letters help children guess what they are reading using some clues they know and some that are predicted. During the full alphabetic level, children comprehend and apply “grapheme-phoneme correspondences” (p. 255) by using reading skills to spell words and using spelling skills to read words. Their understanding of words and word parts continues to improve at this level. Finally, during the consolidated alphabetic level children begin to understand reading and writing conventions that may not follow typical sound-symbol correspondences or letter-naming strategies. In each level, Ehri showed how an awareness of letters and sounds is heightened. She also described how the reciprocal processes of reading and spelling help children learn to understand both the decoding process and the encoding process and use that knowledge to improve each of these individual skills. For example, to ensure that one has spelled a word correctly, the author must read it, and to ensure that a word has been read correctly, the reader must check the word’s spelling. Children use their learned knowledge to encode information from each new word that is read or spelled.
Controversy over Spelling Stage Theories and Application

Recently, stage theories in spelling have been criticized by researchers and theorists. Three types of arguments have been made. Concerns have been raised that address: (a) using a developmental stage model for assessment disregarding the fact that children’s skills may overlap stages (Bourassa & Treiman, 2001; Laminack & Wood, 1996); (b) using a spelling model to include the analysis of correctly spelled words when previous theorists have only analyzed misspelled words (Steffler et al., 1998); and (c) using a stage model approach to account for instances when students regress in strategies in order to spell words that vary in length and complexity (Apel, Masterson & Hart, in press).

Related to the first concern, Bourassa and Treiman (2001) argued that, “spelling development does not proceed in a homogenous fashion” (p. 179). Laminack and Wood (1996) acknowledged the usefulness of stages, but indicated that one “can not assume that spelling develops in a lock-step progression from one stage to the next” (p. 11). They argued that one weakness of stage theory is that it is difficult to determine when a child has fully completed one stage and progressed to the next, without overlapping stages.

Related to the second concern, others have argued that stage theories do not adequately account for the use of correctly spelled words and their role in analysis and stage classification. For example, Steffler et al. (1998) noted, “at some point, correct spelling is simply and automatically retrieved from long-term memory” (p. 493). According to Gentry (1982), analysis should only be applied to misspelled words. However, this presents a dilemma to clinicians attempting to use a stage model to analyze
a child’s spelling abilities when the majority of a child’s words are spelled correctly. In addition, the question could be asked whether correctly spelled words should simply be given a category rating of “correct,” or if they should be observed by the rules that are used correctly, such as a silent e rule or a correct use of bound morpheme endings (e.g. -ed, -ing).

Related to the third concern, another argument against stage theory application is that children use “phonological knowledge to spell some words, but orthographic knowledge to spell other words” (Apel, Masterson, & Hart, in press, p. 7). Apel and his colleagues agreed with some stage theory observations, such as that “beginning spellers rely more heavily on phonologic information, whereas experienced spellers use morphologic information more frequently” [than phonologic information] (p. 7). They noted, however, that as words or assignments get more challenging, children might revert to previous strategies in an attempt to correctly spell new words.

The sum of these arguments maintains that a stage theory for spelling development is too simplistic and that multiple facets should be considered when analyzing a child’s spelling abilities. The concern is that stage theory may not provide enough detail at multiple linguistic levels to give an adequate representation of the child’s skills.

Research Studies Demonstrating Application of Spelling Stage Theory

Researchers and clinicians have been in conflict over whether to use formal spelling tests or to allow the children to free write to assess their progress and needs. Hodges (1981) stated, “children learn to spell not from a study of isolated words but from a rich interaction with written language through daily reading and writing” (p. 15).
Overall, children use what they know about writing and spelling to interact with the way they also complete other literacy activities.

**Diary Approach**

Once Read and colleagues had presented their research, it was applied in classrooms, clinics, and even in homes. Bissex (1980), an English teacher, had a son named Paul. While Bissex was taking advanced courses in English and language development, she learned of Read’s work on invented spellings and decided to conduct her own observational research using her son’s writing. Paul enjoyed writing, and his mother analyzed his work from the time he was five years old until he was ten years old. She noted commonalities between her son’s writing and the writing by the children from Read’s work. She also noted behaviors that did not fit into Read’s descriptions. In Bissex’s (1980) book, “Gnys at wrk” (*genius at work*, as written on one occasion by Paul), she discussed the contexts of Paul’s writing, including notes, labels, and lists. She noted his enthusiasm for writing, as well as his frustration. She also paid attention to his progression from needing a lot of help to desiring independence in his work. Most importantly for spelling development, she recorded the words and sounds that he chose to use, and how the spelling of those words changed over time, in a progression similar to that which Read had described in his phonological studies. For example, she presented his progression for the word “directions” as: “DRAKTHENS” at 5:7; “DRAKESHINS” at 5:8; “DIRECKSHONS” at 7:5; “DIREKSHONS” at 7:5; “DIRECTIONS” with uncertainty at 8:1; and “DIRECTIONS” without a doubt at 8:7 (Bissex, 1980, p. 88). Paul had previous knowledge and use of the *-tion* ending, however, did not apply it to this word until he was 8 years old. Other observable changes in his uses of the phonetic
features previously mentioned, included his omitted vowel letter representing the sonorant ("ir" in the first syllable), and previous experience using the "ck" letter combination from other words. By analyzing her son’s writing samples longitudinally using phonetic features and spelling stages described by Read, Bissex provided valuable insights into relationships among spelling, writing, and reading.

**Cross-Sectional Approach**

Researchers at the University of Alberta (Varnhagen, McCallum, & Burstow, 1997), like Beers and Henderson (1977), analyzed natural writing samples of young writers, while monitoring how children produce two spelling patterns—marking long vowel with silent “e” and using “-ed” for past tense. Varnhagen and colleagues analyzed writing samples from 272 students in first through sixth grade to observe developmental growth over time. Their cross-sectional research contrasted with that of Beers and Henderson in that they only collected one sample from each student and compared the progress between grades. In their study, “the entire school had elected to use a spelling curriculum based on orthographic patterns as an adjunct to their literacy instruction” (Varnhagen et al., 1997, p. 461). The samples all followed a similar protocol as the current study except the students were allowed 20 minutes for writing and editing, rather than 60 minutes. Data collected from the samples measured the spelling errors using the silent -e and past tense words, according to the five stages Gentry’s (1982) model of development: precommunicative, semiphonetic, phonetic, transitional, correct.

Varnhagen’s research team found an increase in correctly spelled words, but found no significant difference in number of incorrectly spelled words. In addition, results for a stage-like progression indicated a “decrease in phonetic stage words associated with an
increase in correctly spelled words from first to second grade” (p. 467) and progress “most strongly depicting a gradual developmental trend of shifting from phonetic stage to correct spelling from first to fourth grade” (p. 469). Although stage-like development was noted in some samples, it was difficult to make generalizations when students did not use silent –e or past tense words. These results were also limited because only two spelling rules were analyzed.

Formal Assessment Instruments

Methods to assess spelling in writing of students between elementary school and college years have been modified over time. Ganske (1999) strongly recommended that educators become aware of a student’s spelling abilities, spelling errors, and understanding of words in order to provide adequate and useful education in the subject of spelling. To expand this knowledge, formal programs have been published that provide information about spelling error analysis. Two of these programs are the Developmental Spelling Analysis (Ganske, 1999) and Spelling Performance Evaluation for Language & Literacy (Apel and Masterson, 2002). Using formal assessment methods, these programs are designed to point out spelling errors that children make.

Strategy-Based Approach

Another research team analyzed students’ progression through stages, based on students’ “self-reported strategies (including reports of retrieval) and spelling correctness” (Steffler, Varnhagen, Friesen, Treiman, 1998, p. 494). Instead of focusing on how and why children produced errors, these researchers studied how and why children spelled words correctly, and which strategies they used. As children spelled words, they were questioned as to how they reached the spelling of the word. The
responses were placed into five “categories”: (a) if they “knew” how to spell it, it was “direct retrieval”; (b) if they “sounded it out,” it was “phonetic”; (c) if they compared it with a word they already knew, it was an “analogy strategy”; (d) if it was due to a known “orthographic convention,” such as the silent –e rule, it was a “rule strategy”; and (e) if it did not fall into one of the above categories, it was classified as “other” (pp. 495-496).

Results indicated that, over time, “direct retrieval” strategies became more prevalent, while “phonetic strategies” decreased. They concluded, “at some point, correct spelling is simply and automatically retrieved from long-term memory” (p. 493). This is in agreement with results from Siegler and Jenkins (1989), who said that an increase in phonological, orthographic, and morphological knowledge leads to a more automatic process of spelling.

**General Implications for Informal Spelling Assessment**

Finding an instrument or developmental stage approach that can best represent a child’s spelling abilities often requires multiple modes of assessment. Instruments or methods described in past investigations have varied by data collection method, the use of formal and informal methods, and the use of qualitative and quantitative data. Reece and Treiman (2001) recommended using a “broad approach,” which is a way to study spelling changes using a longitudinal study and a qualitative analysis procedure, while looking at “a variety of linguistic structures” (p. 4).

Informal spelling assessment techniques, such as using samples of the students’ writing as data sources, provide an effective method for conducting a longitudinal study (Beers and Henderson, 1977; Laminack and Wood, 1996; Masterson and Crede, 1999; Varnhagen, et al., 1997). That was also the approach used in the current study.
Clinical Application and Intervention using a Developmental Stage Model

A debate also exists regarding the strength of the relationship between sound-symbol correspondence in the English language and one’s ability to spell words. Some researchers argue that spelling in the English language has a high symbol-sound relationship (Allred, 1984; Shaughnessy, 1977; Boyd, Talbert, 1971; Caravolas, Hulme, & Snowling, 2001). Others believe that the correspondence between sounds and letters is not consistent enough to improve one’s spelling abilities (Dixon & Kaminska, 1997). This leads to a discussion about the most appropriate form of spelling intervention for students. If the belief is that there is a high degree of sound-symbol correspondence, then phonics should be a part of an appropriate teaching method. If there is not a strong enough sound-symbol relationship for a phonics approach to independently improve spelling, then an orthographic approach to teaching spelling rules may be more appropriate.

In addition, some researchers argue that writing is natural in context, and children have many opportunities to learn based on practicing and revising their own errors. Gentry (1987) instructed educators that “to teach kids to spell, get them to write” (p. 27) and that “the real foundation for spelling is frequent writing” (p. 33). Through the use of trial and error, children create their own words and spellings in order to express themselves on paper and improve other important communication skills (Allred 1984). Some scholars insist that writing and spelling are one and the same skill; without one, you do not have the other, and with strong abilities in both skills, greater progress can be achieved (Boyd & Talbert, 1971).
**Intervention in the Classroom**

Templeton (1991) used Henderson’s stages (1990) in a classroom setting to measure the developmental progression of spelling for instructional purposes. He applied some original “stage” classifications, such as the “onset of conventional literacy learning,” including the child’s knowledge of print awareness and of letter-sound correspondence (p. 187). He continued his description of development using Henderson’s stages: the “within word pattern stage,” the “syllable-juncture stage,” and the “derivational-constancy stage” (pp. 187-188). In addition to the use of stages, Templeton proposed educational implications for spelling in the classroom. He suggested that spelling and writing intervention “should occur in a literature-based, writing process-oriented, oral-language-enriched classroom” (p. 186). Three important areas of focus should include spelling and word knowledge from reading and writing, formal spelling instruction, and in-class generalization. Thus, Templeton recommended using a traditional focus on formal spelling assessment and intervention with a modern focus on informal writing for use in classrooms today.

Bear and Templeton (1998) discussed combining a developmental spelling approach with a model for literacy instruction. Using previously mentioned models, they adapted six spelling stages, including approximate age ranges when typically developing children reach these stages. Their stages included: “prephonemic spelling” for age 1-7 years; “semiphonemic or early letter name spelling” for age 4-7 years; “letter name spelling” for age 5-9 years; “within-word pattern spelling” for age 6-12 years; “syllable juncture spelling” for age 8-18 years; and “derivational constancy spelling” for ages 10 years and up (pp. 224-228). These stages show notable overlap, which was a concern of
stage theory critics. However, they stressed the importance of not selecting a single stage based on age or ability, but in using the information gained from spelling analysis to help the child progress to the next developmentally appropriate stage of spelling.

Bear and Templeton (1998) also recommended three key objectives for guiding intervention. First, they recommended grouping students together who have demonstrated similar spelling patterns and errors (students that are developmentally in the same stage). Next, they suggested that students should work with the words they are already familiar with. Finally, students should be “guided towards discovering patterns and generalizations” among new words in a scaffolding-like manner (p. 230). By using the developmental stage approach as a guide, Bear and Templeton showed that educators and other professionals can determine what a child knows, what he does not know, and what he needs to know to progress with his peers.

Intervention in the Clinic

A school-aged boy with a learning disability was the subject of a case study designed for spelling intervention by Masterson and Crede (1999). Clinicians assessed the student’s literacy and cognitive abilities, including his spelling skills in formal and informal contexts. They also addressed his individual spelling errors, finding patterns in “sound/symbol correspondence, silent e (stressed and unstressed), vowel substitutions, silent letters... past tense, consonant doubling, derivational pairs, and long e digraphs” (p. 246). Masterson and Crede also used Henderson’s (1990) stages to place him in the “within word pattern” stage of spelling development. From this analysis, they selected appropriate goals to expand his strengths and improve on his spelling deficiencies. The
authors “chose to focus on intervention activities designed to facilitate an understanding of the appropriate orthographic concept” (p. 247).

Overview of Spelling Assessment

Multiple methods of spelling assessment have been reviewed, showing variations in the ways researchers and clinicians have applied a developmental stage model. Spelling abilities and weaknesses are apparent when observing change over time, such as in a diary approach or a longitudinal study. A strategy approach can provide information about a child’s self-awareness to patterns used when spelling new or familiar words. Also, specific spelling weaknesses may appear from the results of formal assessments. In addition, spelling strengths not noted in formal assessment may appear when using informal writing samples as a means of assessment. The most important use of a developmental model for measuring spelling ability is deciding the student’s strengths, weaknesses, and needs for improvement so that appropriate intervention goals can be established.

Roles of Speech-Language Pathologists and Educators

As with any type of communication, spelling does not exist in isolation. Students who have difficulty with spelling may have varying degrees of difficulty with other literacy skills, such as reading or writing. “Research indicates that we do need to teach formal spelling lessons to supplement what kids learn about spelling through reading and writing. But when we remove spelling from the context of writing, we make it more difficult” (Gentry, 1987, p. 9). It is up to the teacher and the SLP to use information about a student’s strengths and weaknesses gained from different means of assessment in order to address the student’s current skills. As Gentry stated, “spelling should be taught
as a human right, not as a human obligation. We must free children to learn to spell” (1987, p. 47). The responsibility lies with the general education teacher to instruct all students and with the SLP to instruct students with specialized language learning needs.

The American Speech-Language-Hearing Association (ASHA) has published a position statement for reading and writing skills to address the role of the speech-language pathologist in this area. It stated, “intervention for language disorders targets written as well as spoken language needs” (American Speech-Language Hearing Association, 2001, p. 1). Formal and informal instruments are used to assess a student’s needs, as was previously mentioned. Scott and Brown (2001) proposed that “qualitative analysis of spelling errors...provides the direction needed for planning intervention” (p. 202).

In an article in an issue of Topics in Language Disorders, edited by Apel and Masterson (2000), several speech and language experts offered their view of the role that SLPs have in spelling assessment and intervention. In the discussion, Moats commented on the importance of utilizing knowledge across disciplines, such as from “the teacher, learning disability specialist, and SLP” (Apel et al., 2000, p. 87). Similarly, Pollock stressed the need for a collaborative approach in assessment and facilitation in the classroom. Overall, assessment, the first step to meeting the needs of children with language disorders, involves multiple tools, processes, and people in order to get an accurate impression of the child’s strengths and weaknesses.

The SLP also has an active role in the intervention process. In the previously mentioned article (Apel & Masterson, 2000), Moats stated that knowledge of the English spelling system and the strategies mentioned in several of the stage theories are of
importance to helping children with special needs. Granting the children practice and opportunity to explore such strategies in a non-intrusive environment is also important (Gentry, 1987). Templeton and Bear concluded that another important consideration in the role of the SLP is to include information about word roots and morphemes when addressing spelling accuracy (Apel & Masterson, 2000). As with any well-practiced intervention method, “the foundation of a good spelling program is identification of the right goals” (Scott & Brown, 2001, p. 202). These guidelines should direct the SLP regarding how to provide effective services in and out of the classroom, and to contribute and share information with the teacher to do the same.

Summary

Over time, a developmental spelling stage model has been influential in research, in assessment, and in intervention of spelling. Earlier researchers only observed spelling achievement in spelling errors, sometimes using formal assessment and other times using informal assessment. Problems with that approach led to the decision in this study to concentrate on both the spelling errors and the words spelled correctly in students’ writing samples.

Similarly, in the early 1970’s, spelling development was monitored by analyzing phonetic features of words. Since then, the shift has focused on psycholinguistic features, cognitive strategies, and linguistic underpinnings of words, as well. Thus, in this study, Gentry’s (1982) stage model was used because it included features such as those.

This chapter also reviewed ways in which different stage models can help educators and speech-language pathologists analyze students’ spelling abilities, focus on their strengths and weaknesses, propose goals, and create and implement an effective
intervention approach. Selecting appropriate goals is only one part of the process. Creating an intervention plan with input from the teacher and the SLP is equally important.
CHAPTER THREE

METHOD

Purpose

The primary purpose of this study was to test whether a classification system based on a developmental stage theory could capture evidence of progressive spelling growth over time. Spelling ability was analyzed using narrative writing samples produced by elementary school children at five time points between the middle of second grade and the end of third grade. Both qualitative (spelling stage categorization) and quantitative measures were used to assess developmental growth.

A secondary purpose of the study was to use the classification system to measure the effect of a writing lab intervention model on spelling ability. This study compared the developmental spelling growth demonstrated by two groups of students: the continuous intervention group received intervention from the middle of their second grade year until the end of their third-grade year; the partial intervention group, who served to as the comparison group, received writing lab intervention only during the second half of their second grade year, and not during their third grade year. Therefore, evidence of growth over time, especially during times intervention was provided, would support the clinical application of spelling classification system to guide assessment and intervention decisions.
Writing Lab Approach to Intervention

Spelling assessment and intervention were provided as part of the writing lab approach described by Nelson, Van Meter, and Bahr (2004). In this approach, teachers and speech-language pathologists collaborate to offer writing instruction in the classroom environment. Students are instructed about the writing lab process, “including planning, organizing, drafting, revising, editing, publishing, and presenting” (p. 8). They are also presented with mini-lessons to address different writing skills, such as verb tense, word choice, and spelling. Using curriculum-based writing projects, teachers and SLPs instruct students as a whole class and individually to meet goals related to these writing skills. Students who demonstrate a greater need for writing support are given more individualized attention. In the area of spelling, assessment and instruction are provided using Gentry’s (1982) stage model of spelling development. SLPs observe the students’ spelling abilities, decide in which stage they are spelling, and scaffold them to higher levels of spelling achievement.

Subjects

The participants of this study were students from a public elementary school in Kalamazoo, Michigan. The school was identified by district administrators as one with computer lab facilities and an interest in supporting inclusive written language instruction. Meeting these criteria made it suitable for participation in the Writing Lab Outreach Project (WLOP), which the school district implemented in conjunction with Western Michigan University. The WLOP was supported by a grant from the U. S. Department of Education, Office of Special Education Programs (Grant No.
H324R980120 to N. W. Nelson and C. M. Bahr). In conducting this study, approval was granted from the Human Subjects Institutional Review Board at Western Michigan University. A copy of the approval is included in Appendix B. The students and their parents all signed a consent form, which is also included in Appendix B, allowing the research team to analyze and share data produced by the students in the writing project.

Students who attended this elementary school were in the middle to lower socioeconomic class. According to school statistics, 73 percent of the students at the school received free or reduced lunch rates.

The written language development of 32 students was tracked longitudinally from the middle of their second grade school year through the end of their third grade school year. Narrative probes were collected from all students during the middle of second grade, on January 22, 2002, and at the end of second grade, on April 9, 2002. For the continuous intervention group, probes were also gathered at the beginning of third grade, on September 19, 2002, at the middle of third grade, on January 21, 2003, and at the end of third grade, between April 8 and April 10, 2003. This group included 21 students (10 boys and 11 girls) who completed samples at all five time points over the two-year study. An additional seven students (four boys and three girls) completed samples at four of those time points, but were not included in the data analyses. For the comparison group, probes were gathered again only at the end of the third grade year, between April 8 and April 10, 2003. This group included 11 students (five boys and six girls). Students in the comparison group received intervention in the same classes as students in the continuous intervention group during their second grade year. They were all assigned to a third
grade classroom (by a non-random school placement procedure) that did not participate in the writing lab.

The students were assigned to both second and third grade classrooms following classroom assignment protocol for the school, which was not influenced by this study. The three second grade classrooms were referred to as A, B, and C. The three third grade classrooms that the students were later assigned to were referred to as D, E, and F. The placement of the students and redistribution in third grade is presented in Table 3. The class that did not participate during third grade was classroom F.

<table>
<thead>
<tr>
<th>Second Grade</th>
<th>Third Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom A (n = 10)</td>
<td>Classroom D (n = 2)</td>
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<tr>
<td></td>
<td>Classroom E (n = 4)</td>
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<tr>
<td></td>
<td>Classroom F (n = 4)</td>
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<tr>
<td>Classroom B (n = 13)</td>
<td>Classroom D (n = 8)</td>
</tr>
<tr>
<td></td>
<td>Classroom E (n = 3)</td>
</tr>
<tr>
<td></td>
<td>Classroom F (n = 2)</td>
</tr>
<tr>
<td>Classroom C (n = 9)</td>
<td>Classroom D (n = 2)</td>
</tr>
<tr>
<td></td>
<td>Classroom E (n = 3)</td>
</tr>
<tr>
<td></td>
<td>Classroom F (n = 4)</td>
</tr>
</tbody>
</table>

Procedures

Collecting the Samples

The students involved in the study all completed writing samples based on the same protocol. The protocol required the instructor (classroom teacher, student teacher, graduate clinician, or clinical supervisor) to (a) ask the students to write a story and (b)
remind them that a story included a problem and told what happened. The students were also told that their story could be real or imaginary. The guidelines, which were kept the same for all sample collections, included: (a) a time limit of approximately one hour for writing and editing, (b) the option to plan and organize on a separate paper before writing, (c) the directions to write in ink and skip lines, (d) the directions to cross out words that the student wanted to change with a single line, and (e) the requirement to spell the best they could without adult help. After the students finished, they individually read their stories to an adult in the classroom, so that any unintelligible spelling or word errors could be recorded on the student’s paper.

Preparing the Samples

After the students wrote the stories, each was typed into a computer document preserving the exact spelling and grammar the students had used. All 165 documents, including samples written by the additional seven students, were typed into files by two trained graduate students using the software program Systematic Analysis of Language Transcripts (SALT) Windows Student Version 7.0 (Miller, 2002). The SALT program provides direct quantitative measures, including total number of words, number of different words, and word root tables. It also allows users to insert customized word codes. The spelling errors in the samples were coded with a “[sp]” word code, making it possible for the software to count the number of “[sp]” codes, to provide data to be used in quantitative analyses. In order for SALT to provide accurate word counts, correct spellings must accompany spelling errors in the transcribed samples. The child’s actual misspelling of the word was added in brackets so that it was not treated as a separate
word, e.g., “The boy[sp-bou] saw his friend[sp-frand].” Each sample was then saved in a database.

Transcription reliability was tested between the two graduate students by comparing agreements for the number of total words and for misspelled words for a randomly chosen subset of 9 independently transcribed and coded samples. The transcribers agreed on 96 percent of total words (930/967) and 86 percent of misspelled words (112/130). Some of the disagreements were based on words that were affected by context (e.g., then/than). Other disagreements reflected differing interpretations of the students’ handwriting or understanding of the word the student was intending to spell.

To prepare the probes for spelling analysis, another trained graduate student removed all personal identifiers from the samples and randomized them numerically. Thus, the primary researcher remained blind to: (a) the child’s identity, (b) time point when the sample was collected, and (c) whether the child was in the continuous intervention group or the comparison group. When the random codes were assigned, all personal information including name, gender, grade, and teacher, was removed from the samples. A random identity coding system was created and stored so that after all samples were analyzed, they could be re-traced to their original subject-number for analysis of each individual students’ spelling development over time.

After all identifiers were removed, the primary researcher then used the resulting electronic transcripts and SALT software to create word level analysis transcripts. This was done by separating the misspelled words and the correctly spelled words and listing them alphabetically for each sample. Examples appear in Appendix C. Incorrectly spelled words were listed first, with the child’s spelling followed by the intended word as
well as the frequency with which the particular spelling error occurred. The alphabetized list of correctly spelled words and frequencies followed on the same page. Proper names for people or animals, numerals, and abbreviations were removed from samples. Proper nouns were included if they had a known correct spelling, such as the name of a city or state.

Analysis

Category Rating System

A category rating system was created using the salient features of Gentry’s five classifications and examples of spelling development: precommunicative, semiphonetic, phonetic, transitional, and correct (Gentry, 1982). The primary researcher listed the classification features for each “stage,” as described by Gentry. As Table 2 in Chapter Two (page 12) showed, each stage was assigned a number (precommunicative = 1, semiphonetic = 2, phonetic = 3, transitional = 4, and correct = 5). The individual features within each stage and specific coding characteristics for this study are presented in Appendix A, including the letters that were used as sub-codes to separate one feature from another.

Gentry (1982) originally based his developmental spelling model only on the analysis of spelling errors, stating that “developmental spelling levels may be determined only by observing spelling miscues, not by observation of words spelled correctly” (p. 197). In this study, however, patterns from both spelling errors and correctly spelled words were considered when providing an overall category rating for each child’s spelling ability. For example, if a child spelled a word incorrectly because of not correctly using the silent -e rule, the researcher would look at the list of correctly spelled words to see if there were any words spelled correctly following that rule. This
observation provided information regarding the rules a child was using correctly, as well as the rules the child was still in the process of learning.

**Analyzing the Samples Qualitatively by Assigning Category Ratings**

The primary researcher analyzed each list of incorrect and correctly spelled words in random order. Each individual spelling error was classified as to which stage the error reflected (1 through 4) and was given an alphabetic sub-code from the coding chart in Appendix A, representing the feature that led it to be placed in that classification. The researcher also reviewed correctly spelled words to see if any feature of the student’s errors was used correctly in other words of the sample. No category classification was assigned to correctly spelled words, because they would have all been placed in stage 5 (“correct”), but the rules displayed in the correctly spelled words gave the researcher insight as to which features from which stage were most prominent in the child’s writing and spelling. Based on overall qualitative observations, a single numeric classification rating was assigned to each sample, using the stage at which the child demonstrated the most features in his or her spelling errors and correctly spelled words. The category rating was one dependent variable in the analysis to determine if changes in classification based on developmental spelling growth were evident over several periods of data collection.

**Intra-Rater Reliability**

At the beginning of the study, the researcher intended to use samples from all 39 subjects for analysis purposes, including the seven subjects who completed only four of the five samples. Therefore, all 165 samples are included in reliability analysis. The 35 samples from the first collection point were analyzed using Time 1 as a referent. Later,
the remaining 131 samples were analyzed in random order. The researcher then re-analyzed the first 35 samples again in the same order one week later. At that time, it was noted that there were 27 intra-judge agreements and 8 intra-judge disagreements, all differing by one stage level. This produced an intra-class correlation (ICC) of 0.66. The majority of the disagreements were found near the end of the sample order, possibly caused by fatigue. In order to assess the potential influence of a fatigue effect, the researcher analyzed a second group of 35 samples, also selected randomly, and again analyzed intra-rater reliability. This time, there were 28 intra-judge agreements and 7 intra-judge disagreements. The disagreements did not all fall at the end of the of the sample order, as they had before, but rather were interspersed throughout the samples, thus ruling out a possible fatigue effect. This time, one of the disagreements differed by two stage levels, while the rest all differed by one, producing an ICC of 0.65. This demonstrated the level of difficulty of assigning one single number classification to each sample.

The level of reliability is not as high as was hoped. The samples varied greatly in total number of words as well as number of misspelled words, which contributed to the complexity of coding the samples as representing one single stage. It also suggested that students tend to incorporate features of more than one stage into their writing samples. If this study were to be completed again, a requirement for the minimum number of words or spelling errors per sample might allow for analysis that would increase this reliability rating.
Analyzing the Samples Quantitatively using Index of Control and Percentage Correct

Quantitative measures were also obtained from each sample, based on the “index of control” (Laminack & Wood, 1996, p. 48). The “index of control” measure is computed using information from each sample, including: (a) the total number of words, (b) the number of different words, (c) the number of correctly spelled words among the list of different words, and (d) the number of incorrectly spelled words among the list of different words. The first two numbers were retrieved using the SALT program; the second two numbers were counted by the researcher. The “index of control” was then computed by dividing the number of correctly spelled words among the list of different words (ignoring names of people, pets or other unknown proper nouns) by the total number of different words, to get a percentage (Laminack & Wood, 1996). In addition, the percentage of correctly spelled words was computed. In this case, the number of correctly spelled words was divided by the total number of words in the sample and multiplied by 100. Both quantitative measures, index of control and percentage of words spelled correctly, were used as dependent variables in statistical analyses.

Analyzing the Category Rating Data for Change over Time

After all the samples were given category ratings, sample identities were revealed so that scores could be entered for each of the 32 participants (21 in the continuous intervention group and 11 in the comparison group), using the following designations for time: Time 1 = mid-second grade, Time 2 = end-second grade, Time 3 = beginning-third grade, Time 4 = mid-third grade, Time 5 = end-third grade. The subjects in the continuous intervention group completed five samples at Times 1, 2, 3, 4, and 5, whereas subjects in the comparison group completed three samples at Time 1, Time 2, and Time
5. Changes between each set of time points were analyzed for both qualitative and quantitative data using the Statistical Package for the Social Sciences (SPSS) Version 9.0.

A one-way repeated measures analysis of variance (ANOVA) was completed for the continuous intervention group, the students who had completed 5 samples during the study, to address the first experimental question, whether a category rating system could measure growth over time. The ANOVA was repeated for the other two dependent variables, index of control and percentage correct. The Pearson product moment correlations (Pearson r) were also computed to compare the qualitative and quantitative measures to assist in answering the first question.

To address the second question related to difference between the group that received continuous intervention and the group that did not, a two-way Repeated Measures ANOVA was used to assess within-subjects factors of time, from Time 1 to Time 2. During this time, intervention was provided for students in all of the second grade classrooms. A between-subjects analysis was also completed using the independent variable of intervention during third grade. This analysis was conducted to provide information about how well the two groups were matched, based on spelling ability, at the beginning of the study, testing for main effects of group, time, and interaction between group and time.

Also, paired t-test analyses were used to compare changes over time between each time interval and between the two different groups. In this case, changes were analyzed from Time 2 and Time 5, allowing for comparison between changes made by the continuous intervention group and the comparison group. In addition, changes for the
continuous intervention group were analyzed from Time 2 to Time 3, to observe the
effects of having no intervention during summer vacation.

The results of statistical analyses are presented in Chapter Four. The discussion
follows in Chapter Five.
CHAPTER FOUR

RESULTS

This study was designed to answer two questions. The first asked whether a linguistically-based category rating system could produce evidence of students’ growth in spelling ability over a period of longitudinal observation during the early elementary years. The second asked whether analysis of spelling growth would provide evidence for the effectiveness of a writing lab intervention model. To answer both questions, the five narrative samples from the continuous intervention group and the three narrative probes from the comparison group were analyzed using SPSS software.

This chapter summarizes the results of statistical analyses used to answer the two research questions. The question of change over time was addressed using three separate repeated measures ANOVAs, one for each of the three dependent variables: category ratings, index of control, and percentage of words spelled correctly. Bivariate correlations were also computed among the three dependent variables at each of the five time points. In addition, frequency analysis of individual word classification within individual samples was completed and will be reported. The question of difference between groups was addressed using a two-way repeated measures ANOVA and paired t-tests. A discussion of the results reported in this chapter can be found in Chapter Five.
Review of Statistical Data

The three dependent variables used to evaluate and compare the significance of the change over time were: qualitative category ratings, quantitative index of control, and quantitative percentage of words spelled correctly. The mean scores for each dependent variable were calculated for each of the two groups: the continuous intervention group (n = 21), who completed samples at five time points between mid-second grade and the end of third grade and the comparison group (n = 11), who completed samples only at three time points (1, 2, and 5). Table 4 shows these scores for category rating, index of control, and percentage of words spelled correctly at each time point.

Average category ratings at each time point and for each group were plotted to allow visual comparison of the differences. The dashed line indicates times when the group did not receive writing lab instruction. The comparison group only received instruction between the first two time points, and therefore, they have a dashed line covering the remaining three intervals until their final sample at Time 5. The continuous intervention group received intervention following the writing lab model during all intervals except between Times 2 and 3, at which time the students were on summer vacation. Figure 1 presents the average ratings at each time point.

Average index of control measures were calculated separately at each time point for each group, as well. The index of control was calculated using the formula explained in Chapter Three in which the ratio is calculated by dividing the number of correctly spelled words by the number of different words in a child’s sample (Laminack & Wood, 1996). The averages are plotted in Figure 2. In addition, averages of percentage of words
spelled correctly are plotted for comparison in Figure 3. Data for individual subjects is presented in Appendix D.

<table>
<thead>
<tr>
<th>Time (grade)</th>
<th>Category Rating Mean (S.D.)</th>
<th>Index of Control Mean (S.D.)</th>
<th>Percent Correct Mean (S.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (mid-second)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Intervention</td>
<td>3.048 (0.59)</td>
<td>0.646 (0.23)</td>
<td>0.700 (0.21)</td>
</tr>
<tr>
<td>Comparison</td>
<td>3.273 (0.65)</td>
<td>0.798 (0.12)</td>
<td>0.810 (0.13)</td>
</tr>
<tr>
<td>2 (end-second)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Intervention</td>
<td>3.476 (0.51)</td>
<td>0.722 (0.15)</td>
<td>0.769 (0.13)</td>
</tr>
<tr>
<td>Comparison</td>
<td>3.909 (0.54)</td>
<td>0.883 (0.13)</td>
<td>0.895 (0.10)</td>
</tr>
<tr>
<td>3 (beg-third)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Intervention</td>
<td>3.524 (0.60)</td>
<td>0.720 (0.16)</td>
<td>0.762 (0.11)</td>
</tr>
<tr>
<td>4 (mid-third)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Intervention</td>
<td>3.810 (0.51)</td>
<td>0.762 (0.15)</td>
<td>0.826 (0.11)</td>
</tr>
<tr>
<td>5 (end-third)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Intervention</td>
<td>3.857 (0.48)</td>
<td>0.822 (0.13)</td>
<td>0.837 (0.12)</td>
</tr>
<tr>
<td>Comparison</td>
<td>3.909 (0.30)</td>
<td>0.883 (0.09)</td>
<td>0.919 (0.07)</td>
</tr>
</tbody>
</table>

*a* Continuous intervention students (n = 21) began writing lab instruction in second grade and continued across third grade. *b* Comparison students (n = 11) received writing lab instruction only during second grade and completed probes only at Times 1, 2, and 5.
Figure 1. Category Growth Over Time Between the Continuous Intervention and Comparison Groups. Dashed lines indicate times during no intervention.

Figure 2. Index of Control Growth Over Time Between the Continuous Intervention and Comparison Groups. Dashed lines indicate times during no intervention.

Figure 3. Percentage Correct Growth Over Time Between the Continuous Intervention and Comparison Groups. Dashed lines indicate times during no intervention.
Change Over Time for Three Dependent Variables

A one-way analysis of variance was selected to compare the changes over time across all five times for the continuous intervention group. Separate analyses were conducted for each of the three dependent variables. Results are presented below.

Changes Over Time Measured by Category Rating

The first experimental question asked whether a spelling stage category rating system could reflect change over time. This question was addressed in the continuous intervention group only, using a repeated measures one-way analysis of variance (ANOVA) to assess statistical significance for the qualitative variable of category rating. This analysis revealed that the main effect of category change over time was statistically significant for the continuous intervention group, $F(4, 80) = 10.266, p < 0.001$, when category rating was used as the dependent variable.

Changes Over Time Measured by Index of Control

A second analysis using data from the continuous intervention group only, was a repeated measures ANOVA used to assess the second dependent variable, index of control. This analysis revealed that change over time for the continuous intervention group based on the index of control variable also was statistically significant, $F(4, 80) = 6.401, p < 0.001$.

Changes Over Time Measured by Percentage of Words Spelled Correctly

In addition, a third repeated measures ANOVA was completed using the data from the continuous intervention group for the quantitative variable of percentage of words spelled correctly. Again, the change over time was statistically significant, $F(4, 80) = 5.542, p = 0.001$. 
Correlations Between Qualitative and Quantitative Measures

The first experimental question was also addressed by considering the degree of correlation between the three dependent variables. This analysis was conducted by computing Pearson product moment correlations (Pearson r) using SPSS. A two-tailed test revealed that each dependent variable pair correlated significantly with the other two measures at each Time (1 through 5) with at least a 0.01 confidence interval. Pearson r correlation between the category rating and the index of control variable produced correlation coefficients that ranged from 0.443 to 0.744, with the highest correlation coming at the beginning of third grade. The category rating and percentage correct pair yielded similar Pearson r correlation coefficient values, ranging from 0.471 to 0.640. However, the pair that included the two quantitative variables, index of control and percentage of words spelled correctly, yielded higher Pearson r correlation coefficients than those for the category ratings and either of the quantitative measures, ranging from 0.796 to 0.956, as well as p values at 0.000 at each time. This is not surprising since these two variables have similar methods of calculation and provide similar information. Table 5 summarizes the Pearson r values and includes the p values for significance in parentheses.

Summary of Evidence for Ability to Measure Growth Over Time

Two analysis methods were used to measure the significance of growth over time for the coding system used in this study. The within-subjects effects revealed time as a significant factor for all three dependent variables: category rating, index of control, and percentage of words spelled correctly. In addition, moderate to high correlations were found between each of the three measures at each of the five time points.
Table 5
Correlation Data Between Dependent Variable Pairs during Five Time Points

<table>
<thead>
<tr>
<th>Correlation Pair</th>
<th>Time 1 Pearson $r$ ($p$)</th>
<th>Time 2 Pearson $r$ ($p$)</th>
<th>Time 3 Pearson $r$ ($p$)</th>
<th>Time 4 Pearson $r$ ($p$)</th>
<th>Time 5 Pearson $r$ ($p$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category Rating-</td>
<td>0.450$^a$ (0.007)$^b$</td>
<td>0.523 (0.001)</td>
<td>0.744 (0.000)</td>
<td>0.443 (0.018)</td>
<td>0.594 (0.000)</td>
</tr>
<tr>
<td>Index of Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category Rating-</td>
<td>0.471 (0.004)</td>
<td>0.538 (0.001)</td>
<td>0.521 (0.004)</td>
<td>0.505 (0.006)</td>
<td>0.640 (0.000)</td>
</tr>
<tr>
<td>Percentage Correct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of Control-</td>
<td>0.915 (0.000)</td>
<td>0.956 (0.000)</td>
<td>0.796 (0.000)</td>
<td>0.947 (0.000)</td>
<td>0.807 (0.000)</td>
</tr>
<tr>
<td>Percentage Correct</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$^a$ Correlation coefficients expressed as Pearson $r$.

$^b$ Actual $p$ values yielded by SPSS analysis.

Word-level Coding Frequency Analysis

In addition to individual category ratings per sample, individual category ratings per word per sample were also analyzed. Each spelling error in the samples was rated by category, using the same five-point model that rated the entire sample. These ratings were calculated to observe what percentage of the words in each sample was rated as a 1, 2, 3, 4, or 5. It is important to note that the percentage of words rated as a 5 (correct) for category rating is equivalent to the dependent variable, percentage of words spelled correctly. Coding frequency analyses were used to observe difference in error patterns over time with and between the two groups. No statistical tests were run on these data.

As demonstrated in Figure 4, the words spelled correctly in the samples from the continuous intervention group, as a whole, increased from 71% at Time 1 to 85% at Time 5. Also, the use of categories 2 and 3 decreased, during which time the use of category 4 increased.
Similar observations can be made regarding the data from the comparison group. In this case, as seen in Figure 5, at Time 1 the comparison group had a higher percentage of words spelled correctly (81 percent compared to 71 percent produced by the continuous intervention group). The percentage correct also rose over time, making an 11 percent growth from Time 1 to Time 5, compared to a 14 percent growth demonstrated by the continuous intervention group. With a high percentage of words spelled correctly at each time point, the percentage of words spelled in other categories is smaller for the comparison group than the continuous intervention group, making growth between the stages over time less obvious. These data should be interpreted with caution, as the differences in growth could be contributed to a change in groups, a regression towards the mean, or a ceiling effect exhibited by the students in the comparison group. This will be discussed further in Chapter Five.
Differences Observed Between Groups

Effects of Writing Lab Intervention

The second experimental question asked whether there would be difference between the continuous intervention group and the comparison group when only one group received intervention guided by the writing lab model. These analyses measured the change between different points in time between the continuous intervention and the comparison groups using the same three dependent variables: qualitative category rating, index of control, and the percentage of words spelled correctly. Initially, the most critical time intervals to compare were: between Time 1 and Time 2 (when both groups received intervention) and between Time 2 and Time 5 (when the continuous intervention group received intervention and the comparison did not). It was hypothesized that there would be a greater change for the continuous intervention group than for the comparison group when the continuous intervention group was the only group receiving intervention (between Time 2 and Time 5).
Difference Between Groups

The first step to address the second question was to assess statistical difference between the two groups at the beginning of the study. In that regard, a two-way repeated measures ANOVA was completed, using time as the within-subjects factor and writing lab participation as the between-subjects factor. This analysis was conducted because both groups participated in the writing lab intervention during second grade, from Time 1 to Time 2. Using qualitative category rating as the dependent variable, this analysis revealed that the main effect of time was significant within-groups, \( F(1, 31) = 13.885, p = 0.001 \), indicating that for the entire sample (\( n = 32 \)), the category rating system showed scores that were significantly higher at Time 2 than at Time 1.

A repeated measures analysis was also used to determine if there was a statistical difference between the two groups (continuous intervention and comparison) at Time 1. The answer to that question revealed a significant difference between groups for the qualitative category rating, \( F(1, 31) = 4.492, p = 0.042 \). In addition, there was a significant difference between groups for the index of control, \( F(1, 31) = 9.037, p = 0.005 \) and for the percentage correct measure, \( F(1, 31) = 6.572, p = 0.016 \). That is, results for all three dependent variables indicated that at Time 1 there were statistically significant qualitative and quantitative differences between groups on this measure.

Growth between Time 1 and Time 2 (Same Intervention)

Paired t-test analyses were also run to compare the results for the two groups during the time period between Time 1 and Time 2. This was the time interval during which all of the students received the same writing lab intervention in three different second grade classrooms. Effect sizes for these analyses were calculated and are
reported. Cohen (1988) recommended computing effect size, $d$, by dividing the mean difference of both score comparisons by the standard deviation of the group mean. He recommended interpreting a small effect size at 0.20, a medium effect size at 0.50 and a large effect size at 0.80 or greater.

**Category Ratings**

Performance based on category rating showed a similar change for both groups in that the paired t-test analyses showed a significant increase from Time 1 to Time 2 for each group. For the 21 students in the continuous intervention group, the difference between Time 1 and Time 2 was significant, $t(20) = 2.631, p = 0.016$, and the effect size (computed as Cohen’s $d$) was 0.57, suggesting a medium effect. For the 11 students in the comparison group, the difference was also significant, $t(10) = 2.609, p = 0.026$. The effect size of 0.79 (Cohen, 1988) also suggested a medium effect, although it was close to the limits for a large effect. These results indicate that the two groups of students demonstrated similar growth between Time 1 and Time 2, during which time all the students were receiving the same intervention in their second grade classrooms.

**Index of Control**

The paired t-tests for the index of control revealed that change was not significant between Time 1 and Time 2 for either group. For students in the continuous intervention group, results showed $t(20) = 1.467, p = 0.158$. Cohen’s $d$ indicated a small effect size for this non-significant difference ($d = 0.32$). Similarly, results for the comparison group on the index of control measure did not produce a significant change between Time 1 and Time 2, $t(10) = 2.087, p = 0.063$. The effect size ($d = 0.63$) could be considered medium sized, although the change was still not significant.
Percentage of words spelled correctly

When analyzing the percentage of words spelled correctly as a dependent variable, there was a significant difference between Time 1 and Time 2 for the comparison group, \( t(10) = 2.342, p = 0.041 \), but not for the continuous intervention group, \( t(20) = 1.484, p = 0.153 \). Also, the effect size for the comparison group \((d = 0.71)\) was larger than for the continuous intervention group \((d = 0.32)\) (Cohen, 1988).

Growth between Time 2 and Time 5 (Difference in Intervention)

Using writing lab intervention as the independent variable, similar analyses were calculated between Time 2 and Time 5. During this time, the continuous intervention group and the comparison group differed in that the continuous intervention group received intervention and the comparison group did not. Neither group received intervention services between Time 2 and Time 3 because of summer vacation.

Category Ratings

Based on category change from Time 2 to Time 5, the continuous intervention group produced data that showed a significant difference in category change, \( t(20) = 2.961, p = 0.008 \), whereas the comparison group showed no significant difference and no effect. For the continuous intervention group, a medium effect size characterized the change \((d = 0.64)\) and for the comparison group, the effect size \((d) = 0.00\).

Index of Control

Similarly, paired t-tests analyses revealed that there was a significant change for index of control measures between Time 2 and Time 5 for the continuous intervention group, but not for the comparison group. For the continuous intervention group, the change was significant, \( t(20) = 2.987, p = 0.007 \), with a medium effect size \((d = 0.65)\).
(Cohen, 1988). The comparison group, on the other hand, produced no statistically significant difference and a small effect size \( (d = 0.06) \) during the time they were not receiving intervention.

**Percentage of words spelled correctly**

Finally, results revealed a significant difference for the continuous intervention group for the change in percentage of words spelled correctly, \( t(20) = 2.374, p = 0.028 \). Again, there was no significant difference for the comparison group, \( t(10) = 0.633, p = 0.541 \), and a small effect size \( (d = 0.19) \). The continuous intervention group produced a smaller effect on percentage correct than on category rating or index control, but maintained a medium effect size \( (d = 0.52) \) (Cohen, 1988).

**Growth Between Time 2 and Time 3 (Continuous Intervention Group)**

Between Time 2 and Time 3 the continuous intervention group did not receive intervention because they were on summer vacation. However, samples were completed upon their return to third grade as baseline for the new school year, providing a means by which to measure any progress or natural growth over the summer months. As anticipated, there was no significant difference for growth for the continuous intervention group, between Time 2 and Time 3, for category change \( (d = 0.07) \), index of control \( (d = 0.19) \), or percentage correct \( (d = 0.63) \), during the period when no intervention was provided.

**Summary of Results**

Results of the ANOVAs across the five time points showed a significant effect for time. This was found for all three dependent measures—both qualitative and quantitative—using data collected from the continuous intervention group and a repeated
measures one-way ANOVA. It is important to note that a significant difference also was found between the continuous intervention group and the comparison group at the beginning of the study, based on qualitative and quantitative measures of spelling in favor of the comparison group. This difference was unintentional and leads to complications in interpreting the data that are discussed in Chapter Five.

The second set of analyses, using paired t-tests, addressed the question of treatment effectiveness. As hypothesized, the continuous intervention group produced a greater change than the comparison group from Time 2 to Time 5, when only the continuous intervention group was receiving writing lab instruction. This indicates a positive effect of the writing lab intervention approach as used for increasing spelling ability over time. Alternate interpretations must be considered, however, including the possibility of regression to the mean. Additional support for treatment effectiveness was added in the finding of no significant change over the summer months when no treatment was provided. These results, some additional cautionary notes, and implications for future research are discussed in Chapter Five.
CHAPTER FIVE

DISCUSSION

This chapter reviews the purpose and method of the study. It also includes a review of the results of analyses found in Chapter Four and presents a discussion related to each of the research questions. It concludes with implications for spelling assessment and intervention, as well as the role and responsibilities for the speech-language pathologist related to developmental spelling category ratings.

Purposes and Hypotheses

There were two purposes for this study. One was to evaluate the use and effectiveness of a developmental stage model for assessing change in spelling ability over time. The researcher analyzed individual students’ writing samples (in the continuous intervention group) at five points to observe growth over time. Frequency of category ratings within individual misspelled words taken from students’ samples also provided information to address this purpose. The researcher hypothesized that the category rating system would provide a means of observing a developmental spelling progression across time periods.

The second purpose was to examine the effects of a writing lab instructional approach for guiding students in their spelling progress. To answer this question, writing samples across three time points (comparison group) and across five time points (continuous intervention group) were analyzed and compared for qualitative and
quantitative change. It was hypothesized that there would be a greater overall change in spelling ability for the continuous intervention group, who received writing lab instruction during both years, than for the comparison group, who did not.

Measuring Change Over Time

Change over time was measured using three dependent variables: category rating (a qualitative variable), index of control, and the percentage of words spelled correctly (quantitative variables). The category rating was a qualitative measure based on a developmental stage model adapted from Gentry’s research (1977, 1981, 1982). One quantitative measure, the index of control (Laminack & Wood, 1996), was calculated by dividing the number of different correctly spelled words by the total number of different words. A second quantitative measure was the percentage of words spelled correctly.

As the statistical evidence presented in Chapter Four indicated, the analysis of the data from the continuous intervention group produced a significant main effect for growth over time with category change as the dependent variable. However, it is also important to be aware of the change in age and grade over time of the students. The writing task was not adjusted for age or grade, as a formal spelling task could be, by including an increase in the use of high level and more complex words. When students write informal language samples, they choose which words to include. Therefore, it is possible that some students use only words they know how to spell, resulting in a higher percentage correct, and other students take risks and have a higher number of different words, but a lower percentage correct. This complicates the interpretation of quantitative data that rely on ratios and percentages. The significant growth in category rating between Times 1 and 2 as well as between Times 2 and 5 for the continuous intervention
group indicate a positive answer to the first research question. Analyses revealed that a category rating system is able to measure growth over time effectively, provided the students produced samples that were more developmentally complex and that neither group reached a ceiling effect with this measure. Degree of risk demonstrated in students’ word choices would exaggerate the ceiling effect. This is a question for future research.

The proportional data in the frequency bar graph in Figure 4 also support the use of a stage theory for measuring growth over time, at least for early elementary school children. The usefulness may not be as effective in third grade. The example of the bar chart illustrates how children use strategies from lower level categories in their early work and progress to greater proportions of higher level strategies over time, as well as increasing the percentage of words spelled correctly.

Together, the evidence supports the hypothesis that the category rating system is able to measure growth over time in elementary writing samples. Measures collected from individual samples as well as from individual words all indicated increased category ratings over time.

Measuring Change Between Groups

The analyses from the first time interval, from Time 1 to Time 2, allowed for comparison between the two groups using the one qualitative (category rating) and two quantitative (index of control and percentage correct) measures. During this time interval, both groups were receiving writing lab intervention. The 32 students were mixed among three different second grade classrooms. The researcher used a between-subjects Repeated Measures ANOVA to compare differences between groups at the
beginning of the study. Unfortunately, the groups showed a significant difference on both qualitative and quantitative variables. The comparison group produced a higher average category rating, index of control, and percentage of words spelled correctly than the continuous intervention group at both Time 1 and Time 2, suggesting that they achieved a higher spelling ability at the beginning of the study. The researcher did not have control over the placement of the students for either second or third grade, and with the initial significant difference, caution is recommended when comparing the results of the two groups.

As hypothesized, both groups demonstrated a significant growth in spelling ability between Times 1 and 2, based on the qualitative category rating. During this time they were both receiving intervention. Evidence for an intervention effect, as hypothesized, was also found in the fact that the two groups displayed different results between Time 2 and Time 5, when the comparison group no longer participated in writing lab instruction. During this time, the continuous intervention group achieved a significant difference for growth in all three measures: category change, index of control change, and percentage correct change, whereas the control group did not show growth in any of the measures. Students in the continuous intervention group, who had previously demonstrated a lower average category rating, average index of control measure, and average percentage of words spelled correctly than those in the comparison group at the middle of second grade, produced samples at the end of the third grade year that were almost equivalent to those of their peers in the comparison group. These data support the effectiveness and usefulness of the writing lab model, based on a developmental stage
model (Gentry, 1982), for helping students in early elementary grades achieve higher spelling ability.

Analyses also revealed no significant difference for growth between the times of no intervention for the comparison group (between Time 2 and Time 5) or between the times of no intervention for the continuous intervention group (between Times 2 and 3). These results strengthen the argument that a writing lab instructional approach is effective when guided by a developmental stage model, such as the Gentry model (1982) used in this study.

Additional information can be obtained from the frequency analysis of individual words. By comparing the percentages in the samples from the continuous intervention group (Chapter Four, Figure 4) with those produced by the comparison group (Chapter Four, Figure 5), one can see a more obvious progression through the stages for the continuous intervention group. Although the students continued to demonstrate more errors that were scored with lower category ratings into later time periods, overall, they showed an increase in correct spelling and an increase in awareness and use of more advanced spelling rules and strategies. However, one must take into consideration the possibility of the ceiling effect that results when using a five-stage model with all correctly spelled words in stage five, and a broad description of stage four. When analyzing the results produced by the comparison group, there is a greater possibility of the ceiling effect because the students produced a higher proportion of correctly spelled words from the beginning of the study.
Results Related to Previous Research

Similar to what previous researchers and theorists have found, this study found partial support for the use of a developmental stage model or a psycholinguistic model for spelling development. Charles Read (1971) took interest in invented spellings in the early 1970s, by using a phonological component in his research. He found that young children spelled words in different ways depending on the way words sound and their phonological contexts. Likewise, students from the current study utilized strategies from the phonetic stage in second grade to spell their words or to select words that they were able to spell correctly based on the way they sounded.

Also in the 1970s, Beers and Henderson (1977) analyzed how students’ spelling changed over time by noting longitudinal trends in students’ writing. Although they studied first grade authors to observe developmental changes in writing, rather than second and third grade authors as in the current study, their research included similarities to the method of the current study. For example, observations of informal samples were made in both studies. In addition, both phonetic and linguistic changes in spelling were categorized as strategies for connecting different sounds and word roots to alphabetic patterns in both studies.

Additionally, the changes over time observed in students in this study followed similar trends to those observed by Bissex (1980) in her son’s writing and spelling development. Bissex related not only phonological changes, but also morphologic and semantic application of rules. Using Gentry’s (1982) stage model, both Bissex and this researcher looked beyond the assessment of single words in isolation, and viewed the
overall picture of what a child produced, including the strengths and weaknesses of skills related to spelling.

Stage Theory Criticism

Proposed Stage Theory Limitations

A number of theorists (Apel, Masterson & Hart, in press; Bourassa & Treiman, 2001; Laminack & Wood, 1996; Steffler et al., 1998) have denied the use of stage theory for assessment and intervention because of restrictive stage boundaries. They have argued that spelling is not a step-by-step process in which children progress in discrete steps from one stage to the next directly (Bourassa & Treiman, 2001; Laminack & Wood, 1996). Another criticism of stage theory assignments used in the past have is that they have not recognized words that children spelled correctly (Steffler et al. 1998). Apel and colleagues (in press) expressed a third weakness of stage theory by pointing out that categorizing a sample using a single stage does not provide sufficient information when a child is spelling words of varying lengths and complexities. These points were considered in preparing the methodology and in interpreting the results of this study.

Current Study Support for Stage Theory

Discrete Stage Concerns

In this study, the researcher used a classification model to capture two different types of data. First, individual spelling errors were classified into stages, based on linguistic rules. Second, the entire writing sample was given a representational classification. This method enabled the researcher to observe the student demonstrate skills in multiple stages, as other theorists have argued, while categorizing the overall sample with a single category rating that best represented the student’s skills. However,
the researcher also produced a low intra-class correlation of 0.66 when using this method, indicating support for the discrete stage argument against stage theory application. Therefore, the emphasis should not be as great on the single number as on the information obtained from individual word analysis and from correctly spelled words.

**Inclusion of Correctly Spelled words**

In addition, the analysis tool was designed to convey the importance of patterns in words that the student spelled *correctly* as well as incorrectly. In coding individual samples, the researcher observed the rules the student did not use correctly in the misspelled words and referred to the correctly spelled words to see if those rules were being used correctly elsewhere. This had not been previously used as part of stage theory application, and it helped to credit the student for their overall abilities, not just the ones that were lacking as demonstrated in their spelling errors. Occasionally, a child might misspell a word using a non-traditional rule or strategy but spell other words following the same orthographic pattern correctly. Steffler and colleagues (1998) suggested that in this case “it is important for teachers to ask children how they spelled words rather than drawing inferences from spelling errors” (p. 503). Bourassa and Treiman (2001) agreed that “an awareness of the linguistic basis of the misspellings can help researchers and educators better understand young children’s performance” (176).

**Using Multiple Levels of Strategies**

It is important to note that students may demonstrate strategies from more than one category in their writing samples. This is similar to other developmental stage strategies in which children revert to previously learned skills when a task (in this case a spelling word) becomes more complex. Apel and his colleagues (in press) presented this
as a concern when disputing the use of a stage theory. Their point is well taken when observing change in students from higher grades (e.g. fifth grade and higher) because by then most orthographic concepts have been mastered. However, in the case of the present study, involving early elementary students, assigning individual category ratings to misspelled words and one overall category to the sample as a whole did not limit the information gained from the assessment. The multiple sources of information made it possible to observe how a child uses strategies for general spelling and writing tasks.

Implications for Spelling Assessment and Intervention

**Spelling Assessment**

A psycholinguistic model for observing developmental spelling growth over time, such as the one used in the present study, has numerous implications for spelling assessment. First, it allows one to observe the child’s spelling ability in a natural communication context. By analyzing a writing sample, rather than only analyzing the results of a formal spelling test, one can gather information about the child’s strengths, strategies, and needs for improvement. Also, information can be obtained from the words that the child spelled correctly, as well as the words that a child misspelled, which is new to the current research base. As one reviews the words that a child spelled correctly, the rules that he has mastered or is in the process of mastering are evident, even if those same rules are used incorrectly in some of the child’s misspelled words. Further research on the assessment of younger authors using a similar method of analysis might yield a more prominent progression of growth over time.

The scoring chart used in this study (found in Appendix A), which used the detailed features within Gentry’s (1982) stages, also provides information regarding the
categories for individual errors, based on a developmental stage, as well as based on individual rules that are used correctly or incorrectly in the misspelled words. This information, combined with overall quantitative information (such as index of control, percentage of words spelled correctly, or number of different words used) can help the SLP or educator plan spelling goals for each individual child. The overall category that is assigned to a sample depicts a general observation of the student’s current performance, and a point from which to draw intervention goals. In many cases, additional information obtained from formal spelling assessments and spelling inventories can be helpful in composing these goals (Henderson, 1990).

Spelling Intervention

In 1981, Hodges stated, “just as one learns to speak by speaking and to read by reading, one learns to spell by spelling” (p. 12). With this statement, he introduced an important element of spelling intervention, that of frequent practice. This could be interpreted in numerous ways, as formal spelling practice, as formal writing practice, or as writing across the curriculum. Henderson (1990) believed that “formal spelling instruction is important” and that “informal spelling instruction is equally important” (p. 167). By using the results from spelling assessment, both informal and formal, educators can decide how to prepare a complete spelling instruction curriculum for students.

The implications for spelling intervention from this study are modeled after the writing lab model, which involves the use of scaffolding during general curriculum writing (Nelson et al., 2004). However, this idea is not new. In 1971, Boyd and Talbert noted, “spelling instruction which has lasting effects cannot be relegated to a single period of the day, but must be the concern of teachers and pupils in all written activities”
(pp. 19-20). One decade later, Hodges (1981) also stated, “because spelling is a language-based activity that involves many of the same intellectual and linguistic processes that are used in verbal communication, spelling should be taught in the context of general language study” (pp. 11-13). A slight shift in the following decade led to conclusions about the importance of combining formal spelling training with informal spelling during writing lessons. Henderson (1990) proposed that basic knowledge and rules are benefits of formal teaching and an understanding and use of the knowledge, as well as vocabulary growth, are gained through informal teaching.

Templeton (1991) emphasized the importance of connecting spelling with meaning in an effort to expand students’ vocabulary, and thus increase spelling abilities, as well. As trends of assessment have changed over the years, trends in spelling intervention have not changed much. It is recommended that classroom teachers continue to emphasize teaching basic phonetic and linguistic spelling rules in formal lessons. In the meantime, speech language pathologists and classroom teachers can collaborate to determine individual spelling goals and ways to scaffold these goals for children with special language learning needs during meaningful, enjoyable writing activities.

Limitations

As previously mentioned, one limitation to this study was the reliability. The researcher completed an intra-rater reliability analysis, producing an intra-class correlation (ICC) of 0.66. This suggested a low possibility of repeating the test with similar results given the current methods and scoring procedures. However, in reviewing the assessment implications, it is more important to gain qualitative than quantitative
information from the analysis. Assigning a student to a single stage is similar to giving a student in special education a single label. The stage number or the label may serve as a guide for intervention, but one must also review students' strengths and needs (in this case gained from the specific features and rules within each stage) (Gentry, 1982) in order to plan for intervention.

This study was completed as a retrospective study, as a part of the research done for the writing lab outreach project at Western Michigan University (Nelson et al., 2004). Therefore, some limitations resulted from the data that had previously been collected. For example, the sample sizes for the comparison group (n = 11) and for the continuous intervention group (n = 28) were small and not equal. In addition, the baseline measures indicated that the two groups began the study at different achievement levels, both qualitatively and quantitatively. The U.S. Department of Education (2003) states that in a good study, “the study should provide data showing that there were no systematic differences between the intervention and control groups before the intervention” (p. 13). The present study did not follow these guidelines, and if repeated, it would be important to verify the starting achievement levels of the two groups, as well as controlling for sample size.

Conclusions

This purpose of this study was to answer two questions. The first question was: Can a linguistically-based category rating system produce evidence of students’ growth in spelling ability over a period of longitudinal observation during the early elementary years? Based on the qualitative measures used to analyze the samples in this study, the answer to this question was positive, indicating that a psycholinguistic category rating
system can be used to measure growth over time. The second question was: Does analysis of spelling growth provide evidence for the effectiveness of a writing lab intervention model? Based on the qualitative and quantitative measures used in this study, the answer to this question is also positive. Different results were found between changes made by the continuous intervention group and changes made by the comparison group from the time the comparison group no longer participated in the writing lab instruction, at the end of second grade, until the end of the study, at the conclusion of third grade. Between these time intervals, the continuous intervention group achieved both qualitative and quantitative changes and the comparison group did not.

Summary and Need for Future Research

It has been suggested that spelling assessment combine both formal and informal approaches. In order to fully appreciate a student’s ability to correctly spell words in the context of self-expression, formal assessment should be supplemented by analysis of informal writing samples. As indicated, some research has shown that spelling develops in stages across time (Beers & Henderson, 1977; Gentry, 1982; Henderson, 1990; Lamme, 1984; Read, 1975). The results of this study support that perspective.

Researchers and educators have emphasized the need to analyze a student’s errors in order to provide effective instruction and intervention for spelling and other literacy skills. This study has demonstrated the importance of also observing correctly spelled words in students’ writing. By putting more focus into the assessment and analysis process of spelling, the instruction avenue will be made smoother for educators and students alike.
The method developed for categorizing both misspelled words and correctly spelled words shows promise for a more adequate representation of students’ spelling ability. However, the procedure was complex and not as reliable as was hoped. Further research is needed to address a more universal way of applying the stage model in an analysis technique that can easily be reproduced by spelling and language experts. The technique should include guidelines for classifying or observing trends in correct spellings of words. Researchers may also find a more prominent example of growth over time by analyzing samples written by students in first and second grade, like Beers and Henderson (1977), rather than in second and third grade (as in the current study) because there may be a more distinct growth curve during those years. In addition, the progression through stage four may last longer than earlier developing stages, because of the complexity of the rules listed in that stage. Finally, after assessment measures have been collected, further research should identify the effectiveness of intervention goals following spelling stage classification at the word level and at the level of the writing sample. The category rating system used in this study allows for clear intervention goals to be written, based on the students’ strengths and weaknesses. Using a scaffolding technique, the students should progress to higher levels of spelling abilities by following these goals, moving toward the long term goal of higher literacy skills and successful school experiences.

**Features of Gentry’s (1982) Precommunicative Stage**

“the earliest of spelling development…where a child first uses symbols from the alphabet to represent words” (p.193); “lack of knowledge of letter-sound correspondence” (p. 194); “at this stage spellings do not communicate language by mapping letters to sounds” (p.194)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Gentry’s Description of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>“The speller demonstrates some knowledge of the alphabet through production of letter forms to represent a message” (p.193)</td>
</tr>
<tr>
<td>(2)</td>
<td>“The speller demonstrates no knowledge of letter-sound correspondence. Spelling attempts appear to be a random stringing together of letters of the alphabet which the speller is able to produce in written form” (p.193-194)</td>
</tr>
<tr>
<td>(3)</td>
<td>“The speller may or may not know the principle of left-to-right directionality for English spelling” (p. 194)</td>
</tr>
<tr>
<td>(4)</td>
<td>“The speller may include number symbols as part of the spelling of a word” (p. 194)</td>
</tr>
<tr>
<td>(5)</td>
<td>“The speller’s level of alphabet knowledge may range from much repetition of a few known alphabetic symbols to substantial production of letters of the alphabet” (p. 194)</td>
</tr>
<tr>
<td>(6)</td>
<td>“The speller frequently mixes uppercase and lowercase letters indiscriminately” (p. 194)</td>
</tr>
<tr>
<td>(7)</td>
<td>“The speller generally shows a preference for uppercase letter forms in his/her earliest samples of writing” (p. 194)</td>
</tr>
</tbody>
</table>
### Features of Gentry’s (1982) Semiphonetic Stage

“invented spellings” (initially “prephonetic”)...represent letter-sound correspondence

<table>
<thead>
<tr>
<th>Feature</th>
<th>Gentry's Description of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>“The speller begins to conceptualize that letters have sounds that are used to represent the sounds in words” (p. 194)</td>
</tr>
<tr>
<td>(2)</td>
<td>“Letters used to represent words provide a partial (but not total) mapping of phonetic representations for the word being spelled. Semiphonetic spelling is abbreviated; one, two, or three letters may represent the whole word” (p. 194)</td>
</tr>
<tr>
<td>(3)</td>
<td>“A letter name strategy is very much in evidence at the semiphonetic stage. Where possible the speller represents words, sounds, or syllables with letters that match their letter names (e.g., R [are]; U [you]; LEFT [elephant]) instead of representing the vowel and consonant sounds separately” (p. 194)</td>
</tr>
<tr>
<td>(4)</td>
<td>“The semiphonetic speller begins to grasp the left-to-right sequential arrangement of letters in English orthography” (p. 194)</td>
</tr>
<tr>
<td>(5)</td>
<td>“Alphabet knowledge and mastery of letter formation become more complete during the semiphonetic stage” (p. 194)</td>
</tr>
<tr>
<td>(6)</td>
<td>“Word segmentation may or may not be in evidence in semiphonetic spelling” (p. 194)</td>
</tr>
</tbody>
</table>
### Features of Gentry’s (1982) Phonetic Stage

**Features of Gentry’s (1982) Phonetic Stage**

“the ingenious and systematic invention of an orthographic system that completely represents the entire sound structure of the word being spelled” (p. 195); “letter choices...are systematic and perceptually correct” (p. 195)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Gentry’s Description of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>“For the first time the child is able to provide a total mapping of letter-sound correspondence; all of the surface sound features of the words being spelled are represented in the spelling” (p. 195)</td>
</tr>
<tr>
<td>(2)</td>
<td>“Children systematically develop particular spellings for certain name details of phonetic form; namely, tense vowels, lax vowels, preconsonantal nasals, syllabic sonorants, -ed endings, retroflex vowels, affricates, and intervocalic flaps (Gentry, 1978; Read, 1975)” (Gentry, 1982, p. 195).</td>
</tr>
<tr>
<td>(3)</td>
<td>“Letters are assigned strictly on the basis of sound, without regard for acceptable English letter sequence or other conventions of English orthography” (p. 195)</td>
</tr>
<tr>
<td>(4)</td>
<td>“Word segmentation and spatial orientation are generally, but not always, in evidence during the phonetic stage” (p. 195)</td>
</tr>
</tbody>
</table>
Features of Gentry’s (1982) Transitional Stage

“great integration and differentiation of orthographic forms take place, marks a major move toward standard English orthography” p. 196); “the speller begins to assimilate the conventional alternatives for representing sounds…greater reliance on visual and morphological representations” (p. 196)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Gentry’s Description of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>“Transitional spellers adhere to basic conventions of English orthography; vowels appear in every syllable (e.g., EGUL instead of phonetic EGL [eagle]; nasals are represented before consonant s (e.g., BANGK instead of phonetic BAK [bank]); both vowels and consonants are employed instead of a letter name strategy (e.g., EL rather than L for the first syllable of ELEFANT [elephant]); a vowel is represented before syllabic r even though it is not heard or felt as a separate sound (e.g., MONSTUR instead of phonetic MOSTR [monster]); common English letter sequences are used in spellings (e.g., YOUNITED [united], STINGKS [stinks]); especially liberal use of vowel digraphs like ai, ea, ay, ee, and ow appears; silent e pattern becomes fixed as an alternative for spelling long vowel sounds (e.g., TIPE in place of phonetic TIP [type]); inflectional endings like s, ‘s, ing, and est are spelled conventionally” (p. 196)</td>
</tr>
<tr>
<td>(2)</td>
<td>“Transitional spellers present the first evidence of a new visual strategy; the child moves from phonological to morphological and visual spelling (e.g., EIGHTEE instead of the phonetic ATE [eighty])” (p. 196)</td>
</tr>
<tr>
<td>(3)</td>
<td>“Due to the child’s new visual strategy, transitional spellers may include all appropriate letters, but they may reverse some letters (e.g., TAOD [toad], HUOSE [house], OPNE [open])” (p. 196-197)</td>
</tr>
<tr>
<td>(4)</td>
<td>“Transitional spellers have not fully developed the use of factors identified by researchers that contribute to spelling competency; graphemic environment of the unit, position in the word, stress, morpheme boundaries, and phonological influences (Gentry, 1982, p. 197)</td>
</tr>
<tr>
<td>(5)</td>
<td>“Transitional spellers differentiate alternate spellings for the same sound. A long a sound, for example may be spelled the following ways by a transitional speller: EIGHTE [eighty], ABUL [able], LASEE [lazy], RANE [rain], and SAIL [sale]. However, as indicated above in condition number 4, the conditions governing particular alternatives for representing a sound are only partially understood at the transitional stage” (p. 197)</td>
</tr>
<tr>
<td>(6)</td>
<td>“Transitional spellers generally use learned words (correctly spelled words) in greater abundance in their writing” (p. 197)</td>
</tr>
</tbody>
</table>
### Features of Gentry’s (1982) Correct Stage

“usually viewed from the instructional scheme rather than the developmental scheme” (p. 197)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Gentry’s Description of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>“The speller’s knowledge of the English orthographic system and its basic rules is firmly established” (p. 198)</td>
</tr>
<tr>
<td>2</td>
<td>“The correct speller extends his/her knowledge of word environmental constraints (i.e., graphemic environment in the word, position in word, and stress)” (p. 198)</td>
</tr>
<tr>
<td>3</td>
<td>“The correct speller shows an extended knowledge of word structure including accurate spellings of prefixes, suffixes, contractions, and compound words, and ability to distinguish homonyms” (p. 198)</td>
</tr>
<tr>
<td>4</td>
<td>“The correct speller demonstrates growing accuracy in using silent consonants and in doubling consonants appropriately” (p. 198)</td>
</tr>
<tr>
<td>5</td>
<td>“The correct speller is able to think of alternative spellings and employ visual identification of misspelled words as a correction strategy. He/she recognizes then ‘words don’t look right’” (p. 198)</td>
</tr>
<tr>
<td>6</td>
<td>“The correct speller continues to master uncommon alternative patterns (e.g., <em>ie</em> and <em>ei</em>) and words with irregular spellings” (p. 198)</td>
</tr>
<tr>
<td>7</td>
<td>“The correct speller masters Latinate forms and other morphological structures” (p. 198)</td>
</tr>
<tr>
<td>8</td>
<td>The child accumulates a large corpus of learned words” (p. 198)</td>
</tr>
</tbody>
</table>
### Scoring Reference used for Categorizing Samples, based on Gentry (1982)

<table>
<thead>
<tr>
<th>Spelling Stage</th>
<th>Characteristics of Stage</th>
</tr>
</thead>
</table>
| **Pre-communicative Stage** | - “uses [random] symbols from the alphabet to represent words” (p. 193)  
- “lack of knowledge of letter-sound correspondence” (p. 194)  
- “may or may not know the principle of left-to-right directionality for English spelling” (p. 194)  
- “may include number symbols as part of the spelling of a word” (p. 194)  
- “frequently mixes uppercase and lowercase letters indiscriminately” (p. 194)  
- “generally shows a preference for uppercase letter forms” (p. 194) |
| **Semiphonetic Stage** | A invented spellings” (p. 194)  
B “represent letter-sound correspondence” (p. 194)  
C “Semiphonetic spelling is abbreviated; one, two, or three letters may represent the whole word” (p. 194)  
- “Letters represent words, sounds, or syllables “(e.g., R [are]; U [you]; LEFT [elephant]) instead of representing vowel and consonant sounds separately.” (“letter-name strategy”) (p. 194)  
- Beginning “left-to-right sequential arrangement of letters” (p. 194) |
| **Phonetic Stage** | A “letter choices…are systematic and perceptually correct” (p. 195)  
B “total mapping of letter-sound correspondence; all…surface sound features of the words represented” (p. 195)  
C “Letters are assigned…on the basis of sound, without (regarding)…letter sequence or other [orthographic] conventions” (p. 195)  
- “Word segmentation and spatial orientation are generally [present]” (p. 195) |
| **Transitional Stage** | A “vowels appear in every syllable (e.g., EGUL instead of phonetic EGL [eagle])” (p. 196)  
B “nasals are represented before consonant s (e.g., BANGK instead of phonetic BAK [bank])” (p. 196)  
C “both vowels and consonants are employed instead of a letter name strategy (e.g., EL rather than L for the first syllable of ELEFANT [elephant])” (p. 196)  
D “a vowel is represented before syllable r even though it is not heard or felt as a separate sound (e.g., MONSTUR instead of phonetic MOSTR [monster])” (p. 196)  
E “common English letter sequences…used in spellings (e.g., YOUNITED [united], STINGKS [stinks])” (p. 196)  
F “especially liberal use of vowel digraphs like ai, ea, ay, ee, and ow appears” (p. 196)  
G “silent e pattern becomes fixed as an alternative for spelling long vowel sounds (e.g., TIPE in place of phonetic TIP [type]); inflectional endings like s, ‘s, ing, and est are spelled conventionally” (p. 196)  
H “new visual strategy…mov[ing] from phonological to morphological and visual spelling (e.g., EIGHTEE instead of the phonetic ATE [eighty])” (p. 196)  
I “may reverse some letters (e.g., TAOD [toad], HUOSE [house], OPNE [open])” (pp. 196-197)  
J “differentiate alternate spellings for…same sound.” (e.g. EIGHTE [eighty], ABUL [able], LASEE [lazy], RANE [rain], and SAIL [sale]” all for long a” (p. 197)  
K “generally use learned words (correctly spelled words)” more often (p. 197) |
| **Correct Stage** | A “accurate spellings of prefixes, suffixes, contractions, and compound words” (p. 198)  
B accuracy in “ability to distinguish homonyms” (p. 198)  
C “accuracy in using silent consonants” (p. 198)  
D accuracy “in doubling consonants appropriately” (p. 198)  
E continued accuracy in “words with irregular spellings” (p. 198)  
- “masters Latinate forms and other morphological structures” (p. 198)  
F “accumulates a large corpus of learned words” (p. 198) |
Date: June 24, 2003

To: Nickola Nelson, Principal Investigator
    Adelia Van Meter, Co-Principal Investigator
    Brandi Newkirk, Student Investigator for thesis
    Pamela Ansell, Student Investigator for thesis

From: Mary Lagerwey, Chair

Re: HSIRB Project Number: 03-05-31

This letter will serve as confirmation that your research project entitled "Writing Lab Sample Analysis" has been approved under the expedited category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: June 24, 2004
WRITING LAB OUTREACH PROJECT PERMISSION FORM
Western Michigan University, Department of Speech Pathology and Audiology
Nickola W. Nelson, Ph.D., Principal Investigator Adelia Van Meter, M.S., Co-Investigator

The Kalamazoo Public Schools and Western Michigan University are working together to help students learn to write better and to develop their language skills. In this project, students use the writing process approach and computers to write stories and reports. The WMU instructors would like to share information from this work with others in presentations and publications. Sharing your child’s work and videotapes of class activities will help other educators and parents learn about the writing lab approach and the possibilities for their classrooms and students. For these educational and research purposes, we are requesting your permission. You may withdraw your permission at any time without penalty or loss of any educational or classroom services to your child.

Child’s name

✓ It is OK to share samples of work produced by my child.

________ parent/guardian signature ________ date

✓ It is OK to videotape or take pictures of my child taking part in writing lab activities.

________ parent/guardian signature ________ date

The only risks anticipated are potential embarrassment at being videotaped or having work shared with others. If your child appears uncomfortable being videotaped or sharing stories, the research team will stop photographing or will not make copies of the story or other written work for sharing. As in all research, there may be unforeseen risks to your child. If an accidental injury occurs, appropriate emergency measures will be taken; however, no compensation or treatment will be made available to you or your child except as otherwise specified in this permission form.

This consent document has been approved for use for one year by the WMU Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. You should not sign this document if the corner does not show a stamped date and signature. Feel free to contact Kevin Campbell, Principal (337-0750), Pat Coles-Chalmers, KPS Assistant Superintendent (337-0190), Nicki Nelson, WMU Project Director (387-8058), or Adelia Van Meter, WMU Project Coordinator (387-8023) if you have questions. You may also contact the Chair, Human Subjects Review Board (387-8293) or the Vice President for Research (387-8298) at WMU if questions or problems arise during the course of the activity.
APPENDIX C- Examples of Students’ Word Lists

CHILD 25

<table>
<thead>
<tr>
<th>CHILD’S SPELLING ERRORS</th>
<th>CORRECT SPELLING</th>
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<th>CLASSIFICATION CODE (1-5)</th>
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<td>1</td>
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<tr>
<td>the</td>
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INDEX OF CONTROL: 9/15 = 60.0%

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Prepared Sample:
Analyzed Sample:
Re-analyzed Sample:
* Most of sample dictated. Dictated portions and numerals removed from sample*
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**INDEX OF CONTROL:** 27/42 = 64.3%

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CHILDF 118

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INDEX OF CONTROL: 18/24 = 75.0%

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Prepared Sample:  
Analyzed Sample:  
Re-analyzed Sample:
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<th>2&lt;sup&gt;nd&lt;/sup&gt;-end</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt;-beg</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt;-mid</th>
<th>3&lt;sup&gt;rd&lt;/sup&gt;-end</th>
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</thead>
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<td>Date/Time</td>
<td>Date/Time</td>
<td>Date/Time</td>
<td>Date/Time</td>
<td>Date/Time</td>
</tr>
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<td>I.O.C. Cat.</td>
<td>I.O.C. Cat.</td>
<td>I.O.C. Cat.</td>
<td>I.O.C. Cat.</td>
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<td>12/2 @ 6:03 p</td>
<td>86.8%</td>
<td>3</td>
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<tr>
<td>002 12/3 @ 1:22 a</td>
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<td>12/4 @ 7:31 p</td>
<td>77.8%</td>
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<tr>
<td>003 12/3 @ 1:04 a</td>
<td>0.0%</td>
<td>2</td>
<td>12/6 @ 5:30 p</td>
<td>73.7%</td>
<td>3</td>
</tr>
<tr>
<td>004 12/3 @ 1:11 a</td>
<td>89.5%</td>
<td>4</td>
<td>12/4 @ 7:33 p</td>
<td>64.3%</td>
<td>4</td>
</tr>
<tr>
<td>005 12/3 @ 1:24 a</td>
<td>87.9%</td>
<td>4</td>
<td>12/6 @ 6:00 p</td>
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<td>006 12/3 @ 12:42 a</td>
<td>57.4%</td>
<td>3</td>
<td>12/4 @ 11:48 p</td>
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<td>12/6 @ 1:45 p</td>
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<tr>
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<td>12/6 @ 3:25 p</td>
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<td>5</td>
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<td>59.1%</td>
<td>3</td>
<td>12/6 @ 3:32 p</td>
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* Date/Time = Date and Time analyzed  
* IOC = Index of Control  
* Cat = Stage/ Category

* APPENDIX D - Raw Data from all Samples  
82
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<th>2\textsuperscript{nd}-end</th>
<th>3\textsuperscript{rd}-beg</th>
<th>3\textsuperscript{rd}-mid</th>
<th>3\textsuperscript{rd}-end</th>
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<td>Cat.</td>
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<tr>
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<td>038</td>
<td>12/3 @ 1:14 a</td>
<td>68.2%</td>
<td>4</td>
<td>12/6 @ 3:08 p</td>
<td>100.0%</td>
</tr>
<tr>
<td>039</td>
<td>12/2 @ 11:54 p</td>
<td>81.8%</td>
<td>4</td>
<td>12/9 @ 9:37 p</td>
<td>81.8%</td>
</tr>
</tbody>
</table>

* Date/Time = Date and Time analyzed
* I.O.C. = Index of Control
* Cat = Stage/ Category
REFERENCES


Miller, J. F. *Systematic Analysis of Language Transcripts [Computer software]*. Madison, WI: Language Analysis Laboratory.


