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An Analysis of Spelling Patterns Produced by Elementary School-Aged Speakers of African American English

Lindsay Meyer Turner

Louisiana State University and Agricultural and Mechanical College, lindsaymeyer571@gmail.com

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AN ANALYSIS OF SPELLING PATTERNS PRODUCED BY ELEMENTARY SCHOOL-AGED SPEAKERS OF AFRICAN AMERICAN ENGLISH

A Dissertation

Submitted to the Graduate Faculty of the Louisiana State University and Agricultural and Mechanical College in partial fulfillment of the requirements for the degree of Doctor of Philosophy in

The Department of Communication Sciences and Disorders

by

Lindsay Meyer Turner
B.A., Millsaps College, 2002
M.Ed., Southern University and A&M College, 2006
M.A., Louisiana State University, 2013
August 2015
This work is dedicated to…

...my parents, Conrad and Sibera Meyer,
who taught me the value of education, hard-work, and perseverance from toddlerhood...

...my husband, Micah,
for his unending support and patience during this journey...

...my children, Marley and Micah Jr.,
who are my inspiration and constant reminders of why I do what I do.

In loving memory of my grandfather, John W. Meyer.
I wish you were here to see me fulfill this dream,
but I know you are looking down with a smile for your “Toot Toot.”

This Ph.D. is not just mine.
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I could not have finished this journey without the love and support of my family. First I must thank my parents, Conrad and Sibera Meyer. Since I was a small child, you taught me the value of education, hard work, and perseverance. I have always wanted to learn and to teach others because of these values you instilled in me. Daddy, thank you for always allowing me to shine as your “little girl.” Thank you for your years of hard work in the Army that made it possible for me to go to school and never have to worry about how I was going to afford necessities such as tuition or a laptop. I know you’ve always wanted what was best for me.

Mommy, without your help over the years, especially in the past 3 months, I would not have finished. Thank you for being so selfless and for raising me to be a strong woman that gives up on nothing. Thank you for loving my husband and children and for contributing your time and energy daily to make sure that after MJ was born, I always had hot meals, clean clothes, a shower, and my sanity at the end of the day. There is not enough room in this document for me to express how grateful I am to have your help, Mommy. I’m so happy that God blessed me with the best parents.

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come true. Work hard, be honest, dream big, and you’ll never fail. Mommy loves you.

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having supportive and encouraging words. You are the best “bookends” a sister could ask for.

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ABSTRACT

Over the years, less attention is given to students’ spelling skills compared to other areas of literacy achievement like word reading and passage comprehension in relationship to nonmainstream dialect usage. Considering that English spelling is based on the phonological and morphological structures of Mainstream American English (MAE), it is likely that children who speak a nonmainstream dialect such as African American English (AAE) will demonstrate differences in their spelling abilities. The purposes of this study were to explore the relationship between degree of AAE dialect use and spelling for a group of first to third grade children, and to describe error patterns using phonological processes and dialect-specific morphological and phonological patterns.

Twenty-four children from two local Baton Rouge elementary schools participated in the study. The 1st, 2nd, and 3rd graders were administered the Diagnostic Evaluation of Language Variation – Screening Test to determine dialect density and two spelling tests. The students’ spelling patterns were analyzed and described in terms of dialect density, written production of dialect-specific errors (e.g., omission of plural –s), and phonological processing errors similar to those produced during speech development (e.g., initial or medial cluster reduction).

The results of the study revealed first, that the amount of AAE dialect usage related to children’s spelling skills as measured by a standardized spelling test. Second, dialect usage decreased with grade level and correlated with higher scores in spelling. And third, the ability to accurately spell dialect-specific features in words was influenced by the degree of dialect usage. These results indicate that the amount of dialect use affects spelling accuracy in students in the early stages of spelling development (i.e., first graders); however, spelling accuracy improves as students are exposed to more MAE forms as they advance through grade levels.
INTRODUCTION & LITERATURE REVIEW

Spelling is an acquired language ability with which many individuals experience difficulty over the lifespan. This is particularly true for African American children whose writing scores, including spelling, continue to be the lowest among ethnic groups (Nation’s Report Card on Writing, 2011). Over the past 30 years, the literature on children’s development of spelling has grown. Like other language skills, spelling begins in early childhood and gradually incorporates more features of the alphabetic principle and English orthography. Research consistently shows that written English is especially difficult for children to learn compared to other written languages (Aro & Wimmer, 2003; Hanley, 2010). The writing of English takes years to master because children must learn the complexities of 46 phonemes, including 22 vowel phonemes and 26 letters including 5 vowel letters. Adding to the complexity of English are spellings based on morpho-phonological features such as the affixes “-ed,” “-tion,” or “-ous” (Fide, 2012).

English spelling is based on the phonological and morphological structures of Mainstream American English (MAE). Research exploring the patterns of spelling development has been largely based on the developing spelling attempts of MAE spellers. However, little is known about the developing patterns of spelling for students who speak a nonmainstream dialect. A nonmainstream dialect common amongst African American children is African American English (AAE). Evidence from previous research examining oral and written language shows that children who speak a nonmainstream English dialect demonstrate differences from MAE users in the areas of phonology, morphology, semantics, and syntax (Craig & Washington, 1994, 1995; Craig, Thompson, Washington, & Potter, 2003; Wyatt, 1995). Differences in phonology and morphology have been shown to result in different patterns of spelling attempts as AAE-
speaking children learn to encode words (e.g., Terry, 2006; Terry & Connor, 2010). These studies focused exclusively on a limited number of AAE specific patterns. While the studies revealed important information about how a nonmainstream dialect is represented in early spelling, they did not explore other spelling patterns or explain why difficulty with spelling continues throughout the school years and beyond. To contribute to the existing literature, the purposes of the current study were to explore the relationship between degree of nonmainstream dialect use and spelling for a group of first to third grade children, and to describe their error patterns using phonological processes and dialect-specific morphological and phonological patterns.

The following literature review is divided into six sections. In the first section, I describe the stage theory of spelling development (Gentry, 1981; 1982). Next, I describe common phonological and morphological features of the AAE dialect highlighted in the literature. In the third section, I present research examining the rate with which children use nonmainstream dialect forms (i.e., dialect density) and a tool commonly used to measure nonmainstream dialect density, the Diagnostic Evaluation of Language Variation—Screening Test (DELV-ST; Seymour, Roeper, & de Villiers, 2003). Section four contains a review of the relationship between nonmainstream dialect use and early literacy achievement. In the fifth section, I review the literature pertaining to our current knowledge of the spelling skills of students using AAE. In the final section, the analysis of spelling errors using phonological patterns are presented.

A Theory of the Typical Development of Spelling Skills

Spelling is an acquired language skill that develops over time through which children progress from infancy (Gibson & Levin, 1975; Gibson & Yonas, 1968) through high school (Gentry, 2004). According to several researchers including Gentry (1982), Ehri (1986, 1989),
and Templeton and Morris (2000), learning to spell is not merely the memorization of word patterns or spelling rules as believed in the 1960’s (e.g., Cahen, Craun, & Johnson, 1969). To the contrary, spelling is a process of conceptual learning that occurs as children develop strategies for appropriately utilizing the orthography of English language. *Gentry’s Stages of Spelling Development* (1981, 1982, 2006) profile the changing strategies used by children as they learn first the phonemic and gradually the orthographic principles of English spelling. See Table 1.1 for a presentation of the descriptions and examples of spelling produced at each stage.

Table 1.1
Gentry’s Stages of Spelling Development.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: Nonalphabetic Writing</td>
<td>Child is not aware of how letters work. Child produces scribbles of straight, wavy, and loopy lines.</td>
<td><img src="image" alt="Example" /></td>
</tr>
<tr>
<td>1: Precommunicative</td>
<td>Child writes random letters that do not match to sounds.</td>
<td><img src="image" alt="Example" /></td>
</tr>
<tr>
<td>2: Semiphonetic</td>
<td>Partial representation of sounds in words.</td>
<td><img src="image" alt="Example" /></td>
</tr>
<tr>
<td>3: Phonetic</td>
<td>Connection of each sound in word to a printed letter.</td>
<td><img src="image" alt="Example" /></td>
</tr>
<tr>
<td>4: Transitional</td>
<td>More sophisticated spelling, use of phonics knowledge; marking vowels, chunks of letter patterns.</td>
<td><img src="image" alt="Example" /></td>
</tr>
<tr>
<td>5: Correct and Automatic</td>
<td>Child demonstrates good grasp of basic spelling conventions.</td>
<td><img src="image" alt="Example" /></td>
</tr>
</tbody>
</table>

Note: Examples from “Evolution of a Child’s Writing” at http://urbansd.schoolwires.net.

Stage 0 spellers demonstrate nonalphabetic writing. Children at this stage have seen printed letters, but are not yet aware of how letters work. Their “spelling” is characterized by scribbled letter approximations made of straight, wavy, and loopy lines. Children entering kindergarten are typically at this stage of spelling development. Stage 1, *Precommunicative Spelling*, involves children’s exploration and experimentation with the letters of the alphabet.
They do not yet give attention to the sounds in written words, thus there is no letter-sound correspondence (Ehri, 1986). At this level, children do not 1) know all 26 letters of the alphabet, 2) consistently acknowledge the left-to-right and up-down orientation of English writing, and 3) distinguish between upper- and lower-case graphemes. For example, to see a group of letters such as “ShzUMr” written randomly on paper would not be unusual from a child at the precommunicative level of spelling development. Below, I list Gentry’s five substages of precommunicative spelling.

- **Early Scribbling:** Straight, wavy, curvy, and circular scribbles are produced.
- **Prewriting Experimentation:** Mock letters are produced that may contain extra lines or symbols such as hearts and stars. Writing progresses from left to right.
- **Prephonemic:** Random letters and numbers that do not match to sounds (e.g., D8nfS4 for television).
- **Early Phonemic:** Alphabetic principle is applied to first letter with random letters following (e.g., TuIVpmN for television).
- **Letter-name:** Syllables or sounds represented with letter name (e.g., AT for eighty).

At Stage 2, *Semiphonetic Spelling*, children begin to pay closer attention to the sounds represented in words and begin to “invent” spellings, oftentimes with the vowel nucleus being omitted (Gentry, 1982, 2004). For example, the word “good” may be spelled “gd” and “his” may be spelled “hz.” At this level 1) children demonstrate letter-sound correspondences, 2) word forms are incomplete in syllable/phonemic representation, 3) children know most, if not all, of the 26 letters in the alphabet, 4) a few memorized spellings that facilitate the readability of the written message are used, 5) acknowledgement of the left-to-right and up-down orientation of
English writing is demonstrated, 6) phonological processes are similar to those appearing earlier in speech development, 7) some processes affect syllable structure (e.g., “vis” for advice), and 8) some processes affect phonemic representation (e.g., “res” for reach). An additional example word form from a child at this level of spelling development is a string of letters “RUHAB” (are you happy) where the speller demonstrates letter-name spellings. According to Treiman (1993, 1994, 2003), children produce letter-name spellings in their writing at this level because of the phonological properties of some letters’ names. Thus, the grapheme “R” is often utilized when the /ar/ phoneme is heard because it sounds the same as the letter’s name. Conversely, the grapheme “W” is used correctly more often as /w/ does not correspond to the phonological properties of the letter’s name.

Hoffman and Norris (1989) administered the Spelling subtest of the Wide Range Achievement Test to a group of 1st, 2nd, and 3rd graders. The test was stopped when the student missed ten consecutive words. The words spelled with semiphonetic patterns were produced at all grade levels, with 43%, 56%, and 58% of students producing these spellings at 1st, 2nd, and 3rd grades, respectively. Semiphonetic patterns that simplified syllable structure increased with age as students attempted polysyllabic words, with 49%, 67%, and 80% of the error patterns present from 1st through 3rd grades, respectively. Phonetic simplifications decreased from 1st through 3rd grades, with occurrences of 51%, 33%, and 20%, respectively. Error patterns demonstrated at the semiphonetic stage are presented in Tables 1.2 and 1.3 below.

Children develop from partial phonemic awareness in Stage 2, to full phonemic awareness at Stage 3: Phonetic Spelling. Children demonstrate a better understanding of letter-sound correspondence by using one letter to represent one sound. Oftentimes, children at the
phonetic spelling level overgeneralize their letter-sound mappings and disregard (or have no knowledge of) acceptable letter sequences such as “ph” for /f/, “tion” for /ʃəәn/, or “dge” for /dʒ/.

Table 1.2
Examples of Syllable Structure Errors.

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Example</th>
</tr>
</thead>
</table>
| Weak syllable deletion      | order = ord, rad, red  
nature = naoch, nas, nat  
surprise = spirs, spis, spris |
| Cluster reduction           | order = odr, oder  
enter = itre, eir, itr |
| Final consonant deletion    | and = an  
him = he  
reach = re |
| Epenthesis                  | dress = ders, deress  
forty = foredy, fority  
plant = planet, palant |
| Metathesis                  | kitchen = kinech, kentch  
explain = elxpne, elopan |
| Reduplication               | success = sixsix  
explain = esplaplan |


Table 1.3
Examples of Phonetic Errors.

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Example</th>
</tr>
</thead>
</table>
| Stopping                     | dress = dit, dest, jist  
go = got, god |
| Affication/deaffrication     | dress = jress, gess, gress  
kitchen = kicshin, kiten |
| Assimilation                 | advice = advive, advise |
| Voice/devoice                | forty = fordy fordty  
kitchen = kigen, kidgen |


In this stage, children begin to pay attention to phonetic forms such as past tense “–ed”, affricates, and preconsonantal nasals (Gentry, 1978). An essential feature of this level of spelling development is children’s use of invented spellings with English orthography. It is common for children to realize that some letters make the same sounds (e.g., “c” and “k” can represent /k/) and sounds can be substituted for others to create new words. An additional developmental
marker that distinguishes Stage 2 from Stage 3 is children’s learning to spell vowels (Ehri, 1986). Subsequently, as children produce invented spellings at Stage 3, they implicitly learn more about English spelling rules.

The phonological awareness skills that develop through invented spellings at Stage 3 (e.g., substituting the “B” in bad with an “M” to spell mad) help children to progress to Stage 4. At Stage 4, Transitional Spelling, children begin to rely on the visual and morphological representations of words (Gentry, 1982). As they are taught lessons in reading and learning more sight words and high frequency words, they begin to spell these words more accurately. Thus, their repertoire of correctly spelled words expands, and children at this level transition into more proficient users of the basic conventions of English orthography. According to Gentry (1982), the basic conventions of English orthography commonly demonstrated at this level are: 1) vowels are present in every syllable, 2) nasals are placed before consonants (e.g., TANGK instead of TAK for tank), 3) words are spelled utilizing combinations of vowels and consonants instead of represented with single letters (e.g., “R” for are and “U” for you), 4) vowels occur before “r” (e.g., “-er”, “-ur”), 5) vowel diagraphs are used frequently, 6) silent “e” is realized as an alternative for encoding long vowel sounds, and 7) morphological features such as plural and possessive “s”, the gerund, past tense “-ed,” and qualitative markers such as “-est” are spelled to represent the morpheme rather than the sound. Although there is a reliance on the orthographic, phonemic, morphological, linguistic, and visual patterns of words at this level, children may continue to switch letters (MUOSE for mouse) as they problem solve letter combinations and receive direct spelling instruction in school.

At Stage 5, Correct and Automatic Spelling, school curriculum is focused primarily on children’s knowledge of high frequency words, spelling patterns, and spelling principles (Gentry,
Children at this level typically have a large vocabulary and a good grasp on basic spelling conventions as they pertain to the words designated for their grade level. Thus, mastery of the “correct spelling” level depends on the grade level and may change as the child increases grade level and spelling complexity increases. Although children have a good foundational understanding of the English orthographic system and many spelling rules at the Correct and Automatic Spelling level, they continue to learn the phonological, orthographic, and morphological conventions of English spelling through instruction in the classroom and multiple writing experiences. According to Gentry, spelling development over the course of a child’s life occurs in a progressive and gradual manner from level to level, with overlap among the levels also occurring.

**Phonological Features of African American English Dialect**

According to the American Speech-Language-Hearing Association (ASHA; 2003) “no dialectal variety of English is a disorder or a pathological form of speech or language.” Thus, it remains important for individuals working with nonmainstream dialect speakers (e.g., speech-language pathologists and school teachers) to better understand the components of different dialects and to apply this knowledge to assessment and therapy/teaching techniques. A popular nonmainstream dialect used in southern Louisiana is African American English (AAE). AAE is a dialect used by mainly (but not by all) African Americans (Wolfram & Schilling-Estes, 1998), and its use is influenced by an individual’s age, gender, and socioeconomic status (Dillard, 1972, 1977; Washington & Craig, 1998). AAE has been given many labels including Black English, Ebonics, and African American Vernacular English. There are linguistic variations between AAE and other dialects of English at several levels including phonology, morphology, semantics, and syntax (Craig & Washington, 1994, 1995; Craig, Thompson, Washington, &
Potter, 2003; Wyatt, 1995). Of particular interest to this study is the AAE phonological system as it is most likely to play a role in children’s spelling of single words during a spelling task. See Table 1.4 for a list of AAE features and examples.

Craig, Thompson, Washington, and Potter (2003) described the phonological features produced orally by 64 African American students. The 2nd through 5th grade students read aloud passages and nine different dialect-specific phonological features were observed. The most frequently occurring features were neutralization of diphthongs (57% of participants), substitution for /θ/ and /ð/ (45% of participants), and consonant cluster reduction (37% of participants). Postvocalic consonant reduction, substitution of /n/ for /ŋ/, consonant cluster movement, syllable deletion, and syllable addition were also observed, but error rates were not reported. Only one dialect-specific phonological feature was probed but not observed during this study: final consonant devoicing. However, students produced this feature at an unreported rate during a picture description task (Thompson, Craig, & Washington, 2004) and at a very low rate (less than 1% of participants) during administration of the Goldman Fristoe Test of Articulation-2nd Edition and collection of a connected speech sample with preschool, elementary, and middle school students (Harris & Moran, 2006).

Kohler, Bahr, Silliman, Bryant, Apel, and Wilkinson (2007) examined 80 1st and 3rd grade African American students’ spelling during a nonword spelling task. The children’s spellings revealed four dialect-specific phonological features in addition to those noted in the oral productions from Craig et al. (2003). Consonant cluster reduction not involving /l/ was produced on 20% of the children’s spellings, followed by zero /l/ before a bilabial stop (15% of spellings), substitution of /u/ for /ɛ/ before nasals (4% of spellings) and backing of /str/ clusters.
(3% of spellings). Less common phonological patterns noted were vocalization of /l/ (fewer than five occurrences across all participants) and /j/ cluster rhotacization (less than 1% of spellings).

Table 1.4
Phonological and Morphological Features of AAE.

<table>
<thead>
<tr>
<th>AAE Feature</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phonological</strong></td>
<td></td>
</tr>
<tr>
<td>Postvocalic consonant reduction/final consonant reduction</td>
<td>/maʊ/ for /maʊs/</td>
</tr>
<tr>
<td>/bɛ/ for /bed/</td>
<td></td>
</tr>
<tr>
<td>Substitutions of /n/ for /ŋ/</td>
<td>/dʒʌmpɪn/ for /dʒʌmpɪŋ/</td>
</tr>
<tr>
<td>Substitutions of /t, d, f, v/ for /θ/ and /ð/</td>
<td>/wɪt/ for /wɪθ/</td>
</tr>
<tr>
<td>/dæt/ for /dæt/</td>
<td></td>
</tr>
<tr>
<td>/bæf/ for /bæθ/</td>
<td>/bev/ for /beð/</td>
</tr>
<tr>
<td>Devoicing of final consonants</td>
<td>/hɪs/ for /hɪz/</td>
</tr>
<tr>
<td>Consonant cluster reduction</td>
<td>/kol/ for /kold/</td>
</tr>
<tr>
<td>Consonant cluster movement</td>
<td>/ɛkskep/ for /ɛskęp/</td>
</tr>
<tr>
<td>Syllable deletion</td>
<td>/kæz/ for /kæzin/</td>
</tr>
<tr>
<td>Syllable addition</td>
<td>/tɛsɪz/ for /tɛstıs/</td>
</tr>
<tr>
<td>/skɪndɪ/ for /skɪnd/</td>
<td></td>
</tr>
<tr>
<td>Neutralization of diphthongs</td>
<td>/ɑr/ for /ɑɔr/</td>
</tr>
<tr>
<td>Consonant cluster reduction not involving /l/</td>
<td>/frɪn/ for /frɪnd/</td>
</tr>
<tr>
<td>Zero /l/ before a bilabial stop</td>
<td>/hɛp/ for /hɛlp/</td>
</tr>
<tr>
<td>Substitution of /l/ for /ɛ/ before nasals</td>
<td>/dɛn/ for /dɛn/</td>
</tr>
<tr>
<td>Backing of /str/ clusters</td>
<td>/skrɪt/ for /strɪt/</td>
</tr>
<tr>
<td>/ɛ/ and /l/ vocalization</td>
<td>/fɪm/ for /fɪlm/</td>
</tr>
<tr>
<td>Backing of /str/ clusters</td>
<td>/brɑdɑ/ for /brɑdǝ/</td>
</tr>
<tr>
<td>/j/ cluster rhotacization</td>
<td>/ækuz/ for /ækjuz/</td>
</tr>
<tr>
<td>Substitution of the diphthong /oɪ/ for /oa/</td>
<td>/rɒtʃ/ for /rɒtʃ/</td>
</tr>
<tr>
<td>Nasalization of vowels preceding deleted final nasals</td>
<td>/mæ/ for /mæn/</td>
</tr>
<tr>
<td><strong>Morphological</strong></td>
<td></td>
</tr>
<tr>
<td>Zero past tense marker</td>
<td>/kɪs/ for /kɪst/</td>
</tr>
<tr>
<td>Zero possessive marker</td>
<td>“the /bɔɪ/ hat” for “the /bɔɪz/ hat”</td>
</tr>
<tr>
<td>Zero plural marker</td>
<td>“two /bæg/” for “two /bægz/”</td>
</tr>
</tbody>
</table>
/oa/. Lastly, Wyatt (1995) described nasalization of vowels preceding deleted final nasals as an additional phonological feature of AAE.

In conjunction with the phonological features presented above, a few morphological features of AAE may influence the spelling of individual words during a spelling test. For example, Craig et al. (2003) identified two morphological features produced by 2nd through 5th graders during a reading task that are demonstrated at a single word level. These features included zero past tense (45% of participants) and zero plural (42% of participants). These features were also described by Green (2002), Bland-Stewart, Elie, and Towsend (2013), and Wyatt (1995). An additional feature, deletion of possessive markers, was noted by Washington and Craig (2002) in their comparison of verbal productions of dialect-specific morpho-syntactic features produced by children during play with their caregivers. Of the total utterances containing deletion of the possessive marker, 47% were formed when the children deleted the –s. As shown by these examples, these three AAE morphological features often involve a consonant cluster reduction (e.g., walked – walk; cats – cat; mom’s – mom). As such, although these features are considered morphological, their origin or source may be phonological in nature.

**Measuring Dialect Usage in Children**

According to Oetting and McDonald (2002), it is important that the type and rate of dialect features are analyzed and presented when describing the number of nonmainstream dialect forms an individual or group uses (i.e., dialect density). This is important to do because nonmainstream dialect usage varies significantly between individuals based on gender, socioeconomic status, education level, community, and language contexts (Connor & Craig, 2006; Craig & Washington, 1994; Craig, Zhang, Hensel, & Quinn, 2009; Dillard, 1977; Thompson, Craig, & Washington, 2004). For example, children from low socioeconomic status
homes demonstrate higher nonmainstream dialect densities than children from middle-income homes (Pruitt & Oetting, 2009; Washington & Craig, 1998). The most common methods used to determine dialect type and rate are listener judgments, type-based counts of patterns, and token-based counts (Garrity & Oetting, 2010; Horton-Ikard & Weismer, 2005; Oetting & McDonald, 2002; Oetting & Newkirk, 2008; Pruitt & Oetting, 2009; Robinson & Stockman, 2009; Smith, Lee, & McDade, 2001; Wyatt, 1996). Although these methods are used frequently in the literature with adult and child populations, they are not standardized across researchers and are traditionally used to measure dialect usage in spoken language.

Using the listener judgment method of Oetting and McDonald (2002), Horton-Ikard and Weismer (2005) asked listeners to judge spontaneous speech utterances produced by 44 African American and Caucasian children. The children ranged in age from 2.5 to 3.5 years old and were from homes where either AAE or MAE was spoken. Listeners rated dialect usage on a Likert scale from “1” (heavy MAE use) to “7” (heavy nonmainstream dialect use). The toddlers in the AAE group obtained average ratings from 4.58 to 4.73. Children in the MAE group achieved average ratings from 2.25 to 3.69. Additionally, regardless of age, the children in the AAE group produced the same number of nonmainstream features; however the 2.5-year-olds in the MAE group produced more nonmainstream features than the 3.5-year-olds.

The type-based counts method varies in the relevant types counted from study to study and may also include dialect features that overlap with multiple dialects. Smith et al. (2001) characterized child AAE speakers as having a high dialect density if they used five, unspecified nonmainstream dialect features. Speakers were placed in the MAE group if they produced no more than one nonmainstream dialect feature. However, earlier studies (e.g., Seymour et al.,
1998) were specific with the six nonmainstream dialect features they required children to produce in order to be considered AAE users.

Lastly, the token-based count method provides information about both the type and rate of nonmainstream dialect features (Connor & Craig, 2006; Craig & Washington, 1994, 2000, 2004; Craig, Washington & Thompson, 1998; Oetting & McDonald, 2001, 2002; Washington & Craig, 1998). This method involves calculating a child’s dialect density by either dividing the total number of utterances containing nonmainstream dialect features by the total number of utterances produced, or by dividing the total number of nonmainstream dialect features by either the total number of utterances produced or the total number of words produced.

Oetting and McDonald (2002) collected language samples from 93 four- to six-year-olds (40 African American and 53 Caucasian). They showed that the three methods described above (i.e., listener judgments, type-based count, token-based count) effectively classified 88% to 97% of their participants’ dialect densities. However, these authors also reported that these methods are all time consuming because they require language sample collection, transcription, and analysis. In addition to the amount of time required, standardization is not a quality shared by these methods. Another method for measuring a child’s dialect density was developed by Seymour, Roeper, and de Villiers (2003). They developed a standardized instrument, the Diagnostic Evaluation of Language Variation – Screening Test (DELV-ST), that can be administered in approximately 30 minutes.

The DELV-ST is comprised of two subtests. The first characterizes children as MAE speakers or speakers of a nonmainstream dialect. Children’s performance classifies them as speakers of MAE or of language with “Some Variation from MAE” or “Strong Variation from MAE.” The second subtest distinguishes children at risk for a language disorder from those with
normal language development. The scores indicate if a child is at “Low Risk,” “Low to Medium,” “Medium to High,” or “High Risk” for language impairment. Multiple researchers (e.g., Terry & Connor, 2010) have also calculated a dialect density measure (DDM) score from children’s responses on the first subtest. To do this, children’s responses are categorized as either A (response varies from MAE), B (response is MAE), or C (response cannot be scored). A DDM score is then computed by dividing the total score for A by the sum of A and B, then multiplying by 100.

In a recent study, Horton and Apel (2014) compared the relationship between DDM scores that were calculated from listener judgment ratings, two DDMs from narrative retells, and the DELV-ST. The participants were 40 African American kindergartners, 32 first graders, and 41 second graders. Language samples were collected via narrative retell, unlike previous studies where larger language samples were collected during play (e.g., Oetting & McDonald, 2001, 2002). The researchers found that all of the DDM indices were able to detect differences in dialect use at each grade level. The listener judgment ratings were less effective in detecting differences between kindergarten and first-graders, whereas the other indices were able to capture the differences.

For the DELV-ST in particular, the mean percent of dialect for the participants in the Strong Variation group (79%) varied significantly from participants in the Some Variation (44%) and MAE groups (18%). Also, the scores for the Some Variation and MAE groups differed from each other. Scores from the DELV-ST were also positively correlated with all of the other indices. Thus, children with higher DDM scores on the DELV-ST exhibited higher listener judgment ratings and DDM scores from the narrative retell. Overall, these findings indicate that the DDM scores obtained from the DELV-ST are appropriate alternatives to calculating a DDM.
index from listener judgments or language samples. This methodology is utilized more often in recent studies of dialect and written language (e.g., Terry & Connor, 2010). The current study employed the DDM index from the DELV-ST to measure the children’s dialect densities.

**Dialect Usage and Early Literacy Achievement**

The relationship between children’s dialect density and literacy skills has been studied extensively over the years with significant relationships being shown between dialect density and word reading, vocabulary, phonological awareness, and passage comprehension (Charity, Scarborough, & Griffin, 2004; Connor & Craig, 2006; Craig, Kolenic, & Hensel, 2014; Craig & Washington, 2004; Craig, Zhang, Hensel, & Quinn, 2009; Rodrigue, 2012; Terry, 2010; Terry, 2012; Terry & Connor, 2012; Terry, Connor, Petscher, & Conlin, 2012; Terry, Connor, Thomas-Tate, & Love, 2010; Terry & Scarborough, 2011). Craig and Washington (2004) examined 400 African American preschool through 5th graders’ performances on national and state standardized reading assessments (i.e., the reading scores from the Iowa Tests of Basic Skills, the TerraNova, the Metropolitan Achievement Tests, and the reading subtests on the Michigan Educational Assessment Program). Language samples were obtained from a picture description task, and a DDM score was calculated.

The results indicated that reading achievement skills differed significantly between children with low and high DDMs. The children with lower dialect densities (68% of participants) scored higher on the tests (mean z-score = -0.18) compared to the children with higher dialect densities (mean z-score = -0.62). Furthermore, DDM scores decreased as grade level increased. A sharp and significant shift in dialect usage occurred between kindergarten and 1st grades. Compared to the 1st through 5th graders, preschoolers and kindergartners demonstrated
higher DDMs. They produced one morphosyntactic feature for every 10 spoken words, whereas 1st through 5th graders produced one morphosyntactic feature for every 26 spoken words.

Craig, Zhang, Hensel, and Quinn (2009) investigated the relationship between dialect shifting and reading performance with 165 African American 1st through 5th graders. The primary goal of this study was to determine the presence of dialect shifting. The participants’ DDMs from oral and written narratives were compared to determine if shifting occurred from AAE to MAE across these two tasks. A secondary goal was to compare DDMs to reading achievement. Reading achievement was measured using the Gray Oral Reading Tests and the same national/state standardized test battery from Craig and Washington (2004). Results showed lower DDMs on the written narrative task (.040) compared to the oral narrative task (.103). Reading achievement and dialect density were negatively correlated (oral DDMs, r = -.22, written DDMs, r = -.41). Thus, the more AAE features the children produced, the lower their scores on the reading measures.

Charity, Scarborough, and Griffin (2004) assessed the sentence imitation and reading skills of 217 African American kindergarteners to 2nd graders. The phonological and morphosyntactic forms produced during a 15-item sentence imitation task were utilized to measure dialect density. Subtests from the Woodcock Reading Mastery Tests-Revised were administered as a measure of the children’s reading abilities. At kindergarten and 1st grades, strong correlations between dialect density and early reading achievement were found (mean r = -.47 and -.50 respectively). At 2nd grade, reading scores were significantly related to dialect-specific morphosyntactic features on the sentence imitation task (mean r = -.35) but not the phonological features. Again, these findings show that a relationship exists between dialect
density and reading achievement; children that utilize fewer nonmainstream features achieve higher scores on literacy tasks.

Further support for the relationship between early literacy achievement and dialect density was found by Terry, Connor, Petscher, and Conlin (2012). They conducted a longitudinal study to determine if changes in nonmainstream dialect usage were related to children’s reading skills. Forty-nine children in 1st and 2nd grades were recruited for participation. The children varied in ethnicity (34 African American, 10 Caucasian, one Hispanic, two Asian, and two multiracial). The language variation status and DVAR score were obtained at the beginning and end of the school year using Part I of the DELV-ST. Reading achievement was assessed at the beginning, middle, and end of the school year using two subtests of the Woodcock-Johnson Tests of Achievement-3rd Edition. Results showed that children’s use of MAE increased between 1st and 2nd grades. Children considered strong-to-moderate nonmainstream dialect speakers at the onset of 1st grade (DVAR = 66) had significantly lower DVAR scores at the end of 1st grade (DVAR = 52). These scores were maintained over the course of 2nd grade (fall 2nd grade DVAR = 45; spring 2nd grade DVAR = 43). Additionally, the decreased use of nonmainstream dialect was related to improvements in letter-word reading and passage comprehension. In the fall of 1st grade, children achieved standard scores of 98 and 91 on the letter-word reading and passage comprehension subtests respectively. In the spring of 1st grade, scores increased to 104 and 98.

These studies show that nonmainstream dialect usage influences a variety of early literacy skills including paragraph decoding, letter-word reading, passage comprehension, and production of oral and written narratives. Furthermore, children’s nonmainstream dialect densities do not necessarily remain the same during the early elementary school years. As children get older and increase in grade level, their use of nonmainstream dialect features
decreases while their use of MAE features increases. Also, children are able to shift between use of AAE and MAE when required to complete different literacy tasks (i.e. oral versus written narratives). Links between children’s nonmainstream dialect use and another area of literacy achievement—spelling—are relatively unexplored which is striking because of the relationship between reading and spelling. In the following section, I review literature pertaining to the link between children’s dialect usage and spelling.

**Spelling Patterns of African American English-Speaking Children**

American English has a deep, less transparent, orthographic system in comparison to other languages and direct sound-grapheme matches do not exist across all words. In the beginning stages of spelling development, children utilize their understanding of phonology and orthography, which leads to invented spellings that eventually reflect conventional English sound-grapheme matches. Oftentimes, young children’s own pronunciation of a word influences their sound-grapheme correspondences (Treiman, 2003). Learning to spell is challenging for MAE speakers, and the difficulties may be exacerbated for non-MAE speakers by differences in phonology and morphology present in their nonmainstream dialects (Snow, Burns, & Griffin, 1998). If this is the case, AAE-speaking children may find it particularly difficult to spell words conventionally since a mismatch exists between their AAE pronunciations and the MAE features that form the foundation for English spelling.

Research suggests that AAE users in the beginning stages of spelling development may demonstrate spelling errors corresponding to the dialect-specific features common to their own oral productions. For example, in an examination of American and British children’s spelling, Treiman and colleagues (1997) focused primarily on six through ten-year-olds’ abilities to spell words containing the phonological feature of –r in syllable rimes. In the Southern British English
dialect, –r in syllable rimes is not a permissible feature, however it is found in American English. Their findings showed that the younger (6 to 7.5 years) British children’s spellings contained postvocalic –r (e.g., *dirt*) in 62% of words, while words containing other postvocalic consonants (e.g., *kept*) were spelled correctly 82% of the time. Furthermore, the older (7.5 to 10 years) British children overgeneralized the use of the –r by creating spelling errors such as *barth* for *bath* on 63% of trials. The American children overgeneralized –r on less than 2% of their spellings. These results indicate the importance of dialect-specific phonology and the subsequent effects on children’s spelling development.

A number of studies have focused on adult AAE speakers’ spelling (e.g., Treiman, 2004; Treiman & Barry, 2000). Research conducted by Treiman (2004) supports the theory that individuals’ pronunciation of words, particularly those pronunciations influenced by nonmainstream dialectal features, affects their spelling. Final consonant devoicing (e.g., /t/ for /d/) is a dialect-specific phonological feature of AAE that occurs infrequently in speech (Craig, Thompson, Washington, & Potter, 2003; Harris & Moran, 2004; Thompson, Craig, & Washington, 2004). Treiman (2004) compared African American and Caucasian adults’ spelling of words containing final /t/ or /d/ to determine if final consonant devoicing influenced their written productions. For example, the final sound in *fluid* is produced more like /t/. Treiman (2004) also sought to determine if the spellers’ pronunciations, the examiner’s pronunciations, or both affected the spellers’ productions.

Forty-six African American and 47 Caucasian college-aged students heard a list of final /t/ and /d/ words. Half of the participants heard the words produced by an African American examiner, the other half by a Caucasian examiner. After completing the spelling test, each participant was recorded while reading the word list. Although all of the participants produced
more /d, t/ errors when the words were presented by the African American examiner, the African American participants demonstrated the final consonant devoicing feature more frequently than the Caucasian participants overall, regardless of the examiner (African American: 11% with African American examiner, 8% with Caucasian examiner versus Caucasian: 3% with African American examiner, 1% with Caucasian examiner). Furthermore, regression analyses showed that the African Americans who devoiced final /d/ in their own oral productions showed a greater tendency to produce /d, t/ errors compared to the Caucasians. These results show that pronunciation of a word (both the examiner’s and the speller’s) influences spelling, and that the phonology of AAE should be considered in examinations of spelling.

Kligman, Cronnell, and Verna (1972) analyzed the spelling errors produced by 2nd graders living in Los Angeles. The students were categorized as AAE speakers or MAE speakers based on an informal survey given to the students to determine their dialects. The children were then given a spelling test comprised of 43 words in multiple-choice format. The test words were considered “dialect sensitive” in that they contained dialect-specific features of interest such as past tense –ed, plural and possessive –s, and voiced and voiceless –th.

Results from the study showed that the AAE speakers responded with more incorrect answers (56% accuracy) than the MAE speakers (64% accuracy). Overall, there were more nondialect related (23%) compared to dialect related responses (16%) across both groups. The AAE speakers made more dialect related errors (19%) compared to the MAE group (12%). Specifically, the dialect related errors consisted of /ɪ/ for /ɛ/ substitutions, omission of past tense –ed, omission of plural –s, omission of third person singular –s, and omission of postvocalic –l. Rate information was not provided for the individual features. The finding that the over half of the MAE students also produced many of the dialect related errors at least once indicates that it
is possible that the errors were indicative of developmental errors produced by 2nd graders still learning the phonology, morphology, and orthography of the English language.

More recently, Terry (2006) investigated the relationship between AAE dialect-specific morphology and children’s spelling patterns. DDM scores were obtained from narrative language samples. Ninety-two children from a variety of ethnic backgrounds between grades 1st and 3rd were separated into either a high dialect density (AAE) or low dialect density (MAE) group based on the DDM scores. The children’s spelling skills were tested using a 25-item sentence dictation task. The test words were comprised of four dialect-specific morphological features: past tense –ed, present progressive –ing, third person –s, and plural –s. Each feature was presented ten times. Additionally, 31 dialect-universal features were included among the test items. Only the spellings of the morphological features were scored. Errors were categorized as phonetic, non-phonetic, omission, morphological substitution, or other error. The AAE speakers produced more morphological errors (74 errors at 1st grade, 48 at 2nd, and 32 at 3rd) compared to the MAE speakers (58 at 1st grade, 18 at 2nd, and 8 at 3rd), with omissions being the most frequent error. The past tense –ed feature was omitted or spelled incorrectly most often (51%) while the present progressive –ing feature was spelled incorrectly least often (16%). Plural –s was spelled incorrectly 37% of the time and third person singular –s was misspelled 30% of the time. Additionally, the students’ errors decreased with grade level as they became more proficient spellers. These findings suggest that it is possible with increased exposure to MAE in school, AAE-speakers improved their use of conventional spelling patterns.

In a follow-up study, Terry and Connor (2010) analyzed 92 African American 2nd graders’ spelling of words comprised of a different set of dialect-specific phonological and morphological features: past tense –ed, postvocalic consonant reduction of /t, d/ in final word
position, devoicing final consonant /d/, and /θ, ð/ substitution. This study varied from Terry (2006) in that the DELV-ST was used to obtain a DVAR score and the children were divided into reading groups for comparisons (struggling readers and typically achieving readers). A significant (but weak) correlation was found between AAE use and the errors on dialect-specific features ($r = -.21$). Both groups of children demonstrated lower accuracy with the dialect-specific features (struggling readers = 32%, typically achieving readers = 67%) in comparison to the dialect-universal features (struggling readers = 78%, typically achieving readers = 91%), particularly the past tense –ed feature (struggling readers = 21%, typically achieving readers = 54%). It is also important to note that the majority of errors (20-57%) on the dialect-specific features were considered “non-AAE related errors.” Thus, the children’s spellings did not represent the typical spoken dialect differences (e.g., kissp for kissed instead of the AAE-related error of kiss for kissed). Together these studies conducted by Terry and colleagues indicate that a child’s nonmainstream dialect density needs to be considered when describing the spelling skills of African American children. Furthermore, some dialect-specific features (e.g., past tense –ed) are misspelled in ways that do not match spoken AAE during the early elementary years.

Kohler and colleagues (2007) examined the role of AAE dialect-specific phonology on phonemic awareness and nonword spelling. Eighty 1st and 3rd graders were separated into a high dialect density group and a low dialect density group based on DDM scores derived from oral narratives. To reduce the influence of lexical familiarity, the researchers created a list of 60 nonwords by changing phonemes in grade-appropriate words to assess spelling skills. The list of 1st grade nonwords contained 11 contexts that could lead to AAE dialect-specific phonological features, while the 3rd grade nonwords contained 12 contexts. A continuous scoring system was employed to analyze the spelling errors. Therefore each nonword was worth a set number of
points and students lost points depending on how far their production deviated from the correct spelling.

Findings from the study indicated that DDM was related to the spelling errors produced, especially the 3rd graders. Overall, the students with high DDM used more phonological features of AAE during their spelling. From a developmental perspective, it is important to note that the 1st graders in both groups produced approximately the same scores (low density 71% and high density 72%). These scores are commensurate with spelling development at that grade level where children are overgeneralizing their letter-sound mappings and frequently disregard (or have no knowledge of) acceptable letter sequences (Gentry, 1982). The 3rd graders in the low DDM group scored higher (81%) than the high DDM group (72%). This suggests that even at a higher level of spelling development, where children should have a good foundational understanding of the English orthographic system and many spelling rules, the use of nonmainstream dialect has a significant influence on spelling attempts for unfamiliar words or nonwords.

One issue with Kohler et al. (2007) is the continuous scoring system. Since each nonword was worth a different number of points if spelled correctly it failed to illuminate many of the errors, especially those produced by the 1st grade children. Dickerson (2009) re-analyzed the data from the Kohler et al. (2007) study to further examine and describe the developmental and dialectal influences on AAE users’ spelling. She used a scoring system that categorized the children’s spelling errors as phonological, orthographic, morphological, or phonological-orthographic. The analyses of real word spellings were also included to compare error types across grade levels. The results with both the real words and nonwords revealed primarily developmentally appropriate errors, with few errors categorized as morphological or
phonological-orthographic. For example, several 1st graders produced the developmental error of substituting the letters “iy” for the –igh spelling pattern.

The 1st graders produced more phonological errors on nonwords (40%) compared to real words (35%), and more orthographic errors on real words (50%) compared to nonwords (30%). Third graders produced slightly more orthographic errors on both real words (60%) and nonwords (40%) when compared to the 1st graders. They also produced fewer phonological errors on both real words (15%) and nonwords (30%) when compared to 1st graders. Considering that they are in the early stages of spelling development, the 1st graders had more difficulty with the phonology of words. The 3rd graders, who have better understanding of the system of phonology, had more difficulty matching letters with the sounds in words, especially nonwords.

With regards to dialect, AAE features were ascribed to 30% of the 1st graders’ errors and 18% of the 3rd graders’ errors on real words. The following dialect-specific features were noted: /ɛ/ before nasals (produced by 41% of participants), zero /l/ before a bilabial stop (45%), zero plural marking (85%), final consonant cluster reduction (69%), zero past tense marking (76%), initial /j/ cluster reduction (49%), backing of /str/ cluster (15%), and /θ/ substitutions (53%). For nonwords, AAE features were ascribed to 10% of both the 1st and 3rd graders’ errors. The following dialect-specific features were noted: /ɛ/ before nasals (produced by 41% of participants), zero /l/ before a bilabial stop (43%), final consonant cluster reduction (26%), zero plural marking (61%), zero past tense marking (24%), final consonant devoicing (22%), and initial /j/ cluster reduction (28%).

The results also showed that the 3rd graders were more accurate with spelling real words (83% accuracy) and nonwords (72% accuracy) compared to the 1st graders (67% and 66% accuracy respectively). Developmentally, these findings indicate that the 3rd graders were more
proficient spellers with both words and nonwords. It is possible that by this grade, students not only recognize more words and have more familiarity with English spelling conventions (Gentry, 1982; Terry, 2006), but may also have the ability to shift to MAE phonological patterns during spelling tasks (Renn, 2010).

Together these studies indicate that children’s phonological representations are influenced by their dialect, and their dialect also influences spelling. Furthermore, the influence of dialect on children’s spelling seems to decrease as grade level increases, particularly during the early years of elementary school. Recent national statistics show that African American children continue to perform lower than their Caucasian counterparts in literacy. The Nation’s Report Card on Writing (2011) revealed that at 8th grade, African American students score lower in writing, including spelling, than any other ethnic group, with 35% scoring below “basic” and only 10% “proficient” and 1% “advanced.” These figures are consistent with the percentage of children in poverty. The mismatches in language features between MAE and AAE may be one of the influences on African American children’s literacy performance, and spelling is a major component of their ability to read and write. Thus, continued investigation into spelling development and AAE use is warranted to successfully evaluate and instruct young AAE speakers.

**Spelling and Phonological Processes/Patterns**

Another method for analyzing spelling is by phonological processes or patterns (Clarke-Klein & Hodson, 1995; Hoffman & Norris, 1989; Treiman, 1985). Phonological processes were first proposed by Stampe (1969, 1979) in his theory of natural phonology. According to this theory, natural processes occur when a class of sounds or sound sequences presents a common difficulty to the speech capacity of a child, and so an easier but parallel class of sounds is
substituted. For example, difficulty with velars may result in substituting alveolar sounds produced further in the mouth, as in *tar* instead of *car*. According to Stampe (1969, 1979), children have fully formed adult representations of words in their underlying representations, but limitations in production lead to natural processes being applied during speech production. Development occurs as the processes gradually diminish and the adult form is produced.

The theory of natural phonology and the notion of suppressing processes have been criticized by many as lacking psychological reality or explanatory power (Dodd, 1995; McCormack, 1997; Menn & Mattei, 1992). Hoffman and Norris (1989) showed the processes returning in the spelling patterns of first through third graders after they had disappeared from speech. Yet, the phonological processes described by Stampe (1969, 1979) have provided insights and understanding of both typical and atypical speech development. It is regarded by some as the phonological model that has the greatest impact on the field of speech language pathology, which uses the processes descriptively, rather than as tenets of natural phonology (Edwards, 2007). This practice of using the labels of the theory, such as *fronting* or *cluster reduction* has resulted in the term *phonological patterns* being used more frequently to describe the patterns of errors while separating the descriptions from Stampe’s theory. This practice has also resulted in adding patterns seen in atypical development but not in typical development, such as backing and initial consonant deletion (Dodd, 1995; Hodson, 2007).

Three studies have used phonological processes/patterns to describe developmental errors in spelling. Like speech, spelling strategies in the semiphonetic stage are systematic and are related to an emerging awareness of one’s phonological system (Read, 1971). Treiman (1985) examined the spellings of kindergarten and 1st graders. Spellings described using process errors were found, including consonant cluster reduction (e.g., *plant* = "plat"), affrication of stop-plus-
liquid clusters (truck = "chuk"), syllable reduction (e.g., giraffe = "graf"), and epenthesis (e.g., black = "balack"). Treiman concluded that children could make judgments about sounds in words but attend to a phonetic level that may result in spellings that are different from more complex orthographic judgments used by adults.

Clarke-Klein and Hodson (1995) compared the spelling of typically developing 3rd graders to peers with a developmental history of severely unintelligible speech but currently exhibiting typical articulation. The results indicated phonological process errors occurred for both groups, but five times as many errors occurred for those with histories of disordered phonology (means 20.97 vs. 108.86). Those with positive histories for articulation disorders not only produced more errors, but their errors reflected those produced at younger age levels and also errors not shown by typical peers. In addition, a strong correlation was demonstrated between phonological awareness and phonological process errors, with decreasing process errors as phonological awareness scores increased.

Hoffman and Norris (1989) examined the spelling of low average achievers in 1st through 3rd grades for error patterns. Results indicated that errors affecting syllable structure (see Table 1.5), such as syllable reduction, cluster reduction, final consonant deletion, epenthesis and metathesis increased with grade level (49% at 1st grade, 67% at 2nd grade, and 80% at 3rd grade), primarily because more opportunities for this type of error occurred as more polysyllabic words are expected with increasing grade level. Errors such as cluster reduction were not present in one syllable words spelled by older subjects but did appear in polysyllabic words, indicating the processes appear whenever the child’s spelling capacities are reached. When errors representing phonetic simplifications (see Table 1.6) were examined, such as affrication/deaffrication, stopping, or voicing, error rates dropped with each succeeding level (51% at 1st grade, 33% at 2nd
grade, and 20% at 3rd grade). As children became more accurate in detecting sounds (i.e., phonemic awareness) and learned more orthographic patterns, this type of error decreased even as syllable complexity increased.

Table 1.5
Examples of Syllable Structure Errors.

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak syllable deletion</td>
<td>order = ord, rad, red</td>
</tr>
<tr>
<td></td>
<td>nature = naoch, nas, nat</td>
</tr>
<tr>
<td></td>
<td>surprise = spirs, spis, spris</td>
</tr>
<tr>
<td>Cluster reduction*</td>
<td>order = odr, oder</td>
</tr>
<tr>
<td></td>
<td>enter = itre, eir, itr</td>
</tr>
<tr>
<td>Final consonant deletion*</td>
<td>and = an</td>
</tr>
<tr>
<td></td>
<td>him = he</td>
</tr>
<tr>
<td></td>
<td>reach = re</td>
</tr>
<tr>
<td>Epenthesis</td>
<td>dress = ders, deress</td>
</tr>
<tr>
<td></td>
<td>forty = foredy, fority</td>
</tr>
<tr>
<td></td>
<td>plant = planet, palant</td>
</tr>
<tr>
<td>Metathesis</td>
<td>kitchen = kinech, kentch</td>
</tr>
<tr>
<td></td>
<td>explain = elxpne, elopen</td>
</tr>
<tr>
<td>Reduplication</td>
<td>success = sixsix</td>
</tr>
<tr>
<td></td>
<td>explain = eslaplan</td>
</tr>
</tbody>
</table>

Key: *overlaps with dialect-specific AAE features

Table 1.6
Examples of Phonetic Errors.

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stopping</td>
<td>dress = dit, dest, jist</td>
</tr>
<tr>
<td></td>
<td>go = got, god</td>
</tr>
<tr>
<td>Affication/deaffrication</td>
<td>dress = jress, gess, gress</td>
</tr>
<tr>
<td></td>
<td>kitchen = kicshin, kiten</td>
</tr>
<tr>
<td>Assimilation</td>
<td>advice = advive, advide</td>
</tr>
<tr>
<td>Voice/devoice</td>
<td>forty = fordy fordty</td>
</tr>
<tr>
<td></td>
<td>kitchen = kigen, kidgen</td>
</tr>
</tbody>
</table>


Unpublished data analyzed by Norris and Hoffman (2003; see Table 1.7) further revealed that as more phonological pattern errors occur within a word, the word becomes more unrecognizable. Further, the spellings of children receiving six weeks of intervention focusing on
improving phonemic awareness and orthographic patterns changed each week in the direction of
closer approximations to the conventional spelling.

Table 1.7
Changes in Simplification Processes Over Time.

<table>
<thead>
<tr>
<th>Word</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>will</td>
<td>wown</td>
<td>wowy</td>
<td>wow</td>
<td>wnw</td>
<td>wow</td>
<td>wel</td>
</tr>
<tr>
<td>make</td>
<td>sonnl</td>
<td>mon</td>
<td>momy</td>
<td>mayw</td>
<td>mnc</td>
<td>mac</td>
</tr>
<tr>
<td>cut</td>
<td>toe</td>
<td>tpon</td>
<td>caa</td>
<td>caot</td>
<td>cot</td>
<td>cut</td>
</tr>
<tr>
<td>result</td>
<td>reslat</td>
<td>reselt</td>
<td>resealt</td>
<td>rezlit</td>
<td>rezlct</td>
<td>rezelt</td>
</tr>
<tr>
<td>explain</td>
<td>explpon</td>
<td>ecsplane</td>
<td>aplan</td>
<td>ecsplan</td>
<td>ecsplan</td>
<td>ecaplan</td>
</tr>
<tr>
<td>order</td>
<td>wrdr</td>
<td>adar</td>
<td>otr</td>
<td>wredere</td>
<td>odr</td>
<td>rder</td>
</tr>
<tr>
<td>kitchen</td>
<td>kitech</td>
<td>kentch</td>
<td>ketchen</td>
<td>ketchon</td>
<td>ketchen</td>
<td>ketchen</td>
</tr>
<tr>
<td>surprise</td>
<td>spis</td>
<td>cerpris</td>
<td>sperirch</td>
<td>speige</td>
<td>sprize</td>
<td>sperize</td>
</tr>
<tr>
<td>explain</td>
<td>expland</td>
<td>elcpen</td>
<td>explaplan</td>
<td>elxope</td>
<td>explan</td>
<td>expalan</td>
</tr>
</tbody>
</table>


In this study, children were engaged in writing passages. As a spelling error occurred, the child
was given feedback (“Your spelling is telling my mouth to say *udder* instead of *under*, so watch
my mouth as I say the word”), and the feedback was continued with each successive attempt
until the child derived a correct spelling. The same list of words (not worked on during
intervention) was spelled at the end of each week to track changes. Results showed fewer
phonological pattern errors across weeks and phonetic simplifications that were closer to the
conventional spelling by the sixth week.

Analyzing spelling using phonological processes or patterns provide a means to capture
the extent to which a word deviates from conventional spelling. The analysis is sensitive to small
changes or differences between spelling attempts, and reveals patterns characterizing a child’s
spelling. They may lend important insights into spellings of children who continue to spell below
grade level despite instruction, including those children whose spelling patterns may be
indicative of a phonological system that might be tied to a dialect of English that is
nonmainstream, such as AAE.
The Current Study

A gap exists in our understanding of the spelling development of AAE-speakers in elementary school. A good place to investigate this issue is a southern urban school system in Louisiana. According to the Nation’s Report Card (2011), literacy performance in the state of Louisiana is ranked markedly lower than other states. For educators and speech-language pathologists to better service children in this community, it is important that we continue to explore the variables that may influence their performance in spelling, reading, and writing. To date, no studies examining nonmainstream dialect and spelling development have been conducted in Louisiana, where higher dialect densities of AAE are documented relative to those in other regions of the country (Oetting & McDonald, 2002; Oetting & Pruitt, 2005).

As Gentry (1982) suggested, “developmental spelling levels may be determined only by observing spelling miscues, not by observation of words spelled correctly.” The purpose of this study was to add to our understanding through an analysis and comparison of the spelling errors produced by AAE speaking children in the 1st, 2nd, and 3rd grades in a southern urban school system. In line with the research conducted by Terry and Kohler (Kohler et al., 2007; Terry, 2006; Terry & Connor, 2010), investigations with children in these grade levels are important because they are in the early stages of spelling development where reliance on their oral phonology is greater, they have less familiarity with orthography, and they have had limited direct spelling instruction. The following research questions guided my inquiry:

1. Do standardized spelling test scores vary with degree of AAE dialect use?

2. Do spelling patterns for “dialect sensitive” words vary with degree of AAE dialect use?
3. Does the use of phonological processes in spelling vary with degree of AAE dialect use?
METHODS

Design

Twenty-four typically developing, 1st through 3rd grade students from two Baton Rouge, Louisiana public schools were recruited to participate in this study. Fourteen of the children (7 first, 1 second, and 6 third graders) attended “School 1,” while ten children (1 first, 2 second, and 7 third graders) attended “School 2.” According to the Louisiana Department of Education (2014), School 1 obtained a “C” performance rating and School 2 received an “A” rating. School performance ratings are based on the students’ achievement on tests administered in English/Language Arts, Mathematics, Science, and Social Studies. More than 95% of School 1’s students received free and reduced lunch, while 51% of School 2’s students received free and reduced lunch. The racial makeup of School 1 is 82.7% African American, 10.8% Hispanic, and 4% Caucasian. The racial makeup of School 2 is 50.3% African American, 41.6% Caucasian, and 4.8% Asian. Thus, the children who attend the two schools represented a range of socioeconomic backgrounds.

Participants

Participants were recruited through their schools. At School 1, children rode the bus to school and home so direct contact with parents was not available. Classroom teachers sent consent forms home with first, second, and third graders. Parents were provided phone numbers to contact the researcher for an explanation or to answer questions. At School 2, the principal limited recruitment to children who attended extended day (after school homework and child care program). Since the parents picked up their children, the researcher was able to explain the project and answer questions. Participants were selected from those who returned signed parental consent (Appendix B) and assent forms (Appendix C) according to the requirements of the
Institutional Review Board at Louisiana State University, and who met inclusion criteria. The inclusion criteria were children who spoke English as their first language, had hearing and vision within normal limits as reported by the school nurse, received instruction in a regular education classroom, had no history of repeating a grade, and were not currently receiving speech-language therapy.

Along with consent forms, parents completed a short questionnaire (see Appendix D) that included information about the mother’s educational level and mother’s occupation. This information was used to designate the child’s home situation as either high or low socioeconomic status (SES). The Diagnostic Evaluation of Language Variation-Screening Test (DELV-ST) was administered to all participants to determine the degree to which their dialect varied from MAE. Part I of the DELV-ST (Language Variation Status; Seymour, Roeper, & de Villiers, 2003) was utilized to describe the language variation status and dialect density of the participating children. The 15 test items were designed to assess production of the phonological and morpho-syntactic aspects of language and are scored for use of nonmainstream features. During the test, the examiner presents a picture and prompts an a) imitation (e.g., *I see a bird taking a bath. You say it*), b) completion (e.g., *The boys have little kites, but the girl ______*), and c) spontaneous answer (e.g., *Why did she wash these clothes*?). Scores classify the child as using phonological and morpho-syntactic features indicative of a “Strong Variation from MAE (STV-MAE),” “Some Variation from MAE (SMV-MAE),” or “Mainstream American English (MAE).” In addition to the language variation status, DVAR scores were computed. The DVAR score is the percentage of scored responses that vary from MAE. The children’s responses on items 1-15 on the DELV-ST are categorized as either A (response varies from MAE), B (response is MAE), or C (response cannot be scored). The DVAR score is then computed by dividing the score for A by
the sum of A and B and then multiplying by 100. The demographic characteristics of participants are profiled in Table 2.1.

Table 2.1
Demographic Profile of Participants.

<table>
<thead>
<tr>
<th>Subject</th>
<th>School</th>
<th>Race</th>
<th>Age</th>
<th>Sex</th>
<th>Language Variation Status</th>
<th>DVAR</th>
<th>SES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>AA</td>
<td>6;9</td>
<td>Male</td>
<td>Strong</td>
<td>83</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>AA</td>
<td>6;9</td>
<td>Male</td>
<td>Strong</td>
<td>82</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>AA</td>
<td>7;10</td>
<td>Female</td>
<td>Strong</td>
<td>80</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>AA</td>
<td>7;1</td>
<td>Male</td>
<td>Strong</td>
<td>71</td>
<td>Low</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>AA</td>
<td>6;7</td>
<td>Male</td>
<td>Strong</td>
<td>57</td>
<td>Low</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>AA</td>
<td>6;8</td>
<td>Female</td>
<td>MAE</td>
<td>39</td>
<td>Low</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>AA</td>
<td>6;4</td>
<td>Female</td>
<td>MAE</td>
<td>43</td>
<td>Low</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>CAU</td>
<td>6;4</td>
<td>Female</td>
<td>MAE</td>
<td>0</td>
<td>High</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>AA</td>
<td>7;4</td>
<td>Male</td>
<td>Strong</td>
<td>57</td>
<td>Low</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>CAU</td>
<td>7;5</td>
<td>Male</td>
<td>MAE</td>
<td>27</td>
<td>High</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>CAU</td>
<td>7;8</td>
<td>Female</td>
<td>MAE</td>
<td>17</td>
<td>High</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>AA</td>
<td>8;10</td>
<td>Male</td>
<td>Strong</td>
<td>69</td>
<td>Low</td>
</tr>
<tr>
<td>13</td>
<td>2</td>
<td>AA</td>
<td>8;4</td>
<td>Male</td>
<td>Some</td>
<td>50</td>
<td>Low</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>AA</td>
<td>8;10</td>
<td>Female</td>
<td>Some</td>
<td>9</td>
<td>High</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>AA</td>
<td>8;3</td>
<td>Female</td>
<td>Some</td>
<td>39</td>
<td>High</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>AA</td>
<td>8;11</td>
<td>Female</td>
<td>MAE</td>
<td>15</td>
<td>Low</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>AA</td>
<td>8;2</td>
<td>Male</td>
<td>MAE</td>
<td>7</td>
<td>High</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>AA</td>
<td>8;10</td>
<td>Female</td>
<td>MAE</td>
<td>0</td>
<td>Low</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>HISP</td>
<td>9;3</td>
<td>Female</td>
<td>MAE</td>
<td>14</td>
<td>Low</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>AA</td>
<td>8;8</td>
<td>Female</td>
<td>MAE</td>
<td>14</td>
<td>Low</td>
</tr>
<tr>
<td>21</td>
<td>2</td>
<td>AA</td>
<td>8;5</td>
<td>Male</td>
<td>MAE</td>
<td>0</td>
<td>High</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>CAU</td>
<td>8;2</td>
<td>Female</td>
<td>MAE</td>
<td>7</td>
<td>High</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>CAU</td>
<td>9;0</td>
<td>Female</td>
<td>MAE</td>
<td>13</td>
<td>High</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
<td>CAU</td>
<td>9;3</td>
<td>Female</td>
<td>MAE</td>
<td>0</td>
<td>High</td>
</tr>
</tbody>
</table>

Note. AA = African American, CAU = Caucasian, HISP = Hispanic, DVAR = dialect variation score, MAE = Mainstream American English

The eight 1st grade participants ranged in age from 6;4 to 7;10 years (M = 6;10). All but one attended School 1, seven were African American and one was Caucasian. One was classified as High SES and seven as Low SES. Five of the 1st graders were rated as STV-MAE, while three
were MAE. Only three 2nd graders were recruited, ranging in age from 7;4 to 7;8 years (M = 7;6). One African American participant attended School 1 and was rated as STV-MAE. The other two 2nd graders were Caucasian, attended School 2, and were rated as MAE speakers. Two were classified as High SES and one as Low SES. The 13 3rd graders ranged in age from 8;2 to 9;3 years (M = 8;8). Six attended School 1, including five African American and one Hispanic participant (according to her parents, this child’s first language was English and no other languages were spoken at home). Five were rated as MAE, and one was rated STV-MAE. Seven 3rd graders attended School 2 including four African American and three Caucasian. Three were rated as SMV-MAE and four were rated as MAE. Seven were classified as High SES and six as Low SES.

Participants were administered a battery of assessments during their ancillary periods (School 1) or after school (School 2). Language was assessed using both the Diagnostic Evaluation of Language Variation-Screening Test (DELV-ST) and the Diagnostic Evaluation of Language Variation-Norm Referenced (DELV-NR). The DELV-ST provided a DVAR score, which was used to determine the participants’ dialect density. It also provided the Language Variation Status, and a Diagnostic Risk Status, a non-biased measure of syntactic development that indicates the risk for a language disorder, ranging from Low Risk (LR), Low to Medium (LM), Medium to High (MH), and High Risk (HR). A standard score for syntactic abilities (M = 10, SD = 3) was obtained from the DELV-NR, as well as a percentile score for phonology.

The Test of Phonological Awareness 2nd Edition (TPAT-2) was administered to assess participants’ abilities to manipulate phonemes independent of print, including isolation of sounds in word positions, sound segmentation, sound blending, and sound substitution. Quotient scores (M = 100, SD = 15) were obtained from the TPAT-2. In addition, two spelling tests were
administered including the Dialect Sensitive Spelling Test (DSST) and the Test of Written Spelling -4th Edition (TWS-4). A raw score (highest possible score is 32) was obtained from the DSST and a quotient score (M = 100, SD = 15) was obtained from the TWS-4.

**Test Battery**

**Diagnostic Evaluation of Language Variation – Screening Testing (DELV-ST).** Part II of the DELV-ST was administered to obtain a Diagnostic Risk Status to determine if the participant was at risk for language impairment. The 17 test items consisted of morpho-syntactic, wh-movement, and non-word repetition items. For the morpho-syntactic and wh-movement items, the examiner presented pictures and the child either a) completed a sentence (e.g., *He has a kite. She has a ball. The kite is his. The ball is _____*) or b) answered a question (e.g., *I see a sunny day. I see a windy day. Today it is sunny, and the children have their homework, but yesterday their homework blew away. Why?*) about the picture. During the non-word item portion, the examiner presented a non-word (e.g., *goyfowm*) and the child imitated the pronunciation. Scores obtained on Part II of the DELV-ST classified the child as Low Risk (LR), Low to Medium Risk (LM), Medium to High Risk (MH), or High Risk (HR) for having a language disorder.

**Diagnostic Evaluation of Language Variation – Norm Referenced (DELV-NR).** The DELV-NR is a norm-referenced diagnostic tool designed to identify speech and language disorders or delays in children regardless of language variation. The items were presented using either picture stimuli or verbal instruction. Several subtests comprise the DELV-NR, however, only two subtests were administered for the purposes of the current study: Syntax and Phonology.
**Syntax subtest.** The 28 test items on the Syntax subtest were designed to assess children’s knowledge of grammatical rules governing wh-questions, passive sentence construction, and discourse properties of articles. During administration of the wh-question items, the examiner presented one to three pictures and read a short story. The child was required to answer a question about the story. For the passive items, the examiner presented three pictures and described one of the pictures (e.g., *Show me the elephant was pushed*). The child was required to point to the correct picture (i.e., a boy pushing an elephant). For the article items, the examiner read a sentence and asked a question (e.g., *Sally was going to eat a banana, but first she had to take something off it. What did she take off?*). The child was required to answer the question with the appropriate article (i.e., the peel).

**Phonology subtest.** The 25 test items on the Phonology subtest were designed to identify phonological and articulation disorders in children. The target words each contained a consonant cluster (e.g., *crib, smart, control*). Some were monosyllabic, others polysyllabic. Clusters were intra- or intersyllabic and only occurred in the initial and medial word positions. The examiner showed a picture and said a carrier phrase with target word (e.g., *I see a stove*). The child was required to repeat the carrier phrase and word. Responses were scored for accuracy of production of clusters in the target word.

**The Phonological Awareness Test- 2nd Edition (TPAT-2).** The TPAT-2 (Robertson & Salter, 2007) is a comprehensive, norm-referenced, standardized tool that was designed to assess children’s phonological awareness skills. It measures children’s knowledge of the oral language segments of syllables and phonemes. Several subtests comprise TPAT-2; however, only the subtests that pertain specifically to spelling skills were administered for the current study.
Segmentation: Phonemes subtest. This subtest assesses children’s abilities to divide words into individual sounds. The examiner said a word (e.g., *cat*) and the child was required to say each sound in the word (e.g., /k—æ—t/).

Isolation: Initial, Medial, and Final subtests. This subtest examines the ability to identify a sound in the initial, medial, or final word positions. The examiner said a word (e.g., *cat*) and the child was required to identify the beginning sound (i.e., /k/), the middle sound (i.e., /æ/), or the final sound (i.e., /t/).

Deletion: Phonemes subtest. The *Deletion* subtest assesses a child’s ability to manipulate sounds in a word by removing a specific sound. The examiner said a word (e.g., *seat*) and the child was required to repeat the word without a specified sound (i.e., /s/).

Substitution. The *Substitution* subtest measures a child’s ability to manipulate the sounds in a word by isolating a sound and changing it to a different sound to create a new word. The examiner said a word (e.g., *cow*) and indicated the sound that changed (e.g., /k/ to /h/). The child was required to respond with the new word (i.e., *how*).

Blending: Phonemes subtest. This subtest assesses children’s abilities to blend sounds together to produce words. The examiner said the sounds of a word (with pausing between each sound; e.g., /s—n—æ—p/) and the child was required to respond by saying the word (i.e., *snap*).

Spelling Tests

Test of Written Spelling – 4th Edition (TWS-4). The TWS-4 (Larsen, Hammill, & Moats, 1999) is a norm-referenced standardized test used to assess spelling ability. Words increase in spelling difficulty to include more complex orthographic patterns, polysyllabic words, and irregular spellings.
A dictated-word format was used comprised of a) presenting the word in isolation, b) presenting the word in a sentence, and c) repeating the word. Each target word was written on the response form. The “Form A” word list was administered until the participant reached a ceiling, which for purposes of this study was defined as misspelling at least 10 consecutive words. A standard score is derived with a mean of 100 and standard deviation of 15.

**Dialect Sensitive Spelling Test (DSST).** The 32-item dialect-sensitive spelling word list (see Appendix E) was created by the researcher and compiled from words utilized in Terry (2006) and Terry and Connor (2010). The word list contained words with both morphological and phonological dialect-specific features (although as mentioned earlier and as discussed in more detail below, many of the dialect-specific morphological features on this test could be phonological in origin because they involve final consonant clusters and final consonant cluster reduction is a common AAE phonological feature):

<table>
<thead>
<tr>
<th>MORPHOLOGICAL</th>
<th>PHONOLOGICAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Past tense –ed</strong></td>
<td><strong>Voiced –th (ð)</strong></td>
</tr>
<tr>
<td>laughed, smiled, dropped, smelled</td>
<td>them, there, bathe, those</td>
</tr>
<tr>
<td><strong>Third Person Singular –s</strong></td>
<td><strong>Voiceless –th (θ)</strong></td>
</tr>
<tr>
<td>hates, rides, misses, thinks</td>
<td>think, thank, bath, math</td>
</tr>
<tr>
<td><strong>Plural –s</strong></td>
<td><strong>Final Consonant –t</strong></td>
</tr>
<tr>
<td>nails, shirts, rocks, roses</td>
<td>plate, treat, fruit, write</td>
</tr>
<tr>
<td><strong>Present Progressive –ing</strong></td>
<td><strong>Final Consonant –d</strong></td>
</tr>
<tr>
<td>sleeping, shopping, kicking, dancing</td>
<td>braid, grade, glad, slide</td>
</tr>
</tbody>
</table>

When adding a past tense, third person, or plural marker to a word (e.g., hugged, hates, or bags), we typically consider this an addition of a morpheme, or a change that is morphological in
nature. However, nonmainstream dialect research indicates that various linguistic contexts influence marking of these morphemes in spoken AAE. For example, Green (2002) suggests that when allomorphs [t] and [d] are preceded by a stop consonant that matches voicing of the allomorph (e.g., baked), zero marking of the past tense –ed is common. Thus, it is possible that a phonological constraint is present, suggesting that marking the past tense –ed feature in AAE speech may be phonological in nature (Green, 2002; Lee & Oetting, 2014; Pruitt & Oetting, 2009; Rickford, 1999; Thomas & Bailey, 2015). In addition to a phonological constraint for marking of plural –s, a syntactic constraint may also be present. This is because children are more likely to zero mark plural –s when the noun follows a quantifier (e.g. two ball), which suggests that the –s is a redundant plural marker. The effect of the quantifier has been noted with AAE-speakers and non-AAE-speakers (Rice & Oetting, 1993; Wolfram & Schilling-Estes, 1998). Therefore, it is unclear if marking of past tense and plurals is phonological, syntactic, or morphological in nature, or a combination of all three processes. For the current study, the past tense –ed and plural –s features were considered morphological because of its orthographic nature as a morpheme, and to align with previous spelling research conducted with AAE-speakers (Terry, 2006; Terry & Connor, 2010).

Each dialect-specific feature was presented four times. For past tense –ed, the allomorphs [t] and [d] were each presented twice. For both plural –s and third person singular –s, the allomorphs [s] and [z] were each presented twice. The test words consist of one or two syllables and are reflective of words that 1st, 2nd, and 3rd graders have exposure to in the classroom. The words and sentences were read naturally without overemphasis of the target AAE features. All test words were administered in the traditional “spelling test” manner: a) the word presented in isolation, b) the word presented in a sentence, and c) the word presented in isolation again.
Words were written on the response form. Errors were analyzed for specified morphological and phonological dialect-specific features. Performance on assessment measures is profiled in Table 2.2.

### Table 2.2
Profile of Language Scores on the Diagnostic Evaluation of Language Variation (DELV), The Test of Phonological Awareness (TPAT), Dialect Sensitive Spelling Test (DSST), and Test of Written Spelling (TWS).

<table>
<thead>
<tr>
<th>Subject</th>
<th>School</th>
<th>DELV Risk</th>
<th>DELV Syntax SS</th>
<th>DELV Phono %ile</th>
<th>TPAT Quo</th>
<th>TWS Quo</th>
<th>DSST # out of 32</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>HR</td>
<td>9</td>
<td>99</td>
<td>107</td>
<td>85</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>MH</td>
<td>8</td>
<td>21</td>
<td>97</td>
<td>84</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>LM</td>
<td>8</td>
<td>24</td>
<td>--</td>
<td>82</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>LM</td>
<td>4</td>
<td>99</td>
<td>100</td>
<td>84</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>LR</td>
<td>9</td>
<td>3</td>
<td>108</td>
<td>95</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>LM</td>
<td>7</td>
<td>7</td>
<td>102</td>
<td>85</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>LR</td>
<td>11</td>
<td>23</td>
<td>105</td>
<td>95</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>LM</td>
<td>12</td>
<td>99</td>
<td>119</td>
<td>106</td>
<td>13</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>LR</td>
<td>8</td>
<td>14</td>
<td>106</td>
<td>81</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>LR</td>
<td>11</td>
<td>18</td>
<td>110</td>
<td>116</td>
<td>28</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>LR</td>
<td>8</td>
<td>99</td>
<td>103</td>
<td>90</td>
<td>11</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>MH</td>
<td>9</td>
<td>16</td>
<td>107</td>
<td>109</td>
<td>25</td>
</tr>
<tr>
<td>13</td>
<td>2</td>
<td>LR</td>
<td>9</td>
<td>99</td>
<td>99</td>
<td>79</td>
<td>15</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>MH</td>
<td>9</td>
<td>99</td>
<td>92</td>
<td>124</td>
<td>32</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>LM</td>
<td>12</td>
<td>99</td>
<td>98</td>
<td>82</td>
<td>25</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>MH</td>
<td>8</td>
<td>25</td>
<td>111</td>
<td>109</td>
<td>28</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>LM</td>
<td>10</td>
<td>24</td>
<td>98</td>
<td>123</td>
<td>27</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>LM</td>
<td>9</td>
<td>25</td>
<td>97</td>
<td>100</td>
<td>21</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>LR</td>
<td>7</td>
<td>99</td>
<td>99</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>LM</td>
<td>4</td>
<td>99</td>
<td>72</td>
<td>105</td>
<td>26</td>
</tr>
<tr>
<td>21</td>
<td>2</td>
<td>LM</td>
<td>12</td>
<td>99</td>
<td>109</td>
<td>107</td>
<td>31</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>LR</td>
<td>9</td>
<td>99</td>
<td>102</td>
<td>118</td>
<td>29</td>
</tr>
<tr>
<td>23</td>
<td>2</td>
<td>LM</td>
<td>8</td>
<td>99</td>
<td>101</td>
<td>107</td>
<td>27</td>
</tr>
<tr>
<td>24</td>
<td>2</td>
<td>LR</td>
<td>14</td>
<td>99</td>
<td>104</td>
<td>91</td>
<td>19</td>
</tr>
</tbody>
</table>

Notes. HR = High Risk, MH = Medium to High Risk, LM = Low to Medium Risk, LR = Low Risk, SS = Standard Score mean of 10 with SD of 3, Quo = Quotient Score mean of 100 with SD of 15, Phono %ile = Highest percent in range achieved on Phonology subtest.
Procedures

All students were tested at their school in a quiet room. Examiners were trained to administer all tests. Testing occurred over two to three 45-minute sessions. All tests were administered individually.

Analysis of Individual Spelling Errors

Dialect Errors. After a word on the DSST was scored as incorrect, each individual error within the word was coded as an omission or substitution of a) a dialect-specific feature, b) a consonant, or c) a vowel. For example, the spelling “slepn” for sleeping contains a substitution of the dialect-specific feature of present progressive –ing (i.e., n/ing) and an omission of a vowel (i.e., –e).

Phonological Process Errors. After a word on the TWS-4 was scored as incorrect, each individual error within the word was coded as resembling a phonological process or as an orthographic consonant or vowel error. Table 2.3 presents the definitions and examples for phonological process patterns analyzed for the current study.

Data Reliability

Undergraduate volunteer members of the Language Intervention Laboratory scored the test protocols according to the procedures established in the test manuals. A second volunteer double-checked the test scoring for accuracy before data entry. The inter-scorer reliability for the tests were: DELV-ST 96%, DELV-NR 92%, TPAT:2 100%, TWS-4 100%, and DSST 100%. The volunteers also entered the data into an Excel spreadsheet. One assistant entered the data, a second assistant checked for entry errors. The researcher did the final check of entry. Inter-scorer reliability for data entry was: demographic information 99% and test scores 98.
Table 2.3
Definitions and Examples of Phonological Process Patterns Analyzed on TWS-4.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak Syllable Deletion</td>
<td>the weak syllable of a word is not included in the spelling</td>
</tr>
<tr>
<td>Cluster Reduction</td>
<td>the spelling of a consonant cluster does not include all of the consonants</td>
</tr>
<tr>
<td>Final Consonant Deletion</td>
<td>the spelling does not include the final consonant of a word</td>
</tr>
<tr>
<td>Epenthesis</td>
<td>a consonant or vowel is added between two consonants</td>
</tr>
<tr>
<td>Metathesis</td>
<td>letters in a word are repositioned</td>
</tr>
<tr>
<td>Reduplication</td>
<td>letters in a syllable are repeated</td>
</tr>
<tr>
<td>Stopping</td>
<td>letters representing a fricative or affricate such as “f”, “ch”, “s”, “j” or “sh” are replaced by letters representing a stop such as “b”, “d”, “g”, or “t”</td>
</tr>
<tr>
<td>Affrication</td>
<td>a nonaffricate is replaced by an affricate (either “ch” or “j”)</td>
</tr>
<tr>
<td>Deaffrication</td>
<td>an affricate (either “ch” or “j”) is replaced by a fricative (“f”, “s”, “z”, “v”, “sh”, “th”) or a stop consonant</td>
</tr>
<tr>
<td>Assimilation</td>
<td>a consonant in the word is replaced by another consonant in the word</td>
</tr>
<tr>
<td>Voicing</td>
<td>a voiceless consonant is replaced by a voiced consonant</td>
</tr>
<tr>
<td>Devoicing</td>
<td>a voiced consonant is replaced by a voiceless consonant</td>
</tr>
<tr>
<td>Backing</td>
<td>a consonant representing a sound produced in the front of the mouth is replaced by a consonant representing a sound produced in the back of the mouth</td>
</tr>
</tbody>
</table>

1 Cluster reduction and final consonant deletion are also considered dialect-specific features that occur frequently in oral and written productions of AAE-speaking children (Craig et al., 2003; Green, 2002; Kohler et al., 2007). The features were analyzed as phonological process patterns for the current study.
To determine the inter-scorer reliability for the DSST, 20% of the responses (i.e., 154 of 768) were randomly selected. Two scorers, including the researcher and an undergraduate laboratory volunteer, independently scored and coded the errors on the test. Reliability on scoring correct words was found to be 100% (70 agreements/70 opportunities). Reliability on scoring errors was found to be 90% (145 agreements/162 opportunities).

To determine the inter-scorer reliability for the TWS-4, 20% of the responses (i.e., 124 of 621) were randomly selected. The same reliability scoring procedure from the DSST was utilized. Reliability was found to be 100% for scoring correct words (66 agreements/66 opportunities). Reliability on scoring errors was found to be 92% (66 agreements/72 opportunities).

**Data Analysis**

The original plan was to use Pearson product moment correlations to measure the strength of the relationship between each of the test scores and dialect density. However, initial examination revealed a relationship between Grade and $DVAR$ inasmuch 5 of the 8 children demonstrating Strong Variation were in 1st grade ($DVAR$ ranged from 57 to 83; mean = 74.6, S.D. = 10.92), one in 2nd grade ($DVAR = 57$), and one in 3rd grade ($DVAR = 69$). All of the children categorized as using Some Variation were in 3rd grade ($DVAR$ ranged from 9 to 50;  

<table>
<thead>
<tr>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fronting: a consonant representing a sound produced in the back of the mouth is replaced by consonant representing a sound produced in the front of the mouth</td>
<td>go = toe</td>
</tr>
<tr>
<td>Gliding: “r” and “l” are replaced by “w”</td>
<td>run = wun</td>
</tr>
<tr>
<td>Diminutization: addition of “y” to the end of a word</td>
<td>store = story</td>
</tr>
</tbody>
</table>

(Table 2.3 continued)
mean = 32.67, S.D. = 21.22). The converse of this relationship can be seen in that 38% of the 1st graders were using MAE (DVAR ranged from 0 to 43; mean = 27.33, S.D. = 23.76) compared to 69% of the 3rd graders (DVAR ranged from 0 to 15; mean = 7.78, S.D. = 6.51). The correlation between Grade and DVAR was $r = -0.613$ ($p < .001$) indicating that Grade accounted for 37% of the variance in DVAR scores. This correlation was similarly high ($r = -0.709$, $p < .001$) when only the African American children were considered. To compensate for this trend in the data, the relationships between dialect density and measures of spelling were calculated as partial correlations using age in months and race of the child as control variables. Age in months was used as a proxy for the amount of school-based exposure to literacy activities the child has experienced, assuming that all of the children entered school at approximately the same age.

**Summary**

Twenty-four 1st, 2nd, and 3rd graders participated in the current study. The students attended two different schools in the local area and represented a range of socioeconomic backgrounds and utilized nonmainstream dialect features at varying rates. Each student was administered a battery of tests comprised of syntax, phonology, phonemic awareness, and spelling assessments. Comparisons of participants’ test performance, including qualitative analyses conducted with spelling patterns, are presented in the following chapter.
RESULTS

The purposes of this study were to explore the relationship between degree of nonmainstream dialect use and spelling for a group of first to third grade children, and to describe error patterns using dialect sensitive morphological and phonological patterns and phonological processes. Examples of the participants’ spelling patterns were obtained through a researcher created spelling test, the DSST, and a standardized spelling test, the TWS-4. The results are detailed in the following sections: Dialect Variation and Orthography, Spelling Dialect Sensitive Words, and Phonological Process Analysis of Spelling Errors. The first section describes the relationships between dialect densities and performance on a standardized test of spelling (TWS-4) and on syntactic and phonological measures (DELV-NR and TPAT-2). The second section describes relationships found between the children’s dialect densities and their spelling of words containing morphological and phonological features that differ between with AAE and MAE dialects. The third section describes the relationships between dialect densities and the occurrence of phonological process error patterns.

Pearson product moment correlations were used to measure the strength of the relationships between SES, age, nonmainstream dialect use, language impairment risk, phonemic awareness, and spelling. Raw scores were utilized in the analysis for equivalency across measures. The number of years of maternal education was used as a measure of SES. The participants’ use of MAE forms on Part I of the DELV-ST was used as a measure of dialect use. Raw scores obtained on Part II of the DELV-ST were considered a measure of language impairment risk. Raw scores from the TPAT-2, TWS-4, and DSST were also entered into the analysis. Table 3.1 depicts the correlations among the various tests.
Table 3.1
Correlations Among Test Measures, Maternal Education, and Age.

<table>
<thead>
<tr>
<th>Maternal Education</th>
<th>Age (months)</th>
<th>MAE</th>
<th>Risk</th>
<th>TPAT-2</th>
<th>TWS-4</th>
<th>DSST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Education</td>
<td>0.04</td>
<td>0.43*</td>
<td>-0.33</td>
<td>0.41</td>
<td>0.02</td>
<td>0.23</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>0.42*</td>
<td>-0.41*</td>
<td>0.58*</td>
<td>0.74*</td>
<td>0.76*</td>
</tr>
<tr>
<td>MAE</td>
<td></td>
<td>-0.44*</td>
<td>.053*</td>
<td>0.6*</td>
<td>0.64*</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td>.034</td>
<td>-0.23</td>
<td>-0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPAT</td>
<td></td>
<td></td>
<td>0.49*</td>
<td>0.55*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TWS</td>
<td></td>
<td></td>
<td></td>
<td>0.9*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant correlations at the p < .05 level.

Notes. MAE = number of MAE responses on Part I of DELV-ST, Risk = language impairment risk, TPAT = phonemic awareness, TWS = Test of Written Spelling, DSST = Dialect Sensitive Spelling Test

Maternal education and child age were related to the children’s number of MAE forms produced on the DELV-ST. Language impairment risk declined with age and the number of MAE forms produced. Phonemic awareness and spelling skills were positively correlated with age. As expected, the TPAT-2 (phonemic awareness) was related to both the TWS-4 and DSST. Lastly, both spelling measures were significantly correlated.

**Dialect Variation and Orthography**

The first question addressed the relationship between dialect usage and scores from a standardized test of spelling as well as measures of syntactic and phonological development. The standardized test examines progressively more difficult orthographic patterns in spelling until a ceiling is reached. In contrast to the DSST, no words contain inflectional morphemes and no words contain the *th* digraph in any word position. Table 3.2 profiles the participants’ mean raw scores, standard scores, and standard deviations on the TWS-4. Visual examination of the table reveals that within each level of the dialect variation, both raw and standard scores appeared to increase with grade. The average standard scores of children using MAE rose from 95 to 107 while the scores of children using a strong variation from MAE appeared to be lower in 1st grade.
(SS = 86) but also appear to be rising to 109 in 3rd grade. Thus, it appears that the children’s standard scores are improving across grades and that children using nonmainstream dialects are achieving lower scores. However, the 2nd and 3rd grade scores for speakers using a strong variation from MAE are based on single child scores.

Table 3.2

<table>
<thead>
<tr>
<th></th>
<th>Strong Variation</th>
<th>Some Variation</th>
<th>MAE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
</tr>
<tr>
<td>Raw Score</td>
<td>5.2</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>(.84 )</td>
<td>(.--)</td>
<td>(.--)</td>
</tr>
<tr>
<td>Standard Score</td>
<td>86</td>
<td>81</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>(5.15)</td>
<td>(.--)</td>
<td>(.--)</td>
</tr>
</tbody>
</table>

These data were analyzed using multiple regression with backward elimination in which the TWS raw scores were predicted by maternal education, the child’s age in months, raw scores on the TPAT, raw scores on the DELV-ST Part II, and the number of MAE responses. The overall regression model predicted a significant amount of variability in TWS raw scores (R = .797, F(2,19) = 16.551, p < .001). The factor of age in months was the sole significant predictor of TWS raw scores (B = .612, t = 4.003, p < .001). Predictions with regards to the number of MAE responses produced on Part I of the DELV-ST approached significance (B = .315, t = 2.058, p = .054).

Each child produced ten consecutive misspelled words for a total of 621 responses. The number of words correctly by children before reaching the ceiling increased across grade levels, with a mean of 5.38 (S.D. = 1.30) at 1st, 9.33 (S.D. = 5.51) at 2nd, and 17 (S.D. = 5.55) at 3rd grade. The number of words spelled with errors also increased, with a mean of 11.5 (S.D. = 2.62) at 1st, 13 (S.D. = 2.65) at 2nd, and 15.23 (S.D. = 2.42) at 3rd grade.
Figure 3.1 profiles the average correct and incorrect spellings by grade level and language variation status. When the spellings of children grouped by language variation were compared, the number of correctly spelled words increased from a mean of 7 (S.D. = 7.64) for participants with language classified as a “Strong Variation from MAE” (STV-MAE), to 14.33 (S.D. = 11.93) for those with language characterized as “Some Variation from MAE” (SMV-MAE), and 14.29 (S.D. = 5.68) for language characterized as “Mainstream American English” (MAE). This was influenced by grade, since the majority of the STV-MAE participants were first graders. When incorrect spellings were compared, STV-MAE participants produced a mean of 12 (S.D. = 3.11) errors, SMV-MAE participants produced a mean of 18 (S.D. = 2.65), and MAE participants produced 13.92 (S.D. = 2.06).

Visual examination reveals that regardless of language variation status, 1st graders produced approximately the same number of correct and incorrect responses before reaching the ceiling. Examination of 3rd grade showed MAE participants produced fewer errors than other dialect groups but STV-MAE participants produced more correct spellings. Third graders characterized as utilizing MAE (n = 9) produced the same number of errors as second grade MAE participants. It is important to note that there was only one participant in the 2nd and 3rd grade STV-MAE groups, and two participants in the 2nd grade/MAE group.

**Spelling Dialect Sensitive Words**

The second question of this study asked whether spelling performance and patterns of spelling for morphological and phonological characteristics that differ in AAE and MAE are related to the child’s degree of dialect usage. The children’s total scores on the DSST measure were predicted using the same multiple regression used for TWS-4 scores. The overall regression was significant (R = .830, F (2,19) = 21.004, p < .001). The R² of .689 indicates that
approximately 69% of the variation in DSST scores was accounted for by the variables in the equation. Age in months was the best predictor of DSST scores ($B = .624, t = 4.420, p < .0001$).

This variable represents the amount of time a child has been in school and thus indirectly relates to the amount of exposure to spelling and other academic activities. The number of MAE responses on Part I of the DELV-ST was the second best predictor ($B = .344, t = 2.441, p < .025$), also predicting a significant amount of the variation in spelling scores. None of the other predictor variables were significant at the $p < .05$ level of significance.

Table 3.3 profiles examples of spelling errors on the dialect sensitive words on the DSST. The participants spelled all 32 words on the DSST, for a total of 768 responses. Average word accuracy on the DSST was 56.51%. First graders achieved an average of 19.44% (S.D. = 12.16) accuracy, 2nd graders achieved 50% (S.D. = 32.63), and 3rd graders averaged 79.33% (S.D. = 14.80) accuracy.
Table 3.3
Examples of Dialect-Related Spelling Errors on the DSST.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Word</th>
<th>Example Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past Tense –ed</td>
<td>laughed</td>
<td>lauth</td>
</tr>
<tr>
<td></td>
<td>dropped</td>
<td>drop</td>
</tr>
<tr>
<td>Third Person Singular –s</td>
<td>misses</td>
<td>miss</td>
</tr>
<tr>
<td></td>
<td>hates</td>
<td>hasn</td>
</tr>
<tr>
<td>Plural –s</td>
<td>rocks</td>
<td>rock</td>
</tr>
<tr>
<td></td>
<td>shirts</td>
<td>shirt</td>
</tr>
<tr>
<td>Present Progressive –ing</td>
<td>kicking</td>
<td>kekeg</td>
</tr>
<tr>
<td></td>
<td>sleeping</td>
<td>slepn</td>
</tr>
<tr>
<td>Voiced –th</td>
<td>bathe</td>
<td>bave</td>
</tr>
<tr>
<td></td>
<td>them</td>
<td>din</td>
</tr>
<tr>
<td>Voiceless –th</td>
<td>thank</td>
<td>tek</td>
</tr>
<tr>
<td></td>
<td>bath</td>
<td>daf</td>
</tr>
<tr>
<td>Final Consonant –t</td>
<td>treat</td>
<td>threy</td>
</tr>
<tr>
<td></td>
<td>fruit</td>
<td>freuth</td>
</tr>
<tr>
<td>Final Consonant –d</td>
<td>grade</td>
<td>gat</td>
</tr>
<tr>
<td></td>
<td>slide</td>
<td>sot</td>
</tr>
</tbody>
</table>

Participants with language characterized as STV-MAE achieved 27.23% (S.D. = 24.45) accuracy, those with language characterized as SMV-MAE achieved 75% (S.D. = 26.7), and participants with language characterized as MAE achieved 67.19% (S.D. = 25.79) accuracy. A total of 524 errors were produced on the test with 116 errors (22.14%) categorized as dialect-related errors. First graders produced 86 dialect-related errors, the 2nd graders produced 13, and 3rd graders produced 17. Participants in the STV-MAE category produced 67 dialect-related errors, those in the SMV-MAE group produced 9, and 40 errors were produced by the MAE group. The remaining errors were categorized as non-dialect related vowel errors (n = 202; 38.55%), consonant errors (n = 162; 30.92%), and phonological process errors (n = 44; 8.4%).

Table 3.4 profiles the means and standard deviations for errors on the dialect-specific features on the DSST, distributed by grade level and language variation status. Visual examination of the means reveals relatively frequent errors with past tense –ed and 3rd person...
singular –s in 1st grade regardless of language variation and few errors by any language variation group by 3rd grade. Plural –s followed a similar pattern with no errors after 1st grade except for 3rd graders with some language variation who still produced errors. Voiced –th errors were produced by participants at each grade level for MAE participants, with more errors produced by the 2nd graders. Errors on voiceless –th, present progressive –ing, and final consonant –t did not occur after 1st grade. The non-dialect related consonant and vowel errors were high for first graders regardless of language variation and increased with grade level.

Errors on the dialect-specific features represented on the DSST were characterized as omissions and substitutions. Participants produced both types of errors when spelling each of the features. Errors on the past tense –ed feature comprised 8% of the total errors. Of these past tense –ed errors, 43% were classified as omissions of the –ed (i.e., “miss” for “missed”), a common characteristic of spoken AAE dialect. The remaining 57% were non-dialectal substitution errors, such as “lauth” or “dropt.”

Errors on 3rd person singular –s comprised 6% of the total errors. Of these, 53% were omissions (i.e., “hate” for “hates”) and 47% were non-dialectal substitutions such as “missis” for “misses” or “thinkes” for “thinks.” Plural –s errors comprised 3% of the total errors, with 57% of these considered omissions of the feature (i.e., “rock” for “rocks”).

Present progressive –ing was noted on 2% of the total errors with 75% of these considered dialectal substitution errors (i.e., “kikn” for “kicking”). Voiceless and voiced –th errors comprised 3% of the total errors with 76% of these considered dialectal substitution errors (i.e., “baf” for “bath”). Errors on the final consonant –t and –d features comprised 1% of the total errors, with 60% of these considered non-dialectal omission errors such as “threy” and “treat.”
Table 3.4
Mean Percentage and Standard Deviations of Errors for Each Dialect Sensitive Feature on the DSST.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Strong Variation</th>
<th>Some Variation</th>
<th>MAE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st  2nd  3rd</td>
<td>1st  2nd  3rd</td>
<td>1st  2nd  3rd</td>
</tr>
<tr>
<td>Past Tense –ed**</td>
<td>8.84 (1.59)</td>
<td>12.12 (--)</td>
<td>0</td>
</tr>
<tr>
<td>3rd Person –s*</td>
<td>2.33 (1.68)</td>
<td>9.09 (--)</td>
<td>0</td>
</tr>
<tr>
<td>Plural –s**</td>
<td>2.85 (1.16)</td>
<td>0   (--)</td>
<td>0</td>
</tr>
<tr>
<td>Present Progressive –ing**</td>
<td>3.08 (1.68)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Voiceless –th</td>
<td>1.11 (1.68)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Final Consonant –t **</td>
<td>1.31 (1.68)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Final Consonant –d</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-dialect</td>
<td>31.56 (3.23)</td>
<td>27.27 (--)</td>
<td>42.88 (--)</td>
</tr>
<tr>
<td>Non-dialect</td>
<td>31.24 (3.69)</td>
<td>48.48 (--)</td>
<td>57.14 (--)</td>
</tr>
</tbody>
</table>
| Notes. *Errors with significant correlations with DVAR scores at the p < .05 level. ** Errors with significant correlations with DVAR scores at the p < .01 level. *** Errors with significant correlations with DVAR scores at the p < .001 level.

Pearson product-moment correlation coefficients show the effects of dialect usage on spelling errors on the DSST. Errors related to five dialect-specific features, including past tense –ed (r = .639, p < .001), third person singular –s (r = .499, p < .05), plural –s (r = .449, p < .01), present progressive –ing (r = .504, p < .012), and final consonant –t (r = .549, p < .01) were significantly correlated with the DVAR score. The participants’ non-dialectical consonant (r = .741, p < .01) and vowel (r = .632, p < .01) errors were also significantly correlated with the DVAR scores.
The dialect-related errors produced on the DSST items were combined to form a *morphology error score* and a *phonology error score*. Table 3.5 presents the means for the number of morphology and phonology errors produced by the participants by language variation status. The *morphology error score* was derived from a combination of errors on items containing past tense –ed, 3rd person singular –s, plural –s, and present progressive –ing. The *phonology error score* was comprised of errors on items containing voiced and voiceless –th, final consonant –t and final consonant –d. As seen here, the children with strong or some language variation produced more errors in all categories except final consonant –t. Separate analyses for the morpheme items (r = .425, p < .055) and phoneme items (r = .398, p < .074) resulted in similar trends and correlations that approached significance and would potentially reach a significant level with an increased number of participants.

Since the majority of the subjects rated STV-MAE were first graders, it is possible that the errors reflected developmental spelling errors. Only three participants at first grade were rated as MAE speakers and their mean level of spelling accuracy on the DSST was higher than the STV-MAE speakers (30% vs. 17%). Many of their spelling errors reflected the same types of morphological and phonological error patterns as STV-MAE participants such as “lauf” for “laughed” or “fank” for “thank.”

No errors in the use of present progressive –ing occurred for MAE participants while this error was more common for STV-MAE participants but this was the only pattern that differed between the groups. The findings were similar for 2nd grade where the two MAE speakers had higher mean spelling accuracy scores than the one STV-MAE speaker (61% vs. 28%, respectively). No differences in patterns were apparent, and no participants produced an error on
present progressive –ing. The majority of errors for all spellers were in vowels and orthographic consonants.

Table 3.5
Means and Standard Deviations of Morphological and Phonological Errors Produced on the DSST by Language Variation Status.

<table>
<thead>
<tr>
<th></th>
<th>Morphology</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PT -ed</td>
<td>TPS -s</td>
<td>Pl -s</td>
<td>PP -ing</td>
<td>V -th</td>
<td>VL -th</td>
<td>FCon -t</td>
</tr>
<tr>
<td>MAE</td>
<td>1</td>
<td>.86</td>
<td>.43</td>
<td>0</td>
<td>.43</td>
<td>.14</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>(1.73)</td>
<td>(.90)</td>
<td>(.79)</td>
<td>(0)</td>
<td>(.53)</td>
<td>(.38)</td>
<td>(.49)</td>
</tr>
<tr>
<td>Strong or</td>
<td>2.81</td>
<td>2.09</td>
<td>1.09</td>
<td>1.09</td>
<td>.73</td>
<td>.45</td>
<td>.27</td>
</tr>
<tr>
<td>Some</td>
<td>(1.83)</td>
<td>(1.51)</td>
<td>(1.14)</td>
<td>(1.64)</td>
<td>(.65)</td>
<td>(.82)</td>
<td>(.47)</td>
</tr>
<tr>
<td>Variation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key: PT-ed = past tense –ed, TPS-s = third person singular –s, Pl-s = plural –s, V -th = voiced –th, VL -th = voiceless –th, PP-ing = present progressive –ing, FCon -t = final consonant –t, FCon -d = final consonant –d

Only one participant ranked as STV-MAE in 3rd grade, three as SMV-MAE, and nine MAE. The mean percentage of overall accuracy was 81% for MAE, 75% for SMV-MAE, and 78% for STV-MAE. Few errors on dialect-specific features were produced by any participants (7 with 0 errors, 3 with 1 error, 1 with 2, and 1 with 3). The exception was one participant rated as SMV-MAE who produced nine errors. He also produced many more orthographic consonant and vowel errors than other 3rd graders, regardless of dialect.

**Phonological Process Spelling Errors**

The third question of this study asked whether there are differences in phonological process spelling patterns across grade levels and dialect usage. A total of 558 errors were produced on the TWS-4 with 181 errors (32.43%) categorized as phonological process errors.

Table 3.6 profiles examples of spellings for phonological process errors on the TWS-4. First graders produced 44 phonological process errors, the 2nd graders produced 23, and 3rd graders produced 114. Participants in the STV-MAE category produced 45 phonological process errors, those in the SMV-MAE group produced 32, and 104 errors were produced by the MAE group.
The remaining errors were categorized as orthographic vowel errors (n = 270; 48.39%) and consonant errors (n = 107; 19.18%).

Table 3.6
Examples of Phonological Process Errors on the TWS-4.

<table>
<thead>
<tr>
<th>Phonological Process</th>
<th>Word</th>
<th>Example Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak Syllable Deletion</td>
<td>visualize</td>
<td>viglulise</td>
</tr>
<tr>
<td></td>
<td>nucleus</td>
<td>newcleset</td>
</tr>
<tr>
<td>Cons Cluster Reduction</td>
<td>institution</td>
<td>insitution</td>
</tr>
<tr>
<td></td>
<td>strong</td>
<td>stog</td>
</tr>
<tr>
<td>Final Cons Deletion</td>
<td>legal</td>
<td>lega</td>
</tr>
<tr>
<td></td>
<td>district</td>
<td>districk</td>
</tr>
<tr>
<td>Epenthesis</td>
<td>terrible</td>
<td>terrbile</td>
</tr>
<tr>
<td></td>
<td>unify</td>
<td>unufly</td>
</tr>
<tr>
<td>Metathesis</td>
<td>signal</td>
<td>single</td>
</tr>
<tr>
<td></td>
<td>section</td>
<td>sesham</td>
</tr>
<tr>
<td>Stopping</td>
<td>knife</td>
<td>nift</td>
</tr>
<tr>
<td></td>
<td>unify</td>
<td>unafine</td>
</tr>
<tr>
<td>Affrication</td>
<td>visualize</td>
<td>vijalise</td>
</tr>
<tr>
<td></td>
<td>section</td>
<td>seschin</td>
</tr>
<tr>
<td>Deaffrication</td>
<td>much</td>
<td>muth</td>
</tr>
<tr>
<td></td>
<td>district</td>
<td>dishret</td>
</tr>
<tr>
<td>Assimilation</td>
<td>section</td>
<td>sheshin</td>
</tr>
<tr>
<td>Voicing</td>
<td>next</td>
<td>nexed</td>
</tr>
<tr>
<td>Devoicing</td>
<td>tardy</td>
<td>tardy</td>
</tr>
<tr>
<td></td>
<td>terrible</td>
<td>terupal</td>
</tr>
<tr>
<td>Diminutization</td>
<td>unify</td>
<td>unafyi</td>
</tr>
<tr>
<td>Fronting</td>
<td>tranquil</td>
<td>tranble</td>
</tr>
<tr>
<td>Gliding</td>
<td>visualize</td>
<td>wisalize</td>
</tr>
</tbody>
</table>

Of the phonological processes observed on the TWS-4, consonant cluster reduction accounted for 8.7% of the total errors. Weak syllable deletion accounted for 3.4%, epenthesis for 2.8%, devoicing for 2.7%, and metathesis for 2.4%. The remaining phonological processes accounted for 1% or less of the total errors.
Table 3.7 profiles the percentage and standard deviation of error contributed by each phonological process error, vowel error, and consonant error by grade level and language variation status for all 24 participants. Visual inspection of the means reveals a greater percentage of weak syllable deletion, stopping, affrication, devoicing, and fronting errors for MAE subjects, especially at the third grade level. In contrast, a greater percentage of epenthesis and deaffrication were produced by participants with strong or some language variation. Errors of voicing, diminutization, fronting, and gliding almost never occurred. Cluster reduction and metathesis occurred with relative high frequency for participants across grades and language variation status.

The total number of syllable structure processes (i.e., consonant cluster reduction, final consonant deletion, weak syllable deletion, epenthesis, metathesis, diminutization) utilized by each child was correlated with DVAR, holding age and race constant, revealing a nonsignificant correlation of $r = .310$. A similar result was found for the total number of feature-based processes (i.e., stopping, deaffrication, affrication, fronting, gliding, voicing, devoicing; $r = -.239$, $p < .283$).

**Summary**

Several significant findings emerged from the analyses. First, with regards to the relationship between dialect and orthography, the participants’ standard scores on the TWS-4 increased from 1st to 3rd grade (as measured by age in months). Additionally, the raw score was significantly correlated with the participants’ use of MAE forms; the more MAE forms used, the higher the raw score. Analyses also showed that the participants’ spelling development was significantly related to phonemic awareness.
Table 3.7  
Mean Percent and Standard Deviations of Phonological Process Errors for Words on the TWS-4.

<table>
<thead>
<tr>
<th>Process</th>
<th>Strong Variation</th>
<th>Some Variation</th>
<th>MAE</th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
</tr>
<tr>
<td>Weak Syllable Deletion</td>
<td>.77</td>
<td>0</td>
<td>3.84</td>
<td>--</td>
<td>--</td>
<td>2.71</td>
</tr>
<tr>
<td></td>
<td>(1.72)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(2.63)</td>
</tr>
<tr>
<td>Cluster Reduction</td>
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<td>11.54</td>
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<td>8.47</td>
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<tr>
<td></td>
<td>(9.42)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(4.37)</td>
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<tr>
<td>Final Consonant Deletion</td>
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<td>(3.19)</td>
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<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(6.60)</td>
</tr>
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<tr>
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<td>(--)</td>
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<td>(3.96)</td>
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<td>(4.39)</td>
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<td>.95</td>
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<td>(--)</td>
<td>(--)</td>
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<td>(--)</td>
<td>(1.65)</td>
</tr>
<tr>
<td>Deaffrication</td>
<td>1.54</td>
<td>9.09</td>
<td>0</td>
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<td>--</td>
<td>0</td>
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<td></td>
<td>(3.44)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(0)</td>
</tr>
<tr>
<td>Assimilation</td>
<td>.77</td>
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<td>0</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
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<td></td>
<td>(1.72)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
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<td>(0)</td>
</tr>
<tr>
<td>Voicing</td>
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<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(0)</td>
</tr>
<tr>
<td>Devoicing</td>
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<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(1.59)</td>
</tr>
<tr>
<td>Diminutization</td>
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<td>--</td>
<td>--</td>
<td>.88</td>
</tr>
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<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(1.52)</td>
</tr>
<tr>
<td>Fronting</td>
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<td>0</td>
<td>3.84</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(0)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(0)</td>
</tr>
<tr>
<td>Gliding</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(0)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(0)</td>
</tr>
<tr>
<td>Orthographic Consonant Error</td>
<td>22.05</td>
<td>18.2</td>
<td>23.08</td>
<td>--</td>
<td>--</td>
<td>14.49</td>
</tr>
<tr>
<td></td>
<td>(1.80)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(8.54)</td>
</tr>
<tr>
<td>Orthographic Vowel Error</td>
<td>44.18</td>
<td>63.6</td>
<td>34.62</td>
<td>--</td>
<td>--</td>
<td>55.72</td>
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<td></td>
<td>(8.46)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(--)</td>
<td>(9.16)</td>
</tr>
</tbody>
</table>

With regards to the relationship between dialect density and spelling patterns produced on the DSST, the participants’ age in months (i.e., amount of schooling) was the best predictor of
Fewer errors occurred on the dialect-specific features as grade level increased, while orthographic consonant and vowel errors increased with grade level. The use of MAE forms was also a significant predictor of DSST performance; the more MAE forms used, the higher the performance accuracy. Morphological errors were related to dialect density individually and approached significance when grouped together. Qualitative analysis of the spelling patterns indicated that morphological errors were common in the 1st grade but were mastered by 3rd grade.

Qualitative analysis of the errors produced on the TWS-4 revealed production of several phonological process patterns, however the patterns were not significantly related to dialect density. Cluster reduction accounted for the majority of the phonological process patterns observed. It occurred twice as often amongst the STV-MAE group as MAE group in the 1st grade. Epenthesis was produced three times as often by 3rd graders in the STV-MAE group compared to MAE.
DISCUSSION

The purposes of this study were to explore the relationship between degree of AAE dialect use and spelling for a group of 1\textsuperscript{st} to 3\textsuperscript{rd} grade children, and to describe error patterns using phonological processes and dialect-specific morphological and phonological patterns. Four primary findings resulted from the analyses. First, the amount of AAE dialect usage relates to children’s spelling skills as measured by a standardized spelling test. Second, AAE dialect usage decreased as age/grade level increased. Nevertheless, the participants’ age contributed significantly to their performance on the spelling tests, when compared to other variables (e.g., nonmainstream dialect density, maternal education, language skills, phonemic awareness). Third, the ability to accurately spell dialect-specific features in words was influenced by the degree of nonmainstream dialect usage. And fourth, nonmainstream dialect usage did not correlate with the production of spelling errors that resembled phonological process patterns.

Relationships between nonmainstream dialect usage and early reading achievement are well established (e.g., Charity, Scarborough, & Griffin, 2004; Conlin, 2009; Connor & Craig, 2006; Craig & Washington, 2004; Craig, Zhang, Hensel, & Quinn, 2009; Terry, 2010; Terry, Conner, Petscher & Conlin, 2012; Terry, Connor, Thomas-Tate, & Love, 2010; Terry & Scarborough, 2011), but links to spelling are relatively unexplored. Previous studies have explored spelling patterns of real and nonsense words for evidence of dialect influence (e.g., Dickerson, 2009; Kohler et al., 2007; Terry, 2006; Terry & Connor 2010) but none have reported performance on standardized tests of spelling.

This study found that children’s amount of nonmainstream dialect use was related to spelling performance on the Test of Written Spelling-4 (TWS-4; Larsen, Hammill, & Moats, 1999). Students with higher dialect densities obtained lower standard scores on the test. At 1\textsuperscript{st}
and 2nd grades, five of six STV-MAE speakers scored at or below one standard deviation from the mean. These students were all considered lower SES and attended the at-risk school. At 3rd grade, two of three SMV-MAE speakers scored greater than a standard deviation below the mean, both attending the high performance school and one considered lower SES. Although the number of participants was small, this study suggests that dialect density influenced spelling regardless of school or SES status. This conclusion was further supported by the finding that by 3rd grade, students from the at-risk school were categorized as MAE speakers, suggesting they had developed the ability to dialect shift during academic tasks (Craig, Zhang, Hensel, & Quinn, 2009; Renn, 2010). These lower SES students achieved average spelling scores, comparable to the higher SES students at the high performing school. These findings suggest that their use of a nonmainstream dialect was a more important factor in determining spelling ability than school performance ratings or SES.

Terry et al.’s longitudinal study (2012) showed that students who rapidly increased their use of MAE between the beginning and end of 1st grade had higher reading skills in 2nd grade. Too few participants at 2nd grade were included in the current study to draw any parallels, but by 3rd grade this trend was also shown for spelling, although with exceptions (one subject with STV-MAE also scored average). That is, students from the low SES school who were rated as MAE (and presumably had been STV-MAE in the 1st grade) also performed at an average level for spelling. The data are not longitudinal, but if the participants are representative it is encouraging to find that low performance in spelling at 1st grade was not predictive of long-term deficits in spelling. It may be that the students’ nonmainstream dialect usage is changing at the same time as they are learning orthographic and language skills important for spelling, such as phonemic awareness. Either the children learned to dialect shift and the influence of dialect
differences decreased while conventional spelling increased, or, they learned to spell better, which influenced their ability to dialect shift.

Evidence of this relationship may be suggested by the students’ scores on the Phonological Awareness Test-2 (TPAT-2; Robertson & Salter, 2007). It is noteworthy that the students were tested at the middle of the school year. By that time, 1st graders had considerable experience with print and metalinguistic concepts, including the sound structure of words. In 1st and 2nd grades, scores on the TPAT-2 were notably higher than spelling scores, while at 3rd grade they were roughly comparable for most subjects. Perhaps the increase in awareness of the sound structure of words across time also led to an awareness of differences between their own speech patterns and print. This exposure to MAE in the classroom likely included reading text, writing experiences followed by corrections of invented spellings, and oral communication with teachers and MAE speaking peers. It may be that the relationships are interactive and reciprocal. Greater metalinguistic skill leads to higher performance in spelling that in turn heightens awareness of differences between MAE and dialect variations (Charity et al., 2004; Mitri & Terry, 2014). By 3rd grade, metalinguistic awareness and spelling performance are comparable.

It was hypothesized that the degree of nonmainstream dialect usage would be the most significant contributing factor to the children’s spelling performance. Evidence from the multiple regression analyses indicated that the participants’ ages were a greater source of variation to spelling test performance. These findings suggest that although nonmainstream dialect density was a contributing factor, age was contributing a lot to the children’s performance. Thus, with more years of schooling, children are likely to become better spellers, regardless of the number of nonmainstream dialect features they use. This is promising for nonmainstream dialect
speakers who are also poorer spellers in 1st grade; with age, their use of nonmainstream dialect should decrease and their spelling skills should improve.

It was predicted that the spelling test comprised of words containing dialect-specific features would support the premise that spelling errors reflect dialect patterns. To some extent this was true in that a positive correlation was found between dialect density and accuracy of spelling words containing dialect-specific features. However, fewer errors occurred on the dialect-specific features as grade level increased, while orthographic consonant and vowel errors increased with grade level. The majority of AAE dialect speakers were 1st graders and 2nd graders for whom spelling errors interacted with developmental attempts. Examination of errors showed that while the AAE dialect speakers may have produced slightly more errors on dialect sensitive words, particularly on the morphological features (i.e., past tense –ed, plural –s, third person singular –s, present progressive –ing) they weren’t qualitatively different (Kligman, Cronnell, & Verna, 1972). Both AAE and MAE speakers omitted past tense markers or spelled them phonetically (laughed = laft), omitted or added es to plurals, and substituted “f” for “th.”

The one exception was present progressive –ing that was only omitted or spelled as it is spoken with an “n” (i.e., kickn) by nonmainstream speakers. All of the MAE speakers spelled the –ing morpheme conventionally.

Similar to Terry (2006), errors on the past tense –ed feature occurred most often (8% of all errors; 43% were omissions) and is of interest since previous research shows that the dialect feature of zero marking of the simple past occurs at very low rates (less than 10%) by typically developing 6-year-old AAE speakers (Craig & Washington, 2004; Lee & Oetting, 2014; Washington & Craig, 1998). In the current study, 1st and 2nd graders produced the spelling equivalent of zero marking (i.e., omission) at a rate of 43%. It is difficult to draw conclusions
with such a small sample size and with a limited number of past tense words on the test. However, if this finding is replicated by a larger study, this dialect-specific feature (which may be described as zero marking of past tense or as final consonant cluster reduction) may persist in spelling longer than it does in spoken language.

A fine-grained analysis of semiphonetic spelling attempts (i.e., Gentry’s spelling stage where not all phonemes are represented in the spelling) was used to evaluate patterns of differences on the TWS-4. The analysis used phonological processes to categorize these errors. While considerable individual variation occurred across subjects, these differences did not correlate with variations in dialect usage. Errors affecting syllable structure, particularly cluster reduction, weak syllable deletion, epenthesis, and metathesis, accounted for the majority of errors produced on the test. Cluster reductions were the most common errors across dialect categories and grade levels (8.7% of total errors), occurring on one-syllable words at the lower grades and in polysyllabic words by 3rd grade. This rate is significantly lower than the reported rates of occurrence by AAE speakers in their oral productions (Craig et al., 2003) and on tests of nonword spelling (Kohler et al, 2007). Weak syllable deletions occurred more for older subjects because they attempted a greater number of complex words before reaching a ceiling. These findings are consistent with Hoffman and Norris (1989) and suggest that the phonological process errors are not “outgrown” but appear on more difficult words as students attempt an unknown spelling.

Overall, it seems that the changes in error patterns for words on the DSST and TWS-4 reflected higher stages of developmental spelling since the students were no longer dropping suffixes and produced fewer phonological processes. Their spellings were more indicative of the transitional stage of spelling (Gentry, 1982) because the errors were more phonetic in nature (e.g.
laughed = laft), vowels were present in every syllable, words were spelled utilizing combinations of vowels and consonants instead of represented with single letters, and morphological features such as plural and third person singular –s and the gerund were produced with greater accuracy. These findings suggest that in terms of spelling ability, AAE should not be considered an immature language variety.

**Theoretical Implications**

Although this study did not test a theory, its findings lend themselves to discussion in existing theories of spelling and dialect usage. As a whole, the study of spelling receives considerably less attention than the study of reading. Because of this fact, few studies and theories provide explanations pertaining to the influence of nonmainstream dialect usage and spelling skills. Current theories of spelling development, including those that take a phonological perspective, statistical learning perspective, or a constructivist perspective (Ehri, 1989, 1991; Ferreiro, 1990; Gentry, 1981, 1982; Sulzby, 1985; Treiman, Kessler, & Bourassa, 2001) make no mention of dialect-related spelling effects in the hypotheses and stages they posit. In conjunction with previous findings (e.g., Dickerson, 2008; Kohler et al., 2007; Terry, 2006; Terry & Connor, 2010), the current study provides evidence that nonmainstream dialect speakers’ spelling skills are influenced by their dialect usage.

To date, no studies indicate that nonmainstream dialect speakers are more likely to have a spelling deficiency. The current study in particular shows that although spelling accuracy is lower for 1st graders with high dialect density, this is not an indicator of long term spelling deficits. With regards to Gentry’s (1981, 1982) theory, the findings of the current study suggest that AAE speakers may have difficulty with learning the spelling conventions of MAE during the first years of school due to the mismatch between the AAE and MAE phonological and
morphological systems. They may produce errors indicative of the earlier stages (i.e.,
semiphonetic and phonetic) at higher rates or slightly longer than their MAE counterparts.
However, as they mature and are exposed to more MAE in the classroom, the mismatch appears
to diminish (Charity et al., 2004; Labov, 1972) and they become better spellers with their
spelling patterns becoming more indicative of the transitional stage. Alternatively, they may
become more efficient handlers of the mismatch once they become better spellers.

The children’s abilities to become better spellers after more exposure to MAE (while
likely remaining AAE speakers in the home environment) suggest that their metalinguistic
abilities may have improved over time. Thus, the findings from this study also have implications
for another hypothesis in the literature: the linguistic awareness/dialect awareness hypothesis
(Charity et al., 2004). This hypothesis is fairly new and certainly requires more testing for
clarification. It argues that the difficulties with literacy achievement faced by many children who
speak nonmainstream dialects are a result of the differences between their home dialect (i.e.,
nonmainstream) and their school dialect (i.e., MAE). It suggests that some children are more
aware of the differences between the dialects, while others are not. The number of
nonmainstream dialect features a child uses in situations that warrant MAE use (e.g., test taking,
reading, writing) may be a sign of their metalinguistic skills. Students with good metalinguistic
skills may recognize the mismatch between MAE and their nonmainstream dialect, and
subsequently demonstrate less difficulty with literacy skills (Charity et al. 2004, Terry et al.,
2010; 2012). They are better able to judge when it is appropriate to use nonmainstream forms
versus mainstream forms.

The findings from this study could be interpreted as indirectly supporting (or at least
being consistent with) the linguistic awareness/dialect awareness hypothesis. For example, by 3rd
grade, the African American children from the low SES school demonstrated lower DVAR scores and language variation status of MAE. Their 1\textsuperscript{st} grade counterparts had higher DVAR scores and language variation status of strong variation from MAE. It is likely that the 3\textsuperscript{rd} graders continued to speak AAE at home with their friends and family members. After several more months of exposure to MAE in the school setting via reading, writing, and oral language tasks (including conversations with teachers and MAE speaking classmates) the 3\textsuperscript{rd} grade students may have become more aware of their own speech patterns and the mismatch it had with MAE. Therefore, they became aware of when it is appropriate to utilize MAE forms. This is obvious in their performance on the TPAT-2, the DELV-ST, and accuracy on the TWS-4. Though the nature of the relationship between dialect usage and spelling remains unclear, the findings from the current study imply that with more MAE exposure and dialect awareness, metalinguistic skills and spelling accuracy have potential to improve.

**Educational and Clinical Implications**

The results of this study do not lend support for any particular teaching or therapy strategy that can be used to improve the spelling skills of AAE speakers; however it does suggest that focus on mismatches between spoken language and spelling during the early years of schooling (1\textsuperscript{st} grade particularly) may be warranted. The results of this study by no means suggest that nonmainstream dialect usage reflects a language disorder or increases the potential for a spelling disorder to develop. They do suggest that it is very important to keep nonmainstream dialect usage in mind when developing teaching and therapy strategies for children who speak nonmainstream dialects of English, especially at young ages before they become proficient spellers. Strategies such as direct spelling instruction (Pittman, 2007) and
increasing MAE exposure while highlighting MAE features during literacy activities may be beneficial to spelling ability.

It is also important for teachers and clinicians to be cognizant of their nonmainstream dialect speakers’ metalinguistic abilities to make informed judgments in terms of literacy instruction and therapy. The current study suggests that dialect usage and spelling may be an additional measure of metalinguistic skill in these children. Concerns should definitely be shown for students that are not aware of dialect differences and are unable to demonstrate age-appropriate metalinguistic skills. These are the students who are more likely to demonstrate reduced literacy achievement relative to their same dialect-speaking peers and who might benefit from additional literacy instruction (Committee on the Prevention of Reading Difficulties in Young Children, 1998).

Limitations & Future Research

Although the results of the present study provide evidence that nonmainstream dialect usage influences 1st, 2nd, and 3rd graders’ spelling, it is not without limitations that could potentially affect generalizability of the results. These limitations need to be addressed in future research. First, the sample size was small, with a total of 24 participants. Also, there were few participants representing each grade level, school setting, SES, race, gender, and language variation status. Future studies need to include more participants to ensure that the sample size is more indicative of the population. Due to the limited sample size, it was impossible to compare group means on the tasks; therefore this study was strictly correlational. Additionally, participant recruitment was constrained to only two schools and this limited the number and diversity of participants. Future studies may find greater diversity from recruitment at more schools in the local area.

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With regards to the tasks chosen to assess the participants’ spelling skills, it is important to note that few dialect-specific features were examined, and there are several more that could be of interest, such as those involving vowels (e.g., i/e substitution, neutralization of diphthongs) and /r, l/ vocalization. Rickford (1999) showed that the phonetic environment of a verb affects the rate of its zero marking in AAE dialect. For example, he showed that zero marking of simple past tense occurred more in environments of the [t] or [d] allomorphs (like those used in the current study), and less in environments where the word ended in a vowel or glide (e.g., cried), or those containing the [ə/d] allomorph (e.g., parted). Thomas and Bailey (2015) suggested that zero marking is higher when the consonant before the –ed is a stop or if the –ed is followed by a consonant versus a vowel. Thus, word lists for future examinations should be constructed with these variables, and other potential influences in mind. It is also important that test items that aim to target AAE morphological features do not overlap with those that might be influenced by AAE phonology (and vice versa). For example, some errors on past tense –ed test items could be classified as consonant cluster reduction (e.g., laugh for laughed because the reduction of the /ft/ to /f/).

Also, the analysis of spelling errors on the TWS-4 and DSST word lists was completed independent of each other. Due to the findings that 1) some dialect-specific AAE features overlap with phonological processes (e.g., consonant cluster reduction) and 2) phonological process patterns were produced on the DSST words, future studies should utilize a single word list and apply both analyses to all spellings. For example, the response KITINEN for kicking could be coded as containing the phonological process of fronting (i.e. t for ck) and dialectal error of reduction of present progressive –ing (i.e., n for ing). Also, the response THNIK for
thinks could be coded as containing the phonological process of metathesis (i.e., the n and i are repositioned) and a dialect-specific consonant cluster reduction of ks.

Lastly, a causal relationship is unable to be derived from the results of the current study because the analyses relied on correlations. Future studies should focus on the effects of spelling interventions in order to contribute to our understanding of children’s nonmainstream dialect usage and spelling accuracy. Keeping in mind the concepts of dialect awareness, metalinguistic skills, and parental involvement, an interesting next step would be to investigate the effects of increased exposure to MAE forms at home (via structured joint book reading with a caregiver) on spelling. A study of this nature could potentially provide the field with valuable insight into techniques that can be used to facilitate spelling, reading, and/or dialect/metalinguistic awareness (MAE vs. AAE vs. other dialects spoken on television and in the community) outside of the classroom.

Conclusion

Examinations of spelling allow us to learn more about children’s literacy skills, especially print awareness and phonological awareness. To date, little research exists that examines the link between nonmainstream dialect use and school-aged children’s spelling skills. The results of this study add new evidence to the literature by illustrating a relationship between nonmainstream dialect density and children’s spelling skills on a standardized spelling test (i.e., TWS-4). Regardless of the type of school attended and the children’s SES, the children’s age and their nonmainstream dialect density proved to be the most important factors of their spelling accuracy. Children who utilized more features of AAE scored lower on the DSST and TWS-4. Furthermore, there was a trend for spelling accuracy to improve from 1st to 3rd grade on both the DSST and TWS-4, and the children’s nonmainstream dialect usage also decreased from 1st to 3rd
grade. However, consistent with previous studies (e.g., Dickerson, 2009) qualitative analysis of errors on the DSST revealed both non-dialectal developmental errors and nonmainstream dialect-related errors primarily produced by 1st and 2nd graders with no significant differences between AAE and MAE dialect speakers. Lastly, although the children’s phonological process patterns were not related to their nonmainstream dialect usage, their performance was consistent with previous research that indicates that children seem to produce more errors with more challenging words (Hoffman & Norris, 1989). Thus, regardless of nonmainstream dialect usage, the children in the current study produced phonological process errors as words on the TWS-4 became longer and contained more complex orthographic patterns and irregular spellings. Taken together, these findings indicate the necessity for continued research to investigate the relationships between children’s development of spelling and their nonmainstream dialect use.
REFERENCES


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APPENDIX A
IRB APPROVAL FORM

ACTION ON PROTOCOL APPROVAL REQUEST

TO: Janet Norris
    COMD

FROM: Dennis Landin
      Chair, Institutional Review Board

DATE: November 6, 2014

RE: IRB# 3565

TITLE: Examination of Spelling Patterns Produced by Elementary School-Aged Students


Review type: Full ___ Expedited X ___
Review date: 11/6/2014

Risk Factor: Minimal ___ X ___ Uncertain ______ Greater Than Minimal ______

Approved X ___ Disapproved ______

Approval Date: 11/6/2014 Approval Expiration Date: 11/5/2015

Re-review frequency: (annual unless otherwise stated)

Number of subjects approved: 200

LSU Proposal Number (if applicable): __________

Protocol Matches Scope of Work in Grant proposal: (if applicable) ________

By: Dennis Landin, Chairman ____________

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU’s Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of any change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
8. SPECIAL NOTE: *All investigators and support staff have access to copies of the Belmont Report, LSU’s Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.lsu.edu/irb
APPENDIX B
PARENTAL CONSENT FORM

Project Title: Examination of Spelling Patterns Produced by Elementary School-Aged Students

Performance Site: East Baton Rouge Parish Elementary Schools

Investigators: The following investigators are available for questions, M-F, 8:00 a.m. – 4:30 p.m.
Dr. Jan Norris, COMD, Louisiana State University, 225-578-3936
Lindsay Meyer Turner, COMD, Louisiana State University, lindsaymeyer571@gmail.com

Purpose of the Project: Your school and Louisiana State University are working together to understand how children from different language backgrounds speak and write words. This project will examine the spelling patterns produced by children who speak Standard American English (SAE) and African American English (AAE) dialects. This type of information is important as we look for ways to help improve children’s spelling, writing, and reading skills in school and on statewide assessments.

Inclusion Criteria: 1st, 2nd, and 3rd graders will be included. Students must 1) speak English as their first language, 2) have normal hearing and vision (may be corrected with glasses) as reported by the school nurse, 3) receive instruction in a regular education classroom, 4) have no history of repeating a grade, and 5) have average language skills.

Exclusion Criteria: Students who 1) learned English as a second language, 2) having a hearing impairment or uncorrected vision impairment, 3) receive instruction in a special education classroom, or 4) have repeated a grade will be excluded. Also, students that score below average on a language test at initial testing will be excluded.

Description of the Study: The purpose of this study is to describe the spelling patterns produced by 1st, 2nd, and 3rd grade students who speak SAE and AAE. An additional purpose is to determine if these patterns are different between the dialects and if the patterns change from grade to grade

Your child will be given tests for language, phonemic awareness, dialect, and spelling. All tests will be given individually except for the spelling tests. The spelling tests will be given in groups of 5 or 6 in the same manner as the student’s weekly spelling test (word presented, followed by a sentence with the word, and the word presented again).

Benefits: Spelling is an important part of students’ literacy skills and affects the areas of reading and writing. The test performance of students in this study will help us to better understand how young children learn to spell and if (and how) dialect differences influence spelling skills. This study will also help us to learn more about the differences in dialect shown in students’ spellings in multiple grades.

Risks: There are no known risks.
Right to Refuse: Participation is voluntary and a child will become part of the study only if both child and parent agree to the child’s participation. At any time, either the participant may withdraw from the study or the participant’s parent may withdraw them from the study without penalty or loss of any benefit to which they might otherwise be entitled.

Privacy: We will use data collected to examine and describe the spelling patterns of the students. Investigators may review the school records of participants in this study. Your child’s name will not be shared with anyone. We will anonymously enter the test scores into a file for statistical analysis. Results of the study may be published, but no names or identifying information will be included for publication. Subject identity will remain confidential unless law requires disclosure.

Financial Information: There is no cost for participation in the study, nor is there any compensation to the subjects for participation.

The study has been discussed with me and all of my questions have been answered. I may direct additional questions regarding study specifics to the investigator. If I have questions about subjects’ rights or other concerns, I can contact Dr. Dennis Landin, Chairman, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. I will allow my child to participate in the study described above and acknowledge the investigator’s obligation to provide me with a signed copy of this consent form.

Child’s Name: ___________________________ DOB: ___________________ Grade: __________

Parent’s Signature: _______________________________ Date: ______________________

The parent/guardian has indicated to me that he/she is unable to read. I certify that I have read this consent form to the parent/guardian and explained that by completing the signature line above he/she has given permission for the child to participate in the study.

Signature of Reader: _______________________________ Date: ______________________

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb
APPENDIX C
ASSENT FORM

Project Title: Examination of Spelling Patterns Produced by Elementary School-Aged Students

Performance Site: East Baton Rouge Parish Elementary Schools

I, _________________________, agree to be in a study to learn how children say and write words. I will have to do work with the testers. I will allow my teacher and the testers to share my papers and test scores with people from Louisiana State University, but my name will not be used. I have to follow all of the classroom rules and do all of my work. I can decide to stop being in the study at any time without getting in trouble.

Child’s Signature: _____________________________________________

Child’s Age: ________ Date: ______________

Witness:* ____________________________________________ Date: ______________

*(N.B. Witness must be present for the assent process, not just the signature by the minor.)

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu | lsu.edu/irb
APPENDIX D
PARENT QUESTIONNAIRE

Dear Mom and Dad,

Please complete and return this to your child’s school along with the attached (and signed) consent form. THANK YOU SO MUCH!

Child’s Date of Birth: _______________
Child’s Grade: ________ Gender: (circle one) Male Female
Child’s Teacher: ___________________________

Parent’s Marital Status:  Married Separated Divorced Never Married

Mom’s Last Grade Completed: ______________
Mom’s Occupation: _________________________
Dad’s Last Grade Completed: ______________
Dad’s Occupation: _________________________

Does your child have normal hearing? YES NO
Does your child have normal vision? YES NO
If no, does he/she wear glasses? YES NO

Is your child currently receiving speech therapy? YES NO
Has your child received speech therapy in the past? YES NO
If yes, when? _________________________

Is English the first language your child learned? YES NO
Are other languages spoken at home? YES NO
If yes, what language(s)? _________________________

Does your child receive free or reduced lunch? YES NO
Does your child enjoy reading books? YES NO
Does your child enjoy reading books alone? YES NO
Does your child enjoy being read to? YES NO

How much time does your child read alone every day? ______________
How much time do you read to your child every day? ______________
APPENDIX E
DIALECT SENSITIVE SPELLING TEST

1. The children *laughed* at the clown.
2. He *smiled* when his mother came home.
3. The girl *dropped* her book on the floor.
4. Everyone *smelled* the onions in the room.
5. He *hates* when they are yelling.
6. She *rides* horses after school.
7. He *misses* his friends a lot.
8. He *thinks* I am moving away.
9. Mom cut my *nails* again.
10. Dad put my *shirts* in the washing machine.
11. He threw the *rocks* outside the window.
12. The *roses* are red and pink.
13. I *think* I need to take a nap.
14. He forgot to *thank* his sister.
15. Mom told me to take a *bath*.
16. *Math* is my favorite subject.
17. We saw *them* at the store yesterday.
18. The cars are parked over *there*.
19. *Bathe* the dogs after dinner.
20. *Those* bananas are not ripe.
21. The dog is *sleeping* on the couch.
22. Mom loves to go *shopping*.
23. Her brother is *kicking* the ball.
24. *Dancing* is her favorite thing to do.
25. Put your *plate* in the sink.
26. Everyone loves to get a *treat*.
27. The *fruit* is in the refrigerator.
28. *Write* your name on your paper.
29. She has a pretty *braid* in her hair.
30. My sister made a good *grade*.
31. I am *glad* everyone came to dinner.
32. The *slide* was too wet to ride.

Underlined words are the test words. Bolded graphemes indicate phonological or morphological AAE features. In this list, the words are grouped by AAE feature; however for testing the list will be randomized before presentation.
Lindsay Meyer Turner received her Bachelor of Arts degree in Elementary Education from Millsaps College in 2002. Upon graduation, she taught 3rd grade students in Jackson, Mississippi. She received her Masters of Education in Elementary Education from Southern University and subsequently entered the doctoral program at Louisiana State University in 2006. During her doctoral program, she worked as research assistant, teaching assistant, and laboratory manager for the Spoken Language Processing Laboratory from Spring 2007 through Spring 2011. Lindsay began her clinical fellowship at Baton Rouge General Pediatric Rehabilitation Center in July 2011 and received her Certificate of Clinical Competence from the American Speech-Language-Hearing Association in 2013. She also received her Masters of Arts in Communication Sciences and Disorders from LSU in May 2013. Currently, Lindsay is a pediatric speech-language pathologist at Baton Rouge General Pediatric Rehabilitation Center. She has 4 years of experience and she specializes in pediatric feeding/swallowing disorders, autism spectrum disorders, and early intervention. She anticipates receipt of the Doctorate of Philosophy at the August 2015 commencement.