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Language and Literacy Multilevel Constructs in Young Nonmainstream American English Speakers: Examining Relationships between Latent Variables

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This dissertation, LANGUAGE AND LITERACY MULTILEVEL CONSTRUCTS IN YOUNG NONMAINSTREAM AMERICAN ENGLISH SPEAKERS: EXAMINING RELATIONSHIPS BETWEEN LATENT VARIABLES, by SOURAYA MANSOUR MITRI, was prepared under the direction of the candidates Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the Doctor of Philosophy in the College of Education, Georgia State University.

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ABSTRACT
LANGUAGE AND LITERACY MULTILEVEL CONSTRUCTS IN YOUNG
NONMAINSTREAM AMERICAN ENGLISH SPEAKERS: EXAMINING
RELATIONSHIPS BETWEEN LATENT VARIABLES
by
Souraya Mansour Mitri
According to the National Assessment of Education Progress (NAEP, 2013),

children from race and language minority groups continue to perform significantly lower

than their peers on reading achievement tests. Current perspectives suggest that multiple

factors (e.g., household income, parent education) likely contribute to the achievement

gap between African American children and their White peers and children from low

income and middle income households (Barton & Coley, 2010; Chatterji, 2006; Jencks &

Phillips, 1998), leading to multiple approaches (e.g., Head Start Early Reading First) to

prevent or alleviate the trend (Barnett, Coralon, Fitzgerald, & Squires, 2011). However,

African American children continue to perform lower than their White peers, and

continue to be over-represented in special services. It has become increasingly important

to understand the contributors to early reading development among African American

children. The purpose of this study was to provide a descriptive view of early language

and literacy among typically developing children in prekindergarten who speak

nonmainstream American English at child and classroom levels. Approximately 673

typically developing children in 95 prekindergarten classrooms were included in this

study from a larger cross-sectional study. Results support a model with language,

literacy, and dialect as separate constructs at the child level while language and literacy

as one construct and dialect as the second construct at the classroom level. Language and

literacy were highly related but distinct at the child level but perfectly correlated at the

classroom level. The dialect construct was moderately and negatively related to language and literacy at both levels.

Keywords: Oral Language, Nonmainstream American English, African American, Literacy.

LANGUAGE AND LITERACY MULTILEVEL CONSTRUCTS IN YOUNG
NONMAINSTREAM AMERICAN ENGLISH SPEAKERS: EXAMINING
RELATIONSHIPS BETWEEN LATENT VARIABLES

by

Souraya Mansour Mitri

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ABBREVIATIONS

SEM	Structural Equation Modeling
K-12	Kindergarten through 12th Grade
NAEP	National Assessment of Educational Progress
NCES	National Center for Education Statistics
NIEER	National Institute for Early Education Research
Pre-K	Pre-Kindergarten
SES	Socio-Economic Status
MAE	Mainstream American English
NMAE	NonMainstream American English
AAE	African American English

CHAPTER 1

INTRODUCTION

Statement of Problem

A vast body of literature informs us about how children learn to read, yet many

children in United States face challenges in becoming proficient readers. According to

The Condition of Education report, more than one-third of fourth graders are not

proficient in reading (Aud et al., 2012). The struggling fourth graders have difficulty

understanding the meaning of words, making inferences, and identifying interpretations

and conclusions in texts (Aud et al., 2012). Furthermore, despite the federal mandate by

the No Child Left Behind Act of 2001 to close the achievement gap, the most recent

National Assessment of Educational Progress report (NAEP, 2013) indicates that children

from race and language minority groups continue to perform significantly lower than

their peers on reading achievement tests, with 51% of Latino and 49% of African

American students performing below the basic reading level while only 22% of White

students performed at this level. White students outperformed their African American

peers by 13%, a 25 point gap in scores reflecting the difference between reading at Basic

Level and Below Basic Level (NAEP, 2013). This general difficulty with academic

achievement is referred to as the Black-White achievement gap. This kind of evidence for

an achievement gap between African American children and their White peers and

children from low income and middle income households has been well documented and

studied, yet continues to be a recurrent issue in education (Barton & Coley, 2010;

Chatterji, 2006; Jencks & Phillips, 1998; Ladson-Billings, 2006; Lewis, Hancock, James,

& Larke, 2008; Lindo, 2006; Talbert-Johnson, 2004). Current perspectives suggest that

multiple factors likely contribute to the achievement gap, leading to multiple approaches to prevent or alleviate the trend (e.g., Barton & Coley, 2010; Barnett et al., 2011; Vanneman, Hamilton, Baldwin Anderson, & Rahman, 2009). . One popular approach the provision of early intervention programs that target children at-risk for reading difficulties. Early learning programs such as Head Start Early Reading First and other federally and state funded preschool programs have focused on providing children with high quality language and literacy instruction so that they can be successful as they enter kindergarten (Barnett et al., 2011). However despite these efforts to provide educational resources, many children still begin school less prepared than their peers; the achievement gap remains present even in kindergarten (Barnett et al., 2011).

Seminal studies, government reports, and empirical studies have outlined several factors that could be contributing to the achievement gap. These factors include but are not limited to family income (e.g., Neuman, 2008; NAEP, 2011), test bias (e.g., Charity et al., 2004; Washington, 2000), access to quality schools, teachers, and instruction (e.g., Hamre & Painta, 2005; Howes et al., 2008), negative attitudes towards language differences (e.g., spoken dialect variation) (e.g., Labov, 1995; Washington & Craig, 2001), and underdeveloped early literacy skills (e.g., Morrison, Bachman, & Connor, 2005; Terry, 2008, 2010, 2012). The current study focused on early language and literacy skills, spoken dialect variation, as well as factors from children's home and classroom environment. Research findings suggest that a better understanding of the various factors that contribute to early literacy skills is needed in order to find effective strategies to close the achievement gap before formal schooling. This is an important step since

research demonstrates that achievement in early years has long lasting effects (Ladson-Billings, 2006; Scarborough, 2001)

It is important to consider the role early language and literacy skills among preschoolers. Research evidence demonstrates that children enter school with a range of developing skills that are precursors to reading and writing, including vocabulary, phonological awareness, alphabetic knowledge, letter-sound knowledge, narrative knowledge, and spelling (e.g., Lonigan, et al., 2008; McCardle, Scarborough, & Catts, 2001; Snow, Griffin, & Burns, 2005; Whitehurst & Lonigan, 1998). Multiple models have been proposed to depict early literacy skills (e.g., Lonigan, Burgess, & Anthony, 2000; Washington & Lonigan, 1998). Several theories have been proposed to explain how early literacy develops among preschoolers. One such perspective is the work by Senechal, LeFevre, Smith-Chant, and Colton (2001) who suggest that early literacy is comprised of at least three major constructs, oral language (e.g., vocabulary), literacy knowledge (e.g., alphabetic knowledge), and metalinguistic skills (e.g., phonological awareness). Figure 1 provides visual representation of the different constructs and variables. The conceptual framework was selected because it provides a comprehensive description of constructs underlying early literacy and because empirical evidence has shown that separating early literacy skills into three constructs as suggested by Senechal et al. (2001) better explains the development of the skills in comparison to one or two constructs (Lonigan et al., 2000; Senechal et al., 2001; Whitehurst et al., 1994).

Oral Language	Literacy Knowledge	Metalinguistic Skills
• Vocabulary • Narrative knowledge • Knowledge of the world	• Conceptual knowledge • Procedural knowledge • Functions of print • Alphabetic knowledge • Letter-sound knowledge • Phonetic spelling • Perception of self as the learner	• Phonological awareness • Syntactic awareness
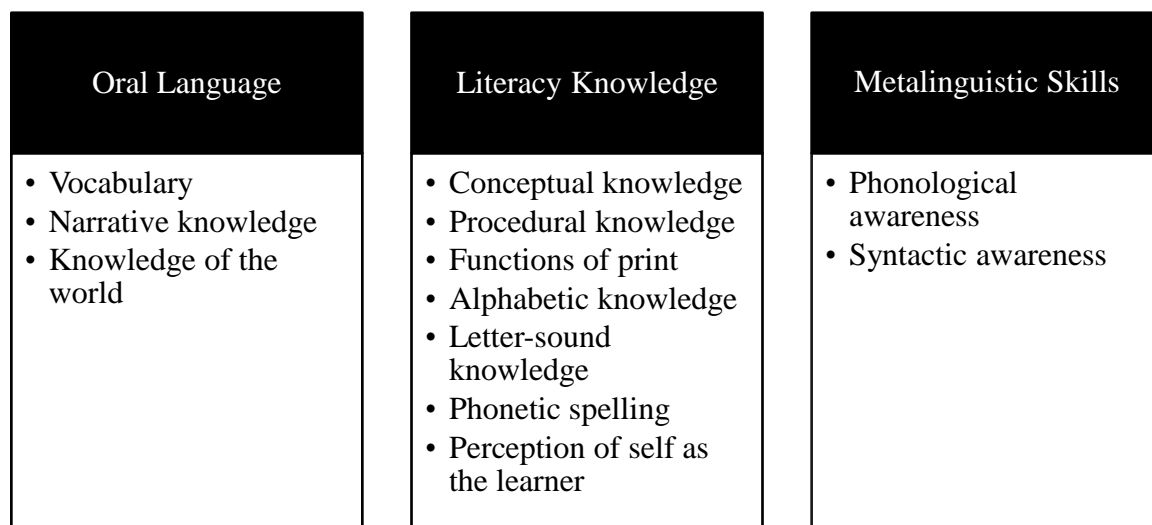
Figure 1. Early Literacy in Preschoolers (Senechal, LeFevre, Smith-Chant, & Colton, 2001)

Moreover, since literacy and reading continue to develop over time, it is important to consider conventional reading. Several theories have been proposed over the past 50 years to explain the process of reading acquisition in children and how the different skills are acquired. One perspective on conventional reading is the componential model of reading (CMR) proposed by Joshi and Aaron (2000, 2008, 2012). Researchers suggest that reading can be explained by three domains among children in kindergarten through 4th grade (Chiu et al., 2012; Oritz et al., 2012; Saez et al., 2012). Joshi and Aaron define the domains as cognitive (e.g., word recognition), psychological (e.g., motivation and interest), and ecological (e.g., teacher expectations). These domains have not been applied to preschoolers but could inform how they develop early literacy skills while explicitly considering dialect variation. Figure 2 provides a visual representation of the CMR.

Cognitive Domain	Psychological Domain	Ecological Domain
• Word recognition • Comprehension	• Motivation and interest • Teacher expectations • Gender differences • Other factors	• Dialect variation • Teacher knowledge • Home environment • Other factors
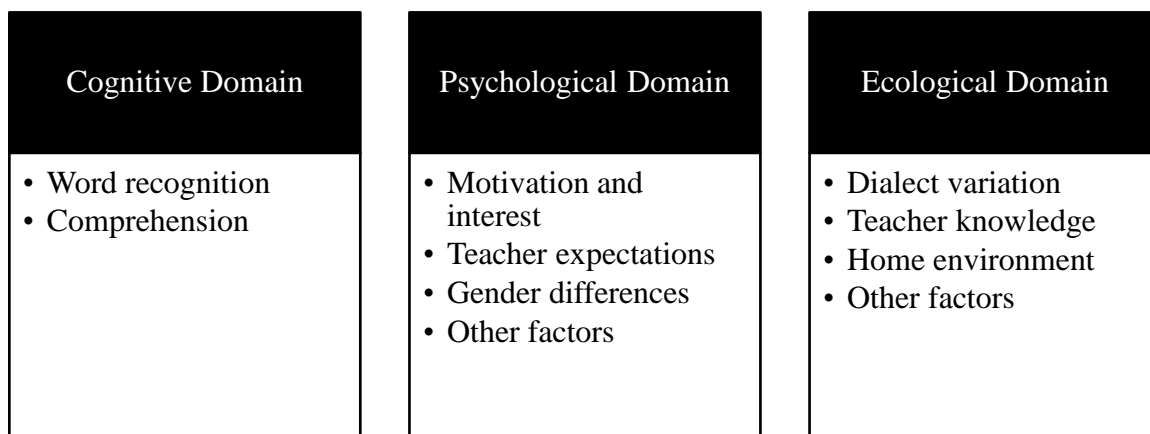
Figure 2. Componential Model of Reading (Joshi & Aaron, 2000; Oritz et al., 2012)

This conceptual framework was selected because it provides a comprehensive model that includes various factors across the three domains that have been shown to contribute to reading acquisition. It is also the first model that attempts to account for dialect variation in the development of reading skills. However, in this model, dialect variation is considered part of the ecological domain suggesting the variable is descriptive rather than a measurable production or skill. The CMR also addresses contextual effects that could influence success in reading by considering teacher knowledge and home environment. Available empirical research supports the effect of contextual effects on success in reading. For example, teachers' process qualities, the provision of supportive interactions, routines, and learning opportunities, were found to be related to gains in language and literacy of young children (Curby et al., 2009; Dickinson & McCabe, 2001; Hamre & Painta, 2005; Howes et al., 2008; Mashburn et al., 2008). Another example is the finding that parent activities such as book reading, that focus on meaning, have been shown to promote oral language development in children (Britto, Brooks-Gunn & Griffin, 2006; Raikes et al., 2006; Sylva et al., 2011).

A factor of considerable interest recently is dialect variation, as many African American children and children from low SES households speak Nonmainstream American English (NMAE) and NMAE features do not generally align well with Standard English orthography (e.g., Wolfram & Schilling-Estes, 2006).Dialects are variations of a language that reflect a group of people that share a geographic location or social background (Wolfram, Adger, & Christian, 1999). When a person's speech does not conform to the standard (e.g., Mainstream American English, MAE), then it is considered a variation and has been alternatively referred to as nonstandard, nonmainstream or vernacular American English (Green, 2000; Wolfram et al., 1999). Features of nonmainstream dialects of American English have been extensively studied and documented, including African American English (AAE; Charity, Scarborough, & Griffin, 2004; Craig &Washington, 2004b; Craig &Washington, 2006; Horton-Ikard & Miller, 2004; Oetting & Garrity, 2006; Oetting & Pruitt, 2005), Southern American English (SoAE; e.g., Oetting, Cantrell, & Horohov, 1999), Creole English (e.g., Oetting & Garrity, 2006), and Latino English (e.g., Gutierrez-Clellen, & Simon-Cereijiodo, 2007; Wolfram, Carter, & Moriello, 2004). African American English (AAE) is a unique example of a nonmainstream dialect because AAE patterns are relatively uniform across the United States (Labov, 2010). Research evidence suggests that most African American students use patterns of AAE in their speech when they enter school (Pearson, Connor, & Jackson, 2013; Wolfram & Schilling-Estes, 2006; Washington & Craig, 1994; Washington, Craig, & Kushmaul, 1998). For the scope of this study, although the children who will be considered for the study are African American, the dialect

production will be described as NMAE, not AAE, since the children will be residents of a Southeastern metropolitan city and may produce some SoAE features.

Researchers have been investigating the relationship between frequency of dialect produced and literacy skills for at least three decades (Siegel, 1999). There has been a recent resurgence in research on NMAE speakers and the relationship between their oral language skills and reading outcomes. There is emerging converging evidence of significant concurrent and predictive relations between NMAE dialect use and several oral language and literacy skills in developing readers including vocabulary, letter-sound recognition, spelling, and alphabet knowledge (e.g., Charity et al., 2004; Connor & Craig, 2006; Craig & Washington, 2004a; Craig, Zhang, Hensel, & Quinn, 2009; Terry, 2012; Terry, Connor, Thomas-Tate, & Love., 2010; Terry, Connor, Petscher, &Conlin, 2012; Terry & Scarborough, 2011). These findings suggest that researchers and educators should consider the contribution of NMAE production to developing language and literacy skills. However, it remains unclear what the role of dialect is when multiple oral language and literacy skills are considered at the child and classroom level, particularly when other contextual contributors (e.g., family income, classroom environment) are considered.

One way to investigate the role of dialect while considering multiple language and literacy skills for children nested within a classroom structure is through multivariate and multilevel statistical approaches. Although relatively new to educational research, multivariate (e.g., Anthony, Solari, Williams, Schoger, & Zhang, 2009; Anthony et al., 2011; Berninger, Abbott, Vermeulen, & Fulton, 2006; Wise et al., 2007) and multilevel models (e.g., Branum-Martin et al., 2006; Branum-Martin, Foorman, Francis, & Mehta,

2010; Mehta, Foorman, Branum-Martin, & Taylor, 2005) have produced seminal findings on the nature of literacy development and achievement. Yet, the vast majority of research on language and literacy in NMAE speakers has used univariate models in which only one dependent variable is investigated, revealing how the variables correlate or how some skills can predict one of the skills at either the child or the classroom level (i.e., unilevel models).

Multivariate and multilevel approaches to investigating the nature of language and literacy have been reported in the literature. For example, Mehta et al. (2005) examined the concept of language and literacy among urban first to fourth grade children, finding that language and literacy skills are better conceptualized as two separate unitary multilevel constructs in that population at the child level. The authors also found that language and literacy were perfectly correlated at the classroom level. Branum-Martin and colleagues demonstrated that the classroom context has complex effects on reading of bilinguals. For example, Branum-Martin et al. (2006) found that cross-language effects varied across classrooms due to instruction and clustering of students. Moreover, Branum-Martin et al. (2010) examined student- and classroom-level differences in reading skills of bilinguals in 1st grade by considering the effect of reading instruction in the multilevel models. The authors found that there were large program and locale differences, providing further evidence for the significance of acknowledging clustering of children in classrooms and schools.

To date, no research has examined whether children's early language and literacy skills exist under one or more constructs (i.e., examining the interrelatedness of multiple between and within sets of variables) for pre-K NMAE speakers. This study examined

whether language and literacy were separable latent constructs in pre-K NMAE speakers and aimed to reveal more about the inherent structures and meaning among the variables. The early language and literacy skills of African American children who speak NMAE might have a unique composition, and this investigation might reveal unique relations among the skills.

In addition, no study has successfully represented spoken dialect as an unobserved latent variable (construct). This study investigated the nature of spoken dialect variation and how it could relate to the language and literacy constructs. The investigation could clarify the relationship between NMAE produced and children's language and literacy skills while also taking into account classroom and home literacy effects. Numerous empirical studies have established a relation between NMAE produced and oral language and literacy skills at the student level (e.g., Charity et al., 2004; Connor & Craig, 2006; Craig & Washington, 2004a; Craig et al., 2009; Terry, 2006, 2012; Terry & Connor, 2012; Terry et al., 2010, 2012).

Finally, the investigation took into account classroom clustering. Preschool classrooms play an important role in children's oral language and literacy development (Barnett et al., 2011; Howes et al., 2008; Mashburn et al., 2008), therefore, contextual effects are important to consider. No research study has investigated the relationship between dialect, language, and literacy skills at the classroom level. This study will add to the existing literature by considering how teachers and home literacy might be related to multiple oral language and literacy measures, including spoken dialect use.

Purpose of Study

In sum, children enter school with a variety of language and early skills that play a crucial role in later reading and literacy development. Variation in early language and literacy skills is worthy of investigation because findings can contribute to more comprehensive models of reading development and instruction. This is particularly important for African American children who speak NMAE as they are often at risk for later reading failure. Thus, the purpose of this study was three-fold. First, this study aimed to provide a priori hypotheses about the structure of early language and literacy skills and dialect among young children who spoke a variation of NMAE based on prior theory and measurement ideas under the influence of classroom structuring. The second aim was to examine the influence of hypothetical constructs on multiple oral language, literacy, and dialect predictors among NMAE speakers. The third aim of this study was to investigate the role of teachers and home literacy habits in the relation between dialect and oral language and literacy skills (i.e., which of the seven proposed models is the best fit). Answering these questions might provide more insight to how high quality early education might positively impact early literacy skills of NMAE speakers such that they can be better equipped when learning to read and write in school. In sum, the following questions were addressed among typically developing pre-kindergartners who speak NMAE:

1- What is the nature of the language construct and literacy construct at the a) child level and the b) classroom level?

2- How does spoken dialect use relate to these language and literacy constructs at the a) child level and the b) classroom level?

3- How do classroom observations relate to classroom level outcomes?

4- How do home literacy observations relate to child level outcomes?

Overview of Study

The research questions posed in this study were addressed using a sequence of multilevel structural equation models. Seven multivariate, multilevel models were proposed and tested using multilevel confirmatory factor analyses in an effort to identify the most appropriate model for the population. In order to address these questions, measures of oral language and literacy were used to look at child level and classroom level effects. Two spoken dialect measures were used to determine the relation between dialect and language and literacy skills at the child and classroom level. In addition, observed measures of the general classroom environment and the language and literacy environment of the classroom were also considered. Finally, measures of the home literacy environment were considered to explain differences in children's language and literacy outcomes.

CHAPTER 2

REVIEW OF THE LITERATURE

Children begin to learn to read from a very young age. Reading skills they develop become crucial to their later academic success. Reviews of early reading development research indicate that child (e.g., health, language development), family (e.g., parent income and education), and classroom (e.g., teacher training) factors influence early reading proficiency (Kainz & Vernon-Feagans, 2007; Snow, Burns, & Griffin, 1998). Many children progress through reading with minimal difficulties however disruption in one or more child, family or school factors could result in delayed or impeded reading (Snow et al., 1998). Research studies show that producing a variation of mainstream American English in speech may play a role during early language and literacy (e.g., Charity et al., 2004; Connor & Craig, 2006; Terry et al., 2010, 2012) and those patterns of NMAE are used in speech when children enter school (Pearson et al., 2013; Wolfram & Schilling-Estes, 2006; Washington & Craig, 1994).

According to the National Center for Educational Statistics, more than one-third of fourth graders in US have below basic reading skills, that is, difficulty understanding the meaning of words, making inferences, and identifying interpretations and conclusions in texts (Aud et al., 2012). American schools are becoming increasingly diverse, making it ever more important to understand the development of literacy skills among diverse learners, particularly since some student populations in the US are more vulnerable to difficulties with reading achievement. From national reports, one group that appears to be particularly vulnerable to reading difficulties are children from race- or language-minority backgrounds and children living in poverty. A significant number of children

from minority groups are not meeting grade level reading expectations, as indicated by a recent NAEP report in which 51% of Latino and 49% African American students were found to perform below the basic level of reading compared to 22% of White children (Aud et al., 2012).

There is evidence that a general achievement gap, and specifically a reading achievement gap, between African American and White children continues to persist in U.S. schools (Barton & Coley, 2010; Chatterji, 2006; Ladson-Billings, 2006; Lewis et al., 2008; Lindo, 2006; Talbert-Johnson, 2004). Despite the federal mandate by the No Child Left Behind Act of 2001 to close the achievement gap, recent National Assessment of Educational Progress (2013) reports indicate that race and language minority children continue to perform significantly lower than their peers on achievement tests.

To provide further context, the NAEP (2013) report shows that African American children make up 11% of the student population in the U. S. Yet, studies show that relative to the national baseline, African Americans are overrepresented in special education referrals for intellectual disability, emotional disturbance, developmental delay, and specific learning disabilities (U.S. Commission on Civil Rights, 2009; National Research Council, NRC, 2002; Swanson, 2008). Moreover, 70 to 89% of all referrals to special education implicate poor reading as the first or second reason for the referral (U.S. Commission on Civil Rights, 2009).Swanson (2008) reported that African American children receive services at a rate about 40% higher than the national average across racial and ethnic groups. The findings highlight the need to find answers related to African American children's performance in education in order to close the achievement

gap. One common approach is the provision of early education and intervention programs that target children at-risk for reading difficulties.

In fact, the number of 4-year olds enrolled in state-funded pre-K programs is increasing, from 14% in 2000 to 28% in 2010 (Barnett et al., 2011). In addition, 16,812 children were enrolled in federally funded Head Start and special education programs in 2000, however, enrollment was down by 40% in 2010 (Barnett et al., 2011). Although these efforts increase access for low- and moderate-income families, gross disparities in access to preschool persists thus children enter school with a range of early literacy skills. Moreover, despite these efforts, academic achievement gaps are observed consistently at kindergarten entry (e.g., Chatterji, 2006). Thus, attempts to address and alleviate achievement gaps must consider additional contributing factors, even in early childhood.

Factors thought to contribute to the achievement gap include but are not limited to: family income (Neuman, 2008; NAEP, 2013), access to quality schools (Cook & Evans, 2000; Darling-Hammond, 2007; Fryer & Levitt, 2004), negative teacher attitudes particularly towards students who speak nonmainstream American English dialects like African American English (e.g., Labov, 1995; Washington & Craig, 2001), test bias (e.g., Charity, Scarborough, & Griffin, 2004; Washington, 2001), and underdeveloped early literacy skills (e.g., Morrison, Bachman, & Connor, 2005; Terry, 2008, 2010, 2012). Specifically during initial school entry, child characteristics (e.g., age, gender, academic and socio-emotional skills, language variation), and family characteristics (e.g., parent education, household income) have been identified as good predictors of reading achievement (e.g., Barnett et al., 2011; Kainz & Vernon-Feagans, 2007; NELP, 2009;

Snow et al., 1998). The manner in which these factors interact as well as the effect they have on a child's acquisition of reading skills is a topic of great interest.

Children enter kindergarten with a range of early literacy skills that play a significant role in how they learn to read and write. Likewise, early reading skills play a role in reading proficiency during later elementary years (Dickinson & Porche, 2011; Kendou, van den Broek, White, & Lynch, 2009; Lonigan, Schatschneider, & Westberg, 2008). Consequently interventions that improve early literacy skills in preschool environments could reduce the achievement gap.

The goal of this review is to provide a brief overview of the language and literacy development in children, focusing specifically on African American children. The review will highlight the following: (a) theoretical perspectives on early literacy; (b) theoretical perspectives on reading; (c) the classroom context; (d) home literacy environment; (e) dialect variation and early oral language and reading skills and (f) new directions with multivariate and multilevel research.

Early Literacy

Several theories have been proposed to explain how early literacy skills develop in preschoolers, a term also referred to as preliteracy in literature. Generally, researchers view early literacy as the process of gaining literacy (i.e., reading and writing) over time in a continuous manner such that a child transitions to reading and does not become a fluent reader abruptly (Clay, 1966; Whitehurst & Lonigan, 1998). Development of early reading skills in the preschool years is the subject of a lot of research as evidenced by the numerous empirical studies, seminal studies, and government reports.

One line of research defines early literacy as a set of skills, knowledge, and attitudes that are developmental precursors to reading and writing in a contextualized environment (Whitehurst & Lonigan, 1998, 2001). The researchers propose that the skills that are precursors to reading can be classified as oral language skills and code-related skills (Storch & Whitehurst, 2002). Oral language skills include semantic (word knowledge, expressive and receptive vocabulary), syntactic (knowledge of word order and grammatical rules), conceptual knowledge, and code-related skills include conventions of print, beginning forms of writing, knowledge of graphemes and grapheme-phoneme correspondence, and phonological awareness (Storch & Whitehurst, 2002).The relationship among these skills has been investigated in diverse settings and among children with a variety of learning abilities, generally finding correlational or predictive relationships among skills in each domain and with reading (e.g., Cabell, Justice, Konold, & McGinty, 2011; Connor & Al Otaiba, 2009; Dickinson et al., 2003; Lonigan et al., 2000; Senechal et al., 2001; Whitehurst & Lonigan, 1998). For example, phonological awareness and print knowledge have been found to be highly correlated (Burgess & Lonigan, 1998).

Another line of research suggests that early literacy is comprised of at least three major constructs: oral language (e.g., narrative knowledge, vocabulary, and knowledge of the world), metalinguistic skills (e.g., phonological awareness and syntactic awareness), and literacy knowledge (e.g., conceptual knowledge, procedural knowledge, alphabetic knowledge, and letter-sound knowledge (Senechal, LeFevre, Smith-Chant, & Colton, 2001). A visual depiction of this model is presented in Figure 1. Evidence for this model comes from a meta-analysis reported in the National Early Literacy Panel (NELP, 2009).

The analysis included approximately 300 studies that examined the predictive relationship between measured preschool or kindergarten skills and later reading outcomes (e.g., word decoding, reading comprehension, and spelling) for children learning to read English. The children's skills that predicted later reading belonged to three distinct clusters: phonological processing skills (e.g., phonological awareness, phonological access to lexical core), print knowledge (e.g., alphabet knowledge, print concepts), and oral language (e.g., vocabulary, syntax, word knowledge). To understand the role of the various skills that make up literacy precursors, it is important to consider the reading process developmentally, from early kills to conventional reading skills.

Conventional Reading

Reading requires the ability to recognize letters, translate between letters and the sounds they make, determine the meaning of a word, and interpret and understand the meaning of text (Adams, 1990). Many children progress in reading with minimal difficulties; however, disruption in one or more factor could result in delayed or impeded reading (Snow et al., 1998). In an effort to explain the process of reading development in children, several theories have been proposed.

An influential theory is the Simple View of Reading (SVR; Gough, Juel, & Griffith, 1992; Gough & Tunmer, 1986; Hoover & Gough, 1990; Tunmer & Hoover, 1992). The SVR is an influential and parsimonious theoretical perspective on the roles of word reading and language comprehension in predicting reading comprehension in monolingual speakers. Tunmer and colleagues suggested that reading (R) equals the product of decoding (D) and comprehension (C), or $R = D \times C$ (Gough et al., 1992; Gough &Tunmer, 1986; Hoover & Gough, 1990; Tunmer & Hoover, 1992). The authors

define R as reading comprehension that depends on decoding skill (D), and listening

comprehension (C). Listening comprehension is the ability to understand discourse using

lexical or word-level information. Decoding is used in a broader sense (i.e., word

identification), referring to the process of identifying a written word by any form. The

SVR assumes that both skills are necessary for success in reading ability.

A number of authors have found empirical evidence that supports the SVR. For

example, Catts et al. (1999) found that measures of oral language (C in SVR) and

phonological processing (D in SVR) in kindergarten accounted for unique variances in

reading achievement in 604 2nd graders. Vellutino et al. (1991) also found that

phonological awareness and oral language measures made unique and independent

contributions to word recognition and reading comprehension, good and poor readers'

differed in these skills in later grades. Nation et al. (2004) found that 8-year-old children

who were poor comprehenders performed more poorly than good comprehenders on

semantic and morphosyntactic tasks. The authors suggested that poor comprehenders in

the sample had adequate phonological skills and a word recognition system (D in SVR),

but limitations in oral language skills (C in SVR) affected their performance in reading

comprehension (Nation et al., 2004).

Building upon the SVR, Aaron and colleagues proposed the Componential Model

of Reading (CMR) which includes three domains that contribute to reading skills:

cognitive, psychological, and ecological (Aaron et al., 2008; Joshi & Aaron, 2012). As

shown in Figure 2, the authors proposed that each domain has several components: the

cognitive domain includes word recognition and comprehension, the psychological

domain includes factors such as motivation and interest, teacher expectation, and gender

differences, and the ecological domain includes factors such as teacher knowledge, dialect differences, home environment, and English as a second language (Aaron et al., 2008; Aaron, Joshi, & Quatroche, 2008; Joshi & Aaron, 2012). The authors first proposed a revised model of reading based on the SVR whereby reading comprehension equals decoding and listening comprehension plus a speed of processing (Joshi & Aaron, 2000). Joshi and Aaron (2008, 2011) then identified components and subcomponents based on a comprehensive list of measures used to identify reading as indicated by the SVR. The CMR represents a more comprehensive reading model in which factors beyond decoding, listening comprehension, and speed of processing are considered as important contributors to variance in reading skill. Three research studies provide empirical support for CMR.

Oritz et al. (2012) examined predictors of first grade reading performance during kindergarten entry. Specifically, the elements within the cognitive domain included initial vocabulary, phonological, and morphosyntactic skills, and alphabetic and word recognition skills. Elements within the psychological domain included teacher-reported academic competence, social skills, and behavior. Finally, the elements within the ecological domain included dialect, maternal education, amount of preschool, and home literacy. Stepwise regression analysis revealed that 16% of the variance was explained by the cognitive factors, 18% of the variance was explained by the psychological factors, and 20% of the variance was explained by the ecological factors. The three domains explained a total of 54% of the variance, indicating the importance of examining factors from all three domains during literacy investigations.

Chiu, McBride-Chang, and Lin (2012) examined the relationship between the factors in the three domains with the reading performance of 186,725 fourth grade students in 38 countries. The measures of each domain included: alphabetic knowledge, reading and writing words, and reading sentences for the cognitive domain; gender differences for the psychological domain; and SES, parents' attitude toward reading and school, and number of books available at home for the ecological domain. Stepwise regression analysis revealed that 9% of the variance was explained by the cognitive and psychological factors while over 90% of the variance was explained by the ecological factors. The ecological measures included were in a global context since they were at the classroom and country level. Additionally, the ecological measures explained most of the variance indicating the importance of adding the ecological domain to the study of reading acquisition across multiple cultures.

Saez, Folsom, Al Otaiba, and Schatschneider (2012) examined the contribution of factors from the psychological domain (students' attention), and ecological domain (teacher practices) to the word reading performance of 432 kindergartners. Teacher ratings of student attention uniquely predicted word reading. In addition, hierarchical linear regression revealed that when both student attention and teacher practices were considered, individualized instruction only helped children who paid attention. Taken together, these findings highlight the complex and dynamic process of reading development. Although literacy develops within the individual, the interactions that occur with members of the home and classroom environment play an important role in literacy development.

The Classroom Context

The preschool classroom is an important environmental context that has been shown to play a role in children's oral language and literacy outcomes (Barnett et al., 2011; Dickinson & McCabe, 2001; Howes et al., 2008). Hamre and Pianta (2005) refer to the interactions, routines, and learning opportunities in the classroom as process quality, and these elements have been found to be associated with literacy gains among young children (Bryant, Burchinal, Lau, & Sparling, 1994; Dickinson & McCabe, 2001; Howes et al., 2008). For example, Hamre and Pianta (2005) found that at-risk children in high process quality classrooms engaged in highly stimulating activities, received warm responses from their teachers, and had well organized classrooms that built healthy routines had higher achievement scores and less conflict than at-risk children in lower process quality classrooms. In fact, process quality was found to predict children's academic school readiness and language skills beyond the effects of teacher education and teacher-child ratios (Mashburn et al., 2008). While it is important to account for sources of variance from the teacher and classroom, it is also important to examine the home environment.

Home Literacy Environment

The home literacy environment plays an important role in the development of oral language and literacy skills of young children from very early years. Literacy activities exist at home in various forms. Senechal and colleagues conceptualized a novel way to look at literacy activities by distinguishing between formal and informal literacy activities between parent and child (Senechal, 2006; Senechal & LeFevre, 2002). A common example of a home literacy activity is shared book reading. In this context,

formal literacy is when the focus is on print such as by pointing to labels, while informal

literacy is when the focus is on the meaning of the text and not so much the reading.

Researchers have found evidence that formal literacy activities have stronger relationship

with literacy related skills (e.g., phonological awareness, print knowledge) and informal

literacy activities have a stronger relationship with oral language skills (e.g., vocabulary)

even before formal schooling begins (Senechal, LeFevre, Smith-Chant, & Colton, 2001).

Researchers have conceptualized the home literacy environment to include: parent

abilities indicated by demographic characteristics (e.g., parent education), parent reading

habits (e.g., number of books at home), family storybook reading (e.g., number of times

books read with child), and parent teaching habits (e.g., formal versus informal literacy

activities), usually measured by self-reported questionnaires (e.g., Burgess, Hecht, &

Lonigan, 2002; Hood, Conlon, & Andrews, 2008; NELP, 2009; Senechal, 2004, 2006;

Senechal, LeFevre, 2002; Senechal et al., 2001). Ample research evidence shows the

relationship between home literacy activities and children's oral language and literacy

skills. For example, Burgess et al. (2002) found that the home literacy environment is an

important variable in a number of developmental and educational outcomes of 115

preschool children. Hood et al. (2008) found that parent teaching was independently

related to children's performance on a letter-word identification task in preschool, while

parent-child reading was related to performance on a vocabulary task in grade 1.

Senechal (2004) found that parent teaching about literacy in kindergarten directly

predicted kindergarten alphabet knowledge, while storybook exposure directly predicted

kindergarten vocabulary. Moreover, storybook exposure indirectly predicted grade 4

reading comprehension.

When considering reading development for children from linguistically and culturally diverse backgrounds, a variation in oral language becomes a critical factor to explore. Since children rely heavily on their oral language skills during the development of reading and writing skills, it is important to investigate the linguistic variation in these skills (Connor, 2008; Washington, 2001). Linguistic variation appears to be related in some manner to characteristics of family, home, school, and classroom environments (Connor, Morrison, & Katch, 2004; Kainz & Vernon-Feagans, 2007). Studies have shown support for the relation between language used at home and school language and literacy outcomes in both English and Spanish (e.g., Gutierrez-Clellen & Kreiter, 2003; Hammer, Lawrence, & Miccio, 2007). In addition, one study examined the effect of the language use of the overall family unit as well as the individual family members through proposed multilevel models; the authors found that language used by family members related to home language and literacy activities as well as language and literacy skills in a sample of kindergarten children (Branum-Martin, Mehta, Carlson, Francis, & Goldberg, 2013). For this study, the specific kind of linguistic variation of interest to African American children was spoken dialect variation.

Dialect Variation and Early Reading

Dialects are variations of a language that reflect a group of people that share a geographic location or social background (Wolfram, Adger, & Christian, 1999). Linguistically, dialects are characterized by systematic differences in language components, including phonology, morphology, semantics, syntax, and pragmatics (Bailey & Thomas, 1998; Green, 2000; Wolfram, et al., 1999; Wolfram & Schilling-Estes, 2006). The terms Mainstream or Standard American English (MAE) are often used

to refer to a collection of socially preferred dialects from various geographic regions of the US that are typically represented in Standard English orthography and typically used in formal social contexts such as schools and the workplace (Wolfram et al., 1999).

When a person's speech does not conform to MAE, it is then commonly referred to as a nonstandard, nonmainstream, or vernacular dialect (Green, 2000; Wolfram et al., 1999). These nonmainstream American English (NMAE) dialects are just as rule-governed and systematic as MAE, but often socially stigmatized. Socially stigmatized variants often carry negative connotations through their associations with language differences and different social groups (Wolfram & Schilling-Estes, 2006). Stigmatized variants contain socially diagnostic grammatical and phonological features. An example of a socially unfavorable grammatical feature is the multiple negation (e.g., *I didn't hear nothing*). An example of a socially unfavorable phonological feature includes the final consonant cluster reduction (e.g., *The books are on the des'*).

Some nonmainstream dialects such as Southern African American English and Southern White English have more overlapping features and similar production due to their regional and social context (Bailey & Thomas, 1998; Charity, 2008). Among all NMAE forms, a substantial body of research exists on African American English, with more than five times as many publications devoted to it than any other American English dialect in the past several decades (Schneider, 1996). While this review will highlight major findings from studies that examined reading in children that spoke NMAE, a majority of the studies to be covered examined African American children who speak African American English.

African American English. African American English (AAE) is a distinct, robust, and stable socioethnic dialect of English used by speakers where African Americans live or have historically lived (Charity, 2008; Wolfram & Schilling-Estes, 2006). AAE is a rule-governed dialect that is characterized by numerous morphological and phonological features that differ from MAE. Some features include habitual 'be' (e.g., *She don't usually _be_ here*), absence of copula (e.g., *She _ nice*), plural -s absence (e.g., *Man _ hat*), and use of [f] and [v] for final [th] (*e.g., toof for tooth*) (Wolfram & Schilling-Estes, 2006).

NMAE, oral language, and reading achievement. Researchers have revealed a relationship between spoken NMAE use and early literacy skills. In addition, several theories have been proposed to explain the relationship between AAE and early literacy skills. A comprehensive summary of the relationship between NMAE use and early literacy skills such as phonological awareness, letter/word knowledge, vocabulary, and narrative skills will be discussed in this paper.

Researchers have been investigating the relationship between spoken dialect use and literacy skills for at least three decades; dialects examined included both MAE and NMAE (Siegel, 1999).There has been a recent resurgence in research on NMAE speakers and the relationship between oral language skills and reading outcomes. Researchers have focused on different American English dialects such as NMAE (e.g., Terry, 2010; Terry et al., 2010; Terry & Scarborough, 2011), Southern American English (SoAE; e.g., Oetting, Cantrell & Horohov, 1999), Creole English (e.g., Oetting & Garrity, 2006; Siegel, 2008), Latino English (e.g., Gutierrez-Clellen & Simon-Cereijido, 2007; Wolfram et al., 2004), and African American English (AAE; e.g., Charity et al., 2004; Connor &

Craig, 2006; Craig & Washington, 2004b; Horton-Ikard & Miller, 2004; Oetting & Pruitt, 2005; Pearson, Velleman, Bryant, & Charko, 2009). Several important findings have come from this new research.

First, children who speak an NMAE dialect produce NMAE features with varying frequency. For example, Craig and Washington (1994) found that preschool African American children displayed a wide variation in frequency of utterance of complex syntax, and the increase in percentage frequency of utterance was correlated with an increase in number of different types of complex syntax. Second, the authors found that the preschoolers that produced more AAE features produced a higher number of utterances of complex syntax. Charity et al. (2004) found that a sample of African American children in kindergarten to grade 2 produced MAE with varying frequency during a sentence imitation of MAE task. Third, some researchers found evidence that production of NMAE was associated with poorer reading achievement (e.g., Craig & Washington, 2004a; Charity et al., 2004) and frequency of NMAE production decreased with school experience. In contrast, researchers found that children who spoke a high frequency of NMAE were not necessarily the poorest readers. In fact, children who spoke moderate amount of NMAE performed more poorly on reading tasks than children who spoke very little or a lot of NMAE (e.g., Connor & Craig, 2006; Terry et al., 2010)

Theories on the relationship between dialect and early literacy skills. Three primary theories have been proposed to explain the relationship between NMAE and children's language and literacy achievement: teacher bias, linguistic mismatch, and dialect awareness/shifting or linguistic awareness/flexibility. The *teacher bias hypothesis* suggests that due to preconceived negative attitudes, teachers may expect less from

NMAE speakers which can ultimately result in poorer student achievement. Shields

(1979) found that very few NMAE features were linked with school performance. The

authors found that the production of 'Black English' and Standard English were

minimally associated with oral reading, silent reading, and listening comprehension in

that specific setting. Washington and Miller-Jones (1989) found that teachers with less

knowledge of NMAE were less supportive of students using nonmainstream American

English. Teachers that had more knowledge of the phonological, syntactical, and stylistic

features of NMAE were more likely to exhibit behavior considered to support reading

development (Washington & Miller-Jones, 1989).

The *linguistic mismatch hypothesis* suggests that the mismatch between NMAE,

particularly the mismatch between AAE and MAE, may explain the achievement gap

(Labov, 1995; Rickford & Rickford, 1995). The linguistic mismatch hypothesis,

proposes that NMAE speakers may face literacy challenges due to a mismatch between

the phonological and morphosyntactic structure of AAE and MAE (Labov, 1995). For

example, a child who reduces final consonant clusters (e.g.,*'fin' for find*) might find it

confusing when faced with a printed word that contains two final consonants. For

example, Craig and Washington (2004a) and Charity et al. (2004) found evidence that

AAE feature production was associated with poorer reading achievement. The authors

observed that children's AAE production decreased with school experience. They also

noted that children that decreased AAE production outperformed their peers who did not

display a significant change in AAE production (e.g., Craig & Washington, 2004a).

A new hypothesis referred to as *dialect awareness* (Charity et al., 2004), *dialect*

shifting (Craig & Washington, 2004a; Craig et al., 2009), and *linguistic*

awareness/flexibility (Terry, 2006, 2008, 2012; Terry & Scarborough, 2011) suggests that children acquire the ability to distinguish between dialects (e.g., AAE and MAE) via metalinguistic means, specifically code-switching. Fundamental to the dialect awareness hypothesis is the role of metalinguistic knowledge in the acquisition of literacy skills as well as the role of the sociolinguistic context in variation in language use (Terry, 2012). Terry and colleagues suggested that it is this metalinguistic knowledge of the language forms that might play a central role in the relationship between dialect and reading. Support for this hypothesis comes from several empirical studies. Connor and Craig (2006) found evidence the relationship between dialect production and early literacy skills was not linear such that children who produced very little or a lot of AAE outperformed children who produced a moderate amount. The nonlinear relationship suggests children who used more AAE were not necessarily the poorest readers. The findings suggest that there is a more complex relationship between dialect production and early literacy skills that could be explained by metalinguistic skills. Terry et al. (2010) also found a nonlinear, u-shaped, relationship between dialect variation and reading skills among 1st graders who spoke NMAE. In addition, Terry et al. (2012) examined the spoken dialect use and reading skills of children followed from 1st to 2nd grade. The authors found that children's rate of change in spoken dialect use significantly predicted reading skills, which can be interpreted as a pragmatic change in the children's language and literacy skills as they transition to 2nd grade. Changes in NMAE production as they progress through school can imply that frequency of production could be related to sociolinguistic context. In addition, decrease in NMAE production has been linked to development in linguistic and orthographic knowledge including skills such as

phonological awareness (Conlin, 2009; Terry et al., 2012). In sum, the findings support the concept that changes in dialect production could be an indicator of metalinguistic ability (i.e., thinking about and consciously manipulating language), an ability that has been shown to facilitate reading development.

Second, developmental changes occur in the frequency of NMAE and MAE production in young children. Cross sectional and longitudinal studies have revealed decreases in NMAE use in speech between kindergarten and first grade. For example, Craig and Washington (2004a) found that in a sample of 400 African American children, there was no change in NMAE production between preschool and kindergarten, and between first grade and 5th grade. The authors however found a marked decrease in NMAE production between kindergarten and first grade (Craig & Washington, 2004a). Conlin (2009) found that in a sample of 694 first graders, spoken NMAE use decreased from fall to spring in first grade. Finally, Terry et al. (2012) found that a sample of 49 first and second graders generally increased their production of MAE forms during first grade and maintained these levels in second grade. These results indicate that a developmental change occurs in first grade in which many children go through a marked change in dialect production.

Third, researchers have found significant concurrent and predictive relationships between children's spoken NMAE use and language and reading achievement. For example, Charity et al (2004) found that high familiarity with MAE (i.e., the ability to reproduce MAE features in sentence imitation tasks) was highly correlated with reading achievement. Craig et al. (2009) found that young African American children in grades 1 to 5 who produced more AAE features performed more poorly on reading achievement

tasks. The authors found that oral dialect density measure (i.e., a measure of NMAE production) was indirectly related to reading achievement. The findings support a dialect shifting-reading hypothesis (Craig et al., 2009). In other words, AAE speaking students who learn to use MAE in literacy tasks will outperform their peers who do not learn how to adopt these linguistic skills. The relation between spoken dialect use and literacy skills was also found by Terry and colleagues. In their study, Terry et al. (2010) found that NMAE production was negatively correlated to the word recognition, vocabulary, and phonological awareness skills of 1st graders. Terry et al. (2012) also found that NMAE production was negatively correlated to oral language (e.g., vocabulary, morphosyntax, nonword repetition, and phonological awareness) while SES remained a separate predictor of whether children increased their production of MAE.

New Directions with Multivariate and Multilevel Research

Children are clustered in classrooms and schools; however, most investigations on children's performance in schools are conducted at the child level, leaving classroom or school variability unexplained. Multilevel models have been used to account for variability in student outcomes while taking into account that the children are nested in classrooms or schools (e.g., Goldstein, 2003; Goldstein & McDonald, 1988; Raudenbush & Bryk, 2002).

Research on the contributions of NMAE to the oral language skills of young children has often been conducted at one level, the child, or the classroom. A typical approach is to simply examine the correlations between observed variables in models (e.g., Pearson's correlation). Another common approach is to predict an observable dependent variable by one or more observable independent variables (e.g., regression,

multiple linear regression). A more comprehensive approach is structural equation modeling in which highly correlated variables are conceptualized as a factor or construct. The variables are allowed to covary while unique variances and confounding variables are accounted for in the same analysis (e.g., path analysis, structural equation modeling). Together, findings from the studies Terry and colleagues have created strong converging evidence for how NMAE and oral language skills are related in young children. However, they are all limited in the inference of direct relationships in the presence of several predictors and outcomes. It remains unclear if spoken NMAE use contributes directly and independently to early or conventional reading above and beyond other contributing factors (i.e., discriminant validity). Multilevel and multivariate approaches can move the field a direction that could shed more light on how spoken NMAE could contribute to reading among young NMAE speakers, while taking into account development of both early and conventional reading.

However, multilevel and multidimensional research among NMAE speakers has been limited due to requirements such as sample size and number of observed variables. For example, Wise, Sevcik, Morris, Lovett, and Wolf (2007) conducted a structural equation modeling of the relationship between oral language and reading in a group of 279 African American and Caucasian children in Grades 2 and 3. The authors found that children's receptive and expressive vocabulary knowledge had independent and significant paths to early reading skills. The authors also found that expressive vocabulary knowledge and listening comprehension skills were independently related to performance on a word identification task. Connor and Craig (2009) found a nonlinear relationship between spoken AAE, vocabulary, and literacy skills using hierarchical

linear modeling (HLM) among 63 preschoolers and found that there was a significant and u-shaped relationship between the frequency with which the preschoolers produced AAE features and their early language and literacy skills. In other words, children who used a lot or very few AAE features in their speech performed better on early literacy tasks than their peers who used a moderate number of AAE features in their speech. Craig et al. (2009) proposed a structural equation model to explain the relationship between rate of African American English production, oral language socioeconomic status, and writing skills in 165 African American children in Grades 1 through 5 and found that children's AAE production rates were significantly and inversely related to reading achievement scores. Furthermore, lower rates in written narrative significantly predicted reading scores; the relationship was mediated by measures of oral language comprehension.

In sum, previous literature suggests a complex relationship between spoken dialect and language and literacy skills among NMAE speakers. The studies showed a nonlinear relationship between spoken dialect measures and language and literacy skills. In addition, studies showed a negative correlation between spoken dialect use and language and literacy skills among NMAE speakers. The current study could contribute to both academic and clinical research by examining whether language and literacy should be assessed as separate constructs among NMAE speakers. In addition, the current study could contribute by examining the construct validity of dialect as a construct separable from language and literacy skills among NMAE speakers. Finally, this study could contribute by examining the nature of spoken dialect, language, and literacy in the context of the classroom.

The multivariate multilevel models proposed in this study were specified based on prior established theories and measurement ideas. The design of the study (e.g., the tasks chosen for the children) was informed by prior research and the theories researchers have proposed. The models can provide empirical evidence to support theory fits with the specific population, particularly when considering young early readers. In addition, multilevel modeling allows for consideration of child and classroom effects on the proposed skills. This study could lead to alternate conclusions about within- and across-classroom relations that could have implications about instruction for this population. The results of the study may also reveal conclusions that may have implications for instruction of students that vary in their production of NMAE features.

Purpose of Study

Prior research has established concurrent and predictive relationships between spoken dialect use and early language and literacy skills among young African American children. As mentioned previously, children enter school with a variety of early language and literacy skills that contribute to later reading development. It is particularly important to investigate early language and literacy skills in African American children who speak NMAE as seminal reports indicate that the children are often at-risk for later reading failure.

In this study, children were assessed on nine different language, literacy, and dialect tasks. The first aim of the study was to examine the nature of a collection of early language and literacy skills among African American pre-kindergartners who speak NMAE nested in different classrooms. In other words, the aim was to examine how the various predictors and outcomes are structured in this population based on a priori

hypotheses. The second aim was to examine the influence of hypothetical constructs on multiple oral language, literacy, and dialect predictors among NMAE speakers. Finally, the third aim of this study was to examine the role that the quality of the home and classroom environment played in children's on performance on language and literacy tasks. The study aimed to add to the existing literature by simultaneously examining several predictors and outcomes in classroom nested structure. Findings from this study aimed to provide more information on how to approach the task of improving the reading and writing of children even before they enter formal schooling. The key issues that were addressed in this study were: (a) the nature of the language construct and literacy construct at the a) child level and the b) classroom level, (b) the relationship between spoken dialect and the language and literacy constructs at the child level and classroom level, and (c) the relationship between classroom observations and classroom level outcomes and between home literacy observations and child level outcomes.

CHAPTER 3

METHODOLOGY

Setting

The analytic sample was drawn from a large research and evaluation study conducted by Terry and colleagues in a large metropolitan city in the southeastern United States over the course of four years. In the study, over 1,300 three to five year children from diverse race and linguistic backgrounds were assessed for performance on numerous language and literacy tasks (refer to table 1). The sites were designated as Head Start, school-based, and private preschools (refer to table 2).

Participants

Student participants. The analytic sample used for the study included 1,217 children in 95 preschool classrooms with obtained teacher consent. The final analysis sample (*N*= 673) was reduced due to attrition as well as exclusion of any who did not score within 2 standard deviations on the standardized average of the PPVT, TOPEL print knowledge, and TOPEL phonological awareness tests. Parental consent was obtained for all children (see Table 1). The mean age of the sample at the beginning of pre-K was 60.71 months (SD = 4.13, range = 45-72 months). Of these children, 324 (48.21%) were male, 477 (71.30%) were African American, 116 (17.34%) were Hispanic/Latino, and 76 (11.36%) were White or from other race/ethnic groups. The students who were selected for the study varied in the frequency of their production of spoken NMAE features. All students also had both fall and spring test scores on the various student measures. Parents also completed home environment and family literacy surveys (see Appendix A and B).

Table 1

Student Participants

Variable	Level	*N*	%
Gender	Male	324	48.21
	Female	348	51.79
Ethnicity	African American	477	71.30
	Hispanic/Latino	116	17.34
	Caucasian/other	76	11.36
Age Level	3 year olds children	10	15.86
	4 year olds children	566	84.14

Note. Total students = 673.

Teacher participants. A total of 111 lead teachers consented to participate in the study. Although some teachers were repeated over the four years, the composition of the classroom was different thus the classrooms were considered to be unique. The resulting sample included 95 classrooms across 16 sites. Observations of the teachers were conducted twice a year, took place during morning sessions, and lasted approximately three hours. Demographic information was available for 106 teachers across 44(42.3%) Head Start, 37 (35.6%) school-based prekindergarten, and 23 (22.1%) private prekindergarten classrooms. All teachers received in-classroom support on early language and literacy instruction from instructional coaches. Teachers varied on demographics such as ethnicity and years of education and as shown in Table 2.

Table 2

Teacher Participants

Variable	Level	*N*	%
Gender	Male	1	1
	Female	105	99.1
Ethnicity	African American	77	74
	Hispanic/Latino	1	1
	Caucasian	17	16.3
	Other	9	8.7
Education Level	High school Diploma or GED	1	1
	Child Development Associates (CDA)	2	1.9
	Associates Degree	30	28.6
	Bachelor's Degree	41	39
	Master's Degree or other	31	29.5
Child Care Setting	Head Start	44	42.3
	School-based Prekindergarten	37	35.6
	Private Prekindergarten	23	22.1

Note. Total teachers = 111. Demographic information was missing for some teachers however they were still included in the study.

Measures

Student-level measures. An extensive assessment battery was given to examine spoken NMAE use, oral language, and emergent literacy skills.

Spoken dialect use. Two dialect measures were used: the *Diagnostic Evaluation of Language Variation Screening Test* (DELV-S; Seymour, Roeper, & de Villiers, 2003) and the Sentence Imitation (Charity et al., 2004). The DELV-S consists of two sections,

one that computes degree of language variation, and the other that computes degree of risk for a language disorder. The Cronbach's alpha for the 15-item language variation task was found to be between .77 and 91. The scores from the first section were used to represent dialect use. On this task, children were asked to describe actions in pictures or to respond to questions about pictures presented to them (e.g., they were be asked to identify a picture of "*bath*") and their responses were recorded (e.g., "*baf*" or "*bath*"). Their responses were then scored for the frequency of production of the mainstream or nonmainstream form.

A continuous variable, percentage of dialect variation (DVAR) was computed from the responses of the individual items, according to procedures established by Terry et al. (2010). Each item was given a score of 1 in column A (i.e., responses varying from MAE), column B (i.e., MAE responses), or column C (i.e., alternative responses). The percentage of dialect variation (DVAR) was computed by dividing the number of items that varied from MAE (i.e., column A) by the total number of items (i.e., column A + B) and multiplying with 100. Items in column C were not included in the calculation of DVAR.

The Sentence Imitation task was created by Charity et al. (2004) to measure the frequency of NMAE and MAE production in speech. For this task, children were presented with a story spoken by a White MAE female voice. Each sentence was presented then followed by a pause during which the child was asked to repeat the sentence verbatim. The story included two practice items followed by 15 sentences. The sentences included 18 phonological and 19 morphosyntactic dialect sensitive items (e.g., *the girl behind him is called Lisa*). Responses for phonological MAE (e.g., *behind*) or

NMAE (e.g., *behin'* or *behi'*) forms and morphosyntactic MAE (e.g., *called*) or NMAE

(e.g., *call*) were recorded and scored. A percentage of how often NMAE forms were

produced per dialect sensitive item were computed to create two separate scores, a

phonological score for the phonological items, and a grammatical score for the

morphosyntactic items.

     Phonological awareness. Children's phonological awareness was measured using

the phonological awareness subtest of the standardized *Test of Preschool Early Literacy*

Skills (TOPEL; Lonigan, Wagner, Torgesen, & Rashotte, 2007). The phonological

awareness subtest of the TOPEL includes multiple choice and free-response items that

test word and phoneme awareness. Children were presented with tasks of deleting and

manipulating items at the word and phoneme level. The Cronbach's alpha for the 27-item

phonological awareness task was found to be 0.86 in a large standardized sample. The

standard score for each subtest of the TOPEL was found to be a mean of 100 with a

standard deviation of 15.

     Print knowledge. Children's knowledge of print concepts, letter discrimination,

letter name identification, and letter sound identification were measured by the print

knowledge subtest of the TOPEL. The Cronbach's alpha for the 36-item print knowledge

task was 0.93 in a large standardized sample.

     Name writing. Children's name writing skills were assessed using the

Phonological Awareness Literacy Screening Pre-School standardized test (PALS-PreK;

Invernizzi, Sullivan, Meier, & Swank, 2004). During this task, the children were asked to

draw a self-portrait and write their name. Only the written name was scored. The

children's responses were compared to the scoring sample and a score ranging from 0 to

7 was recorded. The name writing test has been shown to have an inter-rater reliability of .99.

Receptive vocabulary. The receptive vocabulary of the children was measured using the standardized test, the *Peabody Picture Vocabulary Test-IV* (PPVT-IV; Dunn & Dunn, 2007).The test involved matching words to the right picture from a set of four presented in a wordless picture book. The mean standard score for PPVT is 100 and the standard deviation is 15. The Cronbach's alpha for the 228-item vocabulary task was found to be .94 in a standardized sample.

Children's oral language skills were measured using the *Narrative Assessment Protocol* (NAP; Justice, Bowles, Pence & Gosse, 2010). In this task, the tester read a script developed by Mayer (1969). Children then elicited a fictional narrative using a wordless picturebook "Frog Where Are You?" The NAP takes about 8 minutes to administer and about 10 minutes to code. Children's responses were recorded for further analysis. The language comprehension and complex syntax tasks are described below.

Language comprehension. Children were asked seven questions developed from the "Frog Where Are You?" script by the developers of the NAP protocol (Pence et al, 2007) and were recorded and scored according to the standard format. The nature of the questions was both explicit (e.g., *When Sam and Tim woke up, they saw Frog was missing! Where did Tim and Sam look for Frog?*) and implicit (e.g., *How do you think Tim and Sam felt when they saw that Frog was gone?*).Children needed to provide only one of several possible responses (e.g., *in the boot, in the jar, in the woods, on a rock*). The questions were administered by all the examiners during the NAP session and a maximum raw score of 7 was computed as the comprehension score of each child.

Complex syntax. The transcribed narratives were coded for the following 12 language forms using the NAP short form: sentence structure (e.g., complex sentences), phrase structure (e.g., prepositional phrase), advanced modifiers, nouns (e.g., pluralized nouns), and verbs (e.g., auxiliary verbs). The frequency of each item produced, ranging from 0 (did not occur) to 3 (3 or more occurrences), was documented and a mean score for each child was determined, creating a maximum score of 36. Inter-rater reliability was established by randomly selecting approximately 25% of the total sample for re-coding. Two graduate research students independently scored the form. If there were any disputes, a third independent researcher scored the form until agreement was reached. Inter-rater reliability was 100%.

Home literacy measure. A questionnaire was sent home with every consented child to be filled out by the parent. The questionnaire included questions to collect demographic information. One measure was examined in this study is listed below.

Title Recognition Test. The Title Recognition Test (TRT), developed by Cunningham and Stanovich (1990, 1991), is a tool designed to measure a child's non-school exposure to print. The TRT includes a list of popular children's books and the test was provided in the questionnaire (refer to Appendix B). The parents were instructed to put a check next to all titles they know to be titles of children's books.

Classroom level measures. Elements of the classroom environment and elements of language, literacy, and curriculum were documented by trained observers to measure critical distinctions in quality. The observer observed in the classroom for one session and provided a score for each item of the *Early Language and Literacy Classroom*

Observation Tool, Pre-K (ELLCO Pre-K; Smith, Brady, & Anastasopoulos, 2008). Each item was rated on a scale of 1 (deficient) to 5 (exemplary).

    Observed classroom language and literacy. The language and literacy subscale of the ELLCO Pre-K was determined from a list of items that fall under 3 sections. The first section assessed the language environment by rating 4 items (e.g., *discourse climate*). The second section assessed book and book reading by rating 5 items (e.g., *organization of book area*). The third section assessed print and early writing by rating 3 items (e.g., *early writing environment*). All the scores were then be added up to provide the general classroom environment subscale for a maximum score of 60. Inter-rater reliability was found to be about 74%.

Procedures

    Approval for the study was obtained by the institutional review board (IRB) of the University prior to testing. Children were assessed in the fall (between September and October) on several dialect, language, and literacy measures. Children were tested individually in quiet rooms at their schools in 2-3 brief sessions in the fall of the school year. All measures were administered and scored by trained graduate student researchers according to the standardized formats specified in the assessment manuals. Trained graduate research assistants transcribed and coded narratives. Training the graduate research student assistants was done in the following steps: reading protocol provided by NAP developers (available online at www.preschoollab.com), reviewing information on the targeted linguistic forms, listening to audio-recordings while reviewing coded transcripts (for reference see Heilmann et al, 2010; McCabe et al, 2008), and finally coding audio-recorded narratives without assistance. Each transcript was then exchanged

with another paired assistant for coding as part of the coding protocol. All transcripts were thereby coded twice. If there was a disagreement, a third independent researcher discussed the item with both coders until an agreement was reached.

Children's spoken dialect variation was examined and documented using dialect measures. A demographic questionnaire was used to collect information about parent education and home literacy practices. At the classroom level, measures of general classroom environment as well as language and literacy were documented and examined. Measures that are pertinent to answering the research questions were selected. The instruments and measures are described in the measures section above.

Missing Values

Missing data were mainly due to attrition. Because of the large number of assessments, some teachers, parents, and researchers did not complete all assessments (e.g., more than 50% of the parent surveys were not completed or returned). Thus item-level missingness was present. In this study, Mplus 7 software was used to conduct maximum likelihood estimation using robust standard errors (MLR) to address missing values. MLR uses all data that is available to estimate the model using full information maximum likelihood. Each parameter is estimated directly without first filling in missing data values for each individual.

Experimental Design

A research study by Mehta and colleagues suggests that language and literacy operate as distinguishable latent factors at the child level. However, such models have not been tested for children in pre-kindergarten who speak NMAE. Moreover, it is unclear how measures of NMAE dialect might be related to measures of language and literacy.

These questions may be raised at both the student as well as classroom levels. The question of how measures of dialect relate to language or literacy relates to possible alternative structures: language and literacy may be inseparable, or they may be two distinct factors. These two possibilities were tested at both child and classroom levels, through seven models:

1. One factor at both levels: outcomes for children and classrooms are systematically related in a single, coherent way at both levels.

2. Two factors at child, one factor at the classroom level: child performance separates by language and literacy, but classroom performance relates to only one factor.

3. One factor at child, two factors at the classroom level: child performance measures only one factor, while classroom performance is separable into two factors.

4. Two factors at both levels: language and literacy appear as separable factors at each level.

5. Three factors at child, one factor at classroom level: child performances separates into language, literacy, and dialect, but classroom performance relates to only one factor.

6. Three factors at child, two factors at classroom level: child performances separates into language, literacy, and dialect, and classroom performance is separable into two factors.

7. Three factors at child, three factors at classroom level: child and classroom performances separate into language, literacy, and dialect.

One-factor child and classroom language literacy (Model 1). analysis was conducted to determine if child-level covariation among outcomes was explained by a single factor, *child language and literacy*. Analysis was conducted to determine if classroom-level covariation among outcomes was explained by a single factor, *classroom language and literacy*. The model is depicted in Figure 3. This model suggests that there is no meaningful distinction between language, literacy, and dialect at either the child or classroom level. Instead, performance on these nine tests is essentially determined by a single ability at the child level, and a single consistent aspect of the classroom.
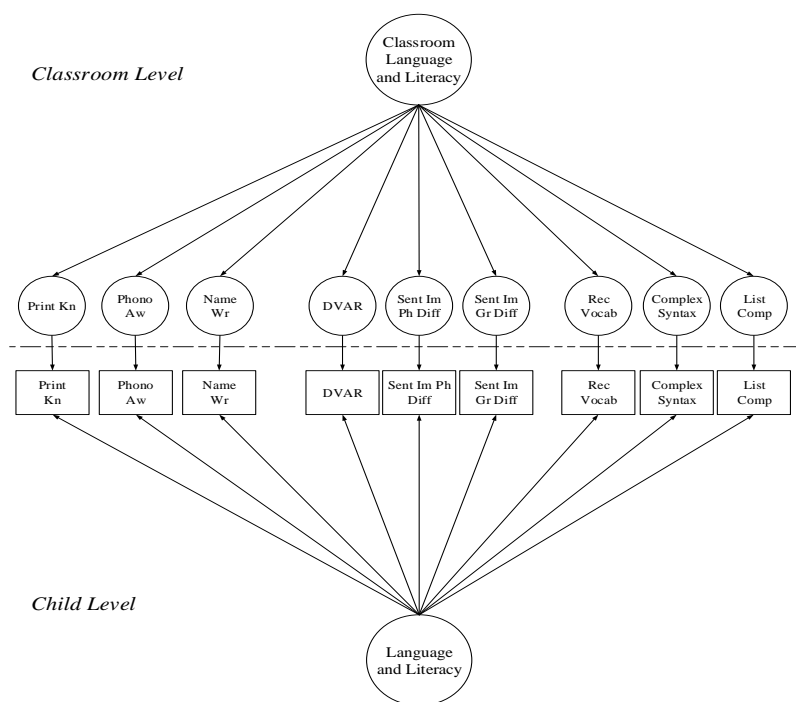
Figure 3. Model 1: Single factor child and classroom

Two-factor child language and literacy and one-factor classroom language and literacy (Model 2). analysis was conducted to determine if child-level covariation among outcomes was explained by two separate factors, *child language* and *child literacy*. Analysis was conducted to determine if classroom-level covariation among outcomes contributed to a single factor, *classroom language and literacy*. The covariance of 3 observed dialect measures was also used to determine the contribution of dialect to a mixture of the language and literacy factors at the classroom- and child-level and not as a separate construct. In other words, Model 2 examined whether all language outcomes contributed to only one general language factor and all the literacy outcomes contributed to only one literacy factor at the child level. The dialect outcomes were expected to contribute to both language and literacy factors. Meanwhile, all language, literacy, and dialect outcomes were expected to contribute to one general language and literacy factor at the classroom level. The model is depicted in Figure 4.

Figure 4. Model 2: Two-factor child and one-factor classroom

One-factor child language and literacy and two-factor classroom language and literacy (Model 3). Analysis was conducted to determine if child-level covariation among outcomes contribute to one factor, *child language and literacy*. Analysis was conducted to determine if classroom-level covariation among outcomes contributed to two separate factors, *classroom language* and *classroom literacy*. The covariance of 3 observed dialect measures was used to determine the contribution of dialect to a mixture of language and literacy factors at the classroom- and child-level and not as a separate construct. In other words, Model 3 examined whether all language, literacy, and dialect outcomes contributed to only one general language and literacy factor at the child level.

Meanwhile, language outcomes were expected to contribute to a language factor and literacy outcomes were expected to contribute to a literacy factor at the classroom level. Dialect outcomes were expected to contribute to both language and literacy factors at the classroom level. The model is depicted in Figure 5.

Figure 5. Model 3: One-factor child and two-factor classroom

Two-factor child and classroom language and literacy (Model 4). Once the model was fit based on theory, analysis was conducted to determine if child-level covariation among outcomes contribute to two factors, *child language* and *child literacy*. Analysis was conducted to determine if classroom-level covariation among outcomes contributed to two separate factors, *classroom language* and *classroom literacy*. The

covariance of 3 observed dialect measures was also used to determine the contribution of dialect to factors at the classroom- and child-level. In other words, Model 4 examined whether language outcomes contributed to only one general language factor at the child level while all the literacy outcomes contributed to only one literacy factor at both the child and classroom level. The dialect outcomes were expected to contribute to both language and literacy factors. This model argues that dialect does not have its own distinct construct but each indicator is a mixture of language and literacy. The model is depicted in Figure 6.

Figure 6. Model 4: Two-factor child and classroom

Three-factor child language, literacy and dialect and one-factor classroom

language and literacy (Model 5). Once the model was fit based on theory, analysis was

conducted to determine if child-level covariation among outcomes contribute to three

factors, *child language*, *child literacy*, and *child dialect*. Analysis was conducted to

determine if classroom-level covariation among outcomes contributed to one factor,

classroom language and classroom literacy. The covariance of 3 observed dialect

measures was also used to determine the contribution of dialect to factors at the

classroom-level. In other words, Model 5 examined whether language outcomes

contributed to only one general language factor at the child level, the literacy outcomes

contributed to only one literacy factor, and dialect outcomes contributed to a separate

dialect factor at the child level. All the language, literacy, and dialect outcomes were

expected to contribute to a general language and literacy factor at the classroom level.

The model is depicted in Figure 7.
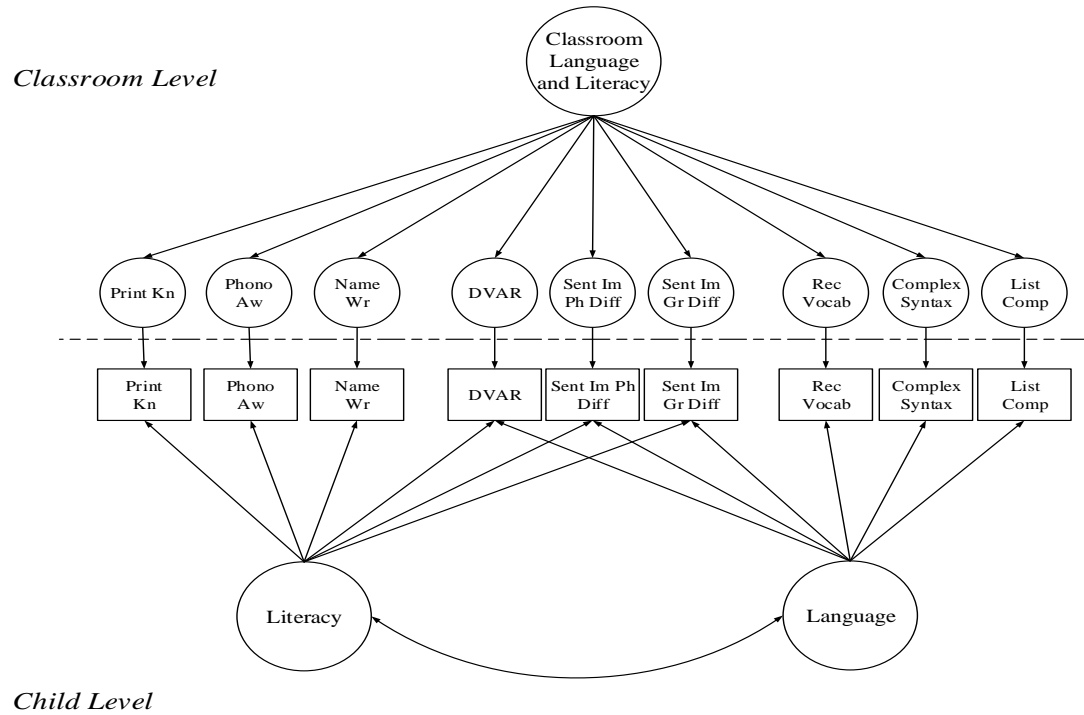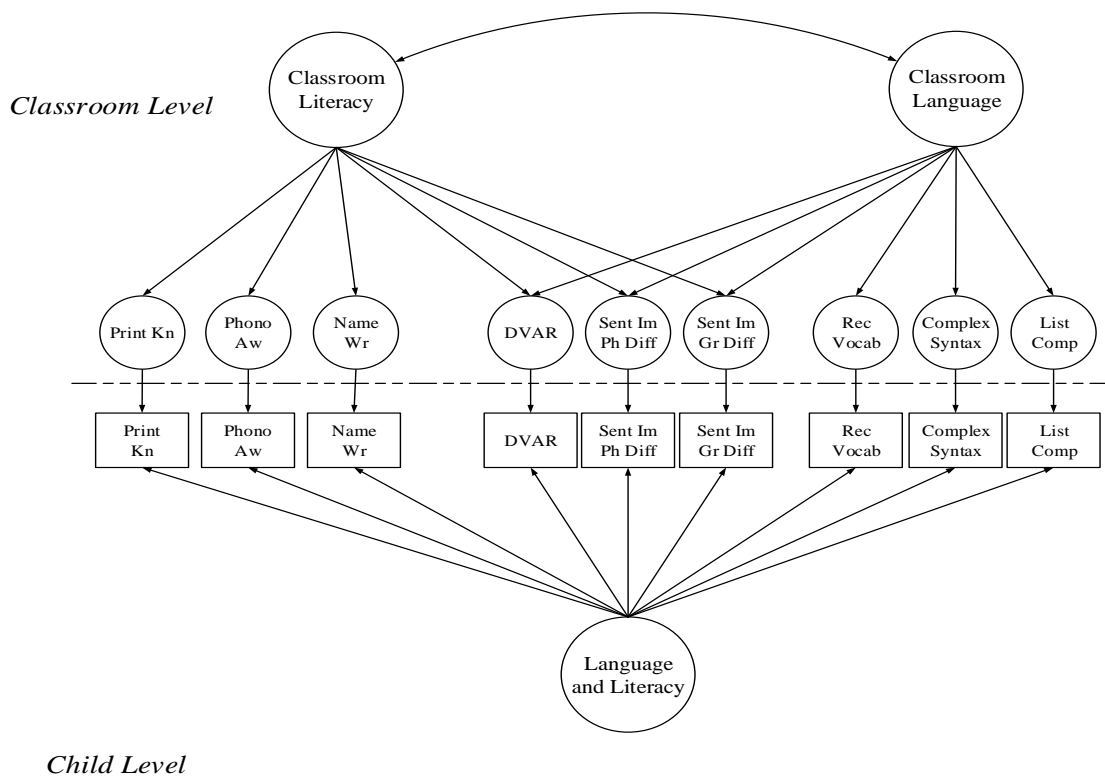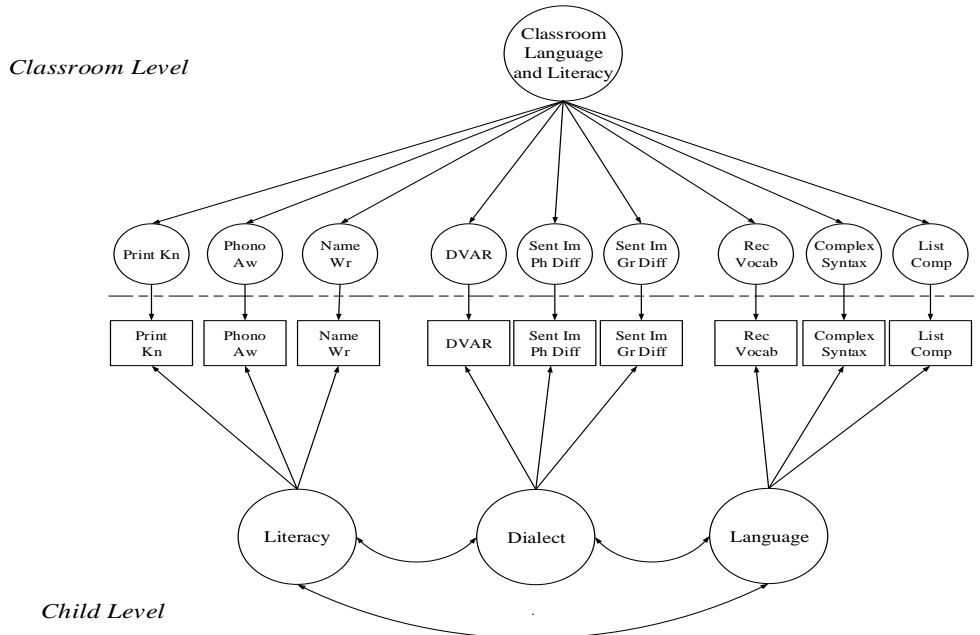

Figure 7. Model 5: Three-factor child and one-factor classroom

Three-factor child language, literacy and dialect and two-factor classroom language and literacy (Model 6). Once the model was fit based on theory, analysis was conducted to determine if child-level covariation among outcomes contributed to three factors, *child language*, *child literacy*, and *child dialect*. Analysis was conducted to determine if classroom-level covariation among outcomes contributed to two factors, *classroom language and literacy* and *classroom dialect*. The covariance of three observed dialect measures was also used to determine the contribution of dialect to factors at the classroom-level. In other words, Model 6 examined whether the language and literacy outcomes were expected to contribute to a general language and literacy factor at the child level. The dialect outcomes were expected to contribute to a separate dialect factor at the child level. The model also examined whether language outcomes contributed to only one general language factor at the classroom level, the literacy outcomes contributed to only one literacy factor, and dialect outcomes contributed to a separate dialect factor at the classroom level. The model is depicted in Figure 8.
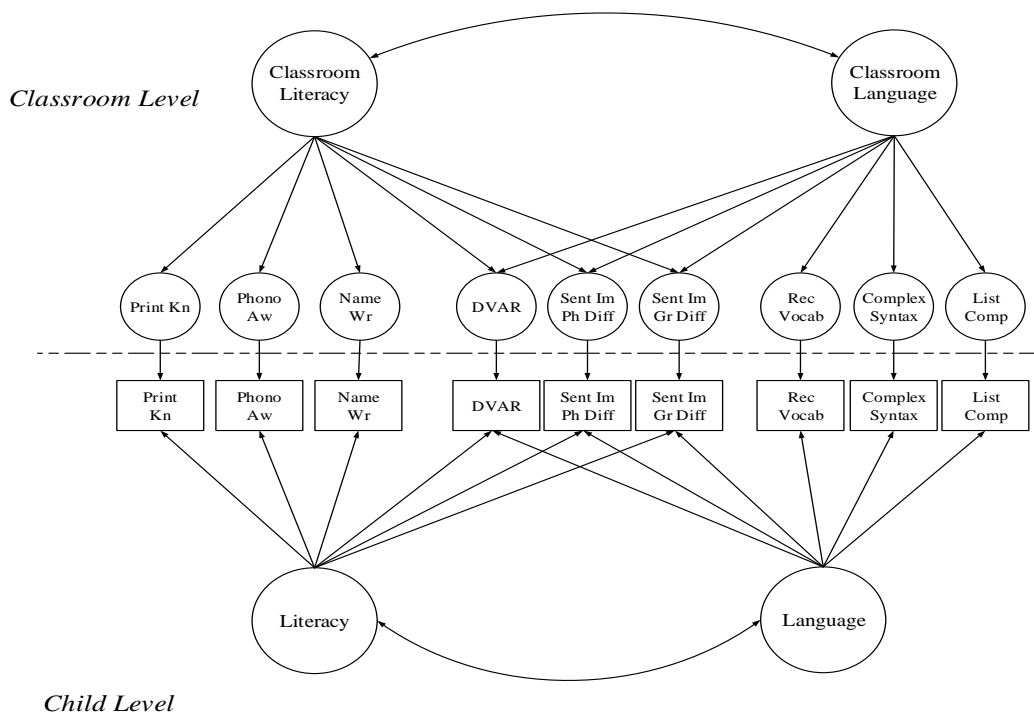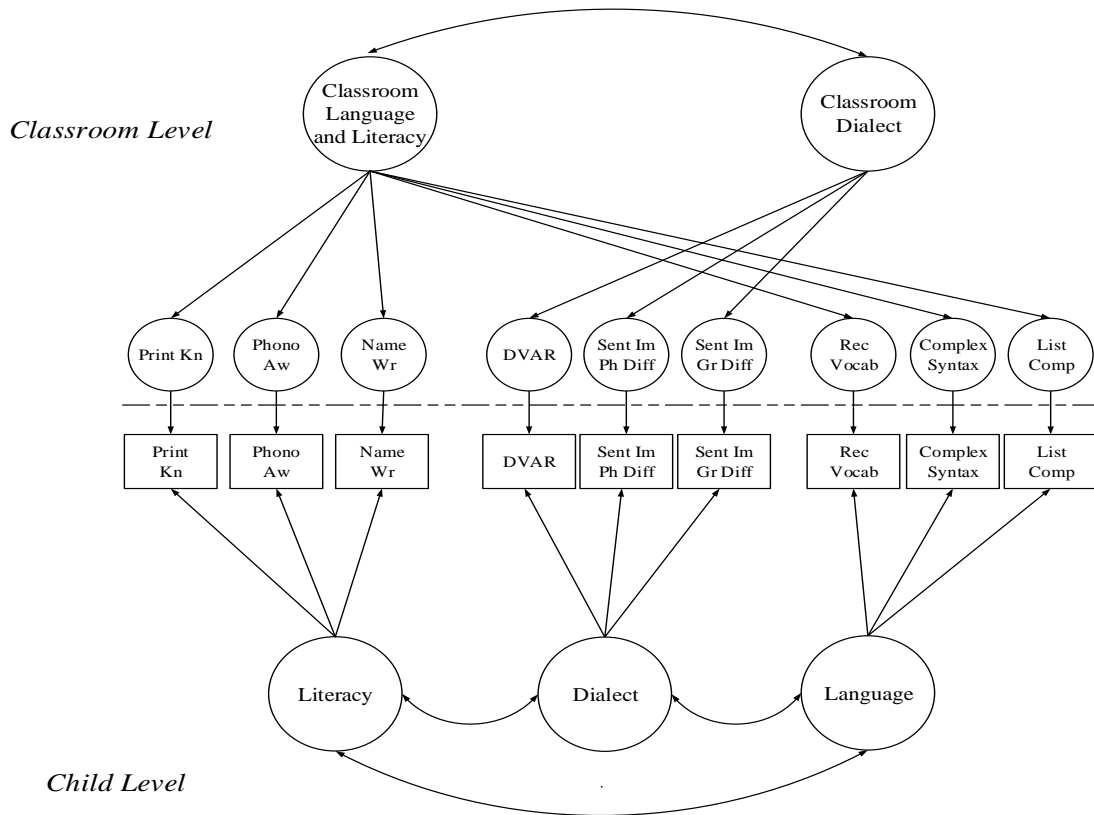
Figure 8. Model 6: Three-factor child and two-factor classroom

Three-factor child language, literacy, and dialect and three-factor classroom language, literacy, and dialect (Model 7). After determining significant correlations among outcomes, analysis was conducted to determine if child-level covariation among outcomes contribute to three factors, *child language*, *child literacy*, and *child dialect*. Analysis was conducted to determine if classroom-level covariation among outcomes contributed to three factors, *classroom language*, *classroom literacy*, and *classroom dialect*. In other words, Model 7 examined whether language outcomes contributed to only one general language factor at the classroom level, the literacy outcomes contributed to only one literacy factor, and dialect outcomes contributed to a separate dialect factor at

the child and classroom level. This is the largest model, and essentially argues that each group of indicators has its own construct. The model is depicted in Figure 9.
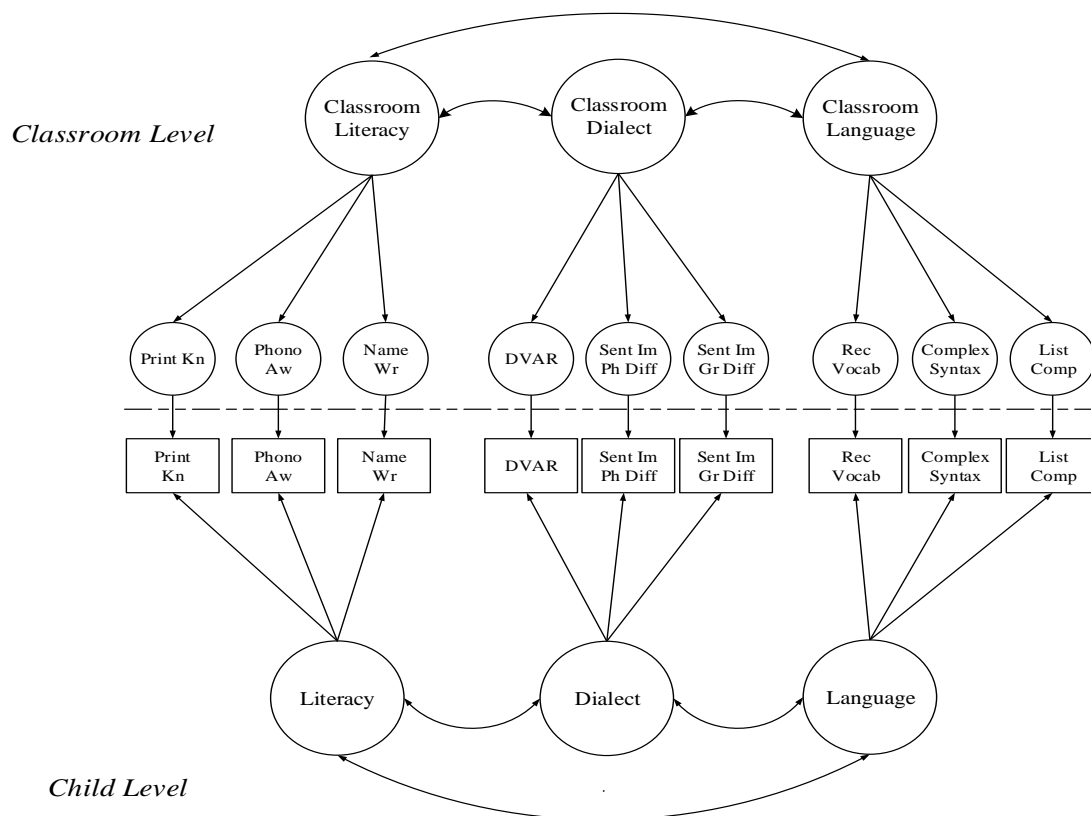
Figure 9. Model 7: Three-factor child and three-factor classroom

Statistical Analysis

  The questions raised in this study were addressed a sequence of multilevel confirmatory factor analysis. Below is the rationale and description of the statistical methods used to investigate the different questions. Details of the final model and its interpretations can be found in the results section.

 **Classroom context.** As mentioned previously, the questions in this study are grounded on the assumption that there is significant variability in average achievement across classrooms. The first step to consider was then to evaluate and identify the variability. The average outcome of the variable was investigated using univariate mixed-effects models that were fitted using Proc Mixed (SAS Institute, 2010).

  Multilevel confirmatory factor analysis. Multilevel confirmatory factor analysis (MCFA) is a combination of a factor analysis model that accounts for the structure of observations on individuals or children in a group (within-group) and a factor analysis model that accounts for the structure of observed group means (between-group) at the classroom level.

  Multilevel CFA was conducted using maximum likelihood estimation with robust standard errors (MLR) in the software program Mplus7 (Muthén & Muthén, 2012) in the following sequence: assumptions for CFA including homoegeneity of variance, linearity, normality, and independence of observations were examined visually, the model was specified for three groups of measures, language, literacy, and spoken dialect, and the models were assessed for fit based on conventional criteria: RMSEA $\leq$ .05, SRMR $\leq$ .08, and CFI $>$ .95 (Hu & Bentler, 1999). In addition, some models are proper subsets of other models (i.e., all terms of the smaller model are present in the larger model); the models

are referred to as hierarchical or nested. This study has 7 nested models which are

restricted versions of each other. For example, Model 1 is nested in Models 2 and 3,

Model 2 and 3 are nested in Model 4, and Model 5 is nested in Model 6. Likelihood ratio

chi-square test was then performed to test the statistical significance of the decrement in

overall fit between the larger model and the smaller nested model (refer to Table 7).

CHAPTER 4

RESULTS

Descriptive Statistics

Univariate analysis and normality tests were used to examine the variables for

outliers, normality, skew, and kurtosis. Most of the children were African American

(68%), followed by Hispanic (22.1%) and other (9.9%). All groups met the assumption of

linearity, homogeneity of variances, and independence of observation. Means and

standard deviation can be found in Table 3.

In general, children were performing in the average ranges on all early language

and literacy measures. Based on a normal distribution curve, 95% of the sample were

included which meant that all students who scored within 2 standard deviations on the

standardized average of the PPVT, TOPEL print knowledge, and TOPEL phonological

awareness tests were included. In other words, students who scored in the range of 70 to

130 on each of the standardized tests just mentioned were included in the analysis sample

(n = 673). With respect to NMAE use, both DVAR and Sentence Imitation scores suggest

that average spoken NMAE production was relatively high. Using the criterion scores of

the sample provided by the DELV-S (n = 535), 65% of children in the sample were

speaking with strong variation, 17.4% were speaking with some variation, and 17.6%

were speaking with little to no variation from MAE.

Table 3

Descriptive Statistics: Means, Standard Deviations, and Range

Level	Observed Measure	M (SD)		Range
Student (*N* = 673)				
	Age (months)	60.71	(4.13)	45.00 – 72.00
	TOPEL Print Knowledge (standard score)	106.03	(12.57)	71.00 – 129.00
	TOPEL Phonological Awareness (standard score)	94.54	(13.70)	71.00 – 129.00
	PALS Name Writing (percentage)	86.11	(20.94)	0 – 100.00
	PPVT-IV Receptive Vocabulary (standard score)	94.45	(12.37)	71.00 – 126.00
	NAP Protocol- Short Form Complex Syntax (percentage)	45.94	(19.69)	0 – 100.00
	NAP Protocol Comprehension (percentage)	58.71	(27.28)	0 – 100.00
	DVAR score Dialect (percentage)	73.54	(23.90)	0 – 100.00
	Dialect Sentence Imitation Phonological Difference (percentage)	54.03	(24.18)	0 – 100.00
	Dialect Sentence Imitation Grammatical Difference (percentage)	37.21	(21.57)	0 – 100.00
	Title Recognition Test (percentage)	7.27	(5.50)	0 – 31.00
Teacher (*N* = 95)				
	ELLCO, Pre-K Language and Literacy Classroom Observation	3.45	(.46)	2.45 – 4.38

Note. Standard errors appear in parenthesis.

Descriptive and unilevel analysis of the child level predictor such as the Title Recognition Test and the classroom level predictor such as the ELLCO revealed that more than 50% of the sample had missing data. These home and classroom environment predictors were not included in the proposed model because their inclusion resulted in

non-convergence. In addition, descriptive analysis revealed that all the nine outcomes had linear relationships with each other.

Multilevel descriptive statistics of the nine language, literacy, and dialect outcomes are presented in Table 4.The top rows of Table 4 show the correlations among the different outcomes. The bottom four rows represent means, between- and within-classroom standard deviations, and intraclass correlations (ICC) estimated using a multivariate mixed-effects model in SAS Proc Mixed (SAS Institute, 2010). The within-classroom standard deviation is the child-level standard deviation pooled across all classrooms and they ranged from 1.00 to 17.02. The between-classroom standard deviation (i.e., classroom-level standard deviation) represents the square root of the variance of the classroom means centered around the mean of all classrooms. The standard deviations ranged from .50 to 13.63. In other words, 68% of the classroom means are within 1 standard deviation from the grand mean for a normally distributed data set. For example, 68% of the classroom means for print knowledge could be expected to lie between 4.57 units from the grand mean of 103.74.

All the ICC values were rather high among the outcomes were typical (Hedges & Hedgberg, 2007). The values ranged from .055 to .18 except for name writing which had an ICC of .05. For example, an ICC value of .16 suggests that 16% of the variability in child scores represent the difference among classrooms in their mean performances. High ICC values thereby suggest high variability among classroom means and this is further evidence that a multilevel model that accounts for the classroom context is appropriate for this study.

Multilevel correlation estimates are shown in Table 4 for all 9 outcomes. Correlations among all outcomes were significant at both child and classroom levels. Correlation values had a wide range and several outcomes appeared to be more homogenous in clusters. For example, the three dialect outcomes were negatively correlated with all other language and literacy outcomes at both the child and classroom levels. Furthermore, the child-level correlations were generally higher than classroom-level correlations.

At the child level (below the diagonal in Table 4), all language and literacy outcomes were fairly homogenous with the exception of the sentence imitation phonological difference variable which had a no significant correlation with the name writing variable. The DVAR variable had a relatively low correlation with print knowledge ($r = -.13$). The dialect outcomes were negatively correlated with all language and literacy measures ($r = -.10$ to $-.32$), suggesting that some of the 9 outcomes might be grouped into 2 or more clusters based on how similar the correlated values are.

A similar pattern was found at the classroom level above the diagonal in Table 4; however, the DVAR outcome was found to be uncorrelated with print knowledge, phonological awareness, complex syntax, and listening comprehension. In addition, sentence imitation phonological difference was not significantly related to complex syntax. Table 4 shows a clear distinction between the correlations of the language and literacy outcomes and the dialect outcomes at both child and classroom level. The correlations appear to be less consistent at the classroom level and could be attributed to missing data. Overall, the correlation estimates suggest that dialect outcomes might differ from language and literacy outcomes at both the child and classroom level.

Table 4

Estimated Correlations, Standard Deviations and Intraclass Correlations of Student

Measures

	Variable	1	2	3	4	5	6	7	8	9
1.	Print Knowledge	-	.68**	.61**	-.05	-.21**	-.23**	.77**	.47**	.47**
2.	Phonological Awareness	.46**	-	.48**	-.27**	-.25**	-.32**	.64**	.39**	.23**
3.	Name Writing	.36**	.25**	-	-.03	-.25**	-.40**	.54**	.39**	.24**
4.	Dialect- DVAR	-.13**	-.29**	-.19*	-	.51**	.63**	-.09*	.02	.04
5.	Dialect - Phonological Difference	-.26**	-.31**	-.10	.30**	-	.64**	-.24**	-.10	-.37**
6.	Dialect - Grammatical Difference	-.24**	-.39**	-.19*	.42**	.41**	-	-.13**	-.26**	-.24**
7.	Receptive Vocabulary	.47**	.51**	.23**	-.31**	-.31**	-.40**	-	.35**	.52**
8.	Complex Syntax	.30**	.32**	.30**	-.17*	-.32**	-.29**	.37**	-	.46**
9.	Listening Comprehension	.32**	.43**	.23**	-.21**	-.31**	-.37**	.55**	.47**	-
	Grand Mean	103.74	90.37	5.88	74.28	54.13	37.47	90.92	16.80	3.61
	Within SD	6.83	7.77	0.64	17.02	13.26	10.99	7.25	4.14	1.00
	Between SD	4.57	4.58	.42	13.63	9.16	10.42	2.91	2.68	.50
	Intraclass Correlation	.13	.11	.08	.32	.17	.18	.06	.15	.07

Note: *N*= 673. Classroom-level correlations are depicted above the diagonal and child-level correlations are below the diagonal. * *p*<.05, ** *p*<.001.

Multilevel Confirmatory Factor Analysis Models

Among all the CFA models, Model 7 with three-factors at each level did not converge and was therefore not included in the results and discussion. The final model was the three-factor at the child level and two-factor at the classroom level (Model 6 depicted in Figure 8). The least restrictive model is the one-factor at the child level that acted as baseline to compare the other models. Fit statistics for all the models are presented in Table 5. The alternative models were compared against each other using the Chi-square difference test of the loglikelihood ratios. Model 6 was a found to be a better fit for the data compared to Model 4 $\Delta\chi$ (1) = 4.08, $p<.005$. Model 5 was not a better fit compared to Model 6 $\Delta\chi$ (2) = 5.09, $p= .07$. The results indicate that the restrictions placed on Model 6 did not result in a worse fitting model and can be accepted.

At the child level of Model 6, the language construct was defined by receptive vocabulary (PPVT-IV; Dunn & Dunn, 2007) and narrative skills (Narrative Assessment Protocol, NAP; Justice et al, 2010). The literacy construct was defined by print knowledge and phonological awareness (TOPEL; Lonigan et al, 2007) and name writing (PALS-PreK; Invernizzi et al, 2004). Finally, the dialect construct was defined by two spoken dialect measure, a dialect screening tool (DELV-S; Seymour et al, 2003) and two-part sentence imitation measure (Charity et al., 2004). Only the results for Model 6 were thereby presented (standardized estimates of the model in Figure 10 and factor loading estimates in Table 6). At the classroom level, a general language and literacy construct defined by receptive vocabulary, narrative skills, print knowledge, phonological awareness, and name writing emerged, while a dialect construct was defined by the two spoken dialect measures. Models1, 2, and 5 were not within recommended fit indices at

the child level. In addition, all the models had poor model fit at the classroom level.

Specifically, the fit of Model 6 was reasonable (CFI = .93; RMSEA = .05; SRMR, within

= .05; SRMR, between = .21) indicating that three factors at the child level and two

factors at the classroom level adequately explains the pattern of covariance among the

nine outcomes. However, there is substantial misfit at the classroom level, suggesting that

this simple model might not be entirely adequate but is the best fit of the series.

Researchers have found these criterion to be too stringent (e.g., Marsh, Hau, & Grayson,

2005; Marsh, Hau, & Wen, 2004)

The latent factors at the classroom level were identified by fixing residual

variance of print knowledge and sentence imitation grammatical difference to zero (see

Figure 10). The remaining factor loadings, latent variances, and residual variances were

freely estimated at classroom and child level. Measurement intercepts were estimated for

all nine outcome variables. Standardized parameter estimates for the multilevel CFA

model are presented in Figure 10. Table 5

Multilevel Confirmatory Factor Analysis: Fit Indices for Six Models

Model Number	Model Name	Chi-Square (*df*)	CFI	RMSEA	SRMR within	SRMR between	Loglikelihood
1	1-factor child, 1-factor class	190.26 (54)	.87	.06	.05	.28	-13801.20
2	2-factor child, 1-factor class	580.35 (52)	.50	.12	.18	.29	-13947.64
3	1-factor child, 2-factor class	155.96 (55)	.91	.05	.06	.42	-13797.71
4	2-factor child, 2-factor class	156.69 (50)	.90	.06	.05	.28	-13792.01
5	3-factor child, 1-factor class	255.07 (53)	.81	.08	.05	.41	-13800.28
6	3-factor child, 2-factor class	125.66 (51)	.93	.05	.05	.21	-13784.78

Note. CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; Residual variance was fixed to zero for: sentence imitation phonological difference and PPVT in model 2, print knowledge and receptive vocabulary were fixed to zero in model 3, print knowledge and sentence imitation grammatical difference in model 5, and sentence imitation grammatical difference in model 6 to avoid negative estimated variance.
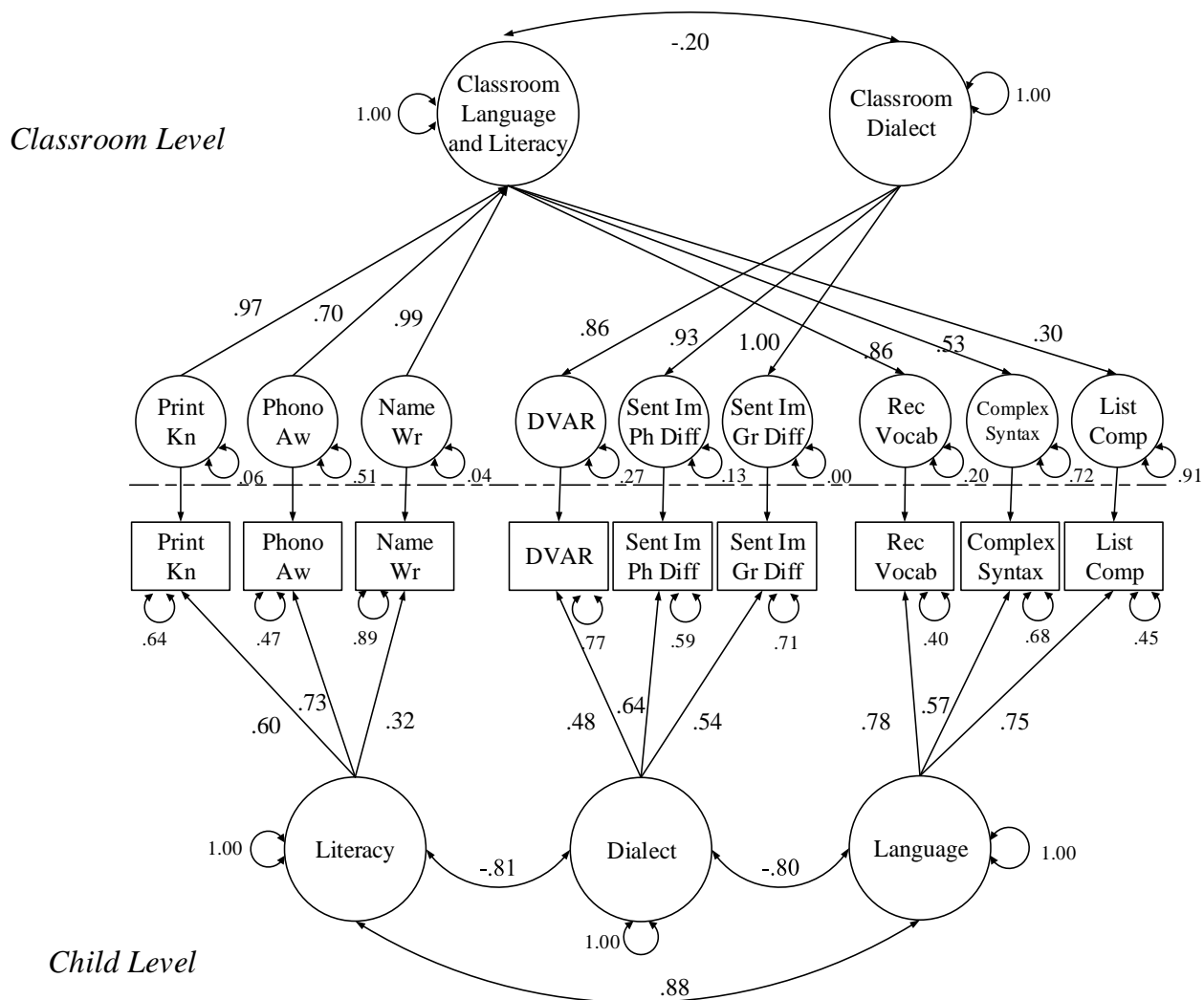
Figure 10. Final model with fully standardized estimates. The results shown are for
Model 6 shown in Figure 8. The dashed line separates child level (below the line) from
the classroom level structures (above the line). Print Kn = Print Knowledge, Phono Aw =
Phonological Awareness, Name Wr = Name Writing, DVAR = Dialect Variation, Sent Im
Ph Diff = Sentence Imitation Phonological Difference, Sent Im Gr Diff = Sentence
Imitation Grammatical Difference, Rec Vocab = Receptive Vocabulary, List Comp =
Listening Comprehension.

Factor Structure: Child and Classroom Level

The extent to which the three groups of measures are specified as factors was examined at both the child and classroom level. The most appropriate model for this sample population was found to be Model 6 and the factors specified are described below.

At the child level, language, literacy, and dialect were specified as three separate factors. The correlation values among the variables of each construct appear homogenous (see Table 4): literacy construct (.25 to .46), language construct (.37 to .55), and dialect construct (.30 to .42). The unstandardized factor loadings for each construct were all statistically greater than zero and are presented in Table 6. The coefficient of determination (R^2) in Table 6 provided an estimation of proportion of variability due to all predictors. The unstandardized factor loadings for child-level latent factors ranged from 0.06 to 1.33 for literacy, from 0.15 to 0.39 for language, and from 1.00 to 1.35 for dialect. The latent factors explained 23% to 53% of the variability in observed child-level outcomes. Name writing was the weakest indicator of the literacy factor, complex syntax was the weakest indicator for the language factor, while all indicators for the dialect factor were fairly homogenous.

At the classroom level, the correlation values for the language and literacy construct were fairly homogenous (.35 to .68) with the exception of the low correlation between listening comprehension and phonological awareness($r = .23$) and name writing ($r = .24$) high correlation between print knowledge and receptive vocabulary ($r = .77$). The dialect measures that defined dialect were also homogenous (.51 to .64). The bottom section of Table 6 shows the unstandardized factor loadings for classroom-level latent

factors. The factor loadings were found to be significantly different from zero. The loadings ranged from 0.09 to 0.73 for language and literacy and from 0.67 to 0.81 for dialect. The latent factors explained 9% to 95% in classroom means of the outcomes. Complex syntax and name writing were the lowest indicators of the language and literacy factor at the classroom level suggesting that these two predictors might be influenced by a separable factor. The indicators for the dialect factor were also homogenous at the classroom level which is consistent with the correlation matrix shown in Table 4. All outcomes had significant residual variance suggesting that specific excluded factors such as home and classroom covariates might be influencing these outcomes.

In summary, a CFA model three-factor at child level and two-factor at classroom level was the best fit model to represent the correlation between the hypothesized constructs and the corresponding outcomes. It did not explain all variances because there could be other contributors to the outcomes that were not included in the model. The presence of considerable residual variances suggests specific factors may better explain variances. The results suggest that there is convergent validity between the indicators defining each construct (i.e., how well similar outcomes correspond to each other in the defined construct).

Table 6

Final Model Results: Loadings, Residual Standard Deviation, R², and Intercept

Variable	Loading		Residual SD		R²	Intercept
Child Level						
Literacy Factor						
Print Knowledge	1.00	(0.00)	88.63	(6.45)	0.36	n/a
Phonological Awareness	1.33	(0.13)	79.32	(8.59)	0.53	n/a
Name Writing	0.06	(0.01)	1.77	(0.20)	0.10	n/a
Language Factor						
Receptive Vocabulary	1.00	(0.00)	57.55	(6.28)	0.60	n/a
Complex Syntax	0.39	(0.06)	28.11	(3.98)	0.33	n/a
Listening Comprehension	0.15	(0.02)	1.50	(0.22)	0.56	n/a
Dialect Factor						
DVAR	1.00	(0.00)	304.38	(31.22)	0.23	n/a
Phonological Difference	1.35	(0.26)	239.61	(39.19)	0.41	n/a
Grammatical Difference	1.27	(0.25)	357.07	(53.21)	0.29	n/a
Classroom Level						
Language and Literacy Factor						
Print Knowledge	1.00	(0.00)	1.16	(7.07)	0.95	105.99
Phonological Awareness	0.73	(0.40)	10.95	(4.19)	0.49	94.42
Name Writing	0.09	(0.05)	.006	(0.08)	n/a	6.05
Receptive Vocabulary	0.58	(0.19)	2.25	(1.90)	0.75	94.41
Complex Syntax	0.32	(0.18)	5.37	(1.71)	0.28	18.33
Listening Comprehension	0.03	(0.04)	0.23	(0.14)	0.09	4.09
Dialect Factor						
DVAR	1.00	(0.00)	48.06	(37.44)	0.73	75.27
Phonological Difference	0.67	(0.13)	8.80	(16.11)	0.87	40.91
Grammatical Difference	0.81	(0.30)	0.00*		1.00	58.11

Note. Standard errors appear in parenthesis. Loadings are unstandardized regression weights; standardized estimates are shown in Figure 10. The residual variance of the grammatical difference variable was fixed to zero to avoid negative estimated variance. Fit statistics: χ^2 (51) = 125.66, p <.001; Loglikelihood = -13784.78; parameters= 48; CFI= .93; Akaike information criterion= 27665.55; root-mean-square error of approximation= .05; standardized root-mean-square residual, within = .05; standardized root-mean-square residual, between = .21.

Correlations between the latent factors are depicted in Table 7. At the child level, literacy and language factors were found to be highly correlated (r = .88) while dialect was moderately and negatively correlated to both language and literacy (r = -.80 to -.81). At the classroom level, dialect was moderately and negatively correlated to the general language and literacy factor. The findings provide statistical support to the proposed model that the dialect factor is distinct from language and literacy at both the child and classroom level in this sample population. Overall, language and literacy as distinct factors cannot be truly confirmed in this study.

Table 7

Latent Factor Correlations, Covariances and Standard Errors

Latent Factors						
Child Level	Literacy		Language		Dialect	
Literacy	–	–	.88	(.04)	-.81	(.03)
Language	57.87	(6.36)	–	–	-.80	(.06)
Dialect	-54.80	(10.24)	-81.46	(15.70)	–	–
Classroom Level	Language and Literacy				Dialect	
Language and Literacy	–		–		-.20	(.37)
Dialect	-9.99		(5.02)		–	–

Note. Standard errors appear in parenthesis. Correlations appear above the diagonal and covariances appear below the diagonal (see also Figure 10).

CHAPTER 5

DISCUSSION

The purpose of this study was to examine the proposed relationships that exist between emergent literacy, language skills, and spoken dialect use. To date, no other study has attempted to include measures of print knowledge, phonological awareness, name writing, receptive vocabulary, complex syntax, listening comprehension, and spoken dialect to explain the nature of the relationships among these variables in a sample of prekindergarten children. The proposed relationships between the observed and unobserved variables in this study were based on theoretical relationships established in previous empirical research studies.

The framework that was considered for emergent literacy skills in this study is one which separates the skills into three categories, print/literacy knowledge, oral language skills, and metalinguistic skills (Senechal et al., 2001). The conceptual framework of separating the skills into three constructs has been shown to better explain the development of the skills in young children in comparison to one or two constructs (Lonigan et al., 2000; Senechal et al., 2001; Whitehurst et al., 1994). In addition, the Componential Model of Reading (Aaron, 1997; Joshi & Aaron, 2000, 2012) was considered for the theoretical framework in this study to account for cognitive skills such as decoding and listening comprehension while still accounting for factors such as dialect variation and the classroom environment. Three latent variables were proposed (language, literacy, and dialect) and each latent variable was measured with three observed variables. The outcomes for these constructs were examined at the child and classroom level. The language construct was measured by receptive vocabulary, complex

syntax, and listening comprehension. The literacy construct was measured by print knowledge, phonological awareness, and name writing. The dialect construct was measured by a spoken dialect screener, a phonological difference sentence imitation task, and a grammatical difference sentence imitation task. Seven hypothesized models were used to examine hypotheses regarding the structure of these nine tasks for the extent to which they indicated three potentially underlying constructs: language, literacy, and dialect. A multilevel, multivariate latent variable approach was used in order to account for the nested structure (i.e., children nested within classrooms) and for examining numerous variables simultaneously.

Overall, the results for the factor structure at the child level supported a three-factor model (i.e., language, literacy, and dialect factors). Results for the factor structure at the classroom level supported the two factors (i.e., one factor representing the observed language and literacy skills, and another factor defined by the dialect measures). Finally, data were not available to address the final research question which was to look at the effect of child and classroom level factors that might influence performance. The findings as well as the implications for instruction and assessment are summarized below.

The Nature of Language, Literacy, and Dialect Constructs

With regards to the nature of language and literacy constructs of young children who speak NMAE, prior literature indicates that language and literacy skills are separable at the child level and teacher level among diverse linguistic groups (e.g., Branum-Martin et al., 2006; Mehta et al., 2005). Specifically, Branum-Martin and colleagues (2006) found two factors representing language and literacy in Kindergarten, and Mehta and

colleagues (2005) had similar findings in children in Grade 1 to 4. Therefore, it would be expected that the model for two separable factors at child and classroom level would be the best fit for the population of the current study. Although the language and literacy factors at the child level were distinct from one another in this study, they were highly correlated. This suggests that the skills of preschoolers may be less differentiated than the older children whose performances were represented by the moderately correlated two-factor model found by Mehta et al. (2005). The high correlation between the language and literacy factors of this population suggests that the language and literacy outcomes represent more general emergent language and literacy skills that can be attributed to their young age. In fact, research studies show that emergent language and literacy skills among preschoolers are highly interrelated (e.g., McCardle et al., 2001; NELP, 2008; Pearson & Hiebert, 2010).

The outcome of the CFA model in this study adds further reason to consider the validity and importance of language and literacy as distinct concepts. In fact, the findings of the study suggest that language and literacy are indeed distinct and separable at the child level for this population. In the context of the classroom, the language and literacy factors were perfectly correlated and are therefore considered as one unified factor. Mehta et al. (2005) had similar findings in the sample of older children. Perhaps when considering the average achievement across the classroom, the measures are too correlated to be separated into distinct categories and might be better conceptualized as a general language and literacy construct.

Variability in print knowledge, phonological awareness, and name writing were adequately explained by the literacy factor and variability in receptive vocabulary,

complex syntax, and listening comprehension were adequately explained by the language factor. Among the literacy measures, name writing was the weakest indicator at the child level but was found to be the strongest indicator at the classroom level. Weak indicators (i.e., indicators with considerably low loadings on a factor) may be measuring a different factor. Mehta et al. (2005) found that writing was also the weakest indicator of literacy at both the child and classroom level. Perhaps name writing acts as a precursor skill to early writing and both these skills are measuring a different factor. The variability in evaluation and teaching of emergent writing in preschool classrooms (IRA/NAEYC, 1998; NELP, 2008; Neuman, Copple, & Bredekamp, 2000) could be reflected in the relationships between name writing and emergent literacy. In fact, in this study, name writing was not strongly correlated to any of the other indicators which could be attributed to the uniqueness in how it is measured compared to the other indicators as well as to the quality of teaching in the classroom.

In addition to investigating whether language and literacy are distinct factors in young children, the study extended the literature by considering whether spoken dialect use would be better conceptualized as a separate factor from language and literacy. With regard to the nature of how spoken dialect use might relate to language and literacy constructs, the final model suggested that the dialect factor is separable from the language and literacy factors at both the child and classroom level. The dialect factor explained the observed variance of the three dialect outcomes almost equally, suggesting convergent validity of the construct. That is, the child measures (i.e., sentence imitation phonological difference, sentence imitation grammatical difference, and dialect variation DVAR) appear to be consistent indicators of a single underlying ability. The high correlation

between dialect factor and the language and literacy factors at child suggests discriminant validity however; the results should be interpreted cautiously. That is, the measures of dialect use are in fact distinct from the measures of early language and literacy skills in this sample but are almost perfectly correlated and further evidence is required to support the findings. The high negative correlation between the dialect and the language and literacy factors at the child level supports prior research studies which found that spoken dialect use was related to oral language and early literacy (e.g., Charity et al., 2004; Connor & Craig, 2006; Craig & Washington, 2004a; Craig et al., 2009; Terry, 2012; Terry et al., 2010, 2012). The low correlation between the dialect factor and the language and literacy factor at the classroom level indicates discriminant validity. That is, the measures of dialect use are distinct from the language and literacy factor. The moderate negative correlation between the dialect factor and the language and literacy factor is a unique research finding as no study has yet looked at the factors at the classroom level. Further research could reveal what factors are contributing to the different structures at the child and classroom levels.

This finding is unique since a latent factor representing spoken dialect has not been previously derived from three observed variables. Previous studies have examined spoken dialect as a single observed variable in relation to early language and literacy measures (e.g., DVAR, Terry et al., 2010; sentence imitation; Charity et al., 2004). The findings of this study suggest that spoken dialect use is a factor that can be measured reasonably well by several observed variables. It should be noted that a 3-indicator model is not falsifiable on its own so future studies can examine other dialect indicators and how they fit in a latent factor. In summary, findings from this study suggest that the

spoken dialect use may be separate from language and literacy in the context of classroom average as well as in the context of the individual child.

With regards to the third research question, variables measuring factors from the home and classroom environment were to be added to the model as these have been found to play an important role in children's oral language and literacy skills (Barnett et al., 2011; Howes et al., 2008). However, due to too many missing values (more than 55% missing values), the variables could not be included in the models. It may be that once measures of the classroom and home environment, more variance within a classroom as well as between each classroom might be accounted for. Future studies with home and classroom covariates could help some of the variance in the various language, literacy, and dialect measures. For example, if classroom observations are found to be related to classroom level outcomes, then some of the variance in child performance on the language and literacy tasks at the classroom level can be explained. This would indicate that quality of classroom and teaching plays a significant role in the language and literacy outcomes of children at the classroom level. Finally, if the home literacy observations are related to child level outcomes then some of the variance in child performance on the tasks at the child level can be explained. This would indicate which home literacy measures play a significant role in the child outcomes.

Theoretical and Educational Implications

Findings from this study have theoretical implications for emergent literacy as well as for spoken dialect. The concept that a unitary construct represents language skills that is different from literacy skills is not new and has been documented in seminal

studies. What this study adds to existing literature is the empirical validation of the two separate factors and a multilevel context among preschoolers. A review of the literature shows that the definitions of language and literacy and the measures representing each construct vary across studies. For example, Storch and Whitehurst (2002) represented oral language with receptive vocabulary, expressive vocabulary, word structure, and sentence structure. On the other hand, Senechal et al. (2001) defined oral language as including measures of vocabulary, narrative knowledge, and knowledge of the world. Although there is some overlap of measures used to define oral language skills, some measures used are different. The same can be found for defining the concept of emergent, early, and conventional literacy in young children. Methodological approaches like the ones used in this study could be helpful in moving towards a more consistent definition of what language and literacy could represent in young children. These methodological approaches may also be used to guide researchers and educators to using a more concise list of assessments and protocols that are less redundant.

The findings of the study may help add more clarification to the theories proposed in prior literature to explain the relationship between spoken dialect and emergent language and literacy skills. One hypothesis, the linguistic mismatch hypothesis, proposes that NMAE speakers are more vulnerable to reading difficulties because of a mismatch between spoken NMAE and MAE and Standard English orthography. According to this hypothesis, observed spoken dialect would have a negative and linear relationship with emergent language and literacy skills (Charity et al., 2004; Craig et al., 2009; Terry, 2006; Washington, 2001). Children who speak NMAE frequently are more likely to have difficulty on emergent language and literacy tasks. Findings from this study

including the moderate negative correlation between the dialect factor and the language and literacy factors as well as the consistent negative correlations across classrooms may align with the linguistic mismatch hypothesis. One limitation is that the classroom contexts (i.e., factors such as instructional quality) were not explicitly defined in the study. In conclusion, findings from this study cannot refute the linguistic mismatch hypothesis.

In contrast, the second hypothesis, the linguistic awareness/flexibility hypothesis, takes into account the role of metalinguistic skills in children's emergent language and literacy skills. According to the hypothesis, the relationship between NMAE and language and literacy would be highly sensitive to classroom or school context and could result in either linear or nonlinear relationships (Charity et al., 2004; Connor & Craig, 2006; Craig et al., 2009; Terry et al., 2010, 2012; Terry & Scarborough, 2001). In other words, this hypothesis accounts for children's ability to use NMAE or MAE depending on the appropriate context as they are able to think about and manipulate parts of language with intention. In addition, according to the hypothesis, sociolinguistic context plays a role in language use and linguistic diversity, therefore, if the environment presupposed different linguistic context (i.e., children were expected to use NMAE in one classroom and MAE in another classroom) then it may result in less consistent variation across classrooms. Furthermore, the hypothesis suggests that it is more likely that a mediated relationship could exist between dialect and reading- according to the hypothesis; metalinguistic ability could be mediating this relationship however no measure to test this ability was included in this model. Dialect could be a facet of language skills since metalinguistic ability includes all aspects of language (morphology,

semantics, syntax, and pragmatics). Additionaly, dialect is said to be characterized by systematic differences in these parts of language, and it is suggested the parts are not independent from each other. Therefore, the aspects of dialect might not be separable from language skills and would be better captured by a model that has less than 3 factors or constructs.

In this study, only linear relationships between spoken dialect and language and literacy were observed. Additionally, the spoken dialect factor was found to be separate from the language and literacy factor. Finally, the variation in performance on the dialect indicators was consistent across classrooms. Several concepts fundamental to the linguistic awareness flexibility hypothesis were not included in the models in this study. First, the role of sociolinguistic context was not included. Second, the effect of context the relationship between dialect and language and literacy was not measured. Third, metalinguistic knowledge was not measured and included in the study. In summary, findings from the study are unable to support the linguistic awareness flexibility hypothesis.

It is noteworthy to add that the moderate and negative correlations are not indicative of causal relationships. In other words, these findings do not indicate that the dialect factor is not predictive of language and literacy skills. An important methodological step that can be explored next would be to examine causal linear and nonlinear relationships that can exist between spoken dialect and the language and literacy factors. The study does show that the latent correlations were higher than the standardized loadings, and higher than the reliability estimates in the larger models (i.e., more than one latent factor). In addition, the models with fewer factors had very poor fits.

Together, these findings provide further evidence that the factors are distinct and therefore exhibit discriminant validity. Finally, with regard to the two hypotheses mentioned previously, a direct relationship between spoken dialect and the factors would align more closely with the linguistic mismatch hypothesis. On the other hand, a mediated relationship between spoken dialect and the factors would align more with the linguistic awareness/flexibility hypothesis.

Another important implication is to consider the developmental nature of language, literacy, and spoken dialect. One trajectory is that the children continue to develop skills representative of factor at different rates (e.g., due to variation in instruction) and the three factors remain distinct. Another trajectory is that children experience literacy-related instruction later than oral language skills, the latter which remains highly related to spoken dialect such that oral language and dialect are better conceptualized as one factor while literacy is a distinct factor. Conversely, the children's language and literacy skills could become so correlated (e.g., due to instruction) they are represented by one factor but spoken dialect is represented by another factor. Finally, there is a possibility that although school-age children enter school with different language and literacy backgrounds and skills, the language, literacy, and dialect outcomes are so related they are not discernible into different factors and rather become one unified factor. In sum, findings from this study and other recent investigations indicate that dialect variation should be considered in theoretical discussions on the development of language and literacy skills in young children who speak NMAE dialects.

Limitations and Future Directions

One of the main limitations of this study is that it was based on secondary analysis of previously collected data. Thereby, the research questions posed in this study might have been limited by factors such as the available measures, sample size, and child demographics. An additional limitation was the smaller sample size, particularly at the classroom level. Confirmatory factor analysis and structural equation modeling require a large sample, particularly if a lot of measures are loaded in the model. In addition, there are many confounding factors such as SES and parental education that could explain variances in children's performance that were not obtained for this study.

The classroom observations and home predictors were found to have considerably high missing data (i.e., more than 50% missing data) and were thereby excluded from the MCFA analysis. In comparison to single-level analysis, difficulties presented by missing data in multilevel analysis are concerned with the likelihood that the missing data at one level (e.g., classroom level) is linked to the missing data at another level (e.g., child level). For example, if a predictor is missing for one classroom (level-2), then all the children (level-1) in that classroom would have that predictor missing. In this case, these missing data at level-1 cannot be truly considered missing at random. Most multilevel analysis software would eliminate the children with the 'missing data' from the analysis, thus potentially eliminating cases that did not truly have missing data and thus reducing the sample size or affecting the estimation. A future step would be to use statistical software to impute plausible values at the level-2 that would reflect at level-1 and thus reduce the amount of missing data while allowing for analysis of the predictors in question.

Future studies could consider a sample that includes children from more diverse socioeconomic, language, and parental education environments. Prior research shows a change in spoken NMAE use and the relation with reading achievement (e.g., Terry & Connor, 2012; Terry et al., 2012). Future studies might consider how the nature of the language and literacy constructs might be different in populations that come from different social and linguistic backgrounds. Finally, future studies could conduct item-level analysis to unpack the nature of factor structures at the classroom level particularly for the spoken dialect measures. Item-level analysis of the spoken dialect measures might provide more insight to the effect of morphological and syntactic features of NMAE on reading skill development.

Finally, when interpreting results of this study, it is important to consider that multilevel confirmatory factor analysis is the proposal of more than one a priori hypothesis based on existing literature. Thus, multiple models may fit the same data set and result in acceptable model fit. Future multilevel models that include more indicators relationships may be a better representation of the relationships that exist in the real world. A child exists within a rich context that is made up of many influencing factors and investigating the direct effects of these factors might provide more insight to how reading proficiency can be achieved for different populations.

In summary, the observed variables measured in this study were best captured by a model that had distinct factors for language, literacy, and dialect at the child level. Language and literacy were not separable at the classroom level but spoken dialect remained better represented as a separate factor. This sample consisted of a majority of the students that produced a high frequency of NMAE which is an asset in investigating

the nature of spoken dialect use and the relationship with language and literacy factors. Future studies could validate the model in a less restrictive population as well as in samples where teacher and home literacy environment effects can be included in the model to consider direct/causal relationships. Finally, examining this model in older children or in a longitudinal sample to see the developmental trajectory of the different skills and factors could add more to the literature.

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APPENDIXES

APPENDIX A

PARENT EDUCATION SURVEY

Child's Full Name: _____   Child's School: _____

Parent/Guardian Name: _____   Today's Date: _____

The highest grade/year of school I completed was (choose one):

__ some high school   __ graduated from college with associate's degree

__ graduated from high school   __ some graduate/professional school

__ graduated from vocational/technical school   __ master's degree (MA, MS)

__ some vocational/technical school   __ doctoral degree (PhD)

__ some college   __ professional degree (MBA, MD, JD)

__ graduated from college with bachelor's degree

APPENDIX B

TITLE RECOGNITION TEST

FAMILY LITERACY QUESTIONNAIRE

Children's Books...

Below is a list of 60 book titles. Some of these are titles to popular children's books and some are made up. You are to read the titles and put a check next to those titles which you know to be titles of children's books. Do not guess, but only check those you know. Please answer without stopping to verify the books in your home.

		Children's Title			Children's Title
1.		A Difficult Day	2.		Brown Bear, Brown Bear What Do you See?
3.		A Pocket for Corduroy	4.		Bears on Wheels
5.		Caps for Sale	6.		Curious George
7.		Franklin in the Dark	8.		Go Dog Go
9.		Green Eggs and Ham	10.		Happy Birthday Moon
11.		In the Night Kitchen	12.		I Was So Mad
13.		Just Me and My Dad	14.		Love You Forever
15.		Mortimer	16.		Murmel, Murmel, Murmel
17.		Red Is Best	18.		Saggy Baggy Elephant
19.		Shy Little Kitten	20.		The Poky Little Puppy
21.		The Snowy Day	22.		Big Old Trucks
23.		Eleanor and the Magic Bag	24.		Hello Morning, Hello Day
25.		How Wishes Come True	26.		I Hear a Knock at My Window
27.		Martha Rabbit's Family	28.		Terry Toad
29.		Rachel's Real Dilemma	30.		The Paper Boat's Trip
31.		Tracy Tickles	32.		Three Cheers for Gloria
33.		Worry No Longer	34.		Winter Fun on Snowy Days
35.		The Very Hungry Caterpillar	36.		This Is My Family
37.		Tootle	38.		Velveteen Rabbit
39.		Zack's House	40.		Thomas' Snow Suit
41.		Alligator Pie	42.		We're Going on a Bear Hunt
43.		Busiest Firefighters Ever	44.		Wonderful Pigs of Jillian Jiggs
45.		Farmer Joe's Hot Day	46.		Whispering Rabbit
47.		Goodnight Moon	48.		Snowflakes Are Falling
49.		Harry the Dirty Dog	50.		The Toy Trunk
51.		Jelly Belly	52.		What Do I Hear Now?
53.		Alexander and the Terrible (...) Day	54.		Matthew and the Midnight Tow Truck
55.		Polar Express	56.		Clarissa's Patch
57.		Scuffy the Tugboat	58.		How Stephen Found a Pet
59.		The Runaway Bunny	60.		Kimberly's Horse
61.		Tacky the Penguin	62.		Lily's Purple Plastic Purse

Thank you for your help! Please return the survey to your child's teacher.
Your child will receive the school supplies and books at school and will bring them home.