Similar but Different:

Profiles of Language-minority Early Adolescent Struggling Readers

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ABSTRACT

Language-minority adolescents constitute a growing number of struggling readers in upper elementary, middle and high schools, yet very little is known about their reading profiles. Currently, a handful of researchers have used empirical classification techniques to profile struggling adolescent readers, yet only one has looked specifically at language-minority students. This exploratory study drew on archived, informal reading data of 78 language-minority, early adolescent struggling readers in Grades 4 through 7. Hierarchical cluster analysis revealed four distinct profiles of language-minority, early adolescent struggling readers. Although clusters of readers were defined by their varying knowledge of foundational reading skills, the majority of readers experienced oral reading rates (words per minute) outside expected grade-level performance ranges. The findings support differentiated instructional and intervention support offered to language-minority, early adolescent struggling readers.

DEDICATION

"Success is no accident. It is hard work, perseverance, learning, studying, sacrifice, and most of all, love of what you are doing or learning to do."

–Pele

This dissertation is dedicated to the loving memory of

Linda Shouse Nagel (1947-2013), an extraordinary mother

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"Piglet noticed that even though he had a very small heart, it could hold a rather large amount of gratitude."
-A.A. Milne

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CHAPTER I

INTRODUCTION

"El que busca la verdad corre el riesgo de encontrarla."

Isabel Allenda

For many adolescent readers, struggling to read has become a lifelong challenge. Even as researchers proclaim that "advanced literacy achievement for all students is no longer a luxury but an economic necessity" (RAND Reading Study Group, 2001, p.4), many struggling readers continue to drop out of school after years of academic failure (Chapman, Laird, Ifill, & Kewal-Ramani, 2011). As students' "gradation of risk" (Vellutino, Scanlon, Small, & Fanuele, 2006, p. 25) continues to increase, their lack of motivation to engage in all academic endeavors often decreases. For many students, academic success – and not mere survival – is dependent on researchers moving beyond the broad needs of adolescent readers (Biancarosa & Snow, 2004; Meltzer, 2002) and identifying the specific challenges of various types of adolescent struggling readers. This exploratory study strives to advance such identification.

Several reviews of the adolescent literacy research have emerged in recent years (Alvermann, 2008; Biancarosa & Snow, 2004; Carnegie Council on Advancing Adolescent Literacy, 2010; Curtis, 2002; Heller & Greenleaf, 2007) highlighting the formidable task schools face in providing appropriate instruction for struggling adolescent learners regardless of their native language. As researchers have argued, "A close examination of the demands of reading required at each stage [of development]

clarifies the distinctions between earlier reading and the kind of reading required of adolescents" (Jacobs, 2008, p.12). Adolescent readers are often faced with a sharp increase in the amount of reading and vocabulary knowledge, as well as a barrage of text genres and structures, needed to learn content. One of these elements alone can confound a student's reading comprehension regardless of ability level (RAND Reading Study Group, 2001), but adolescent struggling readers are at a heightened risk when more than one of these elements operates in concert to challenge their efforts.

A popular way of framing these challenges has been in terms of the stages of reading development. Researchers have argued that "[a] close examination of the demands of reading required at each stage clarifies the distinctions between earlier reading and the kind of reading required of adolescents" (Jacobs, 2008, p.12), yet adolescent struggling readers may require instruction in many elements of early reading development. Reading instruction at the fourth grade and beyond has historically focused on what Chall (1983/1996) termed "reading to learn" instead of "learning to read." Not surprisingly, a "reading to learn" focus on developing reading comprehension skills has been reflected in many reading interventions targeting adolescent struggling readers and propelled through policy briefs (e.g., Berman & Biancarosa, 2005) and other publications (e.g., Ivey & Baker, 2004), even though very little is truly known about the profiles of adolescent struggling readers whom the interventions are designed to help. Recent research (Brasseur-Hock, Hock, Kieffer, Biancarosa, & Deshler, 2011) reveals that some adolescent struggling readers may still require instruction in foundational skill areas such as phonics and oral reading fluency because "low reading comprehension scores at older ages might often be attributable to difficulties with word-level processing rather than to

true deficits in understanding" (Leach, Scarborough, & Rescorla, 2003, p. 212). Until clearer profiles of adolescent struggling readers are defined, the misalignment between instruction and instructional needs will continue.

Not surprisingly, researchers have begun to expose the minimal scientific foundation of "many claims about the nature of the reading challenges faced by adolescent struggling readers" (Brasseur-Hock et al., 2011, p. 438) and the fallacy of treating adolescent struggling readers as a homogenous group of learners. One subgroup of adolescent struggling readers at a particular risk for reading failure is language-minority students. Because the number of foreign-born residents in the United States has sharply risen over the past ten years, the number of school-aged, language-minority students in upper elementary, middle, and high school classrooms has drastically increased as well (Batalova & McHugh, 2010).

Recent research on language-minority students' language and literacy development has focused on "instruction that cognitively engages students in literacy-rich activities coupled with explicit teaching on specific literacy components" (O'Day, 2009, p. 109). Language-minority readers may also require more "instruction that combines interactive and direct approaches" (Genesee et al., 2006, pp. 139–140), as well as a "greater knowledge of oral English language simultaneously so the literacy tools provided by instruction can be used to maximum advantage" (Shanahan & Beck, 2006, p. 436). Unfortunately, the majority of reading research involving language-minority readers has focused on students in the primary grades and historically has lacked research designs that permit findings to be broadly generalized (Genesee et al., 2006). The result is

a murky understanding of adolescent language-minority students, particularly those struggling to read.

Problem and Purpose

Although syntheses of research targeting language-minority students have concluded that the key components of literacy development for native English speakers are similar to those for language-minority students (August & Shanahan, 2006; Gersten & Geva, 2003), questions abound concerning the applicability of current research findings to various language and age groups, and about the design of reading interventions for adolescent struggling readers. Because advancements in the understanding of reading development for adolescent learners and best instructional practices for native and non-native speakers of English have developed slowly in recent years, publishers have marketed products on the basis of a limited research base and practitioners have implemented them in the hope they will be effective. Brasseur-Hock et al. (2011) write that it is imperative to "increase the precision with which we can identify subgroups of adolescent struggling readers so interventions can be better tailored to the unique needs of students and optimize the return on investment of our intervention work" (p. 438). Given that language-minority students are among the most likely to drop out of high school in the US (US Department of Education, 2014), a greater understanding of adolescent struggling reader profiles, and a cognizance of how they may differ from the profiles of native speakers, is imperative in ensuring they are not "being left behind" (Underwood & Pearson, 2004, p. 137) in today's classrooms, which are often characterized by "one size fits all" instruction and intervention approaches that

fail to differentiate among struggling adolescent readers on the basis of native language background or target specific reading component areas of need.

The guiding purpose of this study was to explore the unique subgroups within language-minority, early adolescent readers and "fill a significant void in the literature" (Hock et al., 2009, p. 24). Cluster analysis of language-minority, early adolescent, struggling readers' reading component skills, begins to explore how their reader profiles parallel and depart from emerging profiles of native English-speaking early adolescent struggling readers (Buly & Valencia, 2002; Dennis, 2012), as well as Lesaux, Crosson, Kieffer, and Pierce's (2010) recent profiles of language-minority, early adolescent struggling readers. By utilizing archived data collected during summer university-based reading clinics in a Mid-Atlantic state, I have endeavored to add to the literature on language-minority adolescent struggling readers who do "double the work" (Short & Fitzsimmons, 2007) of their native English language peers. Specifically, I attempted to answer the following research questions:

1. Are there unique profiles of struggling readers within a sample of language-minority, early adolescent learners?
2. Are language-minority adolescent struggling readers more likely to struggle with all aspects of the literacy diet or with specific areas of reading development?
    a. Do the majority of language-minority, early adolescent struggling readers in this sample have similar reading profiles to Lesaux and Kieffer's (2010) slow word callers profile?
    b. How can affective characteristics further describe language-minority, early adolescent struggling reader profiles?

Key Terms

Early Adolescent Learner: Adolescent development is generally subdivided into three substages including early, middle and late. Early adolescence, ages 10-14, is a time of great emotional, physical, cognitive and social development for students (Moje, Young, Readence, & Moore, 2000). For this study students in upper elementary and middle school grade levels (4^{th} to 7^{th}) were considered early adolescent learners.

English Language Learner: One of many terms used to describe students with limited proficiency in English but who speak another language.

Language minority student: A broad term that encompasses students who speak a language other than the one spoken by the majority of people in a particular region or nation. In the United States it may include students who are bilingual, speak English as a second language (ESL), or have limited proficiency in English (ELL). Students included in this group may or may not receive English language support services in school.

Struggling Reader: Criteria for identification of struggling readers varies greatly by schools, school districts, and states. For this study struggling readers were identified by their schools based on their academic record, teacher recommendation, and in most cases their failure to pass their previous grade levels' state assessment.

CHAPTER II

LITERATURE REVIEW

"Once you learn to read you will forever be free."

-Frederick Douglass (1818-1895)

In this chapter the history of profiling readers and the theoretical underpinnings of much of this work is discussed. First seminal cognitive theories of reading development, which have informed both native English and language-minority reader research and practice, is discussed with particular attention paid to the Simple View of Reading (Gough & Tunmer, 1986) and its variations. Next the skill profiles of readers, with a focus on the various statistical analyses used and subsequent development of reader profiles is explored. A final narrowing of focus to empirical classification studies on struggling adolescent readers, particularly language-minority students, completes the chapter.

Cognitive Theories and Models

The majority of research on reader profiles is rooted in cognitive theory, which offers a critical lens through which to understand reading development and remediation for all students. Cognitive theories of reading attempt to explain the processing, storage and retrieval of information during reading (Tracey & Morrow, 2006). Since its inception, cognitive theory has laid the groundwork for many of the most frequently applied models of reading for native and language-minority students, by presenting

reading as a set of sublexical, word-level and text-level processes that work together to enable a reader to gain meaning from a text.

Automatic Information Processing Model

LaBerge and Samuels' (1974) seminal Theory of Automatic Information Processing hypothesized the importance of automaticity in successfully navigating "the operation of multi-component, complex skills such as reading" (p. 295). LaBerge and Samuels argued that automatic information processing allows readers' limited attentional resources to be used for more cognitively draining acts of negotiating the meaning of text, instead of being bogged down in deciphering the code of text, because "we can only attend to one thing at a time," even if "we may be able to process many things at one time, so long as no more than one requires attention," (LaBerge & Samuels, 1974, p. 295).

LaBerge and Samuels emphasized the interactive and reciprocal relationship between word-level and text-level processes, where reading fluency is viewed as a bridge between developing word-level skills and extracting meaning from text (Pikulski & Chard, 2005). As Perfetti (1985) writes, "the outcome of reading is limited by the efficient operation of local processes" (p. 101), and LaBerge and Samuels hypothesized that efficient or automatic word-level processes are necessary for reading comprehension. They proposed that reading skills develop on a continuum from accurate to automatic, freeing cognitive space for readers' internal attention to focus on comprehension, as automaticity is achieved. When students expend too much attention to "translating between oral and written language," (Perfetti, 1985, p.41) reading becomes a laborious act.

The Simple View of Reading

Influenced by LaBerge and Samuels' earlier work, Gough and Tunmer (1986) proposed a model of reading in which reading comprehension (R) is the mathematical product of two broad areas of reading development: decoding (D) and linguistic comprehension (C). Their Simple View of Reading equation, R=DxC, attempts to simplify the complex interactions between lower-level linguistic processes (e.g., word-level processes such as letter and word recognition, listening comprehension, etc.) and higher-level cognitive processes (e.g., use of background knowledge, monitoring comprehension, inferencing, strategic processing, etc.). Although not a core component of the Simple View of Reading equation, the automatization of processes advocated by LaBerge and Samuels (1974) is thought by many to be subsumed within their equation. Applications of the Simple View of Reading have shown that automatic word-level processes are generally required for fluent reading to develop (Anderson, 2000; Koda, 2005; Stanovich, 1990/2000), which then provides the cognitive opportunity to apply the "slow, error prone, and serial in nature" (Walczyk, 2000, p. 554) higher-level processes in order to make meaning.

Gough and Tunmer (1986) argue that both levels of processing are essential for skilled reading to develop. As Gough, Hoover, and Peterson (1996) write, "Literacy—reading ability—can be found only in the presence of both decoding and comprehension. Both skills are necessary; neither is sufficient" (p. 3). Gough and Tunmer illustrated this idea by applying a range of 0 (low skill level) to 1 (high skill level) to each of the variables in their equation in order to differentiate between types of readers. As seen in Table 1, Gough and Tunmer (1986) hypothesized four types of readers, including normal,

dyslexic, hyperlexic, and garden-variety poor readers. With the exception of normal readers, the three struggling reader subtypes could theoretically achieve similar levels of reading comprehension given the Simple View of Reading equation, but for very different reasons.

Table 1
Gough and Tunmer (1986) Types of Readers

Listening Comprehension	Decoding: 0	Decoding: 1
1	Low Decoding High Linguistic Comprehension Dyslexic Reader	High Decoding High Linguistic Comprehension Normal Reader
0	Low Decoding Low Linguistic Comprehension Garden-Variety Poor Reader	High Decoding Low Linguistic Comprehension Hyperlexic Reader

Hoover and Gough (1990) tested the validity of their Simple View of Reading model by sampling a group of first-to-fourth-grade native Spanish-speaking students. They hypothesized that linguistic comprehension, as measured by listening comprehension scores, and decoding skills, as measured by nonsense word reading, would account for the majority of variance in students' reading comprehension scores. Following students from first to fourth grade, Hoover and Gough determined that linguistic comprehension skills account for a larger amount of variance in students' reading comprehension scores over time but both decoding and linguistic comprehension contribute to students' reading comprehension.

Encouraged by the Simple View of Reading's "considerable meat for debate, for it has a number of testable implications" (Gough & Tunmer, 1986, p. 7), other researchers have found similar support for the Simple View of Reading model, attributing 40-80% of variance in reading comprehension to decoding or linguistic comprehension for second-to-tenth-grade students (Catts, Adolf, Hogan & Weismer, 2005; Dreyer & Katz, 1992; Johnson & Kirby, 2006; Savage, 2006; Tilstra, McMaster, Van den Broek, Kendeou, & Rapp, 2009). Yet as reading researchers' focus has tentatively turned to adolescent readers, some have championed a modified or expanded Simple View of Reading model, which would represent the changing influence of various foundational reading skills and additional factors such as motivation and engagement, to better understand adolescent readers' development and causes of their struggles with making meaning while reading (Adlof, Catts, & Little, 2006; Guthrie & Wigfield, 1999; Johnson & Kirby, 2006).

Guthrie and Wigfield (1999) and Guthrie, Wigfield, and Perencevich (2004) propose an expanded Simple View of Reading model, arguing that more than cognitive processes interact as readers attempt to make meaning as they read. In their Motivational-Cognitive model of reading, cognitive processes (activating background knowledge, forming text representations, constructing causal inferences and integrating prior knowledge) and motivational processes (task mastery, intrinsic motivation, self-efficacy, personal interest, and beliefs about reading) interact to make meaning from text. Guthrie et al. (2004) propose that students' interactions are dependent on the type of text and reading situation and that therefore students' reading struggles might be indicative of

accumulated gaps in students' lack of motivation and engagement while reading, not simply a deficit in text or meaning-level processes.

Likewise, many in the field of second language and literacy development also question the ability of the Simple View of Reading to capture the complexities of all readers (Kirby & Savage, 2008). Although Hoover and Gough (1990) proved the utility of the Simple View of Reading to capture second language learners' reading development in English, Gottardo and Mueller (2009) warn that, "Theoretical models that test only L2 [second language] predictors are missing a potentially important piece of information because constructs are not identical in the L1 and the L2" (p. 341). While the Simple View of Reading model has been applied to language-minority students and shown to capture the impact of students' linguistic comprehension on their reading comprehension in English (Gottardo & Mueller, 2009; Leider, Proctor, Silverman, & Harring, 2013; Lervag & Aukrust, 2010; Proctor, Carlo, August, & Snow, 2005; Proctor, August, Snow & Barr, 2010), the specific elements of linguistic comprehension that have the largest impact on second language acquisition are still unclear.

Given the weaker relationship between language-minority students' comprehension skills related to English oral language development and word-level skills, (Geva, 2006), it is not surprising that language-minority students' comprehension skills often "do not appear to develop to the same extent as those of their language-majority peers" (Lesaux, Koda, Siegel, & Shanahan, 2006, p.100). Although additional studies are needed to understand why language-minority students' text-level skills develop less rapidly (Lesaux et al, 2006, p.100), researchers have hypothesized that language-minority students may progress through the early stages of reading, where the focus is on

developing fluent word-level skills, in alignment with their native English-speaking peers but that as they advance to the later stages of reading focused on "reading to learn," their lack of "vocabulary skills, awareness of cognates, listening comprehension, oral story telling and syntactic skills" (Geva, 2006, p. 135) likely diminish their ability to make meaning connections.

Skill Profiles of Struggling Readers

Researchers have expanded the Simple View of Reading to theorize about subtypes of readers and utilized several types of statistical analysis, in an effort to identify struggling readers and thereby describe various types of readers. Expansion of theory and application of statistical analyses provide another foundational layer to current classification studies identifying subtypes of readers.

Stage Theories of Reading

Stage theorists were early profilers of struggling readers often through their reconceptualization of the Simple View of Reading as stages of skill development that readers either progress through or stall in as they struggle to read (Chall, 1983; Ehri, 1999; Snow, Burns, & Griffin, 1998; Spear-Swerling & Sternberg, 1996). Chall (1983) proposed six stages of reading development, including: pre-reading, initial reading, fluency, reading to learn new information, reading from multiple viewpoints, and construction and reconstruction of knowledge. She theorized that various foundational reading skills and cognitive processes are activated at different stages of a reader's development. When a skill or process is impeded, a student's overall reading development is affected.

Chall (1990) found that students, particularly those from low-income households, may read adequately through third grade where the focus of instruction is typically on developing word-level processes, but begin showing signs of struggling to read at the fourth-grade level and beyond if their word-level processes are not fully developed. Calling it the "fourth grade slump," Chall concluded that students transitioning from learning to read, to reading to learn, may experience a "slump" in their development because they lack automaticity of word-level skills, vocabulary knowledge, or reading fluency (1983, 1996). Table 2 provides an overview of Chall's proposed reading stages and corresponding areas of development.

Table 2
Jeanne Chall's (1983) Stages of Reading Development

Stage	Name	Age/Grade	Area of Development
Stage 0	Prereading	Birth to 6	Oral language development Print knowledge Vocabulary knowledge
Stage 1	Initial Reading	Beginning of Grade 1	Alphabetic principle Sound-spelling relationships
Stage 2	Confirmation and Fluency	End of Grade 1 to the end of Grade 3	Automatic word recognition Reading Fluency Decoding Skills Comprehension Strategies
Stage 3	Reading for Learning New Information	Grades 4 to 8	Comprehension of a variety of text genres Vocabulary knowledge Monitoring Comprehension and applying appropriate comprehension strategies
Stage 4	Multiple Viewpoints	High school and early college	Critical analysis of text Reconciling different views
Stage 5	Construction and Reconstruction	Late college and graduate school	Analysis and synthesis of information

Expanding Chall's early work, Spear-Swerling and Sternberg (1996) created a stage model of reading acquisition to highlight the continuum of reading problems evident in various profiles of struggling readers. The authors theorize that many students who suffer from a reading disability have simply "gotten off track" from the normally developing phases of reading acquisition. Spear-Swerling and Sternberg (1996) present phases of normal reading development: visual-cue word recognition, phonetic-cue word recognition, controlled word recognition, automatic word recognition, strategic reading, and proficient adult reading (p. 92) as a "road map." They posit that students' reading development may get "off track" at any phase and lead to the development of reading difficulties, lowered motivation and expectations, and decreased reading practice. Phases of deviation may include: non-alphabetic readers, compensatory readers, non-automatic readers, delayed readers, and suboptimal readers (p. 120). Spear-Swerling and Sternberg (1996) propose that students who get "off track" during the first four levels of reading acquisition are reading disabled because of their deficient word-level skills, whereas nonstrategic and suboptimal readers have acquired proficient word-level skills but suffer from comprehension problems. Table 3 provides an overview of Spear-Swerling and Sternberg's typical reading phases and corresponding deviations of reading difficulty.

Table 3

Spear-Swerling and Sternberg (1996) Phases of Reading Development

Typical Phase	Age	Areas of Reading Development	Phases of Reading Difficulties	Areas of Difficulties
Visual-Cue	2-5 years old: preschool to early K	Oral language, print awareness	Nonalphabetic	Very inaccurate word recognition, very impaired comprehension
Phonetic-Cue	5-6 years old-K-1st grade	Alphabet and letter-sound knowledge, listening comp knowledge; listening comprehension	Inaccurate	Inaccurate word recognition, impaired reading comp
Controlled Word Recognition	6-7 years old-late 1st to 2nd	Letter-pattern knowledge, phonemic awareness	Nonautomatic	Accurate but effortful word recognition, impaired reading comprehension
Automatic Word Recognition	7-8 years old-2nd to 3rd grade	Consolidation and use of larger Letter patterns	Delayed	Too-slow acquisition of word recognition skills, impaired reading comprehension
Strategic Reading	8-9 years old-3rd to 4th grade	Routine use of comprehension strategies, increased vocabulary and conceptual knowledge	Nonstrategic	Impaired comprehension strategy use
Proficient Reading	Late adolescence late high school or college	Critical and reflective reading comprehension	Suboptimal	Impaired higher-level comprehension

Note: Spear-Swerling and Sternberg (1996) use phases as a parallel term to Chall's (1983) stages of reading development, not to be confused with Ehri's (1999) phases of word reading.

Poor Reader Identification Studies

Many of the earliest attempts at applying the Simple View of Reading and detailing skill profiles of struggling readers came out of cognitive researchers' work in efficiently identifying "poor" readers and defining dyslexia. Historically, students' intelligence quotient (IQ) and academic achievement were used in a discrepancy model to identify students struggling to learn, but many researchers and practitioners found the IQ discrepancy model a poor litmus test for identifying struggling readers (Fletcher et al., 2005; Lyon et al., 2001; Stanovich, 1988). Vaughn, Wanzek, Woodruff, and Linan-Thompson (2007) illuminated the fallacy of the IQ discrepancy when they found as many as 30% of students in a given classroom, not just those who meet the IQ discrepancy criteria for special education services, require additional reading support and intervention.

In an effort to clearly define the characteristics of struggling readers and consequently the best type of support for their reading development, regardless of their classification as low achievers or as learning disabled, researchers began highlighting the similarities between struggling readers identified through the IQ discrepancy formula and those who struggle due to ineffective instruction (Fletcher et al., 2005; Lyon et al., 2001; Vellutino et al., 1996). Researchers found that the majority of reading difficulties are the result of underdeveloped foundational reading skills such as decoding and comprehension strategies but a small percentage of students severely struggle with learning to read because of a core phonological processing disability (Stanovich, 1988).

Stanovich (1988) argues that severe strugglers or dyslexics, can be found within "IQ-discrepant" poor readers, those whose reading abilities severely contrast with their IQ, and "garden-variety" poor readers, whose reading abilities are commensurate with

their IQs. Therefore, the IQ and achievement discrepancy formula is an ineffective means of identifying dyslexic readers. Although a "garden-variety" poor reader may "share the phonological problems of the dyslexic reader—though perhaps in less severe form," Stanovich concluded that the garden-variety poor readers' reading difficulties are not "localized in the phonological core" (Stanovich, 1988, p. 602) and are therefore not as severe as those of dyslexic poor readers. Stanovich proposed that dyslexia is a specific type of learning disability characterized by a core phonological processing deficit, which may range in severity from mild to severe (Stanovich, 1988, p. 599).

Vellutino et al. (1996) tested Stanovich's Phonological-Core Variable Difference Model (1988) with a group of teacher-identified, first-grade "poor readers" by studying their response to reading intervention. Study participants were tutored daily, one-on-one for 30 minutes, with intervention lessons tailored to their needs in phonemic awareness, decoding, sight word knowledge, comprehension strategies, and reading in context. Linear regression analysis of students' Word Attack and Word Identification scores on the Woodcock Reading Mastery Test-Revised (WRMT-R) across the winter of their first-grade year to the spring of their second-grade year revealed four intervention reader profiles. One-third of the students were classified as "limited growth" or "very limited growth," and considered "difficult to remediate." A comparison of seven variables that differentiated between the "very limited growth" and "very good growth" showed significant differences in students' phonological processing abilities. Conversely, two thirds of the participating students fell into the "good growth" or "very good growth" reader profiles, whose scores on the WRMT-R after a semester of tutoring resembled students' WRMT-R scores who were not identified as poor readers. Vellutino et al.

(1996) propose that students who were originally identified as poor readers but received effective reading intervention and no longer struggled with reading are "instructionally disabled" within various areas of literacy development, not reading disabled and suffering from a core phonological processing difficulty.

Explanation of Individual Differences

Correlation and multiple regression studies in reading have contributed to a greater understanding of types of readers by analyzing the explanatory relationship between reading variables contributing to students' reading success and failure. Eager to identify the root cause of poor comprehenders' reading struggles, Catts, Hogan, and Fey (2003) tested the Reading Component model, a descendent of the Simple View of Reading, to analyze struggling second-grade readers' decoding and listening comprehension skills. Students were assigned to one of four subgroups based on their strengths and weaknesses in listening comprehension and word identification by applying "cut-off values for defining a deficit" (Catts et al., 2003, p. 155). Assigned subgroups included a language-learning disabled group, comprising those who struggle with both decoding and listening comprehension; a non-specified group, whose overall reading comprehension is low but word identification and listening comprehension is average; a hyperlexic group, who struggle with listening comprehension but have average-to-above-average word identification scores; and a dyslexic group, who struggle with decoding but achieve average-to-good listening comprehension scores.

Follow-up analysis in fourth grade revealed that the subgroups remained stable over time, with second-grade indicators predictive of fourth-grade reading subgroups. The only group that had varying membership from second to fourth grade and did not

"maintain their deficits in reading comprehension" (Catts et al., 2003, p. 158) was the non-specified group, whose mean reading comprehension scores fell within the average range in fourth grade. Although students were placed into four subgroups in second and fourth grade, the majority (71%) of students fell into two groups: dyslexic (35.5%) and language-learning disabilities (35.7%). ANOVAs were conducted on all variables to highlight significant strengths and weaknesses of students within each group. Given the consistency of their results from preadolescent (2nd grade) to early adolescent (4th grade), Catts et al.'s (2003) results question whether interventions that focus solely on comprehension are appropriate for all older struggling readers considering that some may struggle with word-level skills, instead of or in addition to comprehension difficulties.

Leach, Scarborough, and Rescorla (2003) voice similar concerns given their research on late emerging poor readers, whose reading difficulties were found to be "heterogeneous with regard to their skill deficits" (p. 221). Leach et al. (2003) selected 289 native English-speaking fourth- and fifth-grade students from a pool of 2,300 who showed academic histories of reading difficulties. Based on a review of school records and parent and student questionnaires, students were assigned to one of five researcher-created subgroups: early school-identified persistent, early school-identified transient, late school identified, parent concern, and no history. Given limited time and resources to further assess students, Leach et al. (2003) further reduced the student sample to 161 students, being careful to equally reduce each subgroup. Remaining students' reading and spelling skills, cognitive and language abilities, print exposure, and reading self-efficacy were assessed. Similar to Catts et al.'s (2003) subgrouping procedure, students were assigned to one of four subgroups based on cutoff points for speed and accuracy

composite scores. Table 4 provides an overview of Leach et al.'s (2003) reading subgroups.

Table 4
Leach et al.'s (2003) Reading Subgroups

Group	# of students assigned	Areas of Difficulties and Strengths
RC	12	Reading comprehension deficit No word-level deficits
WL	28	Word-level deficit No comprehension deficit
WL-RC	26	Word-level deficit Reading comprehension deficit
NRD	95	No deficits

To assess mean differences between groups, MANOVAs were conducted contrasting the NRD group with each of the remaining three groups (RC, WL, WL-RC), as well as between "conceptually related dependent variables" (p. 215). Students assigned to the RC, WL, and WL-RC groups were furthered analyzed in terms of when their reading difficulties were identified; 35 students were coded as early-identified and 21 as late-identified. A review of students' third-grade reading achievement data encouraged the authors to rename the late-identified group as late-emerging because "their reading abilities were not just late identified but actually emerging" (p. 211) after average reading development in first to third grade. Performance profiles of students assigned to the late emerging reading difficulties subgroup revealed that over 60% of identified students had reading comprehension difficulties and over 60% of identified students had word-level processing difficulties. The even spread of reading comprehension difficulties across word- and meaning-level skills parallel Catts et al.'s (2003) findings and support the notion of reading skill and process heterogeneity within adolescent struggling readers.

In an effort to understand the heterogeneity of reading development pertinent to language-minority adolescent readers, Lesaux, Crosson, Kieffer, and Pierce (2010) followed 87 fourth-grade native Spanish-speaking students through fifth grade. Structural equation modeling was utilized for exploratory analysis of the causal relationships between reading comprehension in English, and English and Spanish word-level reading skills and oral language development. Lesaux et al. (2010) found that English oral language skills have a significant effect on language-minority students' reading comprehension skills but that word-level reading skills in English and Spanish do not. The authors theorize that the "striking disassociation" between word-level and meaning-level skills for their sample of language-minority students, may be due to students' "language related changes" as they begin reading to learn (Lesaux et al., 2010, p. 482). Clarity of cause will only come from further research on language-minority poor comprehenders.

Empirical Subtype Classification Studies

The Simple View of Reading and its theoretical descendants, as well as treatment-validity studies searching for a clear picture of reading disabilities and correlation or multiple regression analysis of variance in students' scores, have been influential in conceptualizing normal and deviant reading development. However, "little empirical evidence exists showing whether the component reading skills identified in the Simple View hold for older struggling readers" (Brasseur-Hock et al., 2011, p. 439) whether English is their native or second language. Luckily, the use of empirical classification techniques to identify subtypes of struggling readers has shown promise for many years (Lyon, 1985) and has recently grown in popularity, although the research pool is still

limited. Empirical subtype classification studies "treat test scores as integrated profiles" (Konold et al., 2003), allowing a multivariate approach to grouping similar students together where the "emphasis is on children and their profiles rather than variables" (Speece & Cooper, 2004, p. 89). Empirical classification studies attempt to combat misguided instruction and prevent prolonged reading difficulties by clarifying the specific strengths and weaknesses, and consequently the needs, of various subtypes of struggling readers.

Preadolescent readers. Morris, Stuebing, Fletcher, Shaywitz, Lyon, et al. (1998) applied multiple cluster analyses to cognitive assessment results of nearly 400 seven-to-nine-year-old normally developing and reading disabled readers. Grounded in Stanovich's (1998) phonological core-variable differences model and informed by other theories of reading development, researchers selected the following variables to analyze: phonological skills, rapid naming, short-term memory, vocabulary, and visual perception. From Morris et al.'s (1998) analysis, nine subtypes of readers were identified: two without reading difficulties, two "garden-variety" poor reader groups with significant difficulties in all areas assessed, and five with specific reading disabilities. Morris et al. (1998) found that the "garden-variety" poor reader groups were distinguished from the five reading disabled groups by their lower-than-average vocabulary scores, which certainly would contribute to their lower-than-average comprehension scores. Interestingly, six of the latter seven reader subtypes shared a difficulty with phonological processing, lending credence to phonological processing's causal relationship with dyslexia (Stanovich, 1998).

Konold, Juel, McKinnon, and Deffes (2003) also focused on younger readers (5-10 years old) in an attempt to highlight the "heterogeneous nature of children's reading abilities and identify homogeneous subgroups of children that display similar patterns of strengths and weaknesses" (Konold et al., 2003, p. 95) with decoding, listening comprehension, short-term memory, and processing speed. Cluster analysis of 1,604 students' Woodcock Diagnostic Reading Battery (Woodcock, 1997) results identified six unique and homogenous profiles of readers: average reading ability, below-average reading ability, average reading ability with strengths in comprehension knowledge and short-term memory, above-average reading ability, average reading ability with strengths in auditory processing, and average reading ability with elevated processing speed.

As predicted by the Simple View of Reading (Gough & Tunmer, 1986), Konold et al.'s (2003) results indicate that the above-average reading ability group outperformed other subgroups in all areas assessed. In support of Chall's (1983) theory of changing skill priorities across stages, Konold et al. (2003) found phonological processing for five year olds and comprehension for ten year olds to have the greatest influence on students' overall reading achievement. Konold et al. (2003) also discovered that strengths in short-term memory have a larger influence on students' overall reading performance as students enter early adolescence (10 years old), conceivably supporting the idea that the Simple View of Reading is perhaps too simple to capture the complexities of adolescent struggling readers.

Language-minority, preadolescent readers. Ford, Cabell, Konold, Invernizzi, and Gartland (2013) investigated the heterogeneity of reader profiles within native Spanish-speaking kindergarten students receiving English as a Second Language support services

in school. Students were followed to the end of first grade in order to assess reader profiles' ability to predict future reading achievement. Identification variables from students' beginning-of-year kindergarten Phonological Awareness Literacy Screening (PALS) results, including beginning sound awareness, rhyme awareness, letter-name knowledge, letter-sound knowledge, phonetic spelling, concept of word in text, and their first-grade PALS literacy composite score were included in the cluster analysis. Ford et al. (2013) found four distinct profiles of readers. Table 5 provides an overview of Ford et al.'s (2013) emergent reader subgroups.

Table 5
Ford et al.'s (2013) Reading Subgroups

Group	*# of students assigned*	*Areas of Difficulties and Strengths*
1	*403*	Highest early literacy skills (approximately one to one and a half standard deviations above the mean on all measures)
2	596	Average phonological awareness Average phonetic spelling Strength in alphabet knowledge
3	644	Average phonological awareness Weakness in phonetic spelling Weakness in alphabet knowledge
4	657	Lowest early literacy skills (approximately one standard deviation below the mean on all measures)

Analysis of students' subgroups revealed that although stronger phonological awareness abilities were a strength within the highest performing groups (groups 1 & 2), orthographic skills were better predictors of later success in first grade, "suggesting that while phonological awareness may be a necessary precursor to reading, phonological awareness in the absence of orthographic skills may not be sufficient" (Ford et al., 2013, p. 907). Researchers also analyzed students' English language proficiency levels and

found it had little bearing on the membership of groups. Ford et al.'s (2013) findings demonstrate the diversity of language-minority students' reader profiles at even the earliest stage of students' academic careers and give hope that with the right type of academic supports, based on their reading profiles, the majority of language-minority emergent students can eventually cluster together as successful readers.

Adolescent struggling readers. Adolescent students who lack reading proficiency may have widely different reading needs (Biancarosa & Snow, 2004). Vellutino (2003) writes that "individual differences in knowledge, skills, and abilities that underlie word recognition and language comprehension, along with individual differences in dispositions such as the readers' motivation, goals, and purposes, are all important sources of variability in reading comprehension" (p. 51). Nowhere is this claim more apparent than with adolescents who struggle to read and often receive ineffective instruction and intervention (Kamil, 2003). As Chall and Jacobs (2003) write, "because of the developmental nature of reading, the later one waits to strengthen weaknesses, the more difficult it is for the children to cope with the increasing demands in the later grades" (Chall & Jacobs, 2003, p. 15). The limited number of empirical subtype, classification studies, focused on older struggling readers, have certainly supported this idea.

Middle/late adolescent and adult struggling readers. Brasseur-Hock, Hock, Kieffer, Biancarosa, and Deshler (2011), assessed 319 rising ninth graders' reading comprehension and reading component skills. The majority of students in the study sample were native English speakers (94.7%). An initial Latent Class Analysis identified four groups of readers differentiated by their level of reading comprehension. A

secondary Latent Class Analysis was conducted on the 195 students identified as below-average comprehenders to clarify their reading component skill profiles. Five distinct reading profiles of older, poor comprehenders were identified: students with (a) weak listening comprehension, (b) weak reading comprehension, (c) dysfluent reading, (d) moderate weaknesses in all reading component areas, or (e) severe weaknesses in all reading component areas.

Additional analyses comparing below-average comprehenders and low-average comprehenders were conducted to assess the statistically significant differences in the reading component profiles of both groups. The researchers found that 49.6% of struggling or below-average comprehenders (60 students) clustered into the moderate weaknesses profile versus just 14.9% of low-average comprehenders (11 students). Not surprisingly, a greater number of struggling readers (20.7%; 25 students) clustered into the severe global weaknesses versus 4.1% (3 students) of low-average comprehenders. Interestingly, only 1.7% of struggling readers (2 students) were classified as weak reading comprehenders, versus 21.6% of low-average readers (16 students), a finding that lends greater credence to the idea that older, struggling readers have unique reader profiles and a myriad of reading component challenges, not simply a challenge with "acquiring meaning from written text" (Gambrell, Block, & Pressley, 2002, p. 4).

Mellard, Fall, and Mark (2009) found similar heterogeneity in their profiles of native English speaking, low-literacy, adult readers. Using three hierarchical cluster analyses, Mellard et al. analyzed Adult Education students' phonemic decoding, word recognition, oral reading fluency, reading comprehension, and overall reading ability in an effort to identify "a useful instructional grouping scheme for adults with low literacy"

(Mellard et al., 2002, p. 977). Seven reading ability groups were identified with basic decoding (groups 1, 2, 3, 4), word level reading and fluency (groups 5, 6), and reading comprehension (group 7) highlighted as their greatest instructional areas of need. Even though "the common practice among Adult Education programs is to use functional assessments" (Mellard et al., 2002, p. 976), which only assess adults' reading comprehension abilities, to place students in adult education classes, only one group (Group 7) was found to have poor reading comprehension skills but adequate skills in all other reading component areas. The mismatch between Adult Education programs and adult learners' needs perpetuates less effective and efficient instruction that "could be important for improving learner outcomes" (Mellard et al., 2002, p. 990).

Early adolescent struggling readers. Buly and Valencia (2002) randomly selected 108 fifth-grade students who fell " below the bar" on their end-of-year Washington Assessment of Student Learning (WASL) test in fourth grade. An initial analysis of students' reading skills revealed weaknesses in all areas assessed: word identification, phonemic awareness, vocabulary, reading speed, expression while reading, and reading comprehension. Analysis of the variance between reading skill areas and students' WASL revealed three areas of development that accounted for 78% of the variance in their WASL scores: word identification, fluency (rate and expression) and meaning (vocabulary and comprehension). Cluster analysis of students' scores revealed six distinct profiles of poor readers: automatic word callers, struggling word callers, word stumblers, slow and steady comprehenders, slow word callers, and disabled readers. Although Buly and Valencia (2002) found deficient word identification skills and reading fluency unique to three reader profiles, researchers offering descriptions of adolescent

struggling readers have often dismissed their importance (Berman & Biancarosa, 2005) and focused on reading comprehension, a factor unique to four of the six poor reader profiles.

Given that Buly and Valencia's (2002) participating students were upper elementary, it is not surprising that reading comprehension accounted for more of the variance in WASL scores for many students. However, caution should be exercised in advocating comprehension-focused interventions for all struggling adolescent readers. Comprehension did not account for all of the variance in students' scores; therefore, struggling adolescent readers may require more than comprehension support. Caution should also be employed in generalizing Buly and Valencia's (2002) results to all struggling adolescent students, since their testing sample did not include language-minority students, students receiving special education services, or middle and high school students.

Encouraged by Buly and Valencia's (2002) results, Dennis (2012) focused on 94 struggling readers in sixth to eighth grade who scored below the proficient level on their state test of achievement. The student sample included a large number of student receiving special education services (36%) and English language learner support (10%). An analysis of students' reading skills and development showed pervasive difficulties on all measures administered. Factor analysis was then used to identify the variables most pertinent to differentiating among reader profiles. Three factors, including meaning, decoding, and rate, were identified as explaining close to 75% of the total variance of scores. Hierarchical cluster analysis of the three factors identified four unique clusters of readers: slow and steady comprehenders, slow word callers, automatic word callers, and

struggling word callers. Table 6 provides an overview of Dennis' (2012) reader subgroups.

Table 6
Dennis (2012) Reader Subgroups

Group	# of students assigned	Areas of Difficulties and Strengths
Slow and Steady Comprehenders	23	Strong comprehension Slow reading rate Low decoding skills
Slow Word Callers	24 (high % of SPED)	Strong decoding skills Strong spelling skills Slow reading rate
Automatic Word Callers	23 (high % of ELL)	Strong decoding Fast reading rate Low comprehension
Strong Word Callers	24	Fast reading rate Low decoding skills Low comprehension

It is not surprising that a high number of English language learners (ELLs) clustered within the Automatic Word Callers group, given the complex language skills necessary to make meaning of the variety of concepts and genres that language-minority students are exposed to as they "read to learn." Cummins (1981) hypothesizes that ELLs' basic interpersonal communication skills (BICS) may develop within two years of learning a language but that more complex cognitive academic language proficiency (CALP) may take five to seven years to parallel native English-speaking students' proficiency and "pay bigger dividends to reading later in the developmental process when the characteristics of texts place greater demands on the reader for comprehension" (Ford, Cabell, Konold, Invernizzi, & Gartland, 2013, p. 891).

Given the similarities between Dennis' (2012) and Buly and Valencia's (2002) findings, a clearer picture of early adolescent struggling readers is emerging, but

additional investigations that analyze adolescents' individual differences and shared differences between subgroups of struggling adolescent readers are needed to further develop the literature base, particularly for language-minority struggling readers.

Language-minority, early adolescent readers. Lesaux and Kieffer (2010) analyzed factors contributing to 262 (201 language-minority) sixth-grade students' reading comprehension difficulties. Participating students' reading comprehension, oral reading fluency, word reading efficiency, decoding, general vocabulary knowledge, semantic working memory, and academic vocabulary knowledge were assessed and students' language status was provided by participating schools. In contrast to Ford et al.'s (2013) findings with younger native Spanish speaking students, Lesaux and Kieffer (2010) found that language status was a "statistically significant predictor of classification as a struggling reader" (p. 611). Using latent profile analysis, three distinct profiles of struggling comprehenders were identified: slow word callers, globally impaired readers, and automatic word callers. Table 7 provides an overview of Lesaux and Kieffer's (2010) reader profiles.

Table 7
Lesaux and Kieffer (2010) Reader Profiles

Profiles	*% of identified Struggling readers*	Areas of Difficulties and Strengths
Slow Word Callers	60.3	Above average decoding skills, far-below-average vocabulary skills, low average word and passage level fluency skills
Globally Impaired Readers	21.4	Below-average on all measures
Automatic Word Callers	18.3	Above-average decoding skills, substantially below-average vocabulary skills, average fluency skills

Lesaux and Kieffer (2010) found that although a higher percentage of language-minority students were identified as struggling readers by their schools (60% vs. 40% native English-speaking students), all struggling readers in their sample suffered from low general vocabulary skills and low semantic working memory but typically developed into fluent readers. Although language-minority status predicted students' identification as a struggling reader, "LM [language-minority] status was not found to predict membership in any of the three latent classes; that is, LM learners were not found to disproportionately demonstrate any of the three skill profiles" (p. 616). Lesaux and Kieffer's (2010) findings "challenge the overly simplistic assumption that students have developed skills but merely lose interest in reading over time" (p. 621) resulting in their reading comprehension woes. Their findings also combat the idea that language-minority early adolescent readers need reading instruction and intervention that are substantially different from that required by native English-speaking struggling adolescent readers. Yet "replication and stability…coupled with intervention research tailored to each of the specific profiles" (Lesaux & Kieffer, 2010, p. 624) is needed to evaluate the generalizability of language-minority struggling reader profiles and the effectiveness of interventions for particular profiles of struggling readers.

Conclusion

Although a handful of empirical classification studies of struggling early adolescent readers have included language-minority students in their student samples, only one (Lesaux & Kieffer, 2010) has focused solely on classifying subgroups of language-minority, adolescent readers to understand their unique reading skills profiles. The importance of continued investigation into this age and language group cannot be

overstated since adolescent struggling readers are less likely to achieve academic success (Borg, Plumlee, & Stranahan, 2007), and language-minority students are more likely to drop out of school than their native English-speaking peers (Kim, 2011). To change the predictive relationship between language-minority status and struggling to read (Kieffer, 2010), language-minority adolescent struggling readers' heterogeneity of needs must be further investigated in order to develop targeted instruction that has a real chance at significantly changing the academic achievement outcome for many students.

Looking Ahead

In the next chapter, my research problem, questions, research design and methods of analysis are described. Even though the research base on language-minority, early adolescent struggling readers is severely limited, tentative hypotheses about the number and types of reading profiles I would find in my data, were lurking in my mind. Given Lesaux and Kieffer's (2010) results and previous classification studies on struggling adolescent readers (Brasseur-Hock, Hock, Kieffer, Biancarosa, and Deshler, 2011; Buly and Valencia, 2002; Dennis, 2012), I expected to find three to six profiles of readers in my dataset. I also expected that if multiple profiles of readers were identified, at least one of them would constitute a group of students struggling in all aspects of literacy development.

CHAPTER III

METHODOLOGY

"A researcher must try to learn from the work of those who preceded him--knowing that neither he nor anyone following him will have the final word."

Jeanne Chall (1967)

As the number of language-minority adolescents entering American schools continues to increase, the need for understanding how to support those who struggle with developing literacy skills in English grows as well. This exploratory study drew on archived data collected by graduate students in reading during summer university reading clinics in a Mid-Atlantic state from 2005-14 to examine the following questions:

1. Are there unique profiles of struggling readers within a sample of language-minority, early adolescent learners?
2. Are language-minority adolescent struggling readers more likely to struggle with all aspects of the literacy diet or with specific areas of reading development?
    a. Do the majority of language-minority, early adolescent struggling readers in this sample have similar reading profiles to Lesaux and Kieffer's (2010) slow word callers profile?
    b. How can affective characteristics further describe language-minority, early adolescent struggling reader profiles?

Research Design

Grounded in the Simple View of Reading (Gough & Tunmer, 1986; Hoover & Gough, 1990) and informed by recent exploratory profiles of struggling adolescent readers (Buly & Valencia, 2003; Dennis, 2012) and language-minority learners (Lesaux & Kieffer, 2010), as well as Guthrie and Wigfield's (1999) Motivational-Cognitive Model of reading, six areas of literacy development, available from the archived data, emerged as pertinent to investigating the profiles of language-minority early adolescent struggling students: sight word vocabulary knowledge, oral reading fluency, reading comprehension, listening comprehension, and students' decoding and spelling abilities. Descriptive statistics captured each student's instructional reading level (or range), native language, age, grade, sex, and reading attitude or self-perception. Using the classification methodology developed by Morris et al. (1998) and replicated by Mellard et al. (2009), multiple agglomerative, hierarchical cluster analysis techniques, which sequentially partition groups of variables into several clusters based on their degree of similarity, were used to identify unique reader profiles.

Cluster analysis comprises a group of multivariate statistical techniques that can be used to identify and group meaningful patterns of variables (Everitt, Landau, & Leese, 2011). It is one of many person-centered analytic approaches describing the "similarities and differences among individuals with respect to how variables relate to each other" (Masyn, 2013, pp. 552-553). In person-centered analytic approaches, variables are expected to interact differently across individuals in order to classify individuals into groups where membership is determined by similar variable response patterns (Jung & Wickrama, 2008). Typically, within-cluster variables geometrically plot closely together,

and individual clusters distance themselves from one another, forming distinctive clusters or groups of individuals. In contrast, variable-centered analytic approaches focus on capturing the relationship between variables and assume that "each association between one variable and another…holds for all individuals within the population" (Masyn, 2013, p. 553). Table 8 provides an overview of common quantitative analyses identified as either person-centered or variable-centered analytic approaches.

Table 8
Types of Quantitative Analyses

Type	Focus	Examples
Variable Centered	Correlations among variables	Correlations Regression Factor Analysis Structural Equation Modeling
Person Centered	Relationships among Individuals	Cluster Analysis Latent Class Analysis Latent Profile Analysis

In hierarchical cluster analyses, clusters combine sequentially using the distance between individuals to create clusters using either an agglomerative or divisive method. The more commonly used agglomerative methods place individuals into separate clusters and then combine the most similar clusters until one cluster remains. In contrast, divisive methods begin with individuals in one cluster and segment them until individuals compose their own clusters. Given the limited understanding of language-minority early adolescent struggling readers, hierarchical agglomerative cluster analysis is a good fit for exploratory analysis because it does not require prior knowledge about profile membership or the number of groups within a dataset, and it works well with smaller datasets. Although cluster analysis is non-inferential, it can provide an initial understanding about the clusters of variables within a dataset and generate hypotheses

about clusters, which can later be explored through a more rigorous latent profile or class analysis (Lazarsfeld & Henry, 1968; Vermunt & Magidson, 2002).

Participants

For this study, previously collected data from university-sponsored, summer reading clinics (2005-2014) were used. Assessed students were recruited by their elementary or middle school to participate in a four-week, university-sponsored, free reading clinic hosted by their school or school district. Selected students were assessed and tutored daily by graduate students completing their degrees in reading, and supervised by a university instructor. An initial review of archived student case folders found 96 potential participants based on the following selection criteria: early adolescent, struggling reader, native language other than English. Given the Simple View of Reading's (Gough & Tunmer, 1986) emphasis on linguistic comprehension, the dataset was initially reduced by 12 participants, because of missing listening comprehension scores. An additional five participants' data were eliminated because of multiple missing data points; with a final reduction in the dataset occurring after an initial review of archived student case folders detected one duplicate case.

The final sample of 78 language-minority, rising-fourth to rising-seventh grade struggling readers included in this study were recruited from two suburban school districts and enrolled in Title I elementary and middle schools. Depending on students' school district organization, a participating sixth-grade student may be an upper elementary or middle school student. In addition, Special Education (SPED) students were identified by their participating schools as possessing an Individual Education Plan (IEP) for a learning disability but limited information about their particular classifications

were included in their case folders. A review of the provided information revealed all participating SPED students were of average or above average intelligence with a general classification of Learning Disabled (LD) in reading. Detailed demographic information for all study participants is listed in Table 9.

Table 9
Demographic Summary of Participating Students (n=78)

Demographic Characteristic	All Students Frequency	All Students %	Male Frequency (n=47)	Male %	Female Frequency (n=31)	Female %
Ethnicity						
Hispanic	60	77%	35	74%	25	81%
Asian	7	9%	6	13%	1	3%
Other	11	14%	6	13%	5	16%
White	0	0%	0	0%	0	0%
African American	0	0%	0	0%	0	0%
Native language						
Spanish	60	77%	35	58%	25	42%
Amharic	2	3%	1		1	
Arabic	2	3%	2		0	
Bengali	2	3%	2		0	
Farsi	1	1%	0		1	
Gonja	1	1%	1		0	
Indonesian	1	1%	0		1	
Japanese	1	1%	1		0	
Korean	1	1%	1		0	
Native Liberian language	1	1%	0		1	
Urdu	4	5%	2		2	
Vietnamese	2	3%	2		0	
Rising grade level						
4th	26	33%	12	46%	14	54%
5th	23	29	19	83%	4	17%
6th	7	9	4	57%	3	43%
7th	22	28	12	55%	10	45%
Special Education	10	13	6	60%	4	40%

Although the most frequent native language represented in the student sample was Spanish (77%), other languages, including Amharic, Arabic, Bengali, Farsi, Gonja,

Indonesian, Japanese, Korean, Native Liberian languages, Urdu, and Vietnamese, were also present and indicative of the pervasive language and cultural diversity found within the sample school districts represented in Table 10. The heterogeneity of the student sample therefore contributes to the generalizability of the findings of this study to language-minority, early adolescent struggling readers but is limited by the small size of the student sample, limited knowledge of students' oral language proficiency levels, and the limited number of language-minority students whose native language is not Spanish.

Table 10
Demographic Summary of Sample School Districts (n=2)

Demographic Characteristic	District 1 frequency (n=24,677)	District 1 percentage	District 2 frequency (n=186,785)	District 2 percentage
Ethnicity				
White	11,598	47%	74,714	40%
Hispanic	6,910	28%	46,696	25%
African American	2,714	11%	18,679	10%
English Language Learners	4,442	18%	28,870	15%
Native Spanish Speakers	3,021	68%	20,616	71%
Number of native languages other than Spanish spoken by students	76		169	
Special Education	3,702	15%	25,715	14%

External validation of the sample. Participating students were identified as struggling readers by their schools, based on progress monitoring and end-of-year reading assessment results, as well as teacher and school counselor referrals. Failure to successfully pass the most recent state assessment was also listed by school personnel as a common identification criterion. Given the somewhat subjective classification of struggling readers across the two school districts, an external validation of students' struggling reader categorization was conducted by analyzing a subset of students whose

state assessment scaled scores and end-of-year Developmental Reading Assessment (DRA; Beaver, 1997) or Degrees of Reading Power (DRP; Koslin, Zeno, & Koslin, 1987) scores were reported by their participating school. Unfortunately only 19 of 78 student case folders contained state assessment and end-of-year-data therefore only 19 students were included in the external validation. Table 11 provides demographic information for the 19 students analyzed.

Table 11
Demographic Summary of External Validation Data

Demographic Variable	Frequency (n=19)	Percentage
Female	4	21%
Native Spanish speaker	19	100%
Rising grade level		
4th	1	5%
5th	8	42%
6th	0	0%
7th	10	53%
Special Education	2	11%

State assessment scaled scores for 15 of 19 students fell below the state established benchmark of 400 for an achievement level of pass/proficient (M=368, SD=51.74). A closer analysis of the assessment results for the four students who scored above the pass/proficient benchmark of 400 on their state assessment revealed that none met the state-established benchmark of 500 for an achievement level of pass/advanced. In addition, three of the four students failed to meet district-established end-of-year benchmarks on a school-administered informal reading inventory, the Developmental Reading Assessment (DRA; Beaver, 1997), and one student failed to meet the district benchmark on a standardized test of reading comprehension, the Degrees of Reading Power (DRP; Koslin, Zeno, & Koslin, 1987). These results highlight the necessity of multiple data sources in identifying struggling readers, and lend credence to the

classification of students in this dataset as struggling with some aspect of the reading process.

Measures and Instruments

Graduate students completing their summer reading clinic requirement administered informal reading assessments to participating students to determine an overall reading level or reading range, as well as areas of strengths and weaknesses in students' literacy development. Areas assessed included reading attitude or self-perception, sight word knowledge, reading accuracy, oral and silent reading fluency, reading comprehension, listening comprehension, spelling, decoding, and writing. All assessments were administered in English and completed during two, 1.5-hour testing sessions on consecutive days.

Given the Simple View of Reading's (Gough & Tunmer, 1986) emphasis on linguistic comprehension and decoding as determinants of reading comprehension, sight word vocabulary, listening comprehension, decoding, and spelling variables were included. A measure of oral reading fluency was added due to the strong relationship between automaticity and reading comprehension (LaBerge & Samuels, 1974; Perfetti, 1985) and reading motivation variables were added due to their strong links with reading achievement and given the propensity of adolescent readers to experience decreased motivation to read (Guthrie, 2000; Guthrie & Wigfield, 2000; McKenna, Conradi, Jang, Lawrence, & Meyer, 2012; McKenna, Kear, & Ellsworth, 1995). Although important to assessing readers' full literacy development, writing and silent reading fluency results will not be included in this study, given the wholly qualitative analytical approach used with student writing samples and the inconsistent assessment of silent reading rates

across cases by graduate assessors. Table 12 lists the selected reading variables for this study and their corresponding assessments.

Table 12
Classification Variables and Corresponding Assessments

Reading Variable	Assessment
Reading Attitude or Self-Perception	Adolescent Reading Attitude Survey Elementary Reading Attitude Survey Rhody Secondary Reading Attitude Survey Reader Self-Perception Scale
Sight Word Vocabulary	Qualitative Reading Inventory-5 Critical Reading Inventory-2 -Words Read in Isolation (flashed)
Oral Reading Fluency	Qualitative Reading Inventory-5 Critical Reading Inventory-2 -Leveled Passages
Listening Comprehension	Qualitative Reading Inventory-5 Critical Reading Inventory-2 -Leveled Passages
Reading Comprehension	Qualitative Reading Inventory-5 Critical Reading Inventory-2 -Leveled Passages
Decoding	Qualitative Reading Inventory-5 Critical Reading Inventory-2 -Words Read in Isolation (untimed) -Words Read in Context
Spelling	Developmental Spelling Analysis Words Their Way -Primary Spelling Inventory -Elementary Spelling Inventory

Reading attitude and self-perception. Students' attitudes toward the act of reading, and/or themselves as readers were previously evaluated using one of four surveys. Graduate student examiners reviewed one of four scales with their participating student before it was administered. Students were given the choice of reading a survey independently (orally or silently) and circling their answers, or having the survey and subsequent questions aloud to them. Students who chose to read and answer questions on

their own were monitored by their examiner and given assistance if they appeared to struggle with reading or answering questions.

Adolescent Reading Attitude Survey (ARAS). The ARAS (McKenna, Simkin, Conradi & Lawrence, 2008) was piloted in 2008 and refined into the Survey of Adolescent Reading Attitudes (McKenna et al., 2012). The ARAS requires students to rate their feelings about different types of text (digital and print format) and reading purposes (academic and recreational) through 32 questions, on a six-point Likert scale, ranging from very good (6 points) to very bad (1 point). Subscale scores vary across the reading purpose and medium of text: recreational reading in print settings (12-72 points), recreational reading in digital settings (9-54 points), academic reading in print settings (10-60 points), and academic reading in digital settings (10-60 points). A guide to interpret scores as negative, somewhat negative, indifferent, somewhat positive, and positive, is provided and reproduced in Table 13.

Table 13
ARAS Guide to Interpreting Scores (McKenna, Simkin, Conradi & Lawrence, 2008)

Subscale	Negative	Somewhat negative	Neutral/ indifferent	Somewhat positive	Positive
Recreational reading in print setting	12-24	25-36	37-47	48-59	60-72
Recreational reading in digital setting	9-18	19-27	28-35	36-44	45-54
Academic reading in print setting	10-20	21-30	31-39	40-49	50-60
Academic reading in digital setting	10-20	21-30	31-39	40-49	50-60

The ARAS authors found a good level of internal consistency (Cronbach, 1951) for the full scale (0.88), as well as for the individual subscales, with alpha coefficients ranging from .72 to .85 (McKenna et al., 2012). To establish the survey's construct validity, the authors completed cognitive interviews with 15 adolescents to ensure that

the survey questions targeted the intended underlying concept. Factor analysis was also conducted and found only 15 of the 32 questions loaded onto one of four subscales. Following the analysis of student interviews and initial factor analysis subsequent revisions to the survey items were made and an additional three questions were added

Elementary Reading Attitude Survey (ERAS). The ERAS (McKenna & Kear, 1990) measures two aspects of reading attitude: academic reading and recreational reading. The survey consists of 20 questions (10 referring to academic reading items and 10 to recreational) that students read and respond to on a four-point, Likert scale represented by pictures of the comic strip character Garfield. Students are instructed to choose the Garfield illustration that most represents their response of very happy (4 points), a little happy (3 points), a little upset (2 points), or very upset (1 point). Examiners are instructed to review the Garfield illustrations and their corresponding emotion with students before administering the survey. Subscale (academic reading and recreational reading) scores range from 10 to 40 points with a composite score range of 20 to 80 points (McKenna & Kear, 1990). Percentile ranks by grade level (1-6) are available for the subscales and the total composite.

The ERAS authors found a high level of internal consistency (Cronbach, 1951) for the two subscales and the full scale, with alpha coefficients ranging from .74 to .82 for the recreational subscale, .81 to .83 for the academic subscale, and .87 to .89 for the full scale. (McKenna & Kear, 1990). They also utilized several means of evaluating the ERAS' construct validity through an analysis of each subscale independently and the relationship between the two subscales. First the ERAS authors analyzed the recreational subscale by comparing students in the national norming group who identified themselves

as library cardholders and those without library cards. Not surprisingly, library cardholders had significantly ($p<.001$) higher recreational reading attitude scores ($M= 30.0$), than non-library cardholders ($M= 28.9$). A second analysis of the recreational subscale focused on teacher-identified students from the norming group who were not required to check books out of their school library. A comparison of those who did not have books checked out with those who did revealed that those who did have books checked out had significantly ($p<.001$) higher recreational reading scores ($M= 29.2$) than those who did not have books checked out ($M= 27.3$). A final review of the recreational subscale pitted students from the norming group who self-reported watching less than an hour of TV a night against those who reported watching two or more hours of TV per night. The recreational reading subscale mean for students who watched less TV was significantly ($p<.001$) higher ($M= 31.5$) than those who reported watching more TV ($M= 28.6$). To analyze the academic reading subscale, the ERAS authors compared the means of students from the norming group whose teachers identified them as low, average or high in overall reading ability. The high-ability readers had significantly ($p<.001$) higher scores on the academic reading attitude subscale ($M= 27.7$) than the low-ability group ($M= 27.0$). Taken together, the analyses of the individual academic and recreational subscales provide strong evidence that each subscale assesses its particular aspect of reading attitude. The fact that the Pearson product-moment correlation coefficient between the two subscales was .64, and that factor analysis revealed that all but one question (#13) loaded on the intended subscale further substantiate that the ERAS captures reading attitudes and that the "two subscales reflect discrete aspects of reading attitude" (McKenna & Kear, 1990, p. 639).

Rhody Secondary Reading Attitude Survey (RSRAS). The RSRAS (Tullock-Rhody & Alexander, 1980) assesses a secondary student's "degrees of feelings" (p. 610) towards reading. The survey consists of 25 statements that students read and respond to on a five-point Likert scale. Scores range from very positive (5 points) to very negative (1 point), with a minimum total score of 25 points and a maximum total score of 125 points. The authors of the RSRAS determined its reliability through the test-retest method, which measured how consistent the results of the survey were over a one-week period. The RSRAS authors found a good degree of test-retest reliability ($r=.84$). To establish the instrument's validity, the RSRAS authors included survey statements constructed from secondary students' comments and final test items or statements that correlated with the total scale at an acceptable level ($r=.40$ or above) (Tullock-Rhody & Alexander, 1980). The authors also conducted a t-test between the survey results of students identified by their teachers as having extremely positive and extremely negative attitudes toward reading, and reported that the survey adequately discriminated between the two groups, $t(60)=4.16$, $p<.001$.

Reader Self-Perception Scale (RSPS). The RSPS (Henk & Melnick, 1995) evaluates how a student feels about him/herself as a reader. The survey consists of one statement pertaining to students' general perception of themselves as readers and 32 statements that span Bandura's (1977) dimensions of self-efficacy represented as Progress, Observational Comparison, Social Feedback, and Physiological State.

Students read and rate their agreement or disagreement with each statement on a five-point Likert scale. Scores range from "Strongly Agree" (5 points) to "Strongly Disagree" (1 point), with norms and standard deviations available for each dimension of

self-efficacy assessed. Scores more than one standard deviation above or below the mean define the limits of the High, Average, and Low score ranges. The RSPS was found to have a high level of internal consistency for all four dimensions of the scale (Cronbach's alpha ranging from .81 to .84).

The RSPS authors evaluated the scale's construct validity through factor analysis to ensure that specific statements or test items related to each of the four dimensions of self-efficacy assessed by the RSPS. An initial factor analysis revealed that elements of Observational Comparison, Social Feedback, and Physiological State were represented by the RSPS but that the original Performance dimension had to be rethought and corresponding statements rewritten. After input from an expert panel, the Performance dimension was redesigned and renamed Progress. Subsequent factor analysis revealed "existence of each of the expected categories" (Henk & Melnick, 1995, p. 482). The RSPS authors also established the scales' concurrent validity by assessing the correlations between the RSPS' subscales with the subscales of the ERAS and Iowa (ITBS; Hieronymous & Hoover, 1985) and Stanford (SAT; Gardner, Rudman, Karlsen, & Merwin, 1989) achievement tests. The authors also compared the statewide reading achievement scores of fourth- and sixth-grade students on the Test of Essential Learning and Language Skills (TELLS) with students' RSPS results. With the exception of Observational Comparison (from the RSPS) and Academic Reading (from the ERAS) ($r = .13$, $p = .01$), the RSPS authors found "moderate, yet significant relationships" (Henk & Melnick, 1995, p. 482) between the subscales of the RSPS and the subscales of the ERAS ($r = .22$ to $.58$, $p < .001$). Similar levels of correlation were found between the RSPS and the Iowa (mean $r = .28$, $p < .001$) and Stanford (mean $r = .39$, $p < .001$) achievement tests, as

well as with the Narrative, Informational, and Total Reading scores of the TELLS (r= mid .20s to mid .30s, $p<.001$).

After an initial review of the dataset, I determined that the variance in how the affective measures report their findings (e.g., total scores versus subscale scores) makes a comparative analysis of the results problematic. Although artificial total scores could have been created for the two measures with subscale scores, I ruled out this approach due to the possibility of compromising the validity of the measures. However, although I did not include the reading attitude and reader self-perception measures as clustering variables, I subsequently used them for descriptive analyses of the clusters.

Reading accuracy, reading comprehension, decoding, oral reading fluency, and sight word knowledge. Participants' decoding skills (words read in context and words read in isolation untimed), listening comprehension, oral reading fluency, reading accuracy (words read in context), reading comprehension, and sight word vocabulary (words read in isolation timed) were previously evaluated using either the Qualitative Reading Inventory-4 (QRI-4), Qualitative Reading Inventory-5 (QRI-5) or the Critical Reading Inventory-2 (CRI-2). Graduate student examiners were trained, prior to assessing their students, on appropriate testing techniques. To ensure reliable and valid testing results, student examiners had multiple opportunities to practice scoring dummy informal reading inventories, and time to compare their scores to fellow classmates' results during two previous semesters of diagnosis and remediation coursework. Graduate student examiners were monitored during testing by their reading clinic director, who also reviewed their scoring procedures for accuracy and requested additional testing if scores appeared inaccurate or invalid.

Qualitative Reading Inventory-4 & 5 (QRI-4/5) and Critical Reading Inventory-2 (CRI-2). The QRI-4 (Leslie & Caldwell, 2005), QRI-5 (Leslie & Caldwell, 2011) and CRI-2 (Applegate, Quinn, & Applegate, 2008) are informal reading inventories designed to determine students' reading proficiency (i.e., the independent, instructional, frustration reading levels), and strengths and weaknesses in students' reading performance. Both assessments include graded word lists in a timed and untimed format, allowing for the assessment of students' knowledge of sight words (timed) and decoding (untimed). QRI-4/5 and CRI-2 graded passages at the preprimer through the high school levels assist in assessing students' reading accuracy and oral or silent reading fluency. Accompanying before-and-after comprehension questions allow examiners to assess students' prior knowledge and understanding of passages heard or read. Comprehension questions that evaluate literal and inferential levels of understanding can be found in the QRI-4/5 and CRI-2, but critical response level questions are unique to the CRI-2.

The authors of the QRI-5 judged its consistency in three ways: interscorer reliability, internal consistency reliability, and alternate form reliability (Leslie & Caldwell, 2011, p. 478). Interscorer reliability, or interrater reliability, is based on consistency of scores across examiners of the same phenomenon. The QRI-5 authors found a high degree of reliability for examiners' detection and scoring of students' miscues (.99 for total miscues and meaning-change miscues) and examiners' abilities to accurately score students' responses to comprehension questions after reading (.98 for explicit comprehension and implicit comprehension) (Leslie & Caldwell, 2011). To determine the QRI-5's internal consistency, the QRI-5 authors calculated the standard error of measurement (SEM) for the total comprehension score on every passage at each

grade level. Given the inverse relationship between SEMs and reliability, the authors expected small SEMs would signify stronger reliability. Acting as a proxy for reliability coefficients, SEMs for individual passages ranged from .10 to .23 (Leslie & Caldwell, 2011, p. 479), with SEMs significantly decreasing, when students completed more than one passage at a particular level. Not surprisingly, the QRI-5 authors recommend interpreting total comprehension scores and explicit versus implicit comprehension scores from more than one passage to increase the probability that the QRI-5 comprehension score represents students' true comprehension scores. Finally, the QRI-5's alternate form reliability, which examines the consistency of scores across passages of the same level to determine students' instructional reading levels, was reported as correlational coefficients above .80 (75% above .90), documenting a high level of consistency.

The CRI-2 authors determined consistency of their instrument by comparing examiners' interrater reliability percentages. A high level of agreement was found for examiners' detection and scoring of students' miscues (94.7% agreement) and examiners' ability to accurately score students' responses to comprehension questions after reading a narrative or informational passage (95.2% total agreement) (Applegate, Quinn, & Applegate, 2008).

Nilsson (2008) reviewed eight informal reading inventories and found that both the QRI-4 and CRI-2 appear to have a high level of content validity. Although the Nilsson review includes a previous version of the QRI than used in this study, the only substantive changes in the fifth edition of the QRI are the inclusion of additional narrative passages at the primary levels and an expansion of the supplemental DVD. Based on the

conceptual framework of Gough and Tunmer (1986) and LaBerge and Samuels (1974), both the QRI and CRI present reading as a fluid relationship between word-level and meaning-level skills. Both assessments determine students' knowledge of progressively more difficult, graded word lists and reading passages that were previously deemed to be at an instructional reading level for varying grade levels of students tested (Applegate, Quinn, & Applegate, 2008; Leslie & Caldwell, 2011). Nilsson (2008) also found that the QRI-4 and CRI-2 contained reading passages that were of an appropriate length and true to the genre they assessed (p. 528).

The QRI-4 was also found to have a high level of construct validity. Given the significant correlation values among word identification, reading accuracy, semantic accuracy and reading rate ($r=.34$ to $.59$, $p< .001$) through the second-grade level, and prior knowledge and comprehension from third grade ($r=.40$, $p<.05$) to the high school level ($r=.86$, $p<.001$), the QRI-5 authors state that "we have evidence that the QRI-5 measures at least two constructs that have been posited to be central to the reading process – word recognition and comprehension" (Leslie & Caldwell, 2011, p. 487). Although no correlation studies were conducted on the CRI-2's graded word lists, the CRI-2 word lists were found to accurately estimate the correct base level passage students should read while being administered the CRI-2 (84.5% correct identification). The CRI-2 authors also found a positive correlation between students' retelling scores and total comprehension item scores for both narrative ($r=.51$, $p<.001$) and informational ($r=.43$, $p<.001$) passages.

One of the strengths of any informal reading assessment is the multitude of data points across grade levels available to determine a student's independent, instructional,

and frustration reading level. Given that students may show independent and instructional level scores across several levels, I used each student's highest independent and instructional scores for analysis in this study. Table 14 defines the score/s used with corresponding study variables. Table 15 provides the total accuracy scoring guidelines for interpreting informal reading inventory scores, established by the university reading clinic faculty and informed by commonly used total accuracy scoring guides (Barr, Blachowicz, & Wogman-Sadow, 1995; Betts, 1954; Gunning, 1998; Johnson, Kress, & Pikulski, 1987; Leslie & Caldwell, 2011; Lipson & Wixson, 1997).

Table 14
Classification Variables and Corresponding Assessments

Reading Variable	Score Used
Sight word vocabulary	Highest independent level of words read in isolation -flashed/timed
Reading comprehension and oral reading fluency	Percentage correct on highest instructional level passage -based on highest instructional level words read in context score
Listening comprehension	Percentage correct on rising grade level, narrative passage
Decoding	Highest instructional level of words read in context Highest instructional level of words read in isolation -untimed

Table 15
Total Accuracy Scoring Guideline

Reading Variable	Interpretation of Scores	
Sight word vocabulary	Independent Level	90-100% correct
	Instructional Level	51-89% correct
	Frustration Level	0-50% correct
Reading comprehension &	Independent Level	90-100% correct

Listening comprehension	Instructional Level	51-89% correct
	Frustration Level	0-50% correct
Decoding	Independent Level	98-100% correct
	Instructional Level	90-97% correct
	Frustration Level	0-89% correct

To ensure that students' reading accuracy, reading comprehension, and decoding scores were representative of both students' functioning grade level and performance level, their scores were transformed (Buly & Valencia, 2002; Gelzheiser et al., 2011; Stahl & Heubach, 2005). Students' reading accuracy scores (the total accuracy percentage correct) and reading comprehension scores (the total accuracy percentage correct) were multiplied by their grade level using an interval scale developed by Gelzheiser et al. (2011) and provided in Table 16. For example, if a student's highest instructional decoding score (total accuracy) was 93% correct on a third grade passage their transformed decoding score would be 3.5 (.93 x 3.8).

Table 16
Interval Scale for Transforming Informal Reading Inventory Scores

Reading Level	Grade Level
Below Preprimer	1.0
Preprimer 1-3	1.3
Primer	1.6
1st Grade	1.8
2nd Grade	2.8
3rd Grade	3.8
4th Grade	4.8
5th Grade	5.8
6th Grade	6.8
Upper Middle School	7.8

In order to keep the distances between first to upper middle school grade levels equal, Gelzheiser et al.'s (2011) added .8 to each grade level interval point, since first grade was subdivided into three levels (preprimer, primer and first grade) to reflect the variance between early (1.3), middle (1.6) and late (1.8) first grade reading abilities.

Conversely the upper middle school level is comprised of two grade levels because of decreasing variance between middle and high school level reading levels, and the varying readability estimates of upper middle, grade level text (Leslie & Caldwell, 2011).

Spelling. Graduate reading student examiners, using one of three spelling inventories, previously assessed participating students' spelling or encoding abilities. All three spelling inventories are based on developmental spelling theory and determine students' stage of spelling (emergent, letter name, within word pattern, syllables and affixes, and derivational relations), as well as students' strengths and weaknesses in specific orthographic features. Each inventory requires the examiner to call out a word, read a provided sentence using the word, and repeat the given word before participating students are asked to spell and write the word on paper. Before participating in the summer reading clinic, graduate reading student examiners completed a three-hour graduate course in developmental spelling where they learned how to reliably administer, and consistently analyze and interpret the results from each of the four spelling inventories.

Developmental Spelling Analysis (DSA). The DSA (Ganske, 2000) consists of a screening inventory (20 words) and four feature word lists (25 words per list) that correspond to four of the five levels of developmental spelling (Letter Name, Within Word Pattern, Syllables and Affixes, and Derivational Relations). The screening inventory is given to determine which developmental stage of spelling a student is likely in and therefore which feature word list he or she should be given. There are two forms (A and B) for each feature word list, which can be used interchangeably to assess a student's knowledge of particular features within a stage. By summing a student's stage

scores across levels, a total inventory score is determined. For this study, screening inventory scores were not analyzed.

Ganske evaluated the DSA's reliability and validity through several types of analysis. Internal consistency coefficient alphas for the screening inventory ranged from .88 to .91, and feature inventories' alphas ranged from .86 to .97, revealing a satisfactory level of inter-item reliability. In addition, the stability of the DSA screening inventory and both forms of the feature word lists were examined through test-retest analyses with identical and alternate forms. Test-Retest reliability coefficients for the screening inventory ranged from .87 to .94 and above .90 for all feature word lists. Similarly strong results were found for the test-retest analyses, with alternate form reliability coefficients of .92 or above for all but one of the feature word lists. The exception was Letter Name stage, with grades 5-8 reliability coefficients ranging from .78 to .83. A final assessment of the DSA's stability was completed through an evaluation of its interscorer reliability. Four educators independently scored 10 inventories at each stage of spelling, with correlations ranging from .97 to .99, showing a high level of interscorer reliability (Ganske, 1999).

The validity of the DSA as a measure of students' orthographic knowledge was assessed through an analysis of its content, criterion, and construct validity. Based on developmental spelling theory (Henderson, 1981/1990; Read, 1971) and directly tied to specific orthographic features at each level of spelling, the DSA appears to have a high level of content validity. Ganske also found a high level of criterion-referenced validity for the DSA when comparing its results to the spelling subtests of the Kaufman Test of Educational Achievement (KTEA; Kaufman & Kaufman, 1985) and the ITBS (Hoover,

1985). Correlations with the DSA total inventory ranged from .92 to .94 for the KTEA and .82 to .83 for the ITBS. The DSA's predictive validity proved equally strong when correlating the DSA total inventory scores to the KTEA Reading Decoding subscale (r= .83 to .91). Given the DSA's strong content and criterion validity, and its ability to measure growth of orthographic knowledge over time, its construct validity appears strong (Ganske, 1999).

Words Their Way spelling inventories (WTW; Primary and Elementary). Predecessors of the DSA, the Words Their Way spelling inventories (Bear, Invernizzi, Templeton, & Johnson, 2011), are similarly grounded in developmental spelling theory and work to determine a student's spelling stage, as well as her or his specific orthographic knowledge. The Primary Spelling Inventory (PSI) consists of 26 spelling words and assesses students' emergent-to-late letter stage of orthographic knowledge. Typically, the PSI is given to students in kindergarten to third grade but can also be used with older, struggling readers whose orthographic knowledge is expected to be well below grade-level expectations. The Elementary Spelling Inventory (ESI) consists of 25 words and assesses students' letter name to early derivational relations stage of orthographic knowledge. Typically it is used with students in first through sixth grades.

In 2007 the Center for Research and Educational Policy (CREP) conducted an independent reliability and validity study (Sterbinsky, 2007) of the PSI, ESI, and Upper Spelling Inventory (USI). Reliability of the three inventories was gauged in three ways: internal consistency, item analysis via item discrimination and difficulty, and test-retest. In terms of Cronbach's alpha (Cronbach, 1951), all three inventories showed a high level of internal consistency with overall alphas of .934 (PSI), .915 (ESI), and .908 (USI). Item

discrimination and difficulty were analyzed to assess how accurately individual test items differentiate between higher and lower performing students and to ensure the test items represented an appropriate level of difficulty. The PSI, ESI, and USI had broad ranges of item difficulty percentages and indices of discrimination. Item difficulty ranges from 0 to 100 with higher percentages indicating easier items and lower percentages indicating harder items. Item discrimination highlighted how well individual items differentiate between students who performed well on the assessment and those who faired poorly. High discrimination numbers are preferable, as they indicate an item successfully distinguishes between higher and lower overall student performance (Sterbinsky, 2007, p. 8). Table 17 lists the range of item difficulty and corresponding indices of discrimination.

Table 17
PSI, ESI, USI Item Difficulty and Indices of Discrimination

Assessment	Range of item difficulty	Indices of discrimination
PSI	16.1% to 96.3%	6.30 to 77.70
ESI	15.0% to 98.9%	2.20 to 65.3
USI	7.2% to 88.2%	12.80 to 62.50

The CREP evaluators of the PSI, ESI, and USI also determined its reliability through the test-retest method, which measured how consistent the results of the three assessments were over a one-week period and over a four-month period with the same and differing populations of students. Evaluators found significant ($p<.001$) degrees of test-retest reliability that ranged from acceptable (0.9 to 0.7) to excellent (0.9 and higher) for the three WTW spelling inventories, across all students and testing intervals.

The three WTW spelling inventories' criterion validity was assessed by the CREP evaluators using both a predictive and concurrent design through a comparison of fall and spring results of the WTW assessments with spring results of the California Standards Tests (CST) for second-to-fifth-grade students. The majority of predictive validity

coefficients were significant for the PSI (.540 to .726, p=.01), ESI (.428 to .706, range of p<.001 to p=.05), and USI (.480 to .647, p<.001). Concurrent validity coefficients were equally significant across all three WTW assessments: PSI (.474 to .744, p=.01), ESI (.384 to .692, range of p<.001 to p=.05), and USI (.464 to .660, p<.001). Taken together, the predictive and concurrent validity results show that the WTW spelling inventories are predictive of and related to students' reading achievement.

Procedures

After Institutional Review Board (IRB) approval for this study was obtained in December 2014, I reviewed archived student case folders to identify those who met the qualifying criteria: (a) early adolescent, (b) struggling reader, and (c) native language other than English. Gender, ethnicity, and intelligence were not qualifying factors for choosing student clinic cases. Prior parental permission to use students' assessment data for future educational purposes (see Appendix A) had been collected by university instructors during the summer of their reading clinic and housed with their case folders in a locked cabinet at a university center.

To ensure the anonymity of participating students, identified student clinic folders were assigned a case number, which was used in lieu of student names in all digital files containing participating students' assessment data. Student case folders remained at the university center at all times and were returned to a locked filing cabinet following data entry into a Microsoft Excel and SPSS (22nd version; IBM, 2013) database. The digital database was stored on a personal laptop and password protected at all times.

CHAPTER IV

ANALYSIS

"It is a capital mistake to theorize before one has data."

Sherlock Holmes

A multi-step analytical process was used to identify and describe exploratory profiles of language-minority early adolescent struggling readers subgroups. Multiple hierarchical analysis techniques using the SPSS (22nd version; IBM, 2013) were first used to identify profiles of reader subgroups. A secondary, descriptive analysis of each profile then highlighted skill patterns of each cluster. Since clustering variables that have widely varying scales and standard deviations can greatly skew the data because of their effect on the distance measure between variables, the study variables were converted to standard scaled scores (z-scores) before analyses were run. Comparative analysis of variable z-score means were used to highlight the strengths and weaknesses of reading development for each profile of language-minority, early adolescent struggling readers determined through the initial hierarchical cluster analysis.

Similar to Morris et al.'s (1998) and Mellard et al.'s (2009) earlier cluster analysis of struggling readers, multiple hierarchical agglomerative clustering techniques (Ward's method, average linkage, and complete linkage) were utilized to identify and assess the stability of reader profiles, while ensuring the internal consistency of each reader profile (Everitt et al., 2011). Variables were assessed for collinearity before dendograms were

reviewed for outlier detection and cut points in the dendogram were determined to establish the final number of clusters. In addition, squared Euclidian distance was used as a measure of variable similarity by evaluating the distance between clusters. Cases missing listening comprehension scores and more than one data point were excluded from the dataset.

Cluster Analysis

Review of the Variables

In order to empirically investigate how language-minority, early adolescent students may cluster into reader profiles, six reading component variables from archived student case files were selected for analysis given their importance to investigating the profiles of language-minority early adolescent struggling students. Chosen variables included sight word vocabulary knowledge, oral reading fluency, reading comprehension, listening comprehension, and students' decoding and spelling abilities. To ensure that appropriate variables were chosen for analysis, their collinearity was assessed with a bivariate correlation analysis. Variables with extremely high levels of collinearity (.90 and above) are typically deemed too similar to assist in distinguishing between unique clusters (Hair et al., 1998; Mooi & Starstedt, 2011). Several variables had expected moderate correlations but as Table 18 indicates none were above .90. However, given the consistently strong correlations between students' decoding variable (words reading in isolation-untimed) and all other variables, the availability of a second decoding variable (accuracy while reading in context) that showed more variance in its correlates, and an effort to avoid an abundance of variables when the sample size was small, the WRI-untimed variable was not used in the subsequent cluster analysis.

The remaining variables showed correlations ranging from .031 to .875, with the strongest relationship between the spelling WTW-ESI and sight word vocabulary variables. This is not surprising given previous research with native English speaking students, which has documented the strong correlation between spelling and word identification skills (Ehri, 1992, 1997; Katzir, Kim, & Wolf, 2006; Mehta, Foorman, Branum-Martin, & Taylor, 2005; Torgesen, Wagner, Rashotte, Burgess, & Hecht, 1997). In addition, studies comparing language minority students' and native English speaking students' reading foundational skills development have found fairly equivalent word reading and spelling abilities across both groups (Lesaux & Siegel, 2003; Lesaux et al., 2006).

Conversely, the weakest relationship was found between listening comprehension and sight word vocabulary. Again, this is not surprising given that listening comprehension, a less cognitively stressful activity since it does not require the deciphering of text, and sight word vocabulary, which is text dependent, are not highly correlated for language-minority, early adolescent struggling readers.

Table 18

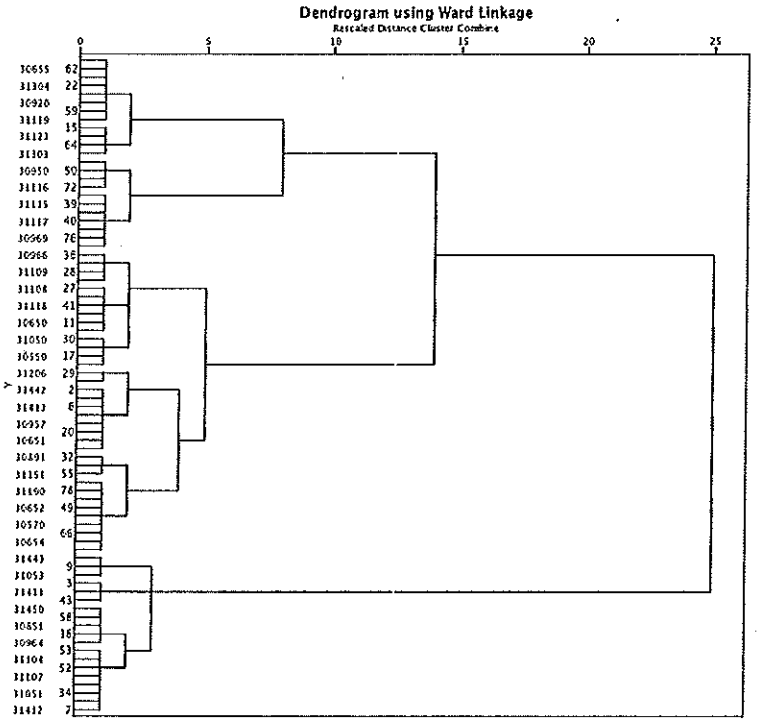
Variable Correlation Matrix

		Sight Words WRI Flashed	Spelling (WTW-PSI)	Spelling (WTW-ESI)	Spelling (DSA)	Decoding WRI Untimed	Decoding Accuracy	Fluency (wpm)	Comprehension	Listening Comp
Sight Words Correlation	Pearson WRI-F	1	.849**	.875**	.712**	.840**	.621**	.621**	.584**	.031
	Sig. (2-tailed)		.002	.000	.000	.000	.000	.000	.000	.785
	N	78	10	23	78	78	78	78	78	78
Spelling Correlation	Pearson WTW_PSI	.849**	1	--	--	.693*	.445	.489	-.141	-.141
	Sig. (2-tailed)	.002				.026	.198	.152	.698	.697
	N	10	10	0	0	10	10	10	10	10
Spelling Correlation	Pearson WTW_ESI	.875**	--	1	--	.880**	.818**	.718**	.759**	.352
	Sig. (2-tailed)	.000				.000	.000	.000	.000	.000
	N	23	0	23	0	23	23	23	23	23
Spelling DSA	Pearson Correlation	.712**	--	--	1	.684**	.547**	.443**	.379*	-.087
	Sig. (2-tailed)	.000				.000	.000	.000	.000	.000
	N	45	0	0	45	45	45	45	45	45
Sight Words Correlation	Pearson WRI-UT	.840**	.693*	.880**	.684**	1	.842**	.683**	.689**	.081
	Sig. (2-tailed)	.000	.026	.000	.000		.000	.000	.000	.480
	N	78	10	23	45	78	78	78	78	78
Decoding Accuracy	Pearson Correlation	.779**	.445	.818**	.547**	.842**	1	.630**	.681**	-.040
	Sig. (2-tailed)	.000	.198	.000	.000	.000		.000	.000	.731
	N	78	10	23	45	78	78	78	78	78
Fluency (wpm)	Pearson Correlation	.621**	.489	.718**	.443**	.683**	.630**	1	.482**	.054
	Sig. (2-tailed)	.000	.152	.000	.002	.000	.000		.000	.640
	N	78	10	23	45	78	78	78	78	78
Comp Reading	Pearson Correlation	.584**	-.141	.759**	.379*	.689**	.681**	.482**	1	.280*
	Sig. (2-tailed)	.000	.698	.000	.010	.000	.000	.000		.013
	N	78	10	23	45	78	78	78	78	78
Comp Listening	Pearson Correlation	.031	-.141	.352	-.087	.081	-.040	.054	.280*	1
	Sig. (2-tailed)	.785	.697	.099	.568	.480	.731	.640	.013	
	N	78	10	23	45	78	78	78	78	78

* Correlation is significant at the 0.05 level (2-tailed).; ** Correlation is significant at the 0.01 level (2-tailed).

Clustering Techniques

Ward's method. An initial hierarchical cluster analysis was performed using Ward's minimum variance method as the initial clustering algorithm based on the squared Euclidean distance, which places more weight on dissimilar cases in an attempt to distinguish initial clusters of cases. The resulting dendogram (see Figure 1), accompanying agglomeration schedule, and scree plot (see Figure 2) were examined, revealing three or four possible clusters of language-minority, early adolescent struggling readers and no outlier cases. Since the results of the Ward's Method analysis were preliminary, two additional hierarchical cluster analyses with varying clustering methods were completed to verify and clarify the number of distinct clusters present in the dataset before analyzing and describing particular cluster characteristics. Although replication



alone is not sufficient to validate cluster membership, successful replication of clusters lends credence to the viability of a solution.

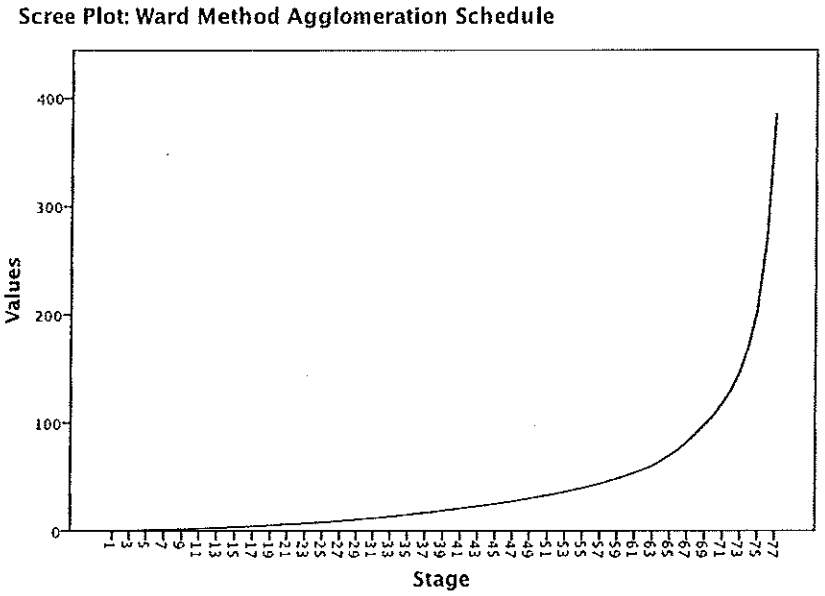


Figure 2. Scree Plot of Hierarchical Cluster Analysis with Ward's

Average linkage. A secondary hierarchical cluster analysis was conducted utilizing the average linkage clustering method and squared Euclidean distance. The average linkage method utilizes the average similarity within a cluster to determine cluster membership. The resulting dendogram (see Figure 3) and agglomeration schedule were examined confirming the initial analysis results, based on the Ward's Method, of three or four possible clusters of language-minority, early adolescent struggling readers.

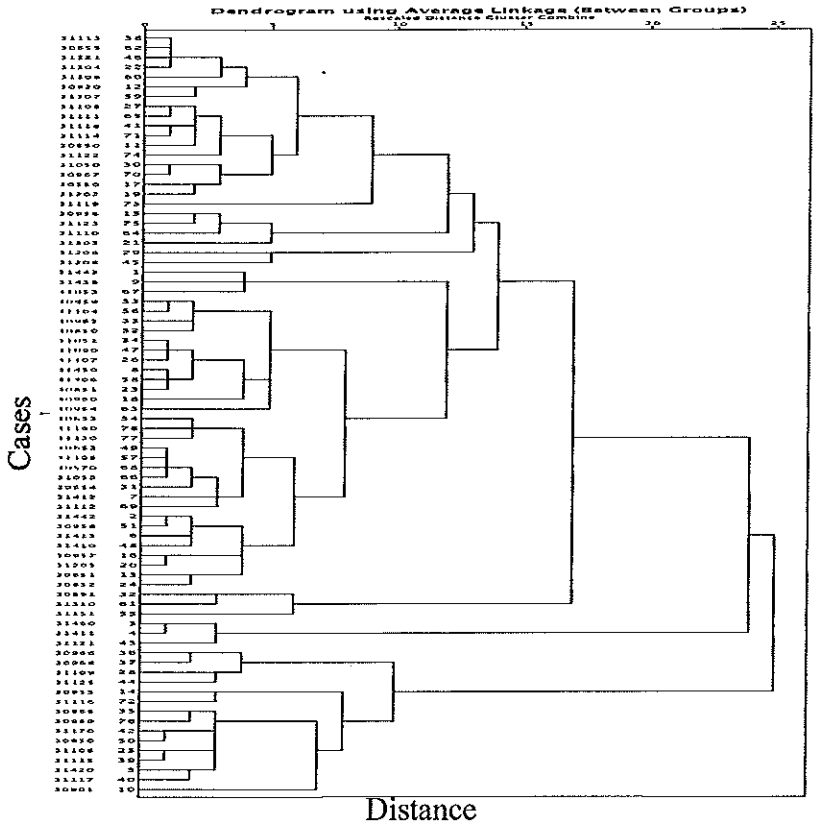


Figure 3. Dendogram of Hierarchical Cluster Analysis with Average Linkage

Complete linkage. A final, confirmatory, hierarchical cluster analysis utilizing the complete linkage clustering method and squared Euclidean distance was conducted. The complete linkage method determines the distance between two clusters by the distance between the most distant cases between clusters. The resulting dendogram (see Figure 4) and agglomeration schedule were examined confirming the results of previous analyses identifying three or four possible clusters of language-minority, early adolescent struggling readers.

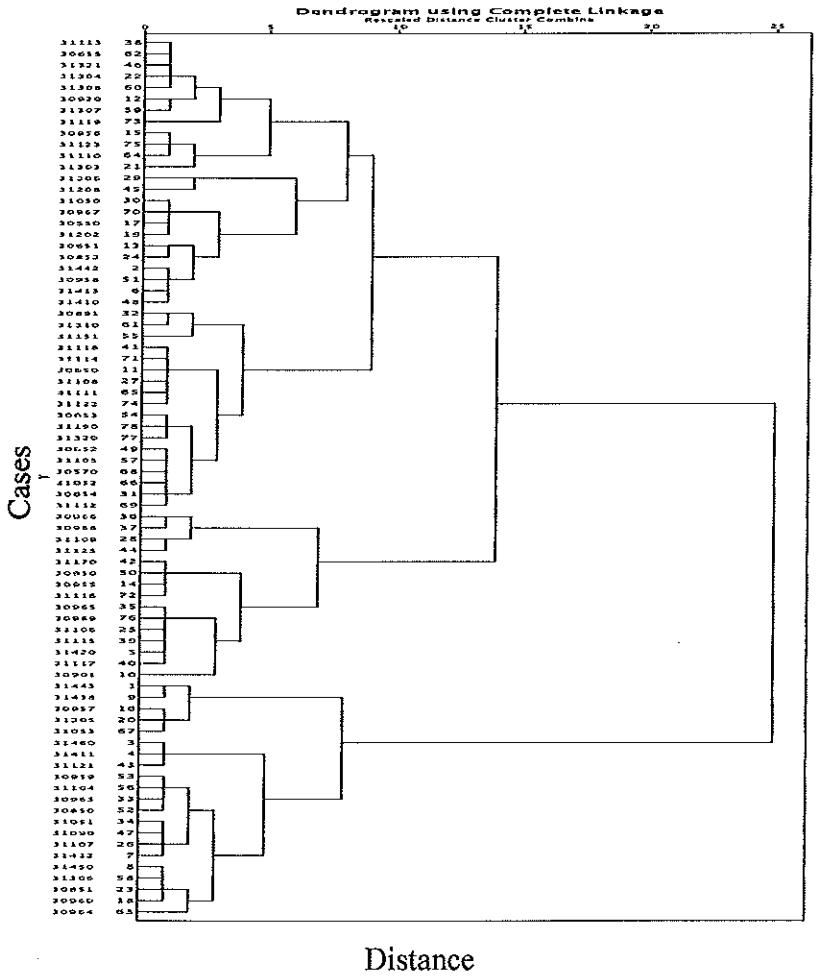


Figure 4. *Dendogram of Hierarchical Cluster Analysis with Complete Linkage*

Exploration of Similarities and Differences

A final determination of a four-cluster solution was decided upon given the results of the three hierarchical cluster analyses and theoretical considerations. Detailed demographic information for each cluster is listed in Table 19, as well as interpretations of available students' reading attitude or reader self-perception results (see Table 20).

Table 19

Demographic Characteristics by Cluster (n=78)

	Cluster 1 (n=19)	Cluster 2 (n=36)	Cluster 3 (n=11)	Cluster 4 (n=12)
Native Language				
-Spanish	17	26	8	9
Female Students	6	16	3	6
Rising Grade Level				
-4th	10	14	0	2
-5th	8	11	2	2
-6th	0	3	1	3
-7th	1	8	8	5
Special Education	6	1	1	2

Table 20

Reading Attitude/Self-perception Results by Cluster (n=54)

	Cluster 1 (n=12)	Cluster 2 (n=24)	Cluster 3 (n=10)	Cluster 4 (n=8)
Negative/Below Average	0	2	1	0
Neutral/Average	10	22	6	7
Positive/Above Average	2	0	3	1

A review of cluster membership characteristics revealed that Cluster 1 contained 24% of the sample (n=19), including 28% of native Spanish speaking students (n=17) and the highest percentage (60%) of Special Education students (n=6). Cluster 1 membership was also skewed towards the earliest grades included in the sample, as fourth- (n=10) and fifth-grade (n=8) students constituted 95% of the cluster. A review of Cluster 1 cases that reported motivation or reader self-perception data (n=12; 63% of cluster members) revealed that 83% (n=10) of selected students had neutral or average feelings about reading or about themselves as a reader; the remaining 17% (n=2) had high or positive feelings.

Cluster 2, which consisted of the largest number of students (n=36; 46% of the sample) and relatively similar numbers of students across grade levels, contained only one Special Education student. Cluster 2 also contained the highest percentage (43%) of

native Spanish speaking students (n=26) and the highest percentage (52%) of female students (n=16). A review of Cluster 2 cases that reported motivation or reader self-perception data (n=24; 67% of cluster members) revealed that 92% (n=22) of selected students had neutral or average feelings about reading or about themselves as a reader; the remaining 8% (n=2) had low or negative feelings.

Cluster 3 contained the smallest number of students (n=11; 14% of the sample) and mostly comprised struggling seventh-grade readers (n=8). However, it had the highest percentage of cases that reported motivation or reader self-perception data (n=10; 91% of cluster members). A review of Cluster 3's motivation and reader self-perception results revealed that 60% (n=6) of these students had neutral or average feelings about reading or about themselves as readers, 30% (n=3) had positive feelings, and 10% (n=1) had negative feelings.

Similarly, Cluster 4 (n=12) consisted of a higher number of sixth- and seventh-grade students (n=8; 67% of the cluster) compared with fourth- and fifth-grade students (n=4; 33% of the cluster). A review of Cluster 4 cases that reported motivation or reader self-perception data (n=8; 67% of cluster members) revealed that 88% (n=7) of selected students had neutral or average feelings about reading or about themselves as readers; the remaining 12% (n=1) had high or positive feelings.

Analysis of the six clustering variables' z-score and raw score means and standard deviations (see Tables 21 and 22 and Figure 5), as well as means and standard deviations for variables of age, independent reading level, and highest instructional reading level for each cluster (see Tables 23-24) were reviewed to further understand the uniqueness of each profile of students.

Table 21

Mean and Standard Deviations for Clustering Variables' zScores, (n=78)

	Cluster 1 M(SD)	Cluster 2 M(SD)	Cluster 3 M(SD)	Cluster 4 M(SD)
Sight Word Knowledge	-1.11 (.46)	.002 (.63)	1.41 (.75)	.46 (.71)
Decoding	-1.07 (.65)	-.07 (.80)	1.18 (.24)	.71 (.48)
Fluency	-1.12 (.63)	.15 (.82)	1.25 (.59)	.17 (.38)
Reading Comprehension	-.29 (.15)	-.08 (.22)	.10 (.23)	-.09 (.21)
Listening Comprehension	-.37 (1.06)	.63 (.65)	-.24 (.64)	-1.15 (.68)
Spelling	-1.01 (.39)	.03 (.74)	1.60 (.31)	-.08 (.57)

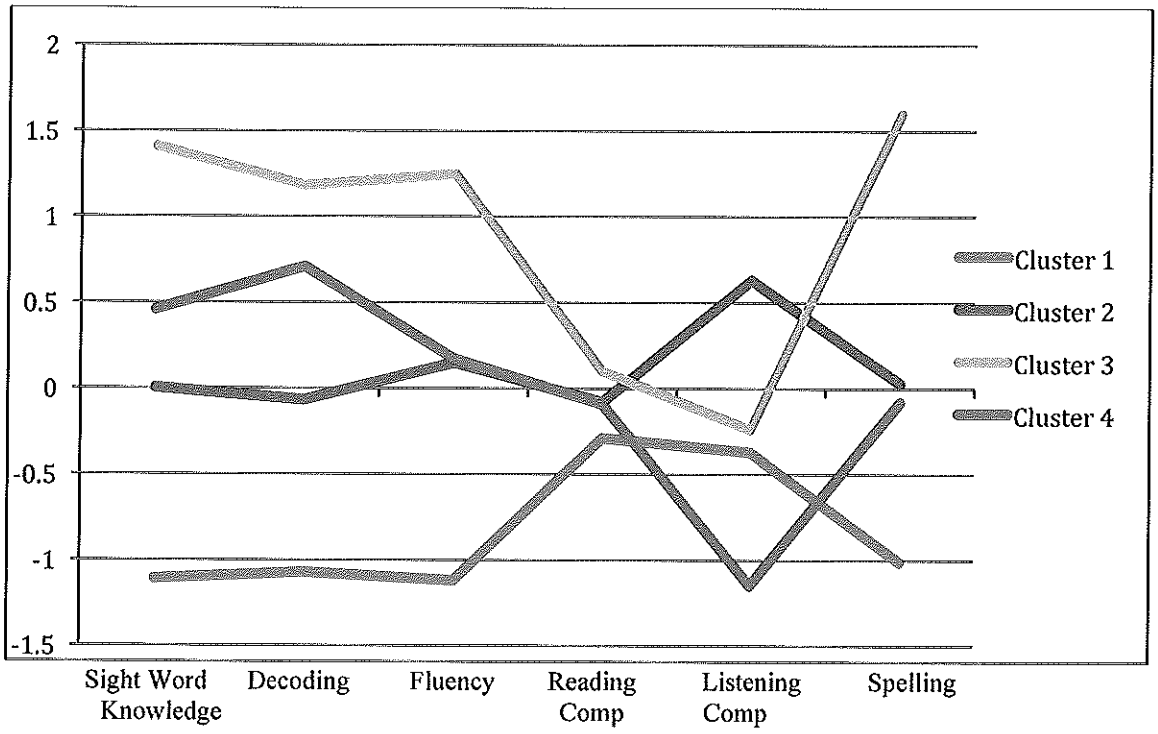


Figure 5. *Mean and Standard Deviations for Clustering Variables' zScores, (n=78)*

Table 22

Mean and Standard Deviations for Clustering Variables' Scores, (n=78)

	Cluster 1 M(SD)	Cluster 2 M(SD)	Cluster 3 M(SD)	Cluster 4 M(SD)
Sight Word Knowledge	56.05(16.52)	95.69(22.60)	145.82(26.54)	112.17 (25.33)
Decoding	3.05(1.25)	4.95(1.52)	7.35(.46)	6.44(.92)
Fluency	63.74 (15.03)	94.22(19.79)	120.55(14.13)	94.83 (9.11)
Reading Comprehension	1.98 (1.04)	3.42(1.49)	4.71(1.57)	3.38(1.44)
Listening Comprehension	39.16(26.50)	64.17(16.23)	42.27(15.99)	19.58(16.95)
Spelling				
-PSI	40(4.12)	63.20(9.50)	---	---
-ESI	38.29(4.86)	59.71(12.46)	77.00(4.36)	54.50(15.12)
-DSA	25.57(7.79)	28.58(8.70)	66.88(5.00)	39.17(9.20)

Note: -- indicates no scores were recorded for that variable within a particular cluster

Table 23

Mean and Standard Deviations for Descriptive Variables by Cluster (n=78)

	Cluster 1 M(SD)	Cluster 2 M(SD)	Cluster 3 M(SD)	Cluster 4 M(SD)
Age	9.69 (.84)	10.08 (1.39)	11.34(1.01)	10.80 (1.51)
Highest Instructional Reading Level (RL)	2.91 (.97)	4.83 (1.18)	6.98 (.60)	5.55 (.87)

Table 24

Students' Independent Reading Level by Cluster (n=52)

	Frequency	Mean	SD
Cluster 1	4	1.65	.24
Cluster 2	27	2.22	1.12
Cluster 3	11	3.81	.75
Cluster 4	10	2.80	.79
Total	52	2.63	1.16

Note. Only 52 of 78 students had a defined independent reading level. The remaining 26 students' independent reading level was labeled "Not Obtained" by examiners since the data collected showed no clear level of independence.

A subsequent one-way ANOVA was conducted, utilizing the cluster membership from the Ward's Method as the independent variable, to determine which cluster variables significantly differed from one another. There were statistically significant differences in students' sight word knowledge $F(3, 74)=40.62$, $p<.001$, decoding F(3,

74)=32.41, p<.001, oral reading fluency F(3, 74)=29.93, p<.001, reading comprehension F(3, 74)=9.54, p<.001, listening comprehension F(3, 74)=18.73, p<.001, spelling F(3, 74)=44.22, p<.001, age F(3,74)=5.08, p<.05, and highest instructional reading level F(3, 74)=40.27, p<.001 but not gender F(3,74)=.68, p=.565 by cluster.

To discern which means were significantly different from one another across clusters, post-hoc comparisons were conducted using Games-Howell follow-up tests since an initial Levene's Test revealed the assumption of homogeneity was questionable for several variables. The Welch tests for equality of means were subsequently reviewed and F statistics for all variables were found to be significant (p<.001) (see Table 25).

Table 25
Welch Tests for Equality of Means

	Welch	p
Sight Word Knowledge	F(3, 26.95)=43.75	<.001
Decoding	F(3, 33.91)=69.6	<.001
Fluency	F(3, 31.85)=36.32	<.001
Reading Comprehension	F(3, 27.66)=11.25	<.001
Listening Comprehension	F(3, 27.60)=22.83	<.001
Spelling	F(3, 31.73)=130.73	<.001
Age	F(3, 28.45)=7.43	<.05
Highest Instructional RL	F(3, 32.06)=66.41	<.001

The results of the Games-Howell post-hoc tests revealed that decoding was the only variable that was significantly different between all clusters. Sight word knowledge, oral reading fluency, spelling, and highest instructional reading level variables were found to differentiate significantly except between Cluster 2 and Cluster 4. However, listening comprehension was significantly different between all clusters but Cluster 1 and Cluster 3. Conversely, reading comprehension was found to significantly differentiate between the four clusters the least successfully, as Clusters 2 and 3, Clusters 2 and 4, and Clusters 3 and 4 had insignificant differences between their reading comprehension

scores. Finally, a significant difference between clusters members' ages was found between Clusters 1 and 3, and Clusters 2 and 3. Table 26 provides an overview of the clusters that significantly differentiated between one another, across variables.

Table 26
Significant Differences Between Clusters and Across Variables

	Cluster 1 vs. Cluster 2	Cluster 1 Cluster 3	Cluster 1 Cluster 4	Cluster 2 Cluster 3	Cluster 2 Cluster 4	Cluster 3 Cluster 4
Sight Word Knowledge	*	*	*	*		**
Decoding	*	*	*	*	**	**
Fluency	*	*	*	*		*
Reading Comprehension	*	*	**			
Listening Comprehension	**		*	**	*	**
Spelling	*	*	*	*		*
Age		*		*		
Highest Instructional RL	*	*	*	*		*

Note: * denotes statistical significance at p<.001; ** p<.05

Based on the results of the one-way ANOVAs and descriptive statistics, the following cluster descriptions were developed.

Cluster 1: Pervasive Strugglers. Cluster 1 students had significantly low sight word knowledge, decoding, reading comprehension, spelling scores, slow oral reading fluency rates, and below grade level instructional reading levels. Most also lacked a defined independent reading level or the ability to listen and understand grade level material, yet their listening comprehension abilities were only moderately low compared to other clusters.

Cluster 2: Middle Muckers-Good Listeners. Cluster 2 students, much like Cluster 4 students, were defined as "Middle Muckers" given their mix of slightly below grade-level and meeting grade-level expectations in most reading foundational skill areas, and moderate level of proficiency compared to other clusters. However, Cluster 2's significantly higher listening comprehension skills than Cluster 4 were defining

differences between the two clusters and lead to the classification of Cluster 2 members as "Good Listeners."

Cluster 3: Older Word Nerds. Cluster 3 students were significantly older than students in Clusters 2 and 4, and experienced significantly higher word-level reading skills including sight word knowledge, decoding, spelling, and oral reading fluency compared to other clusters of students. Although their listening and reading comprehension abilities were significantly higher than most other clusters, they were generally below grade-level expectations for cluster members, contrasting their mix of slightly below grade-level and meeting grade-level expectations word-level results.

Cluster 4: Middle Muckers-Poor Listeners. Similar to Cluster 1, Cluster 4 students generally experienced below grade level instructional reading levels. Defined as "Middle Muckers" given their mix of slightly below grade-level and meeting grade-level expectations in most reading foundational skill areas, and moderate level of proficiency compared to other clusters, Cluster 4 members paralleled Cluster 2 members in many ways. However, their significantly lower listening comprehension skills differentiated Cluster 4 from Cluster 2.

CHAPTER V

DISCUSSION

"Don't raise your voice, improve your argument."

Desmond Tutu

The goal of this study was to determine if unique profiles of language-minority, early adolescent struggling readers existed within the dataset and if so, what similarities and differences existed among the profiles. "Unfortunately, the unique needs of these older EL students are even more overlooked than those of their younger peers" (Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003, p. 3), leading to less effective instruction and intervention for language-minority, adolescent struggling readers. By illuminating their varying profiles, my hope was that this study would add to the limited research base of language-minority, struggling adolescent readers and eventually inform best instructional practices to break "the cycle of failure for older, struggling readers" (Jensen & Tuten, 2012).

Conclusions

Convergent with previous research (Lesaux & Kieffer, 2010), study results supported the notion that discrete reading profiles exist within language-minority, early adolescent struggling readers. In the present study, four distinct profiles of readers that both parallel and diverge from previous understandings of language-minority, early

adolescent struggling readers were found. Here I summarize central conclusions drawn from this study; offer an explanation of similarities to and differences from previous empirical research clustering of language-minority, adolescent readers; distill implications for their instruction and intervention; and suggest directions for further research.

Reader Profiles

Divergent profiles. Similar to Lesaux and Kieffer's (2010) Globally Impaired reader profile and Buly and Valencia's (2002) Disabled Reader profile, I found a unique group of early adolescent readers who struggled with all aspects of reading. Termed Pervasive Strugglers, these predominantly fourth- and fifth-grade strugglers constituted a percentage of the total sample (24%) similar to that of Lesaux and Kieffer's Globally Impaired readers (21%), and included the highest number of Special Education students. The pervasive struggles of this group are not surprising given that their average instructional reading level (M=2.64, SD=.79) was at least a year below the youngest readers in the group. The majority of cluster members also lacked an independent reading level, indicating deficient automaticity of foundational reading skills critical to reading with "speed and smoothness" (Samuels, 1979, p. 380). Given the fact that automatic word recognition is a necessary but insufficient requirement for comprehension, this deficit alone constituted a substantial barrier to Pervasive Strugglers' reading comprehension.

Conversely, the Older Word Nerd group of readers had significantly higher oral reading rates and other word-level skills than any other group in the present study, a finding that is not surprising considering the majority of cluster members were in seventh

grade (73%). Although they could largely read grade-level text, their reading comprehension lagged almost two years behind the level they could adequately decode. It appears their limited listening comprehension abilities contributed to their reading struggles. As Gough and Tunmer (1986) proposed with the Simple View of Reading and Hoover and Gough (1990) discovered with first-to-fourth-grade native Spanish-speaking students, reading comprehension skills may be negatively affected by students' deficient listening comprehension abilities, even when decoding and other word-level skills are above par. The Older Word Nerds conformed to such a profile and generally paralleled Lesaux and Kieffer's (2010) Automatic Word Callers profile. However, the lack of a vocabulary clustering variable in the present study limited the comparative analysis between Older Word Nerds and Lesaux and Kieffer's (2010) Automatic Word Callers group, given the unique contribution of students' vocabulary knowledge to cluster membership in Lesaux and Kieffer's (2010) study.

Slight differences. Although the Middle Muckers-Poor Listeners and Middle Muckers-Good Listerners shared similar mediocre scores across foundational skill areas, their slight divergences offer clues to their unique profiles of readers. Both groups had cluster members representative of every grade level in the sample but fourth and fifth graders constituted 69% of the Good Listener group and sixth and seventh graders constituted 67% of the Poor Listener group. The groups' age difference is important to interpreting their results. Although the Poor Listener group had significantly higher decoding scores than the Good Listener group, it was an expected difference given the higher percentage of sixth-and-seventh grade students in the Poor Listener group. Yet age did not explain why, when trying to listen and understand grade level material read to

them, the Poor Listener group generally experienced significant frustration and the Good Listener group generally experienced success. One plausible explanation is that, similar to the Older Word Nerd group, the Poor Listeners' strong decoding skills could not offset their deficient linguistic comprehension skills. It is also conceivable that the Poor Listeners' low listening comprehension scores were indicative of deficient vocabulary knowledge. Given the strong correlation between language-minority students' vocabulary knowledge and listening and reading comprehension abilities in their second language (Droop & Verhoeven, 2003; Hoover & Gough, 1990; Proctor et al., 2005), students' varying vocabulary knowledge may be the underlying difference between the Good and Poor Listener groups.

Lesaux and Kieffer (2010)

Once discrete profiles of language-minority, early adolescent struggling readers presented in the sample, further analysis sought to answer how closely the largest cluster discovered in the present study compared to Lesaux and Kieffer's (2010) Slow Word Caller group. The present study's Good Listener group, defined by their significantly higher listening comprehension skills in contrast to their mediocre results in other areas of reading development, represented the largest reading cluster in the present study. Conversely, Lesaux and Kieffer's (2010) Slow Word Caller group were defined by their above-average decoding skills, low-average fluency skills, and far-below-average vocabulary skills. Although there are several plausible reasons for the varying results between Lesaux and Kieffer's (2010) groupings and the present study clusters, sampling and cluster variable differences are likely culprits.

Lesaux and Kieffer (2010) investigated sixth-grade, language-minority, struggling readers in an urban school district, whereas the present study focused on rising fourth-through-seventh-grade suburban students. Given the difference in students' ages between at least two reader profiles in the present study, the inclusion of early adolescent students from varying grade levels would likely have affected the results of Lesaux and Kieffer's (2010) reader profiles.

In addition, Lesaux and Kieffer (2010) utilized a cut-point (35th percentile rank) on a norm-referenced reading assessment to identify and define struggling readers in their study. In contrast, students in the current study were identified as struggling readers by their schools, using a variety of measures and varying criteria. Although a review of end-of-year, standardized reading data for a quarter of the study sample validated students' categorization as struggling readers, a clear set of criteria and common measure for making that determination was absent from the present study, and would likely explain some of the differences in reader profiles between the two studies.

Finally, given the strong relationship between language-minority students' vocabulary knowledge and reading comprehension skills (Droop & Verhoeven, 2003; Lervag & Aukrust, 2010; Verhoeven, 2000; Verhoeven & van Leeuwe, 2008), oral language variables hold great promise for differentiating and defining language-minority, struggling adolescent reader profiles (Lesaux and Kieffer, 2010; Proctor et al., 2005). Unfortunately, oral language variables, including students' general vocabulary knowledge, were unavailable for the present study, but explained significant differences between Lesaux and Kieffer's (2010) clusters of readers.

New Finding. Although the present study lacked an oral language variable, the inclusion of students' oral reading fluency rate at their highest instructional reading level offered new insights. Lesaux and Kieffer (2010) found that the majority of students in their sample exhibited oral reading fluency in the average to low-average range. They based their findings on the number of words of a grade-level passage a student read correctly in one minute (wcpm) compared to Hasbrouck and Tindal's (2006) national fluency norms. In contrast, the present study revealed that across clusters many students' oral reading rates (words per minute), at their highest instructional reading level, fell outside expected grade-level performance ranges (Carnine, Silbert, & Kameenui, 1997; Harris & Sipay, 1990). This was particularly true for rising sixth- and seventh-grade students in the sample. Given Hasbrouck and Tindal's (2006) problematic norming sample, which lacked demographic information other than students' grade levels, and Lesaux and Kieffer's (2010) focus on sixth grade instead of a range of grade levels, and their use of a grade level text instead of ensuring students' fluency rates were computed with instructional level text, it is not altogether surprising that oral reading fluency results differed greatly between the two studies. Exploring the differences systematically constitutes a potentially fruitful agenda for subsequent inquiry.

Affective Variables

Unfortunately, reader attitude and self-perception scores were not as useful as I had hoped in describing attributes that might further distinguish among the four language-minority, early adolescent struggling reader profiles. No discernable patterns of reader attitudes or self-perception arose among the clusters. However, a general affective trend did arise across clusters for the sample as a whole. The majority of students

reporting reader attitude or self-perception data (83%; n=45) had neutral or average feelings about reading or about themselves as readers, and only 3% had negative feelings. This is an interesting finding given the significant correlations and predictive relationship found between reading attitudes and reading achievement for native English speaking adolescent readers (Conlon et al., 2006; Katzir et al., 2009; Retelsdorf, Koller, & Moller, 2011). In contrast, the results of this study indicate that language-minority, early adolescent struggling readers' neutral or "might-do," not "can't-do, attitudes about reading, need to change into "can-do attitudes," (McCabe & Margolis, 2001). However, further study is needed to understand if neutral reading attitudes and reader self-perceptions are unique to language-minority, struggling adolescent readers, a common trend with language-minority students, or specific to particular adolescent reader groups (e.g. early versus late).

Implications

Given the variety observed in language-minority, early adolescent struggling reader profiles, both in the present study and previous research (Lesaux & Kieffer, 2010) there is reason to believe that their difficulties are often attributable to multiple causes. Consequently, schools need to differentiate the instructional support given to language-minority, early adolescent struggling readers by their reading profiles in order to effectively target their greatest areas of need.

Although the results of the present, exploratory study were preliminary, future studies that find similar clusters of language-minority, early adolescent learners, would lend credence to the following instructional implications. The Pervasive Struggler group highlighted the importance of the automaticity of foundational skills in developing

proficient readers. When language-minority, adolescent readers fail to attain word-level fluency (viz., decoding, sight word recognition, oral reading fluency), their comprehension often suffers (Nakamoto et al., 2008; Proctor et al., 2005). Although word-level skills are currently a rare instructional or intervention focus for students in the upper grades (Lervag & Aukrust, 2010), a portion of language-minority, early adolescent readers may require support in the automaticity, and not simply accuracy, of their reading skills in English.

Similarly, language-minority, early adolescent struggling readers, like the Older Word Callers, who have obtained word-level fluency but struggle with understanding what they read or hear, may require specific guidance in how to think and interact with the text they have read and how to decipher new concepts and vocabulary. Developing and guiding students' thinking skills and vocabulary knowledge requires an informed teacher who can deftly integrate interactive discussions within explicit comprehension strategy instruction while simultaneously building students' repertoire of words and concepts, across genres of text. To be successful, teachers will need extensive professional development and on-going support, two rare commodities in schools today.

Equally vital is sustained support for increasing the burgeoning research base on adolescent struggling readers, particularly language-minority students. Given the inclusionary definition of adolescent learners as fourth to twelve graders, the multitude of native languages represented by language-minority students, and a lack of consensus in defining adolescent struggling readers, research opportunities to truly understand the variety of language-minority, adolescent struggling readers are limitless and timely. Presently, very few studies have focused on early adolescent versus later adolescent

struggling readers, and many studies have omitted language-minority students from their samples. Therefore, a multitude of studies are needed to continue the conversation of how to best support language-minority, early adolescent struggling readers.

Limitations

Besides its exploratory nature, the present study had two major limitations: (a) sample selection and (b) the use of archived data.

Sample Selection

The present study's sample was limited to students participating in university-sponsored reading clinics. Inclusionary criteria for participation in the summer reading clinics varied by site and year, as well as with referring schools' definitions of struggling readers. Therefore, it is possible that some of the findings of this study are due to a skewed sample of language-minority, early adolescent struggling readers that limit generalization.

The sample size of this study was also relatively small. Although small sample sizes are not uncommon for studies of adolescent struggling readers and language minority students, they limit the types of statistical analyses that can be used and the generalizability of the study findings. A larger sample, with additional language-minority students who speak a native language other than Spanish, would further increase the generalizability of the findings and might reveal language-specific profiles.

Similarly, a sample with larger numbers of students within each grade level would allow cluster analyses within and between grade-levels. These analyses would clarify any confounding effect a student's grade level might have on their cluster membership. In the present study this level of analysis was impossible due to the limited number of students

represented in the sample at each grade level. Without such an analysis, it is possible that cluster membership was influenced by students' grade level, even though analysis of cluster characteristics were made in light of students' grade and age levels.

Archived Data

The use of secondary datasets raises issues of data quality when large amounts of data are missing and data collection procedures may not be uniform. Although graduate students used standardized assessment procedures during data collection, the initial dataset used for the present study contained a considerable number of cases (n=17, 18%) that were dismissed due to missing data points. The subsequent data reduction greatly reduced the overall sample size and generalizability of the study findings.

In addition, several study variables would have been useful in the present study's analysis but were unavailable in the secondary dataset. For example, students' oral language proficiency levels, vocabulary knowledge, and end-of-year testing data for all students, would have provided additional clustering variables used by other researchers investigating language minority adolescent readers, allowing for easier comparative analysis of results across studies.

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