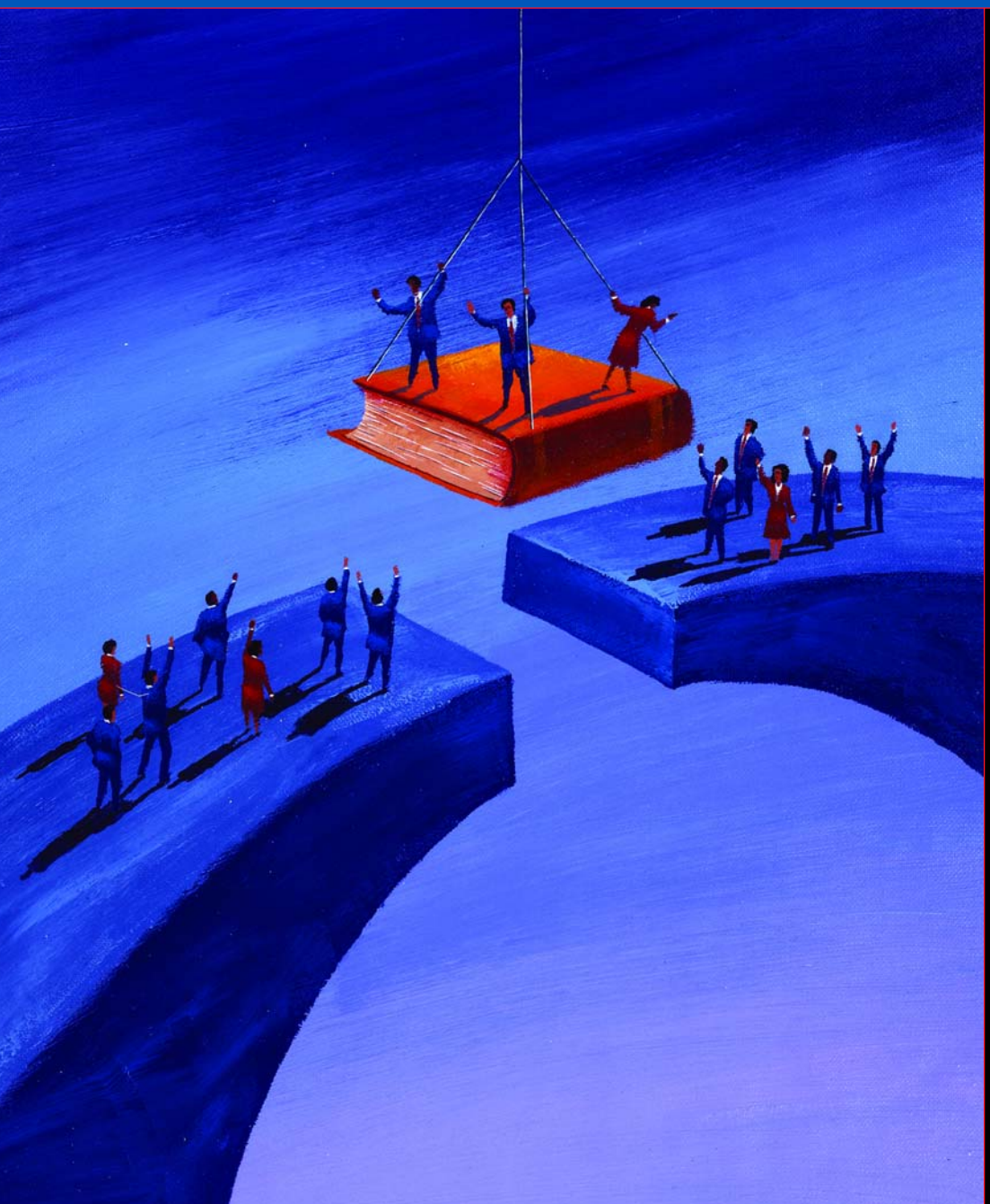
Book 1 of 3

Practical Guidelines for the Education of English Language Learners

RESEARCH-BASED RECOMMENDATIONS FOR INSTRUCTION AND ACADEMIC INTERVENTIONS



CENTER ON INSTRUCTION

Practical Guidelines for the Education of English Language Learners

RESEARCH-BASED RECOMMENDATIONS FOR INSTRUCTION AND ACADEMIC INTERVENTIONS

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This is Book 1 in the series Practical Guidelines for the Education of English Language Learners:
Book 1: Research-based Recommendations for Instruction and Academic Interventions
Book 2: Research-based Recommendations for Serving Adolescent Newcomers
Book 3: Research-based Recommendations for the Use of Accommodations in Large-scale Assessments

2006

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This publication was created by the Texas Institute for Measurement, Evaluation, and Statistics at the University of Houston for the Center on Instruction.

The Center on Instruction is operated by RMC Research Corporation in partnership with the Florida Center for Reading Research at Florida State University; RG Research Group; the Texas Institute for Measurement, Evaluation, and Statistics at the University of Houston; and the Vaughn Gross Center for Reading and Language Arts at the University of Texas at Austin.

The contents of this book were developed under cooperative agreement S283B050034 with the U.S. Department of Education. However, these contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.

Editorial, design, and production services provided by Elizabeth Goldman, Lisa Noonis, Robert Kozman, and C. Ralph Adler of RMC Research Corporation.

Francis, D., Rivera, M., Lesaux, N., Kieffer, M., & Rivera, H. (2006). Practical Guidelines for the Education of English Language Learners: Research-Based Recommendations for Instruction and Academic Interventions. (Under cooperative agreement grant S283B050034 for U.S. Department of Education). Portsmouth, NH: RMC Research Corporation, Center on Instruction. Available online at http://www.centeroninstruction.org/files/ELL1-Interventions.pdf

2006

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FOREWORD

The fundamental principles underlying the *No Child Left Behind (NCLB) Act of 2001* focus on high standards of learning and instruction with the goal of increasing academic achievement—reading and math in particular—within all identified subgroups in the K-12 population. One of these subgroups is the growing population of English Language Learners (ELLs). NCLB has increased awareness of the academic needs and achievement of ELLs as schools, districts, and states are held accountable for teaching English and content knowledge to this special and heterogeneous group of learners. However, ELLs present a unique set of challenges to educators because of the central role played by academic language proficiency in the acquisition and assessment of content-area knowledge. Educators have raised multiple questions about effective practices and programs to support the academic achievement of all ELLs, including questions about classroom instruction and targeted interventions in reading and math, the special needs of adolescent newcomers, and the inclusion of ELLs in large-scale assessments. While ELLs vary in their academic outcomes and many thrive in U.S. schools, there is indeed a significant proportion—whether or not formally designated Limited English Proficient (LEP) or English Language Learner (ELL) and thus receiving support services for language development—who struggle considerably in developing English proficiency, academic skills, and meeting grade-level standards. This document was written primarily with this latter group in mind.

Like any other population of learners with academic difficulties, struggling ELLs require effective instructional approaches and interventions to prevent further difficulties and to augment and support their academic development. When designing an instructional approach or intervention, educators must consider several factors in addition to the content, such as the format for delivery, the match between the learner's difficulty and the approach or intervention, and whether it is meant to be a class-wide approach or targeted for small-group or one-on-one settings. For ELLs, it is especially important to consider the role of second language proficiency in their difficulties as well as in their ability to profit from the planned instruction or intervention.

This document provides evidence-based[a] recommendations for policymakers, administrators, and teachers in K-12 settings who seek to make informed decisions about instruction and academic interventions for ELLs. The domains of focus include reading and mathematics, and the recommendations apply to both a class-wide instructional format and individualized, targeted interventions, depending on the population and the goals of the instruction.

[a] The term *evidence-based* reflects a commitment to providing recommendations on the basis of direct evidence from research conducted with ELLs, evidence from research conducted with mixed samples of ELLs and native English speakers, as well as evidence from studies of instructional approaches validated with native English speakers that are theoretically sound for application to ELLs.

OVERVIEW

Who Are English Language Learners?

The U.S. Department of Education defines ELLs as national-origin-minority students who are limited-English-proficient. The ELL term is often preferred over Limited-English-Proficient (LEP) as it highlights accomplishments rather than deficits. As a group, ELLs represent one of the fastest-growing groups among the school-aged population in this nation. Estimates place the ELL population at over 9.9 million students, with roughly 5.5 million students classified as Limited English Proficient by virtue of their participation in Title III assessments of English language proficiency. In the last two decades, the population of ELLs has grown 169 percent—whereas the general school population has grown only 12 percent—and collectively speaks over 400 different languages, with Spanish being the most common (i.e., spoken by 70 percent of ELLs). By 2015, it is projected that 30 percent of the school-aged population in the U.S. will be ELLs. The largest and fastest-growing populations of ELLs in the U.S. consist of students who immigrated before kindergarten and U.S.-born children of immigrants[1].

This is an especially important statistic in the context of a report such as this one, about effective instructional approaches and interventions to support all ELLs. In fact, many ELLs with academic challenges have been enrolled in U.S. schools since kindergarten, and by the upper elementary years do not have a formal designation to receive support services for language development. Instead, they are learners who have been identified as having sufficient English proficiency for participation in mainstream classrooms without specialized support. These ELLs typically have good conversational English skills, but many lack much of the academic language that is central to success with text and school. For example, in several studies with minority learners in the elementary and middle school years—whether formally designated LEP or not—these students' vocabulary levels are often well below average[2], sometimes with a group average as low as the 20th percentile. Such low vocabulary levels are insufficient to support effective reading comprehension and writing, and in turn have a negative impact on overall academic success.

When compared to their native English-speaking peers in all grades and content areas, the subgroup of ELLs with a formal ELL or LEP designation lags

behind. For example, on a national assessment of reading comprehension in 2005, only 7 percent of fourth grade ELLs with a formal designation scored at or above the proficient level compared with 32 percent of native English speakers. Only 4 percent of eighth grade ELLs scored at or above the proficient level, compared with 30 percent of native English speakers. Similarly, while only 36 percent of all fourth graders score at or above the proficient level on a national assessment of mathematics, within the ELL population only 11 percent score at or above the proficient level[3]. Although learning disabilities are present in all groups, regardless of age, race, language background, and socioeconomic status, estimates of their prevalence range from only 5 to 15 percent of the population. Thus, it is of concern that many ELLs are failing in school even though they do not have a learning disability[4].

Statistics on the performance of ELLs are generally based on the performance of students designated as LEP within state accountability systems. This designation is unlike others, such as gender or ethnicity, because students' membership in this group changes over time as they become proficient in English and the designation is meant to be temporary. Generally, students are counted within the LEP group only as long as they are considered to lack enough proficiency in English to participate in grade-level classes without specialized support. When ELLs have gained the proficiency in the English language needed to participate in grade-level classes, they lose their LEP designation and are required to participate in the mainstream classroom without specialized support. In the past, they were also no longer included in percent proficient calculations for the LEP subpopulation of a school. Because language proficiency plays a significant role in student achievement, this reporting practice was likely to underestimate the achievement performance of ELLs because those students with the highest language proficiency had typically been removed from the LEP group as they became proficient in English.

Under NCLB, students can be counted within the LEP category for up to two years after redesignation as fully English proficient. This practice somewhat lessens the problem of underestimation in more recent reports on student performance. However, states that elect to count students as LEP for the additional two years are not allowed to disaggregate results for former and current LEP students. Thus, these states' results for LEP students reflect the achievement of both current *and* former LEP students. Failure to distinguish

between former and current LEP students when disaggregating accountability data makes it difficult to know how students are performing once they become proficient speakers of English, which, in turn, makes it difficult to accurately evaluate the performance of schools in educating ELLs. Recent efforts to examine the performance of former LEP students have shown that some ELLs do quite well in public schools[5]. On the other hand, many ELLs who are no longer formally designated (ELL, LEP) continue to struggle with academic text and language; these learners are a growing concern for students, parents, educators, administrators, and policymakers.

Among students in U.S. schools, ELLs may be the most vulnerable to the challenges that districts face in providing effective schooling for all learners. Many of them score at or below basic levels of academic proficiency despite an increase in the demand for numeracy and literacy skills in order to fully participate in society. Thinking and reading critically, mastering persuasive expression, and solving complex problems are now central to success in negotiating the complexities of today's workplace[6]. For example, between 1973 and 1998, among skilled, blue-collar, clerical, and related professions, the percentage of workers who were high school dropouts decreased by two-thirds, while the percentage of workers with some college or a college degree doubled. Consistent with these trends, in less-skilled blue-collar, service, and related professions, the number of workers with some college or a college degree tripled[7]. This is an added complexity to effectively meeting the needs of ELLs; many have basic skills but lack sufficient complexity and sophistication in their oral and written academic language to meet today's standards.

Similar to what we have learned from research conducted with native English speakers, we know that many ELLs would profit from a better fit between their instructional needs and the instructional environment in order to prevent some of their difficulties. A focus on the learner-environment fit requires consideration of individual and school-level factors that influence ELLs' abilities in reading and mathematics. For example, educational history, language and literacy ability in their native language, students' socio-cultural backgrounds, as well as educational placements and the instructional contexts (e.g., grouping, curriculum) in U.S. schools each have an effect on academic achievement and outcomes in students' second language.

Together, these facts warrant an emphasis on effective, empirically based instructional approaches and interventions to be used in classrooms across the

nation to better meet the needs of all ELLs, but especially those who are struggling academically. In this report we show that effective instruction and intervention serve at least three functions: to increase achievement in the overall population, to prevent academic difficulties in individual students or particular groups of students, and to remediate problems that compromise the learning of particular individuals or groups of individuals. Whether the primary focus of an instructional approach or intervention is to *augment* the skills in all students, to *prevent* the onset of difficulties, or to *remediate* existing difficulties, a careful analysis of the source and prevalence of the difficulties in relation to population characteristics is likely to result in more effective teaching in class-wide instruction. Incorporating specific practices recommended for ELLs, such as pre-teaching vocabulary in reading and math instruction, into class-wide instruction will benefit all learners and may well serve to prevent difficulties for some.

Academic Language Skills as Key to Academic Success

Unlike their native English-speaking peers, ELLs—particularly young children—are charged with the task of acquiring a second language while simultaneously developing their first. Many related factors influence ELLs' academic outcomes, including educational history, cultural and social background, length of exposure to the English language, and access to appropriate and effective instruction to support second language development. For some learners it is a process that is facilitated—alongside formal instruction—by first language skills. For example, a student who possesses knowledge of a concept in their first language needs only to learn its label in the second language, whereas the student who lacks the concept in both languages must learn the concept and the label in the second language.

Acquiring reading skills in a second language is similar to the process of acquiring reading skills in a first language. For those ELLs who are literate in their first language—with exposure to appropriate and sophisticated instruction—much of their native language reading skills can be applied to their reading in the second language. However, several factors affect this process. These include the individual's reading proficiency in his first language, among other factors (e.g., instruction), and the degree of overlap in the oral and written characteristics of the ELL's native language and the second language (i.e., English). For example, whether both languages are alphabetic, whether writing

progresses from left to right in both languages, whether the languages share orthographic elements and scripts, and whether they share sounds and sound-symbol correspondences all facilitate the transfer of first language literacy skills to the acquisition of literacy in a second language[8].

Although many factors can facilitate second language literacy acquisition, developing literacy in a second language is not a trivial task, whether ELLs have full proficiency or only beginning proficiency in oral language and reading development in their native language. While simultaneously developing conversational ability and basic reading skills, these learners must quickly begin to develop oral and written academic language skills for the development of academic knowledge and success in content-area classrooms.

Mastery of academic language is arguably the single most important determinant of academic success for individual students. While other factors (e.g., motivation, persistence, quantitative skills) play important roles in the learning process, it is not possible to overstate the role that language plays in determining students' success with academic content. Proficient use of—and control over—academic language is the key to content-area learning.

Unfortunately, ELLs often lack the academic language necessary for success in school. This lack of proficiency in academic language affects ELLs' ability to comprehend and analyze texts in middle and high school, limits their ability to write and express themselves effectively, and can hinder their acquisition of academic content in all academic areas, including mathematics. Given the linguistic basis of developing knowledge in academic content areas, ELLs face specific challenges to acquiring content-area knowledge, given that their academic language, and therefore achievement, lags behind that of their native English-speaking peers. It is important to distinguish academic from conversational language skills, as many ELLs who struggle academically have well-developed conversational English skills. To be successful academically, students need to develop the specialized language of academic discourse that is distinct from conversational language. An example of the distinction between conversational and academic language may help to explicate this point:

> *When a student walks up to a newspaper stand and purchases a newspaper, he utilizes his conversational language skills to converse with the clerk and make the purchase. In contrast, other skills altogether are used to read and understand the front-page article, as*

well as to discuss the pros and cons of the proposed policy change that the article describes. The student might use still other skills to compare the writer's opinion to his, and to the opinion of the store clerk. The oral and written language required to be able to engage in the latter "conversation" will involve more advanced and specialized vocabulary, more complex sentence structures, and more complex discourse structures than that required for the former.

Many skills are wrapped up in the notion of academic language. Vocabulary knowledge (including the multiple meanings of many English words), the ability to handle increasing word complexity and length over time, and understanding complex sentence structures and the corresponding syntax of the English language are all aspects of academic language. Other aspects relate to text itself, including the organization of expository paragraphs, the function of transitions such as *therefore* and *in contrast*, and a wide range of vocabulary that appears far more often in text than in oral conversation. A particular source of ELLs' reading difficulties relates to their limitations in academic vocabulary—the words necessary to learn and talk about academic subjects. This academic vocabulary is central to text and its comprehension, and plays an especially prominent role in the upper elementary, middle, and high school years as students read to learn about concepts, ideas, and facts in content-area classrooms such as math, science, and social studies. In doing so, ELLs encounter many words that are not part of everyday classroom conversation. These types of words, including *analyze*, *therefore*, and *sustain*, are more likely to be encountered in print than orally, and are key to comprehension and acquisition of knowledge[9].

The need for well-developed academic language skills runs well beyond the academic skills necessary for success from kindergarten through twelfth grade. In fact, many learners—especially learners from minority backgrounds—who graduate from high school and enroll in post-secondary education often need additional support and remediation to succeed in their post-secondary classrooms. In fact, more freshmen entering degree-granting post-secondary institutions take remedial writing courses than remedial reading courses[10]. This highlights the importance of academic English as it relates to oral language, reading skills, and writing.

There is little disagreement among researchers and educators about the importance of the development of academic language for student achievement, or that limitations in this development are the root of most ELLs' academic difficulties. Similarly, there is little disagreement on the limited attention afforded to its development in most K-12 reading/language arts and content-area curricula. For these reasons, a basic premise that organizes this report is the need to attend to the role of academic language and to support its development in all educational endeavors. This is the case whether administering large-scale assessments to ELLs or planning appropriate and effective instructional approaches, interventions, or specialized programs to meet their needs.

Organization and Methods

This document is organized in two sections: 1) instruction and intervention in reading for ELLs, and 2) instruction and intervention in mathematics for ELLs. Within each of these sections, the guiding conceptual framework is presented first, followed by a set of recommendations for policymakers, administrators, and teachers in K-12 settings who seek to make informed decisions about instruction and academic interventions for ELLs.

As a starting point to identify the relevant research for this report, we drew on the findings from two reports. The first, *Developing Literacy in Second-Language Learners: Report of the National Literacy Panel on Language-Minority Children and Youth (NLP)*[11], is a seminal review that systematically and rigorously synthesized the research on acquiring literacy in a second language. The second, *Educating English Language Learners: A Synthesis of Research Evidence*[12], is a narrative review of relevant research in this area. Since these reviews incorporate studies published before 2002, we also systematically searched for empirical research published after that time. Electronic databases searched included *PsycINFO, Academic Search Premier, ERIC, and Education Abstracts.*

There are many gaps in our knowledge based on the direct evidence available from instructional research conducted with ELLs, yet some of these are addressed or informed by the robust research conducted with native English speakers with academic difficulties. Therefore, in addition to identifying and consulting the empirical research on ELLs, where necessary and appropriate we also drew on the relevant empirical research conducted with

native English speakers. To inform the recommendations on reading instruction and intervention, this predominantly took the form of consultation of the report of the *National Reading Panel* (2000) and the relevant research on reading instruction published since then. To inform our recommendations on mathematics instruction and intervention, the National Research Council Report, *Adding it Up,* and the RAND Mathematics Study Group, *Mathematics Proficiency for All Students,* served as starting points, followed by electronic database searches for relevant research conducted with ELLs and with native English speakers.

The great majority of source documents and studies consulted were written primarily for researchers. Nevertheless, together they provide an excellent basis for the foundation of a document to guide policymakers, administrators and teachers in their curricular planning and program design for serving ELLs, particularly those who are struggling academically.

RECOMMENDATIONS ON READING INSTRUCTION AND INTERVENTIONS FOR ELLS

Conceptual Framework

The conceptual framework for this section is based on a developmental perspective of reading, and is guided by five principles that relate to planning effective instruction and intervention for ELLs. A developmental perspective recognizes that there are many component skills that contribute to successful reading comprehension and there are many factors—individual, instructional, and contextual—that influence reading outcomes. In order to become good readers, students need to begin to master these skills early and to continue to develop them over time. By the upper elementary years, they must be able to read to learn, since text forms the basis for much of the delivery of the curriculum. The role of reading in the development of content-area knowledge and academic success is not unique to ELLs, but applies to all learners. This fundamental relationship between reading and knowledge acquisition in school forms the basis of the first guiding principle of this section of the report.

The crucial application for reading skills is to learn new concepts and develop new knowledge across a range of content areas. As early as the primary grades, readers begin to acquire a significant number of concepts and amount of knowledge through reading. This is especially important for ELLs, since reading is one platform for vocabulary development and knowledge acquisition. But, if a student—whether ELL or native English speaker—experiences reading difficulties that persist over time, she is likely to have a knowledge base and vocabulary that is insufficient for comprehension of texts in content-area classes in the middle and high school years, and for effective independent writing in content areas[13].

Reading comprehension skill—the goal of reading instruction and the precursor to academic success—is a multi-dimensional, complex process that requires that many skills be well-developed. Therefore, the second guiding principle is that, *in order to plan for effective instruction, educators must have a clear understanding of the specific sources of difficulty or weakness for individual students and groups of students.* Effective reading comprehension can be undermined by a number of factors, including word-reading accuracy and speed, vocabulary, understanding of text structure, the ability to use

language to formulate and shape ideas, and the ability to make inferences from text. Every reader needs to integrate and activate these various skills and strategies each time he is engaged with reading text, across many different types of texts. In turn, given the complexity of this process, the specific sources of learners' difficulties and weaknesses must be identified when planning for effective instruction and intervention.

Potential sources of comprehension difficulties are likely to be exacerbated for ELLs, especially difficulties that relate to higher-order language processing, such as unfamiliar vocabulary or understanding complex linguistic structures[14]. However, even if this is the case, there is still the need for an educator to engage in student assessment in order to identify the *specific* source of difficulty and the appropriate corresponding instructional approach or intervention to remedy the difficulty.

Related to effective assessment and instruction for struggling ELLs, the third guiding principle is that *ELLs—whether formally designated LEP or not—often lack the academic language necessary for comprehending and analyzing text.* Performance on national assessments demonstrates that ELLs struggle to achieve academically at the same levels as their native English-speaking peers. Most important, ELLs score below their native English-speaking peers both when they are participating in specialized language support programs and *after* they have been reclassified as having enough English proficiency to access the curriculum without specialized language support[15]. For example, in several studies[b] with ELLs—whether formally designated LEP or not—vocabulary levels are often well below average[16], sometimes with a group average as low as the 20th percentile. Such low vocabulary levels are insufficient to support effective reading comprehension and writing, and in turn have a negative impact on overall academic success.

Equally important to note is that many of the ELLs who struggle academically have well-developed conversational English skills. By the middle school years, ELLs rarely need instruction in basic conversational English, but they lack the academic English vocabulary to support learning from texts. Much of the language of academic texts is language that students only begin to encounter in the middle school years, and have never otherwise been exposed to[17]. It is important to remember that this exposure to more linguistically challenging text is often long after these learners have stopped receiving specialized language support.

[b] Data on ELLs after reclassification are less readily available and tend to come from studies by individual research teams rather than from large-scale, public-use data files of individual state databases and/or national studies. Although some state reports have been released that address this issue (see endnote 5), more widespread and systematic research is needed in this area.

As previously discussed, many facets of language are wrapped up in the notion of academic language, including vocabulary knowledge; understanding words of increasing complexity and length; and understanding complex sentence structures and discourse structures, including argumentation, narration, and exposition, and the corresponding syntax of the English language. Academic language becomes increasingly important with increasing years of schooling, as students read to acquire concepts, ideas, and facts in content-areas such as math, science, and social studies. In reading, students encounter many words that are not part of everyday classroom conversation; these are words like *determine*, *whereas*, and *factor*, that typically only appear in print and carry substantial weight in understanding and acquiring new knowledge from a given text[18].

The multi-dimensional nature of reading comprehension and the multiple factors that have an influence on this process are reflected in the fourth guiding principle of this section of the report. That is, *the great majority of ELLs experiencing reading difficulties struggle with the skills related to fluency, vocabulary, and comprehension.* Research indicates that the five core areas of instruction to promote reading development of native English speakers, namely phonemic awareness, phonics, fluency, vocabulary, and comprehension, similarly apply to reading instruction for ELLs[19]. The first two areas are critical during the earliest stages of reading development. However, the latter three are critical during all stages of reading development, and are especially important during skilled reading and when students are expected to read to learn.

Most ELLs do not demonstrate significant reading difficulties in the primary grades; only a small percentage of ELLs struggle with acquiring accurate and automatic word reading skills[20]. Yet, when the emphasis shifts from learning to read to reading to learn and text becomes central to the delivery of the curriculum and to overall academic success, they perform poorly on assessments of reading comprehension. That is, they can read words accurately, but they don't necessarily understand the meaning of the words as they relate to the passage or text. Given the emerging, but not robust, research in this area, it is not entirely clear what causes these comprehension difficulties in the face of well-developed word reading skills. However, there is a working consensus that for the great majority of struggling ELLs, their fluency, vocabulary, and other skills specific to comprehension (e.g., strategy use) are insufficient to support the effective understanding of text and its use for learning new content[21].

Fluency, vocabulary and comprehension are each multi-faceted[22] in nature and require the integration of specific cognitive (e.g., word-reading accuracy and efficiency, working memory) and sophisticated language skills (e.g., depth and breadth of vocabulary knowledge, syntactic awareness, and morphological awareness). Readers of this document who are familiar with the *National Reading Panel Report* (NRP, 2000) will note that the emphasis here on fluency, vocabulary, and comprehension as foundational skills in reading to learn is consistent with that report, despite the fact that the NRP excluded research that focused specifically on the literacy development of ELLs. The recently completed review of the *National Literacy Panel for Language Minority Children and Youth* (2006)[23] found that these three skills are also crucial to ELLs' academic success, yet they are an instructional challenge for educators. The similarity in the developmental and cognitive processes that underlie English literacy skills in ELLs and native speakers of English allows us to draw on a much larger research base to make specific recommendations related to instruction and academic interventions for ELLs who are struggling.

Thus, the final guiding principle is that *when planning instruction and intervention, there is a need to consider the function of the instruction (i.e., preventive, augmentative, or remedial).* The effectiveness with which a child develops into a proficient reader is very heavily dependent on factors that relate to her schooling experiences. The last three decades of reading research have taught us that many learners lack sufficient opportunities to learn; they experience a lack of exposure to appropriate instruction tailored to their own needs. For ELLs in particular, differences in opportunities to learn have an impact on their reading outcomes, and in many cases a stronger effect than that of second language learning. Given the patterns of achievement within the ELL population, there are many instructional strategies that are best implemented at the classroom level.

For example, academic language is an area of weakness for many ELLs, and their difficulties are known to persist over time. Moreover, native English speakers from all ethnic and socioeconomic backgrounds benefit from explicit instruction to develop academic language. Therefore, targeted, class-wide instruction in this area is warranted to augment the skills of learners in the overall population, and possibly prevent some of the difficulties ELLs have in this area. In contrast, there are other areas where students may be having difficulty but share those difficulties with only a few, if any, of their peers. In

this case, intervention is best delivered in a small-group or one-on-one setting and is considered supplemental for the purposes of this document.

The differing purposes of instruction and intervention (*preventive*, *augmentative*, *remedial*) combined with the varying needs within the ELL population, particularly by grade level, beg a local decision about whether a recommendation is best implemented as a class-wide strategy (i.e., preventive, augmentative), or as a supplemental strategy (i.e., remedial). Thus, the set of recommendations that follows includes the instructional principles for each area of focus, irrespective of the format that educators select as the most feasible and appropriate given the characteristics of their local student population.

Recommendations

The recommendations that follow reflect the need to strengthen and refine the existing educational system to better meet the needs of ELLs who are experiencing academic difficulties. The recommendations pertain to ELLs, whether designated LEP and receiving formal specialized language support or redesignated as fluent English proficient, and also pertain to ELLs whose proficiency in English was advanced enough to avoid formal LEP designation upon school entry.

For each recommendation, there is specific discussion of the typical instructional practices in the domain of focus, and the ways in which that practice needs to be strengthened to better meet the needs of all learners. There is also attention to the developmental nature of reading and language skills and the need for instruction to vary according to developmental stage, which, in the case of ELLs, may be determined in part by grade level, chronological age, and/or time in U.S. schools.

1. ELLs need early, explicit, and intensive instruction in phonological awareness and phonics in order to build decoding skills.

Having English as a second language does not necessarily result in difficulty acquiring word-reading skills. In fact, the great majority of ELLs in the primary grades develop word-reading skills that are commensurate to those of their native English-speaking peers. Research has demonstrated that, as early as kindergarten, it is possible to identify ELLs, from varying language backgrounds, who are at risk for reading difficulties because of underdeveloped phonological awareness skills and/or difficulty learning sound-symbol correspondences. These are learners who—like their native English speaking peers with early difficulties—have trouble "cracking the code."

However, there is a tendency within schools to overlook or delay addressing the possibility that ELLs are experiencing reading difficulties due to difficulties with language-processing skills and decoding print[24]. Instead, oral language proficiency is thought to be the cause of the difficulties and/or that these difficulties are characteristic of ELLs' reading development. In many cases, educators use a "wait and see" approach and hold off on intervention for ELLs, assuming that these skills will develop as they acquire more proficiency in English and experience increased exposure to print. We know from many years of research with native English speakers—and have more recently learned from research with ELLs—that learners who are experiencing these difficulties need explicit, intensive instruction and/or intervention in phonemic/phonological awareness and phonics. This intervention must be explicit, systematic, and intensive in order to augment students' abilities and prevent further difficulties[25]. Findings from several research studies suggest that approximately the same number of ELLs as native English speakers have difficulty with word-reading acquisition. Likewise, recent reviews have made clear the role of phonological awareness in reading acquisition in all alphabetical languages[26], while empirical studies have shown a very high degree of correspondence between phonological abilities across languages in ELLs[27].

These conclusions pertain to ELLs from all different language backgrounds—including learners with native languages that are non-alphabetic—and learners with differing levels of oral language proficiency. One's phonological skill in his native language are strongly related to his phonological skills in English, and in many cases these skills are much better developed than are children's higher order oral language skills (e.g., vocabulary, grammatical skill). For ELLs in the primary grades, there is a very weak relationship between phonological skills and vocabulary, with phonological skills typically much better developed than vocabulary skills, and more important to the development of word-reading accuracy. Whereas there is a need for a child to have a certain amount of vocabulary knowledge in order to receive phonics instruction, this is not the case for phonological awareness. ELLs, even in the very beginning stages of English language development, benefit from phonological awareness instruction and activities. Those ELLs who demonstrate difficulty developing these abilities, even as early as kindergarten, require extra instruction to support this development. Improved proficiency in English is not likely to remediate difficulties in understanding the sound structure of the language.

Therefore, delaying intervention until children gain increased proficiency in English is not advised. Here, it is also important to note that there is a strong relationship between phonological abilities in the first and second languages of individual children.

For children enrolled in native language instruction, it is not necessary that they receive additional, separate instruction in phonological awareness in English if their phonological awareness and literacy skills are developing in their native language[28]. For those children receiving native language literacy instruction whose literacy skills—including phonological awareness—are not developing, educators must decide whether to intervene in the language of instruction or to intervene in English. At present, there is little research to guide this decision in terms of differential impact of the two choices. Decisions should be based on the availability of high-quality effective interventions in the language of instruction, the principles of which are universal for alphabetic languages, and the capacity to deliver them effectively[29].

Supporting reading acquisition. Similar to best practices for native English speakers, districts and schools should consider two complementary formats for explicit, intensive, and systematic instruction and intervention in phonological awareness and phonics for ELLs. This approach would increase ELLs' opportunities to learn and provide them with a firm foundation for reading acquisition. These two formats are:

1) class-wide instruction for all learners and their classmates;
2) supplemental intervention for the subgroup of children who experience sustained difficulties despite effective class-wide instruction, and whose skills are significantly below their peers, whether ELLs or native speakers.

When selecting any intervention, there is a need for a very precise match between the child's source of difficulty and the intervention itself. The student's progress must be monitored over the course of the intervention in order to track growth and response to intervention. In addition, the educators involved with the learner must make a joint decision on the time of day for intervention and whether it will take place during regular class-wide instruction. For ELLs, this decision is particularly important because ELLs also need sufficient opportunities to develop proficiency in English and learn content-area material.

2. K-12 classrooms across the nation must increase opportunities for ELLs to develop sophisticated vocabulary knowledge.

Although there is variation in the nature and amount of vocabulary instruction occurring in classrooms across the U.S., this area of instruction has generally been neglected in efforts to support *all* learners' academic development. For several decades it has consistently been estimated that only about 5 to 10 percent of classroom instructional time is devoted to vocabulary instruction, and that most lessons do not contain any attention to word meanings and students' understanding of them[30]. Given the increasing number of ELLs in classrooms today, this is especially troubling. Whereas some classrooms include vocabulary instruction on a regular basis, most—especially in the middle and high school content-area classes—incorporate little, if any, systematic and explicit vocabulary instruction into the curriculum. When such instruction does occur, it is most often in the elementary years, the primary grades in particular, or in classes for beginning ELLs. Vocabulary instruction rarely occurs despite the fact that it is the academic language of middle and high school classrooms and texts that prove most difficult for ELLs and in spite of the fact that ELLs—and their classmates—need between 12 and 14 exposures to a word and its meaning, across multiple contexts (different texts, classroom discussions, writing activities), in order to gain deep understanding of a word[31].

While many ELLs need to be taught words—both the label for a word and the concept behind the word—there are also many ELLs who have a label for a word, but lack the deep conceptual knowledge about the word itself and the words that relate to it. Yet it is this conceptual knowledge that students need in order to develop their vocabulary and background knowledge, and to have access to vocabulary skills that support academic success.

When vocabulary instruction does occur, it often revolves around the definition of a particular word, either by presenting the word in a sentence that provides one of its meanings, or by having students look up its meaning in a dictionary or glossary. For many older learners, the focus is on words highlighted in the textbook; these word lists are often filled with rare and unusual words, such as *dandelion*, *burrowed*, or *bootlegging* that are not always the most important for comprehension, and can even detract from their learning[32]. These lists don't usually include many of the high-utility academic words such as *analyze* or *frequent*, or important function words such as *although* and *therefore*.

Our understanding of just how sophisticated and complex vocabulary knowledge is, combined with the data on the reading ability and academic achievement of ELLs, suggests that even when vocabulary instruction does occur, it falls far short of meeting the needs of most ELLs. These learners need very sophisticated vocabulary skills to thrive in content-area classrooms, and in turn to graduate from high school well prepared for post-secondary education.

Increasing and strengthening vocabulary instruction. In order to provide ELLs with access to content-area curriculum and in turn to increase their academic achievement, effective vocabulary instruction must be frequent, intensive, systematic, and complex. It must occur in all classrooms, from kindergarten through 12th grade, and be cohesive and consistent across the grade levels. Vocabulary instruction must be based on an understanding of:

- the differences between conversational language and academic language;
- the difference between having a word label and having knowledge of the concept behind the word; many ELLs have the label but lack any kind of deep conceptual knowledge of the word;
- how words relate to one another (word families) and can be transformed into different words through manipulation of word parts (roots, suffixes, affixes, prefixes);
- the interrelatedness of content-area knowledge and academic language;
- the various levels of word knowledge, including the need to know multiple meanings for many words;
- the need for vocabulary instruction to occur through oral, reading, and writing activities; and
- the need for students to be equipped with strategies to learn words independently.

There are many opportunities for vocabulary instruction in kindergarten through 12th grade classrooms; effective vocabulary instruction requires striking a balance between explicit teaching of individual words and teaching word-learning strategies. In the primary grades, teachers can use read-alouds combined with extended talk about words to teach new words, including more sophisticated words than those that students can read independently[33]. In the upper elementary years, teachers can introduce more sophisticated and increasingly academic vocabulary through texts, and increase the emphasis

on word-learning strategies[34]. In all schools, vocabulary instruction must extend beyond the English language arts classroom as students grapple not only with general academic words such as *analyze*, but also more specific content terms such as *estimate* or *Industrial Revolution*[35]. Throughout the grades, vocabulary instruction must provide multiple exposures to carefully and well-selected academic words in meaningful contexts. In turn, this type of instruction is likely to have an effect on students' reading comprehension skills.

3. Reading instruction in K-12 classrooms must equip ELLs with strategies and knowledge to comprehend and analyze challenging narrative and expository texts.

Typical comprehension instruction is mostly uni-dimensional and primarily involves students reading from a text and answering assigned questions that relate to the text or passage[36]. This instruction has an almost exclusive focus on the *products* of comprehension rather than the *process* of comprehension. For example, instruction has focused on product-oriented factors such as whether students learned the appropriate knowledge from the text or were able to grasp the main idea instead of more process-oriented factors such as the active strategies and conscious monitoring involved in negotiating text for meaning. This focus on the products of comprehension rather than the process of comprehension occurs for many reasons, but especially because the great majority of reading comprehension assessments are entirely product-driven; they require that students successfully answer questions following their reading of a text or passage. So it is understandable that, to some extent, this format has shaped comprehension instruction. However, the end result is that many students—particularly those with poor comprehension skills—read passively, often without conscious monitoring and strategy use, and understand reading comprehension to be a demonstration of knowledge after reading a text or passage[37]. Via specific questions—usually multiple choice format—students either succeed or fail to demonstrate what they've understood, and as a result, some students are deemed good comprehenders and others poor comprehenders.

This conception of the reading comprehension process is very narrow and not especially fruitful for improving students' abilities to work with and understand complex text. Within this format for instruction and assessment, neither teacher nor student is engaged in a structured conversation about constructing and extracting meaning from text, the use of appropriate

strategies to foster comprehension, the purposes for reading the text, or the aspects of the particular text genre being read and how this genre affects the strategies to be used. When the comprehension process is implicit and hidden, those ELLs who succeeded in answering the questions likely do not recognize or reflect upon how they comprehended them, while those who failed to answer the questions correctly are left without guidance as to how they might have been more strategic while reading.

Improving comprehension instruction. Instead, effective comprehension instruction for ELLs and their classmates must be explicit and direct, must actively engage the student in monitoring and carefully selecting and reflecting upon her own use of strategies during the comprehension process. Students must also understand how this process has to be adjusted for the type of text (e.g., expository or narrative) being read, the purposes for the reading (e.g., to learn about a science concept or to solve a math problem), and the format of the content (e.g., the format of instructions for a science lab or a primary document in social studies). When students are actively engaged, effective instruction promotes *meta-cognition*—students' ability to reflect on, monitor, and control their own thinking processes. There are several techniques which can be used to promote active reading and engagement with text, fostering better comprehension and a more thoughtful approach to the text, for example[38]:

- **Teaching students to make predictions consciously *before* reading.** When students make predictions before reading, they must recall what they know about the type of text to be read and anything they might know about the specific text or the topic it covers. Making predictions before reading also gives students an opportunity to check, and reflect on, their predictions while reading as well as after reading. Discussions of predictions that include teacher supports and scaffolds also provide an opportunity for students to gain an understanding of the purpose for reading the text.
- **Teaching students to monitor their understanding and ask questions *during* reading.** Monitoring understanding and asking students questions during reading cues students to recognize when their comprehension breaks down and to identify the knowledge (e.g., of a vocabulary word or a content concept) they need to repair their comprehension. Asking ELLs to explain their processes for making meaning while reading and strategies

to overcome difficulties is another method to increase opportunities to produce language.

- **Teaching students to summarize what they have read *after* reading.** Writers and speakers summarize because it requires them to synthesize what they have tried to communicate, distinguishing for their audience what is important from what is not. Similarly, having a reader summarize what he has read requires that he synthesize the information and differentiate between more and less important information.

These aspects of reading comprehension instruction have been shown to be important for native English speakers and relevant for ELLs, who need significant support to navigate and actively make meaning from text and who need opportunities for structured talk about text. Since their reading comprehension is often hampered by lack of academic language, which is strongly related to lack of content knowledge, these are also ways to promote language production and academic language, while working on comprehension skills and increasing ELLs' exposure to print. In addition to these techniques, writing activities before, during, and after reading can also provide ELLs with essential opportunities to strengthen comprehension as well as develop academic language.

Of course, *telling* ELLs to question, predict, monitor, and summarize is very different from *teaching* them to do so. Strategy instruction is most effective when taught within a framework that emphasizes a gradual release of responsibility to the student; teachers provide high levels of support for students practicing new skills and then gradually decrease support as students become more independent in using the strategy. Teachers typically begin by explaining the purpose and characteristics of a given strategy, and by extensively modeling their own strategy use, often through thinking aloud while reading a text, and provide many opportunities for structured practice, whether oral or written. Teachers must push students to use these strategies critically and purposefully when reading independently. This final step can sometimes be the most difficult. When the task requires students to transfer strategies to new contexts or apply strategies to new texts, many students have difficulty transferring and/or adapting the strategies to the new text or context.

For instance, middle school students taught to summarize a chapter from a novel in an English class may fail to do so when reading the social studies textbook, or may try to summarize the social studies text as if it were a

narrative by explaining the sequence of events rather than by identifying the main idea and key supporting details. For these reasons, comprehension instruction must be aligned across content areas *and* must teach students to recognize differences between types of texts and purposes for reading, as well as teach students how to adjust their strategies accordingly.

Though the elements and goals of effective comprehension instruction are largely the same across the grades, the use of text and the features of the texts themselves will be different at different grade levels. From kindergarten through second grade, while students are still acquiring word-reading skills, comprehension instruction must include a focus on books that are read aloud and discussed. Read-alouds provide essential opportunities for ELLs to develop and extend their language via structured talk with teachers and peers while the teacher supports the verbal interactions. Read-alouds that include modeling of explicit comprehension strategies (predicting, monitoring, summarizing) also prepare students to engage in active comprehension behaviors as they become readers of more sophisticated texts. By upper elementary school, effective comprehension instruction should provide opportunities for students to be strategic readers of a wider variety of texts, and should focus on the academic language and sentence structures that are key to comprehension. Following on the elementary years, the great challenge of the middle and high school years is for readers to become adept at reading an increasing variety of more sophisticated content-area texts, and more specifically to employ appropriate strategies for comprehension and word learning while reading independently[c].

4. Instruction and intervention to promote ELLs' reading fluency must focus on vocabulary and increased exposure to print.

Many readers in the upper elementary and middle school years who perform poorly on standards-based assessments of reading comprehension receive phonics instruction[39]. The assumption behind this practice is that if students increase their automaticity with decoding, they will read the text more quickly, and this will improve reading comprehension. Here it is important to make the distinction between rate and fluency. We use rate to refer to the speed with which students are able to read words, either in isolation or in context, whereas fluency embodies rate and students' ability to read connected text with appropriate (1) phrasing, (2) prosody, and (3) inflection, each considered an indicator of comprehension. To read with fluency, one must possess automaticity in word-recognition skills, but also have access to knowledge of

[c] For an in-depth discussion of the need for content-area literacy instruction and the principles of this instruction see the corresponding paper on Adolescent Newcomers.

word meanings and the ability to hold information in working memory while constructing and extracting meaning from text. The link between fluency and comprehension is bi-directional.

Individuals whose word-recognition skills are automatic can devote greater cognitive resources to comprehending the text. Furthermore, when readers encounter words in text whose meanings they do not know or do not understand in the context of the passage, reading rate and fluency decrease. In this case, comprehension or the lack thereof influences fluency, even if decoding is automatic. Thus, many ELLs who struggle with reading comprehension have *fluency* difficulties but their reading *rate* is within the average range. These same learners are not likely to show improvement in fluency following phonics instruction, and do not necessarily need more practice learning the code and increasing their decoding rate. Instead, their difficulties reflect underdeveloped vocabulary and insufficient exposure to print. Therefore, they would benefit from increased practice reading text that is at their instructional level (can be read with 90% accuracy), with the goal of developing deeper representations and more efficient access (lexical, syntactic, semantic) to the words and their meaning(s) in varying contexts[40].

Repeated reading is an empirically-based intervention whereby students practice orally reading instructional-level expository or narrative passages. Students practice reading a text until they can meet a pre-determined goal for oral reading fluency, read the passage with very few errors (number set by program or staff), and read with acceptable phrasing and expression. In most cases, adults (or peers, in a partner reading format) provide corrective feedback if words are not accurately decoded. In some repeated reading interventions, students' attention is focused on comprehension through pre-reading, prediction, and through requiring a written retell and/or completion of multiple choice questions about the passage. In emerging research with ELLs[41], this intervention has been successfully modified to attend to their needs by including oral discussions of vocabulary (two words per passage) and comprehension. In this model, the vocabulary words are pre-taught and the adult leads a discussion about the words. The comprehension activities consist mainly of added attention to questioning students after reading and drawing ELLs into discussion about the passage content.

Given the many elements of repeated reading interventions, and the variations in the format in different settings, it is hard to know exactly what

"active ingredient(s)" result in gains in fluency, and in turn, comprehension. It could be that there are particular components that are most powerful—such as the repeated oral reading itself—or perhaps a combination of multiple, less powerful, elements result in fluency, and in turn, comprehension gains. The elements of successful repeated reading, and the corresponding likely benefits for ELLs, include:

- ***Oral reading,*** which forces the reader to slow down and attend to each word and provides an opportunity to increase vocabulary knowledge and practice speaking and reading with appropriate expression;
- ***Corrective feedback from adults,*** which brings the student's attention to her miscue and provides the correct pronunciation;
- ***Discussions*** and ***questioning*** about the book, which is an opportunity to promote comprehension strategies and vocabulary development;
- Increased ***exposure to print*** which, for a variety of reasons, has been shown to have effects on students' overall reading ability; and
- The likelihood of increased ***engagement*** and ***motivation*** given the small group format and interaction with a supportive adult who structures and leads the intervention.

5. In all K-12 classrooms across the U.S., ELLs need significant opportunities to engage in structured, academic talk.

Language learning is not a passive process; it is facilitated through production and interaction, and therefore, depends heavily on the ability to practice and produce language, especially in academic settings[42]. A significant factor in developing sophisticated language skills is time on task producing academic language in interactive educational settings where there is opportunity for repeated exposure to and use of words, and opportunity for feedback. This is especially the case for ELLs. Although it is important for students to practice their language in informal settings, it is more important that there are structured opportunities in educational settings with supports in place.

There are many academic skills to be taught and learned in all classrooms in spite of limited time, and understandably the general focus within the system has been skills such as reading, writing, and mathematics. While the development of academic language is an important goal for all learners, it has not typically been an entity and educational goal of its own. This is especially the case for the oral aspects of academic language. Aside from the language

goals of many programs designed specifically for ELLs, there is generally minimal focus on providing structured opportunities for the practice and production of academic language in the context of grade-level content, as an important instructional goal in and of itself.

Providing structured opportunities to talk and discuss. In order to increase ELLs' academic language skills, and in turn their academic achievement, there are several principles and factors to consider[43]:

- Like most other academic skills, the development of oral language is a cumulative process and one that must be supported from kindergarten through twelfth grade.
- Although the primary means to developing language should be structured practice with language itself, this practice is further optimized when also connected to reading and writing activities.
- Reading aloud and shared readings that are accompanied by structured discussion are an excellent way to promote language development. Although reading aloud and shared reading are thought of as especially important in the primary grades and primarily thought of to promote comprehension skills, they are equally important in the middle and high school years when there is sophisticated language and content to be discussed. Reading aloud and shared readings provide an opportunity for practice and modeling effective language use, appropriate expression, and a platform for structured discussion, with scaffolds, to promote language development.
- Effective language practice and production needs to be supported by teachers, but not necessarily led by teachers. Ideally, teachers would plan for structured opportunities to practice language, model effective questioning and conversational practices, and gradually turn over the responsibility to students for peer-led discussions and conversations. A key variable in the language acquisition of ELLs is the amount of opportunity to practice language with peers who have slightly more developed language and/or are native English speakers[44].
- More structured "talk" in classrooms across the U.S. would provide increased opportunities to informally assess students' oral language development in different contexts and for students to monitor and become more aware of, and active in, their own language development.

6. Independent reading is only beneficial when it is structured and purposeful, and there is a good reader-text match.

With the goal of increasing students' encounters with language and print, and their background knowledge, independent reading takes place in many classrooms across the U.S. The typical scenario is that, for a prescribed amount of time, each student reads a book that he or she has selected from the class or school library, or one that the whole class is reading as part of novel study. There are many reasons why the opportunity to practice reading independently is potentially beneficial for all learners, but especially ELLs. Independent reading holds promise as a means for vocabulary development, increasing exposure to print, and improving fluency and comprehension.

However, independent reading is only beneficial to learners when it is very carefully planned and when several conditions are met. The most important of these conditions include: 1) the need for a careful match between the reader's ability and the characteristics of the text, and 2) explicit goals must be set for the independent reading activity, and there must be a link between the content of the reading activity and other aspects of the curriculum.

In many cases, especially in the case of ELLs, the text that the student selects, or is assigned, for independent reading is too difficult to promote her vocabulary and comprehension development. As a necessary, but not sufficient, condition to reap the benefits of independent reading, students must be able to decode and understand up to 90 percent of the text. If that is the case, then they stand a much greater chance of learning and working effectively with the remaining 10 percent of material. However, a ratio of unknown to known words that is too high (over 1:20) compromises the reader's ability to use independent reading as a way to acquire new knowledge and vocabulary. To infer the meaning of a word in context and to make meaning of a particular passage, the reader must be able to draw on his knowledge of the words around the unknown word, and in turn to draw on the meaning of the passage up to the point of the unknown material. When the percentage of unknown words is high, the reader has less and less opportunity to work with known information to infer word and text meaning.

The reader-text match is therefore a critical starting point for successful independent reading. However, there are other considerations that must also be taken into account. Independent reading—although the name suggests a stand-alone time to practice reading—must be incorporated into the curriculum and

be connected to other instructional activities, especially writing activities. Students must be reading for a purpose and, while reading, have an understanding that they will then work with this knowledge during follow-up activities such as a written reflection or a structured discussion with peers. Follow-up activities promote more student engagement with reading, increase awareness and monitoring of comprehension, and provide opportunities for repeated exposures to academic language in multiple contexts. The following is a list of considerations when planning for successful independent reading:

- Is there a match between the reader's ability and the text characteristics? Is the reader able to read the text with 90 percent accuracy?
- Is there a ratio of known to unknown words that supports vocabulary knowledge development during independent reading?
- Is there a relationship between the content of the book(s) for independent reading and the content and material being covered in the class?
- Is there a follow-up activity or discussion planned to be held after independent reading?
- Do the teacher and the student have a shared understanding of the purpose or goal that guides that particular session of independent reading?

Conclusions

Supporting and promoting the reading development of the growing population of ELLs is both a challenge and a necessity for educators across the nation. In this section, we identify six recommendations to guide the planning and implementation of any instructional approach or academic intervention to promote ELLs' reading ability:

1. ELLs need early, explicit, and intensive instruction in phonological awareness and phonics in order to build decoding skills.

2. K-12 classrooms across the nation must increase opportunities for ELLs to develop sophisticated vocabulary knowledge.

3. Reading instruction in K-12 classrooms must equip ELLs with strategies and knowledge to comprehend and analyze challenging narrative and expository texts.

4. Instruction and intervention to promote ELLs' reading fluency must focus on vocabulary and increased exposure to print.

5. In all K-12 classrooms across the U.S., ELLs need significant opportunities to engage in structured, academic talk.

6. Independent reading is only beneficial when it is structured and purposeful, and there is a good reader-text match.

These recommendations apply whether the instruction serves a *preventive*, *augmentative*, or *remedial* function, and whether the domain of focus is for class-wide instruction or small-group intensive intervention. These are decisions that must be made locally by the educators supporting ELLs on the basis of characteristics of the population being served combined with feasibility and appropriateness, given the instructional goal and/or target skills of focus.

This report was written to serve a guiding function, rather than as a "how-to" manual. As such, it is intended to serve as one starting point or reference for planning instruction and academic interventions for ELLs. Enabling the nation's ELLs to reach the highest standards of achievement demands sustained, consistent, and intensive delivery of high quality instruction and academic interventions that target the development of ELLs' academic language and reading-related skills, such as fluency, comprehension, and vocabulary. Success in this endeavor will be most assured when all educators who have an influence on this population's achievement participate in the planning and delivery of instruction and interventions.

RECOMMENDATIONS ON MATHEMATICS INSTRUCTION AND INTERVENTIONS FOR ELLS

As in the domain of reading, proficiency in mathematics is central to academic success from pre-K through post-secondary education, to the workplace, and to everyday life. Similarly, the demands for mathematical proficiency have steadily increased over the last two decades and, as a result, the inability to reason mathematically compromises one's ability to participate fully in society[45]. All children must learn to think mathematically, not only for the sake of learning mathematics, but more generally for much of their overall academic success. Mathematical knowledge and the ability to think logically and reason deductively is embedded in other domains of learning, including science and technology, and is related to informal and formal problem-solving. In many cases, efficacy in math relates to the ability to read challenging material; thus, children's performance in both math and reading at the end of the elementary years is an important predictor of their ultimate educational success[46].

Also similar to reading, competence in mathematics depends heavily on appropriate and effective instruction, and on opportunities to learn. There are skills that must be developed in the early years—as early as kindergarten—for success in mathematics and, similarly, there is evidence that early intervention can prevent significant difficulties for many learners. There is also evidence that many more learners struggle with math than have actual learning disabilities, which emphasizes the very important role of effective instruction in learner outcomes. Although learning disabilities are present in all demographic groups, regardless of age, race, language background, and socioeconomic status, estimates of their prevalence range from only 5 to 15 percent of the population. However, 36 percent of *all* fourth graders score at or above the proficient level on a national assessment of mathematics, and only 11 percent of ELLs score at or above the proficient level[47]. Similar to what we have learned from research conducted with native English speakers in reading and mathematics, we know that many ELLs would profit from a better fit between their instructional needs and the instructional environment in order to prevent some of their difficulties and to augment academic achievement in the overall population. A focus on the learner-environment fit requires consideration of individual *and* school-level factors that influence ELLs' ability in mathematics.

What Is Proficiency in Mathematics?

Like reading comprehension, mathematics proficiency is multi-faceted in nature, draws on many different skills, and is influenced by factors at the level of the child, the classroom, the school, and the task itself. Researchers have conceptualized mathematical proficiency as having five interdependent strands, each influenced by multiple factors[48].

- *Conceptual understanding:* comprehension of mathematical concepts, operations, and relations;
- *Procedural fluency:* skill in carrying out procedures flexibly, accurately, efficiently, and appropriately;
- *Strategic competence:* the ability to formulate, represent, and solve mathematical problems;
- *Adaptive reasoning:* the capacity for logical thought, reflection, explanation, and justification; and
- *Productive disposition:* the inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy.

It is clear that for a child to be mathematically proficient, there are a number of skills that need to be well developed and integrated, and that learning and performance proficiency relies on well-developed language skills. Cognitive abilities such as counting, identifying numbers, understanding quantity, identifying patterns, and understanding concepts of measurement are each related to math proficiency. Further, just as vocabulary, background knowledge, effective strategy use, and engagement with the work are important for reading comprehension, they equally important for mathematics proficiency[49].

The Role of Language in Mathematics Proficiency: Implications for ELLs

A very common misconception about mathematics is that it is a "universal language," one that is synonymous with numbers and symbols, and a "culture-free" static body of knowledge[50]. However, the instruction of mathematical concepts and skills and the difficulties experienced by many ELLs highlights the role of academic language in mathematics. Teachers use academic language to deliver instruction and convey knowledge and concepts in all content areas, including math. Indeed, much of the delivery of the mathematics curriculum is

via text characterized by academic language. The skills and ideas of mathematics are conveyed to students primarily through oral and written language—language that is very precise and unambiguous. While it is true that at its most advanced and abstract levels, mathematical concepts and relations may be more difficult to express verbally than in mathematical form, learning mathematics is verbally mediated through language and the association of verbal labels to mathematical forms and expressions. Mathematics is often a specialized form of natural, conventional language and requires a re-interpretation of the way it is used in everyday settings[51]. This grounding of mathematics learning in academic language has tremendous implications for the growing population of ELLs in classrooms across the U.S.; many learners who struggle with reading also have difficulty with mathematics, mainly because of the language demands that are embedded within of each of these skills.

Although historically mathematics has received far less attention from researchers, practitioners, and policymakers than reading has, attention to mathematics in the last five years has been steadily increasing. This interest in mathematics is particularly the case with the advent of *No Child Left Behind Act* (NCLB, 2001), given that districts and schools are held accountable for learners' performance in mathematics and given that reporting by subgroups has revealed low performance in mathematics for large populations of learners, including ELLs.

With the exception of the special challenges that confront ELLs due to limitations in academic language, there is no present evidence to suggest that ELLs acquire mathematical knowledge and concepts differently from native English speakers. Thus, effective mathematics instruction for native English speakers would be expected to be similarly effective for ELLs, provided that specific attention is paid to bridging the language difficulties of the ELL students in the classroom. That is, for the mathematics instruction to be effective for the ELL students in the classroom, it must first consist of comprehensible input.

There are three main considerations when planning and delivering effective instruction and intervention in mathematics for ELLs who struggle.

1. ELLs need early, explicit, and intensive instruction and intervention in basic mathematics concepts and skill.

As in reading, it is important that children with difficulties acquiring basic math

skills and concepts be identified as early as possible. Without effective intervention and support, inefficient or deficient skills in mathematics are likely to result in persistent difficulties over time. For example, older elementary children with numeracy difficulties have been found to be delayed in their knowledge and understanding of counting procedures, to use inefficient counting strategies, to execute counting strategies poorly, and to be unfamiliar with numerical representations[52]. Research with young children from native English-speaking and Spanish-speaking backgrounds has demonstrated that early, explicit instruction in these skills can prevent later difficulties in the overall population and augment the skills of those who are struggling[53].

Similar to best practices for native English speakers, districts and schools should consider two complementary formats for explicit, intensive, and systematic instruction and intervention in early math skills for ELLs. Such an approach would increase opportunities for ELLs to learn and provide them with a firm foundation for later mathematics achievement. These two formats are:

1) class-wide instruction for all learners and their classmates;
2) supplemental intervention for the subgroup of children who experience sustained difficulties despite class-wide instruction, and whose skills are significantly below their peers, whether ELLs or native speakers.

As with any supplemental intervention, there is a need for a very precise match between the child's source of difficulty and the intervention; there is also the need for consistent progress monitoring over the course of the intervention in order to track growth and response to intervention. In addition, the educators involved must together decide on the time of day for intervention with a particular child and whether it will take place during regular class-wide instruction.

2. Academic language is as central to mathematics as it is to other academic areas. It is a significant source of difficulty for many ELLs who struggle with mathematics.

The mastery of math concepts presupposes facility with the academic language used to characterize, express, and apply concepts, yet in math classrooms and curricula across the U.S., ELLs don't understand much of the language that is used, and most learners are not explicitly taught to read, write, or speak mathematically[54]. Unlike other content areas such as English Language Arts,

where oral and written vocabulary and language may be related to some of the instructional goals and standards, in math classrooms and curricula the language demands are likely to go unnoticed and unattended to. This lack of attention occurs despite the permeation of academic language through much of the curriculum as well as standards-based tests.

There are many challenging concepts embedded in the language of mathematics instruction and textbooks. As noted, there are many words that appear in natural and conventional language but that need very specific interpretation and even re-interpretation in the context of mathematics. Consider this list of words:

difference	column
sum	row
factor	root
even (number)	line
odd (number)	point
estimate	pattern
figure	extension
plot	field
divide	find

These are not necessarily rare words, but each of these words carries multiple meanings, and in everyday language their definitions change as a function of context. In the context of mathematics content, each has a very specific, specialized meaning. Similarly, there are phrases used, such as *least common multiple and square of the hypotenuse,* that are particular to mathematics and in which children need significant instructional support in order to use them accurately during mathematics work. There are also cases where words that are specific to mathematics reflect the combined use of two natural language words, such as *output* or *feedback*. Finally, ELLs must be able to analyze and understand new structures and nuanced uses of language, including specialized forms of conventional language, such as *the area under the given curve,* and *the sum of the first* n *terms of the sequence.*

While in many cases there is instruction focused on the Greek and Latin terms that appear in mathematics texts and curricula, there is much less, if any, focus on the words and phrases described[55]. However, these words and phrases have a significant impact on ELLs' proficiency in mathematics. Similarly, there is little attention paid to supporting students' learning from

textbooks. For ELLs—as well as for their native English-speaking peers—reading a mathematics textbook is challenging because of vocabulary, syntax, mathematical symbols, spatial positioning of numbers and symbols, and multiple meanings of words. The reader has to pay significant attention to the content and also close attention to the format.

For these reasons, the oral and written language of mathematics—or the mathematics *register*—should be expanded and explicitly integrated into the curriculum. Opportunities to use manipulatives and diagrams for teaching math skills and concepts does not circumvent the central challenge and goal, namely, to ensure that students have the language and mathematical proficiency needed to be successful. Indeed, these tools may help when providing instruction to promote learners' vocabulary and language skills, but they do not replace the need for support in language development—language that lends itself to proficiency in mathematics. This is not to say that every math teacher needs to be a teacher who specializes in second language learning, but every teacher must incorporate into his or her curriculum instructional support for oral and written language as it relates to the mathematics standards and content. It is not possible to separate the content of mathematics from the language in which it is discussed and taught.

In math classrooms—as in all core content classrooms across the U.S.—there is a pressing need for much more structured and planned "talk" to increase the academic language skills of ELLs and their native English-speaking peers. This is the case whether the ELLs are formally designated or not, and whether they are in mainstream classrooms or specialized programs for language support. Students and teachers alike need to be aware of the language demands of every mathematics lesson. Consistent with the current reform efforts for content-area classrooms[d], teachers must identify language objectives *alongside* content objectives in daily lesson plans. These language objectives might revolve around the meaning of particular academic vocabulary words, academic English structures common to mathematics and/or the lesson in particular, or language functions such as explaining, solving, and discussing. Further, promising practices with ELLs include structured discussions that give students the opportunity to explain their thinking and reasoning, and their understanding of particular problems, strategy use, concepts, and solutions[56]. Similar to some of the reading comprehension instruction that involves story retell and summaries, under these "think-aloud" conditions, students not only

[d]See the previous section in this document, and the corresponding document on adolescent newcomers, for a discussion of the crucial role of academic language and literacy instruction in content-area instruction.

practice relevant academic language, but they also become increasingly aware of their own thinking, and their peers' thinking. In turn, the teacher has the opportunity to informally assess students' understanding of concepts and problem-solving approaches, and evolving language and mathematical abilities.

3. ELLs need academic language support to understand and solve the word problems that are often used for mathematics assessment and instruction.

It is very important to highlight that a significant portion of mathematics assessment and instruction relies on word problems. Word problems demand sophisticated oral language skills and verbal reasoning in order to be understood and, in turn, solved. Specifically, in order to conduct the relevant mathematical operations (react to the *content* of the question), ELLs must first understand the elements of the word problem and the *function* of the language as it relates to the question(s) at hand. Among other skills, generating this understanding demands knowledge of the specific meaning of many words, especially when they are used in specialized ways, an understanding of the syntactic structures of the questions, sometimes figurative language, and in many cases requires that ELLs be able to draw on relevant background knowledge.

Even the simplest word problems require the reader to engage in interpretation of the text and to be aware that words that are used often in everyday language may have very specialized meaning in the context of a math problem. Consider two different word problems[57].

1) Students in Mr. Jacob's English class were giving speeches. Each student's speech was 7 to 10 minutes long. Which of the following is the best estimate for the total number of student speeches that could be given in a two-hour class?
   a) 4 speeches b) 8 speeches c) 13 speeches d) 19 speeches
2) A submarine is 285 feet under the surface of the ocean. A helicopter is flying at 4,500 feet above sea level. Given that the helicopter is directly above the submarine, how far apart are they?

The first question does not appear to contain any necessarily unfamiliar vocabulary words, while the second question contains some difficult words and concepts. Yet, for different reasons, both are equally challenging for ELLs, and the lack of academic English and relevant background knowledge is likely to hamper their performance. In the first question, ELLs need to unpack the

complex phrase structure of the question: *the best estimate for the total number of student speeches that could be given in a two-hour class.* Within this expression there is a complex prepositional phrase: *for the total number of student speeches that could be given in a two-hour class.* As well, there is the passive construction: *could be given*. The passive construction is common in academic English but often difficult for the ELL. There is also the expression to "give a speech" that students must be familiar with. Finally, closer to mathematics, the ELL must understand that 7 to 10 represents a range of time for each student—that speeches are *between* 7 and 10 minutes. In the second question, there are five prepositional phrases for students to understand. Prepositional phrases are difficult for ELLs. Similarly, ELLs must correctly interpret the pronoun *they (how far apart are they?)* as related to the helicopter and submarine; pronouns can be very difficult for this group of students. The relevant vocabulary and conceptual knowledge needed to answer this question includes, but is not limited to, *sea level (above or below)* and *the surface of the ocean.* This analysis is by no means exhaustive[58], but begins to highlight the complexities inherent in any word problem and the challenges that ELLs face in working with word problems on a regular basis due to their limited proficiency with English. The special case of word problems reinforces the need for academic language objectives and content to be built into mathematics instruction and curricular materials.

A secondary consideration is that when planning instruction for all learners, especially ELLs with varied educational experiences outside of the U.S., it is necessary to determine those pre-requisite skills that the individual learner has mastered and where additional or remedial instruction is needed. When assessing the ELL's prior knowledge in mathematics, care should be given to assess both procedural and factual knowledge, which are distinct from knowledge of mathematical applications, and the potential influence of language difficulties on performance in these domains.

Conclusions

In this section, we identify three considerations when planning and implementing any instructional approach or academic intervention to promote ELLs' mathematics ability:

1. ELLs need early explicit and intensive instruction and intervention in basic mathematics concepts and skill.

2. Academic language is as central to mathematics as it is to other academic areas. It is a significant source of difficulty for many ELLs who struggle with mathematics.

3. ELLs need academic language support to understand and solve the word problems that are often used for mathematics assessment and instruction.

The instruction of mathematical concepts and skills and the difficulties experienced by many ELLs highlight the role of academic language in mathematics. In all content areas, including math, teachers use academic language to deliver instruction and convey knowledge and concepts. Indeed, much of the delivery of the mathematics curriculum is through text characterized by academic language. Academic language is as central to mathematics as it is to all other academic domains, and is a primary source of difficulty for ELLs who struggle with mathematics.

As a result, ELLs need early explicit, intensive instruction and intervention in basic mathematics concepts and skills and the language of mathematics. In turn, those who are at risk for math difficulties must be identified as early as possible, even as early as kindergarten. In addition to early instruction in mathematics, some ELLs may need this support through 12th grade, particularly given the pervasive use of word problems for mathematics assessment and instruction, and the possibility that newcomers may arrive at U.S. high schools in all grades. This practice of frequently relying on word problems to teach and assess math knowledge requires that ELLs receive academic language support to better understand and approach word problems and to succeed in mathematics.

REFERENCES (READING)

Allington, R. L. (2001). *What really matters for struggling readers: Designing research-based programs.* New York, NY: Addison Wesley Educational Publishers Inc.

August, D.L., & Shanahan, T. (2006). Synthesis: Instruction and professional development. In D. L. August & T. Shanahan (Eds.), *Developing literacy in a second language: Report of the National Literacy Panel.* Mahwah, NJ: Lawrence Erlbaum Associates.

August, D.L. & Siegel, L.S. (2006). Literacy instruction for language-minority children in special education settings. In D. L. August & T. Shanahan (Eds.), *Developing Literacy in a second language: Report of the National Literacy Panel.* Mahwah, NJ: Lawrence Erlbaum Associates.

Beck, I.L., & McKeown, M.G., (2001). Inviting students into the pursuit of meaning. *Educational Psychology Review, 13*(3), 225-241.

Beck, I. L., McKeown, M.G., & Kucan, L. (2002). *Bringing words to life.* New York: The Guilford Press.

Beck, I. L., McKeown, M. G., & Omanson, R. C. (1987). The effects and uses of diverse vocabulary instructional techniques. In M.G. McKeown & M.E. Curtis (Eds.), *The nature of vocabulary acquisition* (pp.147-163). Mahwah, NJ: Lawrence Erlbaum Associates.

Biancarosa, G., & Snow, C. E. (2004). *Reading next—A vision for action and research in middle and high school literacy: A report from the Carnegie Corporation of New York.* Washington, DC: Alliance for Excellence Education.

Biancarosa, G., & Snow, C. E. (2006). *Reading next—A vision for action and research in middle and high school literacy: A report from the Carnegie Corporation of New York* (2nd ed). Washington, DC: Alliance for Excellence Education.

Biemiller, A. (2004). Teaching vocabulary in the primary grades: Vocabulary instruction needed. In J.F. Baumann & E. Kame'enui (Eds.), *Vocabulary instruction: Bringing research to practice* (pp. 209-242). Mahwah, NJ: Lawrence Erlbaum Associates.

Blum-Kulka, S. & Snow, C. E. (2004). Introduction: The potential of peer talk. *Discourse Studies, 6*(3), 291-306.

Branum-Martin, L., Mehta, P.D., Fletcher, J.M., Carlson, C.D., Ortiz, A., Carlo, M., & Francis, D.J. (2006). Bilingual phonological awareness: Multilevel construct validation among Spanish-speaking kindergarteners in traditional bilingual education classrooms. *Journal of Educational Psychology, 98*(1), 170-181.

Breznitz, Z. (2006). *Fluency in reading.* Mahwah, NJ: Lawrence Erlbaum Associates.

Bryant, D. P., Vaughn, S., Linan-Thompson, S., Ugel, N., Hamff, A., & Hougen, M. (2000). Reading outcomes for students with and without reading disabilities in general education middle school content area classes. *Learning Disability Quarterly, 23,* 24-38.

Buly, M.R., & Valencia, S.W. (2002). Below the bar: Profiles of students who fail state assessments. *Educational Evaluation and Policy Analysis, 24*(3), 219-239.

Cain, K. & Oakhill, J. (1998). Comprehension skill and inference-making ability: Issues and causality. In C. Hulme and R.M. Joshi (Eds.), *Reading and spelling: Development and disorders.* London: Lawrence Erlbaum.

Cain, K. & Oakhill, J. (2000). Inference making ability and its relation to comprehension failure in young children. *Reading and Writing: An Interdisciplinary Journal, 11,* 489-503.

Cain, K., Oakhill, J., & Bryant, P. (2000). Investigating the causes of reading comprehension failure: The comprehension-age match design. *Reading and Writing: An Interdisciplinary Journal, 12,* 31-40.

Capps, R., Fix, M., Murray, J., Ost, J., Passel, J., & Herwantoro, S. (2005). *The new demography of America's schools: Immigration and the No Child Left Behind Act.* Washington, DC: The Urban Institute.

Carlo, M. S., August, D., McLaughlin, B., Snow, C. E., Dressler, C., Lippman, D. N., Lively, T. J., & White, C. E., (2004). Closing the gap: Addressing the vocabulary needs of English-language learners in bilingual and mainstream classrooms. *Reading Research Quarterly, 39,* 188-215.

Carlo, M. S., August, D., & Snow, C. E. (2005). Sustained vocabulary-learning strategies for English language learners. In E.H. Hiebert & M. Kamil (Eds.), *Teaching and learning vocabulary: Bringing research to practice* (pp. 137-153). Mahwah, NJ: Lawrence Erlbaum Associates.

Carnevale, A. P. (2001). *Help wanted . . . college required.* Washington, DC: Educational Testing Service, Office for Public Leadership.

Coxhead, A. (2000). A new Academic Word List. *TESOL Quarterly, 34*(2): 213-238.

Chard, D.J., Vaughn, S., & Tyler, B.J. (2002). A synthesis of research on effective interventions for building reading fluency with elementary students with learning disabilities. *Journal of Learning Disabilities, 35*(5), 386-406.

de Jong, E.J. (2004). After exit: Academic achievement patterns of former English language learners. *Educational Policy Analysis Archives, 12*(50). Retrieved 9/22/05 from http://epaa.asu.edu/epaa/v12n50/v12n50.pdf .

Denton, C.A., Anthony, J.L., Parker, R., & Hasbrouck, J.E. (2004). Effects of two tutoring programs on the English reading development of Spanish-English bilingual students. *The Elementary School Journal, 104*(4), 289-305.

Deshler, D., & Tollefson, J. M. (2006). *Strategic Interventions. School Administrator, 63*(4), 24-29.

Downhower, S.L. (1987). Effects of repeated reading on second grade transitional readers' fluency and comprehension. *Reading Research Quarterly, 22*(4), 389-406.

Dressler, C. (2006). First- and second-language literacy. In D. L. August & T. Shanahan (Eds.), *Developing literacy in a second language: Report of the National Literacy Panel.* Mahwah, NJ: Lawrence Erlbaum Associates.

Droop, M. & Verhoeven, L. (2003). Language proficiency and reading ability in first- and second-language learners. *Reading Research Quarterly, 38*(1), 78-103.

Durkin, D. (1978/79). What classroom observations reveal about comprehension instruction. *Reading Research Quarterly, 14,* 481-533.

Foorman, B. & Torgesen, J. (2001). Critical elements of classroom and small-group instruction to promote reading success in all children. *Learning Disabilities Research & Practice, 16*(4), 203-206.

Francis, D. J.; Snow, C. E.; August, D.; Carlson, C. D.; Miller, J.; Iglesias, A. (2006). Measures of reading comprehension: A latent variable analysis of the Diagnostic Assessment of Reading Comprehension. *Scientific Studies of Reading, 10*(3), 301-322.

Garcia, G. E. (1991). Factors influencing the English reading test performance of Spanish-speaking Hispanic children. *Reading Research Quarterly, 26,* 371–392.

Garcia, G. E. (2000). Bilingual children's reading. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research: Volume III* (pp. 813-834). Mahwah, NJ: Lawrence Erlbaum Associates.

Genesee, F. & Geva, E. (2006). Cross-linguistic relationships in working memory, phonological processes, and oral language. In D. L. August & T. Shanahan (Eds.), *Developing literacy in a second language: Report of the National Literacy Panel.* Mahwah, NJ: Lawrence Erlbaum Associates.

Genessee, F., Lindholm-Leary, K., Saunders, W. M., & Christian, D. (Eds.). (2006). *Educating English language learners: A synthesis of research evidence.* New York, NY: Cambridge University Press.

Gerber, M., Jimenez, T., Leafstedt, J., Villaruz, J., Richards, C., & English, J. (2004). English reading effects of small-group intensive instruction in Spanish for K-1 English learners. *Learning Disabilities Research & Practice, 19*(4), 239-251.

Graves, M. F. (2000). A vocabulary program to complement and bolster a middle-grade comprehension program. In B. M. Taylor, M. F. Graves & P. Van den Broek (Eds.), *Reading for meaning: Fostering comprehension in the middle grades* (pp. 116-135). New York: Teachers College Press

Graves, M. F. (2006). *The vocabulary book.* New York: Teachers College Press.

Gunn, B., Biglan, A., Smolkowski, K. & Ary, D. (2000). The efficacy of supplemental instruction in decoding skills for Hispanic and non-Hispanic students in early elementary school. *The Journal of Special Education, 34*(2), 90-103.

Gunn, B., Smolkowski, K., Biglan, A., & Black, C. (2002). Supplemental instruction in decoding skills for Hispanic and non-Hispanic students in early elementary school: A follow-up. *The Journal of Special Education, 36*(2), 69-79.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first to fourth grades. *Journal of Educational Psychology, 80*(4), 437-447.

Kieffer, M.J. & Lesaux, N.K. (in press). Breaking down words to build meaning: Morphology, vocabulary, and reading comprehension in the urban classroom. *The Reading Teacher.*

Kindler, A.L. (2002). *Survey of the states' limited English proficient students & available educational programs and services 1999–2000* (Summary Report). Washington, DC: National Clearinghouse for English Language Acquisition and Language Instruction Educational Programs.

Kuhn, M.R., & Stahl, S.A. (2003). Fluency: A review of developmental and remedial practices. *Journal of Educational Psychology, 95*(1), 3-21.

Leafstedt, J.M., Richards, C.R., & Gerber, M.M. (2004). Effectiveness of explicit phonological-awareness instruction for at-risk English learners. *Learning Disabilities Research & Practice, 19*(4), 252-261.

Lesaux, N.K. (2006). Development of literacy of language minority learners. In D. L. August & T. Shanahan (Eds.), *Developing literacy in a second language: Report of the National Literacy Panel.* Mahwah, NJ: Lawrence Erlbaum Associates.

Lesaux, N.K., Lipka, O., & Siegel, L.S. (2006). Investigating cognitive and linguistic abilities that influence the reading comprehension skills of children from diverse linguistic backgrounds. *Reading and Writing: An Interdisciplinary Journal, 19*(1), 99-131.

Lesaux, N.K. & Crosson, A.C. (2005). Addressing variability and vulnerability: Promoting the academic achievement of English learners in San Diego. In R. Hess (Ed.),*Urban reform: Lessons from San Diego* (pp. 263-281). Cambridge, MA: Harvard Education Press.

Lesaux, N. K., & Siegel, L. S. (2003). The development of reading in children who speak English as a second language. *Developmental Psychology, 39*(6), 1005-1019.

Limbos, M., & Geva, E. (2001). Accuracy of teacher assessments of second-language students at risk for reading disability. *Journal of Learning Disabilities, 34*(2), 136-151.

Linan-Thompson, S. & Hickman-Davis, P. (2002). Supplemental reading instruction for students at risk for reading disabilities: Improve reading 30 minutes at a time. *Learning Disabilities Research and Practice, 17*(4), 242-251.

Linan-Thompson, S., Vaughn, S., Hickman-Davis, P., & Kouzekanani, K. (2003). Effectiveness of supplemental reading instruction for second-grade English language learners with reading difficulties. *The Elementary School Journal, 103*(3), 221-238.

Lindsey, K., Manis, F. & Bailey, C. (2003). Prediction of first-grade reading in Spanish-speaking English-language learners. *Journal of Educational Psychology, 3,* 482-494.

Lyon, G. (1995). Toward a definition of dyslexia. *Annals of Dyslexia, 451,* 3-27.

Lyon, G. R., Shaywitz, S. E., & Shaywitz, B. A. (2003). A definition of dyslexia. *Annals of Dyslexia, 53,* 1-14.

Manis, F.R., Lindsey, K.A., & Bailey, C.E. (2004). Development of reading in Grades K-2 in Spanish-speaking English-language learners. *Learning Disabilities Research & Practice, 19*(4), 214-224.

McKeown, M. G., Beck, I. L., & Worthy, M. J. (1993). Grappling with text ideas: Questioning the author. *Reading Teacher, 46,* 560–66.

Murnane, R. & Levy, F. (1996). *Teaching the new basic skills: Principles for educating children to thrive in a changing economy.* New York, NY: Martin Kessler Books.

Nagy, W. E., & Anderson, R. C. (1984). How many words are there in printed school English? *Reading Research Quarterly, 19,* 304-330.

Nagy, W. E., & Scott, J. A. (2000). Vocabulary processes. In R. Barr, M. L. Kamil, P. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research: Vol. 3* (pp. 269-284). New York: Longman.

Nagy, W. E., & Stahl, S. A. (2006). *Teaching word meanings.* Mahwah, NJ: Lawrence Erlbaum Associates.

National Center for Education Statistics. (2004). *Language minority learners and their labor market indicators—recent trends.* Washington, DC: U.S. Department of Education. Retrieved 9/21/04 from http://nces.ed.gov/pubs2004/2004009.pdf

National Center for Education Statistics. (2006). *National Assessment of Educational Progress, 2006, reading assessments.* Washington, DC: U.S. Department of Education, Institute of Education Sciences.

National Reading Panel. (2000). *Report of the National Reading Panel: Teaching children to read.* Bethesda, MD: National Institute of Child Health and Human Development.

National Research Council. (2000). *How people learn: Brain, mind, experience, and school.* Washington, DC: National Academies Press.

National Institute of Child Health and Human Development. (2003). *National symposium on learning disabilities and English language learners* (Symposium Summary). Washington, DC: U.S. Department of Education and the National Institute of Child Health and Human Development.

Oakhill, J. (1993). Children's difficulties in reading comprehension. *Educational Psychology Review, 5,* 223-237.

Oakhill, J., Yuill, N., & Parkin, A. (1986). On the nature of the difference between skilled and less-skilled comprehenders. *Journal of Research in Reading, 9,* 80-91.

Oller, K., & Eilers, R. E. (Eds.). (2002). *Language and Literacy in Bilingual Children.* Clevendon, England: Multilingual Matters.

Population Resource Center. (2000). *Executive summary: Status of children in America.*

Pressley, M. (2000). What should comprehension instruction be the instruction of? In M. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of Reading Research: Vol. 3* (pp. 545-561). Mahwah, NJ: Lawrence Erlbaum Associates.

Proctor, C. P., Carlo, M. August, D., & Snow, C. E. (2005). Native Spanish-speaking children reading in English: Toward a model of comprehension. *Journal of Educational Psychology, 97*(2), 246-256.

RAND Reading Study Group. (2002). *Reading for understanding: Toward a research and development program in reading comprehension.* Santa Monica, CA: RAND Corporation.

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context.* New York: Oxford University Press.

Roser, N., & Juel, C. (1982). Effects of vocabulary instruction on reading comprehension. In J.A. Niles & L.A. Harris (Eds.), *Yearbook of the National Reading Conference: Vol. 31. New inquiries in reading research and instruction* (pp. 110-118). Rochester, NY: National Reading Conference.

Saunders, W. M., & Goldenberg, C. (1999). Effects of instructional conversations and literature logs on limited- and fluent-English proficient students' story comprehension and thematic understanding. *Elementary School Journal, 99*(4), 277-301.

Scarcella, R. (2003). *Academic English: A conceptual framework.* Los Angeles: Language Minority Research Institute.

Scott, J.A., Jamieson-Noel, D., & Asselin, M. (2003). Vocabulary instruction throughout the day in twenty-three Canadian upper-elementary classrooms. *Elementary School Journal, 103,* 269-283.

Shanahan, T. & Beck, I.L. (2006). Effective literacy teaching for English-language learners. In D. L. August & T. Shanahan (Eds.), *Developing literacy in a second language: Report of the National Literacy Panel.* Mahwah, NJ: Lawrence Erlbaum Associates.

Shaywitz, S.E., Fletcher, J.M., Holahan, J.M., Schneider, A.E., Marchione, K.E., Stuebing, K.K., Francis, D.J., Pugh, K.R., & Shaywitz, B.A. (1999). Persistence of dyslexia: The Connecticut longitudinal study at adolescence. *Pediatrics, 104*(6), 1351-1359.

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Stahl, S. A. (1999). *Vocabulary development.* Cambridge, MA: Brookline Books.

Stahl, S. A., & Nagy, W. E. (2006). *Teaching word meanings.* Mahwah, NJ: Lawrence Erlbaum Associates.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly, 21,* 360-407.

Stuart, M. (1999). Getting ready for reading: Early phoneme awareness and phonics teaching improves reading and spelling in inner-city second language learners. *British Journal of Educational Psychology, 69,* 587-605.

Stuart, M. (2004). Getting ready for reading: A follow-up study of inner city second language learners at the end of Key Stage 1. *British Journal of Educational Psychology, 74,* 15-36.

Tabors, P., Paez, M., & Lopez, L. (2003). Dual language abilities of bilingual four-year olds: Initial findings from the Early Childhood Study of language and literacy development of Spanish-speaking children. *NABE Journal of Research and Practice, 1*(1), 70-91.

Vaughn, S., Chard, D. J., Bryant, D. P., Coleman, M., Tyler, B. J., Linan-Thompson, S., & Kouzekanani, K. (2000). Fluency and comprehension interventions for third-grade students. *Remedial and Special Education, 21*(6), 325-35.

Vaughn, S., Cirino, P.T., Linan-Thompson, S., Mathes, P.G., Carlson, C.D., Hagan, E.C., Pollard-Durodola, S.D., Fletcher, J.M., & Francis, D.J., (2006). Effectiveness of a Spanish intervention and an English intervention for English-language learners at risk for reading problems. *American Educational Research Journal, 43*(3), 449-487.

Vaughn, S., & Fuchs, L. (2003). Redefining learning disabilities as inadequate response to instruction: The promise and potential problems. *Learning Disabilities Research and Practice, 18*(3), 137-146.

Vaughn, S., Klingner, J. K., & Bryant, D. P. (2001). Collaborative strategic reading as a means to enhance peer-mediated instruction for reading comprehension and content area learning. *Remedial and Special Education, 22*(2), 66-74.

Vaughn, S., Linan-Thompson, S., Mathes, P.G., Cirino, P.T., Carlson, C., Francis, D.J., Pollard-Durodola, S.D., & Hagan, E.C. (2006). Effectiveness of Spanish intervention for first-grade English language learners at risk for reading difficulties. *Journal of Learning Disabilities, 39*(1), 56-73.

Vaughn, S., Linan-Thompson, S., Mathes, P., Cirino, P., Carlson, C., Pollard-Durodola, Hagan, E., & Francis, D. (in press). First-grade English language learners at risk for reading problems: Effectiveness of an English intervention. *Elementary School Journal.*

Vaughn, S., Mathes, P., Linan-Thompson, S., & Francis, D. (2005). Teaching English language learners at risk for reading disabilities to read: Putting research into practice. *Learning Disabilities Research and Practice, 20*(1), 58-67.

Wang, M., Park, Y., & Lee, K.R., (2006). Korean-English biliteracy acquisition: Cross-language phonological and orthographic transfer. *Journal of Educational Psychology, 98*(1), 148-158.

Watts, S.M. (1995). Vocabulary instruction during reading lessons in six classrooms. *Journal of Reading Behavior, 27,* 399-424.

Wixson, K. K. (1986). Vocabulary instruction and children's comprehension of basal stories. *Reading Research Quarterly, 21*(3) 317-329.

Wong-Fillmore, L. & Snow, C. (2000). *What teachers need to know about language.* Washington, DC: ERIC Clearinghouse on Languages and Linguistics.

Ziegler, J. C., & Goswami, U. C. (2005). Reading acquisition, developmental dyslexia and skilled reading across languages: A psycholinguistic grain size theory. *Psychological Bulletin, 131*(1), 3-29.

REFERENCES (MATH)

Bielenberg, B. & Wong Fillmore, L. (2004/2005). The English they need for the test. *Educational Leadership, 45-49.*

Carpenter, T. P., & Moser, J. M. (1984). The acquisition of addition and subtraction concepts in grades one through three. *Journal for Research in Mathematics Education, 15*(3), 179-202.

Cazden, C. (1986). Classroom discourse. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed.) (pp. 432-463). New York: MacMillan.

Cuevas, G. J. (1984) Mathematics learning in English as a second language. *Journal for Research in Mathematics Education, 15*(2), 134-144.

Cuevas, G.J. (March, 1991). Developing communication skills in mathematics for students with limited English proficiency. *Mathematics Teacher,* 186-189.

Echevarria, J., Vogt, M., & Short, D. (2004). *Making content comprehensible for English learners – the SIOP model* (2nd ed.). Boston: Pearson, Allyn & Bacon.

Geary, D. (1990). A componential analysis of an early learning deficit in mathematics. *Journal of Experimental Child Psychology, 49,* 363-383.

Geary, D. C., Bow-Thomas, C., & Yao, Y. (1992). Counting knowledge and skill in cognitive addition: A comparison of normal and mathematically disabled children. *Journal of Experimental Child Psychology, 54,* 372-391.

Geary, D. C., Brown, S. C., & Samaranayake, V. A. (1991). Cognitive addition: A short longitudinal study of strategy choice and speed-of-processing differences in normal and mathematically disabled children. *Developmental Psychology, 27,* 787-797.

Geary, D. C., Hoard, M. K., & Hamson, C. O. (1999). Numerical and arithmetical cognition: Patterns of functions and deficits in children at risk for a mathematical disability. *Journal of Experimental Child Psychology, 74,* 213-239.

Gersten, R., & Jordan, N. (2005). Early screening and intervention in mathematics difficulties: The need for action. *Journal of Learning Disabilities, 38*(4), 291-292.

Ginsburg, H. (1997). Mathematics learning disabilities: A view from developmental psychology. *Journal of Learning Disabilities, 30*(1), 20-33.

Hanich, L. B., Jordan, N. C., Kaplan, D., & Dick, J. (2001). Performance across different areas of mathematical cognition in children with learning difficulties. *Journal of Educational Psychology, 93,* 615–626.

Jordan, N. C., & Hanich, L. B. (2000). Mathematical thinking in second-grade children with different forms of LD. *Journal of Learning Disabilities, 33*(6), 567-578.

Kindler, A. L. (2002). *Survey of the states' limited English proficient students and available educational programs and services 2000-2001* (Summary Report). Office of English Language Acquisition, Language Enhancement and Academic Achievement for Limited English Proficient Students. Washington, D.C.: National Clearinghouse for English Language Acquisition & Language Instruction Educational Programs. Available at: www.ncela.gwu.edu/states! reportslseareponsl0001lsea0001.pdf.

Lager, C. A. (2006). Types of mathematics-language reading interactions that unnecessarily hinder algebra learning and assessment. *Reading Psychology, 27,* 165-204.

Lyon, G. R., Shaywitz, S. E. & Shaywitz, B. A. (2003). A definition of dyslexia. *Annals of Dyslexia, 53,* pp. 1-14.

National Center for Educational Statistics (2005a). *Nation's report card for math.* Washington, DC: U.S. Department of Education, Institute of Educational Sciences.

National Institute of Child Health and Human Development (2003). *National symposium on learning disabilities and English language learners* (Symposium Summary). Washington, DC: U.S. Department of Education and the National Institute of Child Health and Human Development.

National Research Council. (2001). *Adding it up: Helping children learn mathematics.* Washington, DC: National Academies Press.

RAND Mathematics Study Panel. (2003). *Mathematical proficiency for all students.* Santa Monica, CA: RAND Corporation.

Russell, R. L., & Ginsburg, H. P. (1984). Cognitive analysis of children's mathematics difficulties. *Cognition and Instruction, 1,* 217-244.

Shaywitz, S. E., Fletcher, J. M., Holahan, J. M., Shneider, A. E., Marchione, K. E., Stuebing, K. K., Francis, D. J., Pugh, K. R., & Shaywitz, B. A. (1999). Persistence of dyslexia: The Connecticut longitudinal study at adolescence. *Pediatrics, 104,* 1351-1359.

ENDNOTES

[1] For documents that outline the demographics of this population, including its size, see NCES (2004); Capps, Fix, Murray, Ost, Passel, & Herwantoro (2005); Population Resource Center (2000).

[2] Biancarosa & Snow (2006); Kieffer & Lesaux, in press; Carlo et al. (2004); Proctor, Carlo, August, & Snow (2005); Tabors, Paez, & Lopez (2003); Francis et al. (2006).

[3] NCES (2005).

[4] For research on the prevalence and definition of learning disabilities in native English speakers see Lyon (1995); Lyon, Shaywitz, & Shaywitz (2003); Shaywitz et al. (1999); for a review of the research on learning disabilities in language minority learners see Lesaux (2006). For a discussion of the difficulties in and the need for increased opportunities to learn for ELLs to prevent and reduce reading difficulties see NICHD (2003), Snow, Burns, & Griffin (1998). For a review of research on literacy instruction for ELLs in special education see August & Siegel (2006).

[5] Texas reported performance on the 2002 state accountability assessment in English Reading for ELL students as a function of their scores on the Reading Proficiency Test in English (RPTE). The RPTE is designed to assess proficiency in English and is used to indicate when students are ready to take the state accountability test in English. The study found that 15.8% of students passed the English reading test if they scored at the Beginning level on the RPTE in 2002. This percent passing compared to 30.4% for Intermediates, 76.4% for students who scored Advanced in 2002, and 89.6% for students who scored Advanced in 2000. Similar results were found at each grade from 3 through 10, although some differences are noted between the early and later grades. Results can be found at http://www.tea.state.tx.us/student.assessment/reporting/results/rpteanalysis/2002/reading/statewide.html. In a study of students who first entered Grade 9 in 1996, the New York State Education Agency found that 32.6% of current ELLs graduated high school in four years, while 60.1% of former ELLs graduated high school in four years, as compared to 54.5% of students who had never been ELLs. These percentages increased to 49.5%, 76.5%, and 70.5% at seven years. Thus, while former ELLs are completing high school at rates comparable to non-ELL students, it's clear that many ELL students are still not successful. For the complete report see: http://www.regents.nysed.gov/2005Meetings/March2005/0305emscvesidd4.html. Both reports were last accessed by the authors on September 28, 2006 in preparing this report.

[6] National Research Council (2000).

[7] Research on the changing nature of the workplace as it relates to literacy skills is documented and discussed in Carnevale (2001); Murnane & Levy (1996); the educational implications of these changes in demands for skilled labor are further discussed in Biancarosa & Snow (2006) and Murnane & Levy (1996).

[8] For a review of the relationship between first and second language literacy processes see Dressler (2006).

[9] For a discussion of academic language see Scarcella (2003), and of reading vocabulary see Nagy & Anderson (1984); Nagy & Scott (2000); Stahl (1999); Stahl & Nagy (2006). Readers may also wish to consult the Academic Word List website at www.vuw.ac.nz/lals/research/awl/awlinfo.html and references on the development of the Academic Word List in Coxhead (2000).

[10] NCES (2004).

[11] August & Shanahan (2006).

[12] Genessee, Lindholm-Leary, Saunders, & Christian (2006).

[13] For research conducted with native English speakers on the effects of early reading failure see Juel (1988); Shaywitz et al. (1999); Stanovich (1986).

[14] Garcia (1991, 2000); Droop & Verhoeven (2003).

[15] de Jong (2004).

[16] Biancarosa & Snow (2006); Kieffer & Lesaux, in press; Carlo et al. (2004); Proctor, Carlo, August, & Snow (2005); Tabors, Paez, & Lopez (2003); Francis et al. (2006).

[17] For a discussion on academic language see Scarcella (2003); Wong-Fillmore & Snow (2000); for a discussion of reading vocabulary see Nagy & Anderson (1984); Nagy & Scott (2000); Stahl (1999); Stahl & Nagy (2006). Readers may also wish to consult the Academic Word List website at www.vuw.ac.nz/lals/research/awl/awlinfo.html and references on the development of the Academic Word List in Coxhead (2000).

[18] See references above on academic language.

[19] For relevant reviews and syntheses see August & Shanahan (2006); Lesaux (2006); Shanahan & Beck (2006).

[20] For a review of the development of word reading for ELLs, and the prevalence of word reading difficulties and reading comprehension difficulties in this population, see Lesaux (2006).

[21] Biancarosa et al. (2006); Buly & Valencia (2002); Lesaux, Lipka, & Siegel (2006); Proctor, Carlo, August, & Snow (2005).

[22] For reviews of the cognitive processes involved in reading comprehension see August & Shanahan (2006); Breznitz (2006); RAND Reading Study Group (2002); Snow, Burns, & Griffin (1998).

[23] August & Shanahan (2006).

[24] See Limbos & Geva (2001).

[25] For studies on early predictors of reading difficulty and effective early intervention see Denton, Anthony, Parker, & Hasbrouck (2004); Gerber et al. (2004); Gunn, Biglan, Smolkowski, & Ary (2000); Gunn, Smolkowski, Biglan, & Black (2002); Leafstedt, Richards, & Gerber (2004); Lesaux (2006); Lesaux & Siegel (2003); Linan-Thompson & Hickman-Davis (2002); Linan-Thompson, Vaughn, Hickman-Davis, & Kouzekanani (2003); Lindsey, Manis, & Bailey (2003); Manis, Lindsey, & Bailey (2004); Stuart (1999); Stuart (2004); Vaughn & Fuchs (2003); Vaughn, Mathes, Linan-Thompson, & Francis (2005); Vaughn, Linan-Thompson, et al. (2006); Vaughn, Cirino, et al. (2006); Vaughn et al. in press.

[26] Ziegler & Goswami (2005).

[27] For a review of studies prior to 2002, see Genesee & Geva (2006); for examples of studies published since 2002 on the relationship between first and second language phonological awareness, see Branum-Martin et al. (2006) and Wang, Park, & Lee (2006); for an extensive review of studies that examine cross-language relationships see Dressler (2006).

[28] For a review of studies prior to 2002, see Genesee & Geva (2006); for relevant research on the relationship between first and second language phonological awareness see Branum-Martin et al. (2006), Wang, Park, & Lee (2006); for an extensive review of studies that examine cross-language relationships see Dressler (2006).

[29] This conclusion is based on the theoretical review of literacy development in alphabetic languages by Ziegler & Goswami (2005), and the effectiveness of interventions developed in Spanish and in English for Spanish-speaking ELLs by Vaughn and colleagues. These interventions were developed following the same principles used to develop effective interventions for native English speakers and were found to be effective for Spanish-speaking ELLs receiving literacy instruction in the same language as that of the intervention. See Vaughn, Cirino, et al. (2006) and Vaughn et al. in press.

[30] For research that has estimated the amount of vocabulary instruction in classrooms see Durkin (1978/79); Roser & Juel (1982); Scott, Jamieson-Noel, & Asslin (2003); Watts (1995); for a discussion of the implications see Graves (2006).

[31] For vocabulary instruction frameworks Beck, McKeown, & Kucan (2002); Beck, McKeown, & Omanson (1987); Biemiller (2004); Graves (2000, 2006); Nagy & Stahl (2006). For a review of studies of vocabulary instruction with ELLs see Shanahan & Beck (2006). For an example of a recent study of vocabulary instruction with ELLs see Carlo et al. (2004).

[32] For a study that demonstrate negative effects of vocabulary instruction on reading comprehension see Wixson (1986).

[33] Beck, McKeown, & Kucan (2002); Beck & McKeown (2001); Biemiller (2004); McKeown, Beck, & Worthy (1993).

[34] Carlo et al. (2004); Carlo, August, & Snow (2005); Graves (2006); Nagy & Stahl (2006).

[35] Nagy & Stahl (2006); Coxhead (2000).

[36] Biemiller (2004); Graves (2006); Shanahan & Beck (2006).

[37] For developmental research on the nature of reading comprehension difficulties of native English speaking learners who have good word reading skills (similar to many struggling ELLs) see research by Cain, Oakhill and colleagues (e.g., Cain & Oakhill [1998]; Cain & Oakhill [2000]; Cain, Oakhill, & Bryant [2000]; Oakhill [1993]; Oakhill, Yuill, & Parkin [1986]). For a review of research on the nature of reading comprehension for ELLs see Lesaux (2006); for more recent studies conducted with ELLs see for example, Carlo et al. (2004); Proctor, Carlo, August, & Snow (2005).

[38] For research on strategic comprehension instruction see Allington (2001); Bryant, Vaughn, Linan-Thompson, Ugel, Hamff, & Hougen (2000); Deshler & Tollefson (2006); Vaughn, Klingner & Bryant (2001).

[39] For a discussion of this practice and related research see Buly & Valencia (2002).

[40] For studies of repeated reading with ELLs see Denton, Anthony, Parker, & Hasbrouck (2004). Although Denton (2000) does not report significant effects for repeated reading, the study is characterized as exploratory and the lack of effects, which approached significance, are attributed to the short duration of the intervention (10 weeks) and lack of sensitivity of measures. These issues were addressed in the subsequent research study by Denton et al. (2004). For examples of intervention studies with native English speakers, see Downhower (1987); Foorman & Torgesen (2001); Kuhn & Stahl (2003). For a synthesis of the research base on the effects of repeated reading with native English speakers see the National Reading Panel (2000) and for a synthesis of effective interventions to build reading fluency with struggling readers who are native English speakers see Chard, Vaughn, & Tyler (2002).

[41] Denton, Anthony, Parker, & Hasbrouck (2004); see Denton (2000) for a discussion of optimal length of intervention.

[42] For a review of factors that influence second language learning in young children see Oller & Eilers (2002).

[43] For research on effective instruction for ELLs that features academic discussions see the work of Saunders and Goldenberg and colleagues (e.g., Saunders & Goldenberg [1999]). This instructional research is reviewed in Shanahan & Beck (2006).

[44] For research on the role of language production and structured interaction with peers in second language learning see Blum-Kulka & Snow (2004); National Research Council (2000); Rogoff (1990).

[45] For reports on mathematics development and instruction see RAND Mathematics Study Panel (2003); National Research Council (2001).

[46] National Research Council (2001).

[47] Lyon, Shaywitz, & Shaywitz (2003); NICHD (2003); Shaywitz et al. (1999). For reports on academic achievement of ELLs see NCES (2005, 2006); Kindler (2002).

[48] For reports on mathematics development and instruction see RAND Mathematics Study Panel (2003); National Research Council (2001).

[49] For relevant research and reviews see Carpenter & Moser (1984); Gersten et al. (2005); Ginsburg (1997); Russell & Ginsburg (1984).

[50] For discussions of academic language in mathematics learning and teaching see Cazden (1986); Cuevas (1984), Lager (2006).

[51] For a report that focuses on language proficiency and mathematics see Lager (2006).

[52] For research on mathematics development and difficulties, conducted with native English speakers see Geary (1990); Geary et al. (1991, 1992, 1999); Hanich et al. (2001); Jordan & Hanich (2000).

[53] For a review see RAND Mathematics Study Panel (2003); National Research Council (2001).

[54] For a report that focuses on language proficiency and mathematics see Lager (2006).

[55] For a report that focuses on language proficiency and mathematics see Lager (2006).

[56] The elements of effective instruction described here have been incorporated into a model of instruction for ELLs known as the Sheltered Instruction Observation Protocol (SIOP) by Echevarria, Vogt, & Short (2004).

[57] Presented in Bielenberg & Wong Fillmore (20042005).

[58] For a more involved discussion and analysis of these two word problems see Bielenberg & Wong Fillmore (2004/2005).

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