

The Impact of the Level of Native Language Proficiency on the  
Literacy Achievement of English Language Learners

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## **Introduction**

In 19.6% of American homes, a language other than English is spoken (American Community Survey, 2008). Children from homes where English is not the primary language are often at a disadvantage when they enter school. They may find that they are behind in a variety of academic subjects but this disadvantage is often most apparent in the areas of reading and literacy (Snow et al., 1998). The level of proficiency in one's native language can have a major impact on literacy achievement. If a child has not learned basic pre-literacy skills in his/her native language, it becomes that much more difficult to transfer those skills to English (Royer & Carlo, 1991).

Deficits in literacy achievement become compounded when one considers the socioeconomic status (SES) of non-English dominant or English language learner (ELL) children. Currently, 16.6 % of families with children below the age of 18 are living below the poverty level (American Community Survey, 2009). ELLs are more likely to come from low-SES backgrounds, live in areas with high concentrations of poverty and attend schools with limited resources (Orfield & Lee, 2005). These factors all affect their school success and in turn their literacy achievement. It has been found in a number of studies that ELLs who come from high-SES backgrounds are more likely to overcome early deficits in reading and other academic areas than their lower-SES counterparts (Krashen & Brown, 2005; Kieffer, 2008).

Additionally, because ELLs from low-SES backgrounds often attend struggling public schools, they are less likely to encounter high quality instruction, which in turn affects their performance. A number of studies have demonstrated that ELLs perform below their peers on standardized literacy assessments (August and Shanahan, 2006). It

has been found that ELLs in the early grades benefit most from the same components of literacy and reading curricula that English-dominant children do (August & Shanahan, 2010). For example, instruction that is clear, systematic and focused on phonological awareness and decoding is most effective in the early grades. In the upper grades, the necessary skills become more complex and so this is where the real gaps in achievement become most apparent between ELLs and English dominant students and between high-SES ELLs and low-SES ELLs (August et al 2009). Some of these disparities can be overcome through high quality instruction but this becomes nearly impossible when a large sector of the population does not have access to that kind of schooling. These issues are further compounded by the high stakes testing that is becoming more prevalent in the lower grades.

As part of the No Child Left Behind legislation (2002), American schoolchildren are exposed to high stakes testing beginning as early as third grade. In the earlier grades (K-2), it is not uncommon for children to be tested and prepared for standardized tests on a regular basis. This practice seems to contradict much of the research on the appropriate uses of assessment (Casbergue, 2010). Many young children regardless of their native language ability are often not ready to take these kinds of tests. It is also questionable if standardized tests can truly measure the emerging literacy skills of children in the early grades (Stallman & Pearson, 1990; Salinger, 2001; Allington, 2002). For all students, these tests focus on subject matter that has been taken out of context from what is done in the daily classroom activities (Stallman & Pearson, 1990). For ELL students the problems are augmented by their administration in a language not yet mastered (Abedi, Leon & Mirocha, 2003). Even when an ELL is fortunate enough to have a teacher that engages in

high quality instruction, those strategies may not be reflected in the testing materials (Lopez, 2012; Kachchaf & Solano-Flores, 2012).

Overall, ELLs are at a disadvantage and it is reflected in their school performance. They often exhibit low levels of proficiency in their native languages and so they experience difficulties transferring their limited skills to English. They do not always have academic language skills in their native languages and so they are lost even in a bilingual classroom setting. They often come from low SES families with limited resources. Thus, they do not always have access to high quality instruction. While they do benefit from the same kinds of high quality interventions as their English proficient peers in the early grades, they begin to lag behind in the later grades requiring additional support that they do not always receive. The high stakes testing that they are subjected to in school does not always represent what they truly know.

Given ELLs' low achievement in English literacy, I use the Early Childhood Longitudinal Study- Kindergarten (ECLS-K) data set to explore the relationship between level of native language ability in kindergarten and literacy achievement in kindergarten and third grade for Spanish speaking ELLs. In this analysis, I use native language proficiency in kindergarten as a predictor of literacy achievement in kindergarten and third grade. I control for family socioeconomic status (SES), age in months, gender and mother and father's education level. I use OLS regression as my analytic method. I expect to find that ELLs with higher levels of native language proficiency in kindergarten are also higher achievers in English literacy in kindergarten and third grade. I also expect to find that those with the highest SES will show the strongest English literacy achievement in kindergarten and third grade. Lastly, children whose parents have higher

levels of educational attainment will be more likely to exhibit stronger English literacy achievement in kindergarten and third grade. My first two hypotheses were confirmed by the analysis. Native language ability has a statistically significant relationship with English literacy achievement. The same is true for SES. I did not find statistically significant results for parental education level though and so this area warrants more study.

### **Literature Review**

Not much has been written about the impact of the level of proficiency in the native language on the literacy achievement of English language learners (ELL) and so it is an important area to explore. A lot is known about the literacy achievement of ELLs and the instructional approaches that best address their needs but more work is needed on how achievement varies by level of native language ability. It is possible that certain instructional approaches are most effective with children at particular levels of the native language ability spectrum but not with all ELLs. Quite a bit of research has been done on ELLs and standardized testing but again the varying levels of native language proficiency are very rarely taken into account. Without this crucial information, we are not getting the whole story of ELLs' academic performance. Similarly, the impact of SES on the literacy achievement of ELLs is a well-studied area but almost never looks at native language ability. Levels of proficiency vary widely by SES status and so they must be included in any analysis of ELLs' academic achievement. Since ELLs are not a monolithic group but one that varies by level of native language ability, SES, etc., it is

important to understand how these factors differentially impact their literacy achievement.

### ELLs and Literacy Instruction

In an update to the report of the National Literacy Panel on Language Minority Children and Youth, Diane August and Timothy Shanahan (2010) found that more recent studies confirm previous work regarding the types of literacy interventions that are beneficial to ELLs. Those interventions that are systematic and phonologically-based are most beneficial to both English dominant and ELL students. ELLs can often match English dominant students in the learning of English word-level skills, such as phonological awareness, spelling and decoding but even with instruction, equivalency in higher-level English skills such as comprehension is rare (August & Shanahan, 2010). In other words, those aspects of early literacy curricula that are most effective for English dominant students are also some of the most effective for ELLs. However, in the later grades as literacy becomes more focused on higher-level skills like comprehension, ELLs are often in need of additional support. It is unclear from this report how ELLs at different levels of native language proficiency fare in the upper grades though. It may be that only those at the highest levels of native language proficiency are able to match their English dominant peers.

An effective English literacy program for ELLs is similar to that of an effective program for English dominant students.

If instruction is clear, focused, and systematic, it is plausible that when language requirements are relatively low--as they are for learning phonological skills, letter-sound combinations and decoding--[ELLs] can make progress that is close

to English speakers. [ELLs] face more serious challenges when reading requires increasingly higher levels of language skills, such as those needed to comprehend complex academic texts. Here is where the gaps between English learners and English speakers become increasingly large (Coleman & Goldenberg, 2010). Additionally, content-area instruction is critical for promoting students' literacy growth. Even in the earliest grades, ELLs need support in the development of content knowledge and oral language skills in order to aid comprehension. In a research review of effective practices for ELLs, Rhoda Coleman and Claude Goldenberg (2010) promote the use of explicit and interactive teaching techniques. While they mention the gap between ELLs and native English speakers, they do not discuss the gaps that exist among ELLs themselves. It is very likely that all ELLs benefit from the recommendations made here but it is important to consider the individual needs of students at different levels of native language proficiency as well.

Many researchers and educational theorists feel that when possible, students should be taught literacy skills in their native language. Oral language development through quality and meaningful literacy-based instruction, interactive approaches, and direct instruction designed to help children in understanding how to draw on all of their linguistic resources are suggested effective methods for teaching literacy to ELLs (August & Shanahan, 2006; Genesee & Riches, 2006; Slavin & Cheung, 2003). In her research, Lucinda Soltero-Gonzalez finds that Latino immigrant children are most successful when they draw on their home language as a resource to literacy learning (Soltero-Gonzalez, 2009). She argues that this practice provides a source of support for English language development and learning. Even in a monolingual classroom, teachers are able to encourage this practice through social interaction, guided dialogue and direct

instruction. In this way, children are able to connect their literacy practices in school to their home experiences. There seems to be an assumption here that all ELLs are fluent in their native language and are therefore more comfortable learning in that language but this may not always be the case. Those who are at the lowest levels of native language proficiency may be lost in this type of classroom setting.

There is a strong relationship between ELLs' phonological awareness in their native language and their word and pseudo-word reading skills in English. One study (Durgunoglu et al, 1993) examined the English word and pseudo-word reading skills of first-grade ELL beginning readers whose native language was Spanish. The researchers found that native-language oral proficiency as measured by the Pre-Language Assessment Scales (Pre-LAS), with subtests that examine expressive and receptive language skills in three domains of oral language (e.g. morphology, syntax and semantics) did not predict performance on the English word and pseudo-word reading and decoding tasks. However, children's level of phonological awareness in their native language predicted their English word and pseudo-word reading and decoding skills. Another study (Quiroga et al, 2002) yielded similar results. The participants were first-grade Spanish speaking ELLs who had not had systematic instruction in Spanish. The researchers found that Spanish oral language proficiency as measured by the Pre-LAS was not related to English word and pseudo-word reading, whereas phonological awareness in Spanish (and in English) was highly correlated with word and pseudo-word reading in English. A number of studies with children from other native language groups (Farsi, Cantonese, and Urdu) corroborate these findings (Gholamain & Geva, 1999;

Arab-Moghaddam & Senechal, 2001; Gottardo et al, 2001; Mumtaz & Humphreys, 2002).

### Transfer of Literacy Skills

The ability to transfer literacy skills from the native language is crucial in the learning of English. Bilingual educator Cummins (1979, 1984) developed the linguistic interdependence hypothesis in which he posited that proficiency in a second language is partially dependent on proficiency in the native language at the time of the exposure to the second language. Cummins speculated that if a student's competence in his/her native language is low, his/her competence in the second language will also be low. Cummins' hypotheses have received empirical support from a number of researchers (e.g., see Droop & Verhoeven, 2003; Proctor, August Carlo, & Snow, 2006; Verhoeven, 1994).

Likewise, special educators Sparks and Ganschow developed the linguistic coding differences hypothesis in which they speculated that both native language and second language learning depend on basic language learning mechanisms that are similar to both languages and that problems with one component of language, for example, phonology would have a negative effect on learning in both languages (Sparks, 1995; Sparks & Ganschow, 1993, 1995). Their studies have shown consistently that ELLs with significantly stronger native language skills exhibit stronger English language aptitude, proficiency and achievement. Students who struggle with phonological processing often exhibit problems in both the written (decoding, spelling, writing) and oral (listening, speaking) aspects of second language learning. Their findings have been supported by other researchers who have investigated the impact of native language skills on second

language learning (e.g., see Holm & Dodd, 1999; Humes-Bartlo, 1989; Service & Kohonen, 1995).

When ELLs enter school with limited proficiency in their native languages, they encounter even greater difficulties transferring skills to English. Although ELLs can often match native English speakers in early literacy skills, many lag behind their English-only peers in early literacy skills throughout the kindergarten year (Zill & West, 2001), and a trend of limited achievement persists during the later school years (Kindler, 2002). Some of this lag may in part be due to limited literacy skills in the native language.

Reese et al. (2000) conducted a longitudinal study of emergent literacy factors and the extent to which they predict later reading proficiency among ELLs. They followed 66 Spanish-speaking kindergarteners through seventh grade. Most of the children were enrolled in transitional bilingual programs and transitioned at varying rates, depending on their English-language proficiency, during the 8 years. In kindergarten, the children were administered measures of early literacy development in Spanish, including tests of letter identification, word reading, writing, and concepts of print. Shortly after entering school, they were also administered a test of English oral proficiency. The results show that the children who performed better on the Spanish literacy measures in kindergarten were also better at maintaining grade-level Spanish reading (as assessed by yearly tests). They were also the earliest to transition to English reading instruction and they achieved a higher level of English reading in middle school. The researchers concluded that there is an interdependence between native and second language oral language proficiencies.

### Impact of Native Language Proficiency

The research thus far has largely assumed that ELLs fall into one of three categories; limited English proficiency, proficiency in both languages, or English dominant but there is evidence that a fourth category exists of those who exhibit limited proficiency in both English and their native language. Although not a great deal of research has been conducted in this area, anecdotal evidence by teachers suggests that this fourth category is becoming more and more common in American schools. These are the students who are most at risk because they do not have the skills in their native language to transfer to English. It is often assumed that all ELLs are proficient in their native language and need only to learn English in order to be successful in school. Following this logic, those who fall behind appear to lack the motivation to improve. Levels of native language proficiency are rarely taken into account though.

Students who speak a language other than English at home are given an English language proficiency exam upon entering school. The Idea Oral Language Proficiency Test (IPT-1), Language Assessment Scales (LAS), and Woodcock Language Proficiency Battery--Revised (WLPB) are some of the most commonly used exams. They assess vocabulary, comprehension, syntax, and verbal expression in English. They yield a total score, which designates students into one of three categories; non-English speaking, limited English speaking or fluent English speaking (Schrank et al, 1996). The score itself is not analyzed so much as whether or not it falls above or below a defined criterion. Those students who score above are generally put into monolingual English classes and those who score below are put into bilingual classes and/or given ESL services.

In some districts, students are also assessed in their native language. For example, the New York City Department of Education (NYCDOE) administers the Language Arts Battery Revised (LAB-R) to students who speak a language other than English once they enter the system. Then, Spanish-speaking students who do not pass the LAB-R are given the Spanish LAB “in order to determine language dominance” (<http://schools.nyc.gov/Offices/District75/Departments/ELL/default.htm>). It is unclear what specific actions are taken as a result of the Spanish LAB or if teachers are given access to the results of this exam. Due to limited resources and training in this area, the unique needs of these students are often overlooked in the classroom. These students tend to be lumped together with other ELLs but they do not progress at the same rate as those who are more proficient in their native language. They may not yet be ready to learn content in their native language because they are not equipped with the academic language skills needed to do so.

It has been suggested that language proficiency may have two aspects that can be differentiated by context. For example, language proficiency has been defined as "the student's ability to communicate in an informal social setting as well as the ability to function in a more formal, cognitively demanding academic setting" (Hamayan, Kwiat, & Perlman, 1985). Cummins (1984) is often credited with formalizing a distinction between these two aspects of language proficiency. He described one aspect of language proficiency as basic interpersonal communication skills (BICS), or a range of communication skills developed and used in everyday social situations. He described the second aspect of language proficiency as cognitive- academic language proficiency (CALP), or a type of language facility developed through, and needed for success in,

formal classroom settings. This distinction can explain why teachers report that some language-minority students appear to be able to communicate in English but lack proficiency in language-related academic learning.

Not all oral language proficiency exams measure CALP skills though. Measures of BICS may lead educators to believe that a student possesses CALP skills when this is not necessarily the case (Schrank et al., 1996). Since these exams are used to place students in bilingual classes and/or receive ESL services, it is crucial that the results are comprehensive. A student should be able to demonstrate competency in both areas in order to be placed in a monolingual English setting. Those who do not and are placed in a bilingual setting may still require additional services depending on where they fall on the native language proficiency spectrum.

### Effective Interventions for ELLs

Students at the lower end of the native language proficiency spectrum in particular require strong interventions that utilize direct instruction and a differentiated multi-level approach so that they do not fall behind in the upper grades. Some of the programs that have been found to be effective with ELLs provide targeted support to them and their teachers. In a longitudinal study of ELLs' responses to an English instructional intervention, the researchers found that ongoing professional development (PD) for teachers and structured and systematic intervention for students during an English as a Second Language (ESL) block was effective (Tong et al., 2010). The PD sessions were conducted as biweekly workshops and focused on reviewing and practicing upcoming lessons, reflecting on and discussing student learning, assessing teachers'

pedagogical progress and instruction in ESL strategies. One hundred ninety six Spanish-speaking kindergartens, first and second graders in an urban school district were included in the study. All children were determined to be ELLs from low-income families. In the treatment condition, children were exposed to three integrated yet distinctive strands of literacy instruction; (1) daily tutorials in the Santillana Intensive English program, a research-based curriculum that teaches content areas (e.g. math, science and social studies) in English; (2) daily sessions of story retelling and higher order thinking skills based on culturally relevant literature; and (3) daily oral language practice of academic language skills. In addition, instructional intervention was provided for the lowest-performing students. This approach was effective precisely because it allowed for differentiated and multi-level instruction using materials that are relevant to the target population of ELLs from low-income families. All significant findings in this study were in favor of the intervention group and reflected a range of skills, including phonological awareness, oral proficiency, decoding skills, and comprehension (Tong et al., 2010).

Likewise, an experimental/comparison study of secondary-level, small-group instruction (Kamps et al., 2007) found that a differentiated multi-level approach was the most effective with ELLs. All schools in the study served high numbers of ELL students with varying school SES in urban and suburban communities. Experimental schools implemented a three-tier model of intervention. In addition to primary-tier reading instruction, the second-tier small-group experimental interventions included use of (a) evidence-based direct instruction reading curricula that explicitly targeted skills such as phonological/phonemic awareness, letter-sound recognition, alphabetic decoding, fluency building and comprehension skills; and (b) small groups of 3 to 6 students. Students at

comparison schools were not exposed to a three-tier reading program but received (a) an ESL intervention using balanced literacy instruction with a focus on word study, group and individual story reading, and writing activities; and (b) small groups of 6 to 15 students. The ESL/balanced literacy intervention was generally provided in addition to primary reading instruction. Results indicated generally higher gains for ELL students enrolled in direct instruction interventions. ELL students benefited from the same early literacy interventions (i.e., direct instruction) found to be successful with the English-only students. They also benefited from the additional support they received through a differentiated multi-level approach of literacy instruction. As the level of native language proficiency was not specified, it is unclear how the impact of this program varied by student.

While literacy skills are important for achievement, other factors like learning-related behaviors can be even more crucial to future success in some cases. This is true for English dominant and ELL students. In a longitudinal study, researchers investigated the associations between children's learning-related behaviors and literacy achievement among low-income children in elementary school (Stipek, Newton & Chudgar, 2010). Children's literacy and learning-related behaviors were assessed when they were in kindergarten and first grade and then again in third and fifth grades. Four items (e.g., works independently, seeks challenges, accepts responsibility for a given task, tuned in to what's going on in the classroom) from the Teacher Rating Scale of School Adjustment (TRSSA) were used as a measure of learning-related behavior. Two subtests (e.g. letter

word reading and passage comprehension) of the Woodcock-Johnson<sup>1</sup> psycho-educational battery-revised were used as a measure of literacy skills for the third and fifth graders. Learning-related behaviors in one grade predicted literacy achievement in the subsequent grade in which it was assessed, but literacy skills did not predict subsequent learning-related behaviors. This was true for all children in the sample regardless of ethnic or racial background. Despite their extreme importance, these kinds of behaviors are often not explicitly taught in schools. They can be difficult to measure and so they are not reflected in most standardized assessments.

Learning related behaviors can be difficult to measure for many reasons. They often rely on teacher observations, which are more expensive to administer and time consuming for the teacher. They are limited in their scope because it is nearly impossible to measure learning related behaviors outside of the classroom. It is important that researchers maintain clarity in their measures and avoid mixing constructs. For example, components like motivation and attention can be correlated with learning related behaviors but are conceptually different. The researchers in the study above used the TRSSA but feel that a more robust measure is needed to truly capture these behaviors.

### ELLs and Standardized Assessments

Standardized assessments may not always be the most effective measures of early literacy skills. This is especially true for the ELL population. Renee M. Casbergue (2010)

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<sup>1</sup> The Woodcock-Johnson III Tests of Cognitive Abilities (WJ-III) is one of the most widely used instruments for assessing both cognitive abilities and achievement in children and adolescents. It is commonly used in early childhood research. The theoretical foundation of the WJ III Cognitive Battery is derived from the Cattell-Horn-Carroll theory of cognitive abilities (CHC theory) a multi-level approach to the understanding of broad and narrow abilities (McGrew & Woodcock, 2001).

discusses the issues with literacy assessment in the early grades of elementary school. She points to the more common usage of standardized, skills-based assessments that focus on “constrained skills” or those that are limited to small sets of knowledge that are mastered in relatively brief periods of time. Examples of these skills are rapid naming of alphabet letters and the ability to isolate initial phonemes in spoken words. Unconstrained skills such as acquiring vocabulary and understanding the implied meaning of stories are less common in these kinds of assessments. Standardized assessments tend to be grounded in a readiness rather than a constructivist perspective of early literacy development. They do not take the context of a child’s learning into account. “[Constructivist] educators seek to learn the conditions under which a child engages in literate behavior and the details of the behavior itself. They want to find out what children understand about the connection between letters and sounds, not just which letters and sounds they know (p. 16).” Constructivist assessments are highly individualized. They provide rich information about individual students but that information is often difficult to quantify or use to make comparisons across children, classrooms, and schools.

Casbergue mentions that for children in K-3 classrooms, standardized literacy assessments are often inappropriate because of their young age. Many children may do poorly on these kinds of assessments simply because they are unfamiliar with the practice of taking such a test. These kinds of assessments also tend to focus on isolated skills taken out of context. All of these features are at odds with the constructivist approach. She favors documentary assessments, which involve observing, recording and analyzing the behaviors that children demonstrate in the context of everyday activities. These are

less commonly used though because they are more expensive and time consuming to administer (Casbergue, 2010).

The commercially developed large-scale standardized assessments that are most commonly used in American schools are produced largely for native speakers of English or those who are highly proficient in English. Very few ELLs are even included in the norming samples of the most widely used standardized assessments (Butler & Stevens, 2001). As a compromise, ELLs often receive testing accommodations such as an English or bilingual dictionary, questions read aloud in the native language, extra time, etc. A meta-analysis synthesizing the research on the effectiveness and validity of such accommodations found that only one (out of seven) – providing English dictionaries or glossaries- had a statistically significant effect on ELLs’ performance. This effect only resulted in a small reduction in the gap between the scores of ELLs and native English speakers (Kieffer et al., 2009). The researchers concluded that testing accommodations are not particularly effective for ELLs. They argue that ELLs perform poorly on standardized assessments because of their limited grasp of the academic English that is a focus of many of these tests. They require intensive instruction in academic English skills or CALPS in order to truly improve their performance on these kinds of assessments. It is quite possible that the same issues exist with native language proficiency assessments as well. Therefore, these assessments may be giving an incomplete picture of a student’s abilities in his/her native language.

### ELLs and SES

While instruction is an extremely important factor in the literacy achievement of ELLs, individual characteristics like family SES, education level, gender and age are often just as significant in predicting success in school. It has been found in a number of studies that the SES of ELLs can be highly predictive of their school achievement. For example, high-SES ELLs outperform low-SES fluent English speakers on tests of math, and they do about as well on tests of reading (Krashen & Brown, 2005). Therefore, for ELLs, SES may be able to offset the effects of language proficiency on standardized tests of math and reading. Another study (Brown, 2001) examined the impact of language proficiency on the performance of third graders on the mathematics portion of the Maryland School Performance Assessment Program (MSPAP). The data produced the expected advantage of high-SES students (those not receiving free and reduced price lunch) outperforming low-SES students and fluent English proficient (FEP) students outperforming ELLs. The unexpected results were that high-SES ELLs outperformed low-SES FEP students especially in the area of reading comprehension (Brown, 2001).

Similarly, researchers (Cobo-Lewis et al, 2002) examined the impact of bilingual education on Spanish-speaking children born in the Miami area. The findings for vocabulary showed low-SES FEP students were well ahead of the ELLs in kindergarten and Grade 2, but the groups were very similar at Grade 5. In reading comprehension, the ELLs actually did better in kindergarten and remained close to the FEP students at other grade levels (Cobo-Lewis et al, 2002). There were no reports of native language proficiency in this research. It seems that it would be useful to examine how levels of native language proficiency vary by SES as well.

Michael J. Kieffer (2008) examined the growth trajectories in English reading of language minority students who enter kindergarten with limited oral English proficiency and those who enter kindergarten proficient in oral English. He compared them to native English speakers. He used a multilevel model for change on the Early Childhood Longitudinal Study- Kindergarten (ECLS-K) data set to look at students' growth trajectories from kindergarten through fifth grade. His findings were that those who enter kindergarten proficient in English have trajectories similar to those of native English speakers but language minority students who enter kindergarten with limited English have trajectories that diverge from those of native English speakers with large differences by fifth grade. When he controlled for demographic factors like SES, Kieffer found that this reduced the effect of initial English proficiency from large to moderate and yielded differences that narrow over time. Interestingly, these differences depend on school poverty, with smaller differences evident among students in high-poverty schools (in which 75% of students receive free or reduced-price lunch) than among students in low-poverty schools (in which 25% receive free or reduced-price lunch). He did not include levels of native language proficiency in his analysis so it seems unlikely that SES is the only factor.

In another study, Kieffer (2010) reviewed the ECLS-K data to look at the literacy achievement of ELLs who succeed in learning to read in the primary grades but then go on to encounter difficulties after third grade. He found that a number of students in both groups develop difficulties during the upper elementary and middle school grades. ELLs and students from low SES backgrounds are at significantly elevated risk for late-emerging difficulties. ELLs and non-ELLs from similar SES backgrounds are at similar

risk (Kieffer, 2010). In his definition of ELL, he included students who came from homes with a primary language other than English and who performed below a publisher-created cut-score on a screening assessment of English in the fall of Kindergarten. He did not include an assessment of native language ability, leaving out a major part of the story. It is quite possible that in addition to SES, low levels of native language proficiency caused these students to fall behind in the upper grades.

Likewise, researchers used the ECLS to review the literacy achievement of three different language groups. They determined that Spanish-speaking ELLs had significantly less growth over time than native speakers of Asian languages in literacy achievement. In their analysis, SES was the most significant factor explaining the lower-achievement rates of English-proficient native Spanish speakers (Roberts, Mohammed & Vaughn, 2010). The researchers chose to include only those who were determined to be proficient in English by the Oral Language Development Scale. It would be valuable to expand upon these findings to explore how SES impacts the literacy achievement of ELLs with lower levels of native language proficiency as well.

There is an established research base concerning the intergenerational transfer of literacy (Snow and Tabors, 1996, Snow, 1993). Children with parents with higher education levels also tend to be higher achievers in literacy. This is especially true for those from higher income levels. In one study, mother's education level is used as a proxy for SES because it is seen as a factor that is "more accessible to families and school administrators as sources of potential change than broad and unmalleable reflections of SES" (Raag et al, 2011). The authors found that mother's education level has a broad impact on kindergarteners' reading readiness skills. It was also linked to the

amount of time children spent with literacy materials. Effects of mother's education level were reduced by the end of the kindergarten year indicating that literacy programming implemented by the school was successful in closing this academic gap.

There has been quite a bit written about the achievement gap in literacy between girls and boys. Boys are considered to be at a disadvantage. Girls have been found to outperform boys at every grade level and the gap widens with each year (Klecker, 2006; Below et al, 2010). One study using the Early Childhood Longitudinal Study (ECLS) found that gender differences in literacy achievement are present when children enter school and become greater by the first grade (Chatterji, 2006). The gap is even more pronounced for boys from minority backgrounds and ELLs in particular (Lundberg et al, 2012).

A great deal of research has been done on the low performance of ELLs in the areas of literacy and reading. While some of the research has begun to uncover what this means for the larger overall group of ELLs in the U.S., not enough has been done on the smaller sub-sectors of the ELL population. ELLs are not a monolithic group and it is crucial that researchers begin to examine their academic performance through the lens of their level of native language proficiency, SES and school experiences. Only then will we truly begin to understand the needs of this unique population and how they might best be addressed in American schools.

## **Research Question and Hypotheses**

Considering the low achievement of ELLs particularly in the area of literacy, the purpose of this paper is to ask “What is the impact of native language proficiency on English literacy achievement?” In asking this question, the paper’s aim is to contribute to the understanding of the factors that influence literacy achievement of ELLs. In this analysis, I use native language proficiency in kindergarten as a predictor of literacy achievement in kindergarten and third grade. I am interested in determining if there is a temporal relationship between these variables.

Based on the literature, the following hypotheses were formed:

*Hypothesis 1:*

ELLs with higher levels of native language proficiency in kindergarten are also higher achievers in English literacy in kindergarten and third grade (Royer & Carlo, 1991; Durgunoglu et al, 1993; Quiroga et al, 2002; Droop & Verhoeven, 2003; Proctor, August Carlo, & Snow, 2006; Verhoeven, 1994).

*Hypothesis 2:*

Those with the highest SES will show the strongest English literacy achievement in kindergarten and third grade (Krashen & Brown, 2005; Kieffer, 2008; Brown, 2001; Cobo-Lewis et al, 2002).

*Hypothesis 3:*

Children whose parents have higher levels of educational attainment will be more likely to exhibit stronger English literacy achievement in kindergarten and third grade (Snow and Tabors, 1996; Snow, 1993; Raag et al, 2011).

**Data and Sample**

In order to test these hypotheses, this paper analyzes data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K) conducted by Westat for the U.S. Department of Education, National Center for Education Statistics (NCES). It was designed to provide detailed information on children’s early school experiences. The study began in the fall of the 1998–99 school year. The children participating in the ECLS-K were followed longitudinally from kindergarten through the eighth grade. This analysis will use kindergarten achievement in literacy to predict achievement in third grade. Estimates in this report are based on children entering kindergarten for the first time in the fall of 1998.

A nationally representative sample of 22,782 children enrolled in 1,277 kindergarten programs during the 1998–99 school year were sampled to participate in the ECLS-K. The children attended both public and private kindergartens that offered full-day and part-day programs. The sample includes children from different racial/ethnic and socioeconomic backgrounds, and includes oversamples of Asian children, private kindergartens, and private kindergartners.

Sampling for the ECLS-K involved a dual-frame, multistage sampling design. The first stage of sampling involved the selection of 100 primary sampling units (PSU) from a national sample of PSUs. The PSUs were counties and county groups. Public and private schools were then selected within the PSUs, and children were sampled from the selected schools. Public schools were selected from the Common Core of Data, a public school frame, and private schools were selected from a private school frame developed from the Private School Survey. Approximately 23 kindergartners were selected on average in each of the sampled schools. Fall kindergarten data were obtained from

September to December 1998. Spring kindergarten data were obtained from March to June 1999 (West et al, 2000).

For this paper, I attempt to build off of the work of Michael J. Kieffer (2008, 2010) to determine how native language ability and SES influence school performance in the areas of literacy and reading for Spanish speaking ELL students. Like Kieffer, I use the nationally representative ECLS-K data set to explore these issues. Only Spanish is included as a native language because it is the largest subgroup of ELLs in the U.S. with a majority from low-income backgrounds (Krashen & Brown, 2005). Additionally, it is the only second language that is assessed in the ECLS-K. Children's literacy achievement is tracked at the following intervals: Kindergarten, and third grade to determine how their achievement changes over time. This is especially significant for ELLs since their literacy achievement tends to plateau or even decline over time (August & Shanahan, 2010; Kindler, 2002; Cobo-Lewis et al, 2002; Kieffer, 2008; Kieffer, 2010). Other factors such as SES, education level of parents, age and gender are examined as well.

The ECLS-K includes a number of different literacy assessments. For this paper, I use the academic rating scale (ARS) as a proxy for literacy achievement. It has been used in a number of other studies and has proven to be appropriate especially for analyses of children in the early grades of elementary school because it is based on teacher ratings (Duncan et al, 2007; Claessens et al, 2009; Hair et al, 2006; Xue & Meisels, 2004). Children in the early grades are often not ready to take standardized assessments on their own. It is questionable if these kinds of assessments can truly measure emerging literacy skills as they focus on subject matter that has been taken out of context of daily

classroom activities (Casbergue, 2010). Their classroom teacher is with them the entire school day and has the opportunity to see how they perform in various content areas.

## **Measures**

### *Dependent Variables*

In this analysis, the language and literacy section of the ARS serves as a proxy for literacy achievement in kindergarten (ARSK) and third grade (ARS3) and as the primary dependent variable. The ARS for both grades is separated into three areas (1) language and literacy, (2) general knowledge, and (3) mathematical thinking. For this analysis, I focus on the language and literacy component ( $\alpha = .95$ ), which includes 9 questions (see appendix). It should be noted that the three subsections are generally used together in statistical analyses but in order to examine the impact of native language proficiency on literacy achievement in ELLs, I chose to focus solely on the language and literacy component (Duncan et al, 2007; Claessens et al, 2009; Hair et al, 2006). Future work might investigate the combination of or separate examination of the other subsections.

Classroom teachers are asked to rate each of their own students' skills, knowledge, and behaviors within these three areas based on their experience with the child. Each question includes an example of the appropriate skill, knowledge or behavior. A five-point scale is used for each of the questions (1- not yet, 2- beginning, 3- in progress, 4- intermediate, 5- proficient). Teachers may also designate 'not applicable' if the skill, knowledge or behavior has not yet been introduced in the classroom setting. Teachers are asked to rate only students' current achievements or motivations and to rate them in comparison to others of the same age. For ELL students who do not yet

demonstrate skills in English but do demonstrate them in their native language, teachers are encouraged to answer the questions with the student's "native language in mind" (Westat, 1999).

### *Independent Variables*

Children who are identified as coming from a language minority background are administered a language-screening assessment, the Oral Language Development Scale (OLDS), prior to administering the direct cognitive assessments. Spanish speaking children are administered the OLDS in Spanish (SPOLDS) as well. The SPOLDS scores for kindergarten serve as the measure for level of native language ability and as my key independent variable. I also include age in months (agemo), gender, SES (WKSESQ5), mother's education level (Momed) and father's education level (Daded) in my analysis. All variables besides the SPOLDS come from the Fall and/or Spring parent interview (see appendix).

Literacy achievement for kindergarten and third grade as measured by the ARS has a minimum of 1.02 points and a maximum of 4.74 and 5 points respectively. The mean score is 2.16 for K and 3.33 for third grade. Level of Spanish language ability as measured by the OLDS assessment in Spanish has a minimum score of 0 and a maximum score of 60 for K and third grade. The mean score for K is 31.22. The mean for age is 67.73 months or 5 years, 6 months. Twenty two percent of the sample fall into that category. Gender is a dichotomous variable with 50.73% students reporting male. For SES, there are 5 categories or quintiles. The mean is 2.43 and 19.46% fall under that category. For mother's level of education, there are 3 categories; high school, some

college, BA and above. The mean is 1.03. Father's level of education has the same 3 options and the mean is .96.

According to the ECLS-K, 9.52% of Latino mothers have completed high school or less, 64.41% have completed some college and 26.08 have completed a BA or above. 12.13% of Latino fathers have completed high school or less, 67.80% have completed some college and 20.08% have a BA or above. 39.84% of Latinos are in the first SES quintile (\$30,000 and under), 21.56% fall into the second (\$30,001-\$40,000), 16.68% in the third (\$40,001-\$50,000), 13.64% in the fourth (\$50,001-\$75,000) and 8.28% in the fifth quintile (over \$75,000).

## **Methodology**

In order to examine the relationship between native language proficiency and literacy achievement of ELLs, a series of (OLS) regression analyses were conducted for each of the six independent variables: Spanish language ability in K, age in months, gender, SES, mother's education level and father's education level. OLS regression is employed for this analysis as it enables the examination of the impact of native language proficiency on literacy achievement in ELLs while holding other variables constant at their means (Wooldridge, 2009). In controlling for other variables, I am able to isolate the true relationship between level of native language proficiency and literacy achievement.

All variables have been checked for missing values and recoded when necessary (see appendix). I restrict the sample to students who took the Spanish language oral language development assessment (SPOLDSK) in kindergarten. My initial sample size was 22,782. Dropping those who did not take the SPOLDSK reduced the sample size in

this analysis to 1,372. While this represents a significant drop in sample size, it is acceptable for this paper because my main focus is level of native language proficiency. The retained sample is overwhelmingly Latino. It should be noted that although Spanish speakers are not a homogeneous group, I am unable to break them out by subgroups in this analysis. Future research should explore this further.

Table 1

The following table lists the mean or percent of total sample, standard deviation, correlation and min and max for all dependent and independent variables.

Variable	Mean (n=1372)	Standard Deviation	Correlation <sup>2</sup>	Min	Max
Literacy achievement- kindergarten	2.16	.71	.37* <sup>3</sup>	1.02	4.74
Literacy achievement- 3 <sup>rd</sup> grade	3.33	.93	.25	1.02	5
Level of Spanish language ability K	31.22	18.06	.25	0	60
Age in months	67.73	4.12	.13	58.33	79
Gender	.49	.50	-.01	0	1
<i>Male</i>	50.73%				
SES	2.43	1.47	.46*	1	5
Mother's level of education	1.03	.61	-.05	0	2
Father's level of education	.96	.62	-.13	0	2

Consistent with the literature, English literacy achievement improves slightly with age. As an initial exploration of the relationship between my variables, I ran a correlation matrix (see appendix). Child's ARS score for kindergarten (ARSK) is highly correlated with ARS score for 3<sup>rd</sup> grade (ARS3) at .423. If a child performs well in literacy in kindergarten he/she is more likely to do the same in third grade. A child's native language ability in kindergarten (SPOLDSK) is highly correlated with his/her ARS score in kindergarten (ARSK) as well at .374. This relationship is consistent with my initial hypothesis that native language ability positively impacts literacy achievement. SES

<sup>2</sup> [All correlations with SPOLDSK are shown.](#)

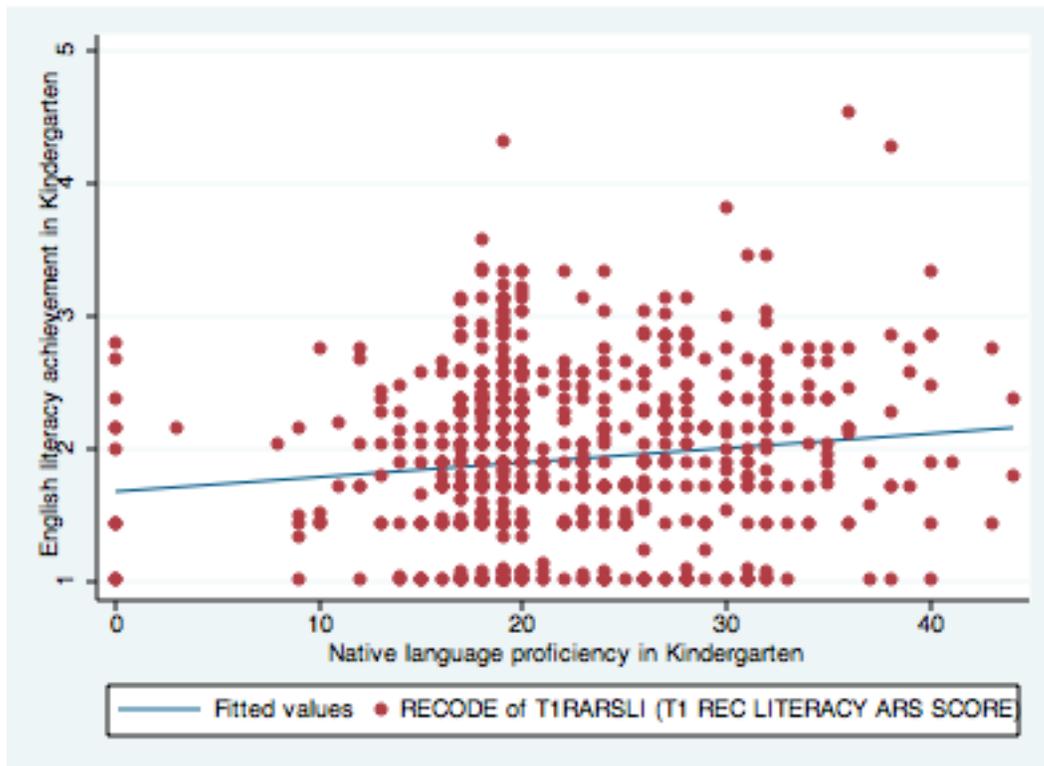
<sup>3</sup> [\\*=high correlation above .35 as seen in Appendix](#)

(WKSESQ5) is highly correlated with ARS score in kindergarten at .321. Children from higher income families tend to have higher literacy achievement. This is also consistent with my initial hypotheses. Spanish language ability in kindergarten (SPOLDSK) is highly correlated with SES (WKSESQ5) at .463 as well. Children from higher income families tend to have stronger native language abilities. A number of these findings are in line with my hypotheses but need to be explored further using OLS regression.

Due to the high correlations between ARSK and ARS3 and SPOLDSK and WKSESQ5, there could be an issue of multicollinearity. This is when there is high (but not perfect) correlation between two or more independent variables (Wooldridge, 2009). Multicollinearity results in unstable parameter estimates which make it very difficult to assess the effect of independent variables on dependent variables. This can be alleviated by dropping one of the independent variables. I chose to drop ARSK in one of my models because it is highly correlated with ARS3.

## **Findings**

I chose to use OLS a method for estimating the parameters of a multiple linear regression model in which the estimates are obtained by minimizing the sum of squared residuals because it is unbiased (Wooldridge, 2009). I aimed to account for a true relationship between literacy achievement and native language proficiency. One of the limitations of OLS is that there must be a linear relationship between the dependent and independent variables. I have established that such a relationship exists between my primary variables of literacy achievement and native language proficiency in Table 1 and in the graph below.



First I ran a model examining the relationship between the level of native language proficiency in kindergarten (SPOLDSK) and English literacy achievement in kindergarten (ARSK). I controlled for SES, mother's level of education, father's level of education, age in months and gender. In this model (table 2), I focus on the relationship as it happens in the same time frame; the kindergarten year (see appendix for regression output). All but mother's level of education are statistically significant at the .05 level. A child who scores 1 point more on the SPOLDS in kindergarten is expected to score .010 more on the ARS literacy assessment in kindergarten ( $p < .05$ ). A child who moves up one quintile on the SES scale is expected to score .074 more on the ARS literacy assessment in kindergarten. A child whose father moves up one category on the education scale is expected to score .091 less on the ARSK. This negative relationship is unexpected and

needs to be explored further in future work. A child who is born one month earlier is expected to score .027 more on the ARSK. A girl is expected to score .101 more on the ARSK than a boy. The adjusted  $R^2$  of .191 suggests that almost 19% of the variation in English literacy achievement in kindergarten is explained by this model which is fairly high. Other than the negative relationship between father's level of education and literacy achievement, these findings are all in line with my initial hypotheses. ELLs with higher levels of native language proficiency in kindergarten are also higher achievers in English literacy in kindergarten. Those with the highest SES show stronger English literacy achievement in kindergarten.

Table 2

Independent Variables	English Literacy Achievement- K	Standard Error
Level of Spanish language ability- K	.010*	.001
Age in months	.027*	.004
Gender	.101*	.032
SES	.074*	.013
Mother's level of education	-.030	.028
Father's level of education	-.091*	.028

\* Significant at the .05 level

In the second model (table 3), I explored the impact of native language proficiency on third grade English literacy achievement (see appendix). I include kindergarten English literacy achievement (ARSK) and Spanish language proficiency (SPOLDSK) as predictors of third grade literacy achievement. I also control for SES, age, gender, mother's level of education and father's level of education. Here, native language proficiency, English literacy achievement in kindergarten, SES and gender are significant

at the .05 level. A child who scores 1 point more on the SPOLDS in kindergarten is expected to score .004 more on the ARS literacy assessment in third grade. A child who scores 1 point more on the ARS in kindergarten is expected to score .48 more (or almost half a point more) on the ARS literacy assessment in third grade. This result may be impacted by a collinear relationship between these variables. A child who moves up 1 quintile on the SES scale is expected to score .044 more on the ARS3. A girl is expected to score .116 more than a boy on the ARS3. Other than the influence of ARSK on ARS3, all other results are similar to my first model. Native language proficiency is a significant predictor of literacy achievement in both K and third grades. The adjusted  $R^2$  of .193 suggests that 19% of the variation in English literacy achievement in third grade is explained by this model which is also fairly high and similar to my first model. These findings are in line with my initial hypotheses though I expected age in months and parent's level of education to be significant as well.

Table 3

Independent Variables	Gr. 3 Literacy Achievement	Standard Error
Level of Spanish language ability- K	.004*	.001
Literacy Achievement- K	.480*	.036
Age in months	.002	.006
Gender	.116*	.045
SES	.044*	.019
Mother's level of education	-.000	.039
Father's level of education	.009	.040

Due to the high correlation between literacy achievement in kindergarten (ARSK) and literacy achievement in third grade (ARS3), I dropped ARSK from my third model in

an attempt to rule out multicollinearity. As mentioned earlier, it is acceptable to drop ARSK from the model because the influence of native language proficiency on third grade literacy achievement is my focus in this analysis. In this model (table 4) level of Spanish language ability in kindergarten (SPOLDSK), SES, gender and age are significant at the .05 level (see appendix). With the strongest, but less focal, predictor removed from the model native ability's influence on 3<sup>rd</sup> grade ability becomes stronger. A child who scores 1 point more on the SPOLDS In kindergarten is expected to score .010 more on the ARS in third grade. A child who moves up 1 quintile in the SES scale is expected to score .084 more on the ARS in third grade. A girl is expected to score .164 more points on the ARS literacy assessment than a boy in third grade. A kindergarten child who is born one month earlier is expected to score .013 points more on the ARS literacy assessment when he gets to third grade. The adjusted R<sup>2</sup> of .094 suggests that 9% of the variation in English literacy achievement in third grade is explained by this model which is lower than the previous model but still fairly strong. After dropping ARSK from the original model, age proves to be statistically significant. I do not show the model here. Table 4 can be found in the appendix.

### **Discussion and Future Research**

In this paper, my initial hypotheses about the positive influence of native language proficiency on English literacy achievement are confirmed. Children who have higher levels of native language proficiency in kindergarten are also higher achievers in English literacy. This is true when the SPOLDS and the ARS literacy assessment take place during the same time period (as in the kindergarten year) and when they are temporally distinct (i.e. SPOLDS in kindergarten and ARS in third grade).

SES also proved to be a significant predictor of literacy achievement. Children from higher income families are higher achievers in English literacy. This relationship exists for both grade levels proving that SES has a long lasting effect on literacy achievement.

My original hypothesis about the impact of parental education level on English literacy achievement was not confirmed through this analysis. Father's education level was statistically significant in only one model and mother's education level did not prove to be significant in any of the models I ran. Future work might examine the relationship between home literacy practices (e.g. reading together, going to the library, how many books one owns, etc.) and English literacy achievement. The impact of speaking Spanish at home on native language proficiency and English literacy achievement would also be valuable to include in future analyses.

Gender proved to be a significant indicator in the relationship between native language ability and literacy achievement. ELL girls are far more likely than ELL boys to perform well in English literacy. This is consistent with findings related to their English-speaking peers. It might be interesting to include more demographic variables in future analyses such as if children come from female headed households, gender of the child's teacher, etc. to begin to understand more about the complexities of this issue.

Age was also significant in some cases. It seems that ELLs who enter kindergarten at a younger age are at more of a disadvantage in terms of English literacy achievement than their older peers in kindergarten. This disadvantage continues into third grade. It might be helpful to include levels of preschool attendance and other measures of school readiness in future analyses (Barnett, 2008; Piasta et al, 2012).

In this paper, I treated Latino students as a monolithic group but it would be important in future work to include a country of origin variable in the analysis. It is quite possible that children from Central or South America fare differently than those from the Spanish speaking Caribbean. It is likely that SES and parental education level would also interact with this relationship. It would be useful to include non-Latino ELLs such as Mandarin speakers or even English dominant students in future analyses as a point of comparison as well (Oshdown & Simic, 2000; Roberts, Mohammed & Vaughn, 2010).

Other factors like school quality and teacher experience would also be important to include in future analyses. There is a strong base in the literature that low income ELLs receiving high quality instruction are more likely to show stronger English literacy achievement (August & Shanahan, 2010; Coleman & Goldberg, 2010).

In this paper I examined composite scores on the SPOLDS native language proficiency assessment but in future work it would be helpful to break the scores out so that one could explore varying levels of proficiency. Initial explorations suggest that most students score a little above average at 40 points on the SPOLDS in kindergarten. The mean is 31.22. It would be interesting to examine how students at the lower end of the spectrum score on English literacy assessments and how this relationship is influenced by SES, gender, age, etc.

One of the limitations of this analysis is the relatively small sample size. For this paper, it is acceptable because I chose to focus solely on the influence of native language proficiency in kindergarten on English literacy achievement in kindergarten and third grade. Future analyses would be improved by a larger sample size of students.

I chose to use the Academic Rating Scale (ARS) as a proxy for English literacy achievement in this paper. A number of researchers have found that the ARS is valuable as an assessment in the early grades because it is based on teacher ratings but teacher ratings can also pose potential problems. Classroom teachers have varying levels of training in second language instruction. The inherent subjectivity of teacher ratings could negatively impact ELLs' scores on these assessments. Future analyses might benefit by incorporating other types of literacy assessments as well.

This research suggests that native language proficiency does in fact influence English literacy achievement in the early grades of elementary school. SES is a significant factor in this relationship. There are numerous policy implications for bilingual education. If children with stronger native language skills perform better in English literacy, then these skills must be supported starting at an early age. High quality instruction in the native language alongside English would benefit ELLs immensely. This support should continue into the later grades in an attempt to stave off the plateauing effect that begins to take effect in the upper grades. ELLs are often rushed out of bilingual programs and into monolingual programs with little thought of what they might need to make a smooth transition. This research suggests that ELLs are in need of targeted support in their native language as well as in English literacy throughout their years in school and that low income male ELLs are most in need of these kinds of programs.

## Appendix

### Academic Rating Scale

The Academic Rating Scale is separated into three areas: (1) Language and Literacy, (2) General Knowledge, and (3) Mathematical Thinking. You are asked to rate the child's skills, knowledge, and behaviors within each of these three areas based on your experience with this child. This is NOT a test and should not be administered directly to the child. Each question includes examples that are meant to help you think of the range of situations in which the child may demonstrate similar skills and behaviors. **The examples do not exhaust all the ways that a child may demonstrate what he/she knows or can do.**

The following **five-point scale** is used for each of the questions. It reflects the degree to which a child has acquired and/or chooses to demonstrate the targeted skills, knowledge, and behaviors.

- 1 = Not yet → Child has not yet demonstrated skill, knowledge, or behavior.
- 2 = Beginning → Child is just beginning to demonstrate skill, knowledge, or behavior but does so very inconsistently.
- 3 = In progress → Child demonstrates skill, knowledge, or behavior with some regularity but varies in level of competence.
- 4 = Intermediate → Child demonstrates skill, knowledge, or behavior with increasing regularity and average competence but is not completely proficient.
- 5 = Proficient → Child demonstrates skill, knowledge, or behavior competently and consistently.
- N/A = Not Applicable → Skill, knowledge, or behavior has not been introduced in classroom setting.

Rate only the child's **current** achievement or motivation. Rate each child compared to other children of the same age level. Please use the full range of ratings. If the skill, knowledge, or behavior has been introduced in the classroom, please rate the child using the numbers **1-5**. Circle "**NA**" only if the skill, knowledge, or behavior has not been introduced in your classroom setting.

**Children with Limited English Proficiency:** Please answer the questions based on your knowledge of this child's skills. If the child does not yet demonstrate skills in English but does demonstrate them in his/her native language, please answer the questions with the child's native language in mind.

**Children with Special Needs:** It may be necessary to consider adaptations for some questions to make them more inclusive for this child's skills and/or use of adaptive equipment. Some children may utilize alternative forms of verbal communication (e.g., sign language, communication boards) or written communication (e.g., word processors, Braille, dictation). Please answer the questions with these adaptations in mind.

SECTION I: LANGUAGE AND LITERACY

THIS CHILD ...	CIRCLE ONE FOR EACH ITEM					
	Not Yet	Beginning	In Progress	Intermediate	Proficient	Not Applicable
1. <b>Uses complex sentence structures</b> – for example, says "If she had brought her umbrella, she wouldn't have gotten wet," or "Yesterday it was raining cats and dogs," or "Why can't we go on the field trip at the same time as the first grade?" .....	1	2	3	4	5	N/A
2. <b>Understands and interprets a story or other text read to him/her</b> – for example, retelling a story just read to the group, or telling about why a story ended as it did, or connecting part of the story to his/her own life.....	1	2	3	4	5	N/A
3. <b>Easily and quickly names all upper- and lower-case letters of the alphabet</b> .....	1	2	3	4	5	N/A
4. <b>Produces rhyming words</b> – for example, says a word that rhymes with "chip," "shop," "drink," – or "light." .....	1	2	3	4	5	N/A
5. <b>Predicts what will happen next in stories</b> by using the pictures and storyline for clues.....	1	2	3	4	5	N/A
6. <b>Reads simple books independently</b> – for example, reads books with a repetitive language pattern.....	1	2	3	4	5	N/A
7. <b>Demonstrates early writing behaviors</b> – for example, by using initial consonants to spell words ("d" for the word "dog"), or using letter names to represent sounds ("r" for the word "are"), or phonetic spelling ("hrt" for the word "heart"), to convey words and ideas .....	1	2	3	4	5	N/A
8. <b>Demonstrates an understanding of some of the conventions of print</b> – for example, by using both upper and lower case letters when writing, or putting spaces between words, or using a period at the end of a sentence.....	1	2	3	4	5	N/A
9. <b>Uses the computer for a variety of purposes</b> – for example, by drawing a picture, or counting objects, or typing numbers, letters, or words.....	1	2	3	4	5	N/A

### Question wordings

The question referring to age in months is: I have recorded that {CHILD} was born on {DATE OF BIRTH}. Is that correct?/What is {CHILD}'s date of birth?

The question referring to gender is: I have {CHILD} recorded as {male/female}. Is that correct?

The question referring to SES is: I have some questions about your income. What was the total income of all persons in your household over the past year, including salaries or other earnings, interest, retirement, and so on for all household members? There are 7 possible responses.

The question referring to mother's and father's education level is: Now I have a few questions about education and job training. What {is/was} the highest grade or year of school that {you/{CHILD}'s {biological/adoptive} {mother/father}} {have/has/had} completed? There are 24 possible responses.

### Data Manipulation & Missing Analysis

All variables have been checked for missing values and recoded when necessary. GENDER was renamed "gender" and recoded so that male is 0 and female 1. The 13 cases of "not ascertained" were dropped. R1\_KAGE was renamed agemo and the 682 cases of "not ascertained" were dropped from the sample. C1SSCTOT or Spanish total OLDS score for kindergarten was renamed SPOLDSK and the 4 cases of "not ascertained" and the 18,085 cases of "not applicable" were dropped from the sample. T1ARSLI or literacy ARS score for kindergarten was renamed ARSK and the 1,039 cases of "not ascertained" were dropped from the sample. T4ARSLIT or literacy ARS

score for third grade was renamed ARS3 and the 48 cases of “not ascertained” were dropped from the sample. WKMOMED or mother’s education level was renamed Momed and the 1 case of “not ascertained” and the 330 cases of “not applicable” were dropped from the sample. The 9 categories were compressed into three; high school or less (0), some college (1), and BA or higher (3). WKDADED or father’s education level was renamed Daded and the 12 cases of “not ascertained” and the 4051 cases of “not applicable” were dropped from the sample. The 9 categories were compressed into three; high school or less (0), some college (1), and BA or higher (3). There were no missing values for WKSESQ5 and so the variable was used as is to represent SES.

### Correlation Matrix

```
. corr ARSK SPOLDSK ARS3 WKSESQ5 Momed Daded agemo gender
(obs=1372)
```

	ARSK	SPOLDSK	ARS3	WKSESQ5	Momed	Daded	agemo	gender
ARSK	1.0000							
SPOLDSK	0.3743	1.0000						
ARS3	0.4231	0.2540	1.0000					
WKSESQ5	0.3211	0.4630	0.2248	1.0000				
Momed	-0.0779	-0.0482	-0.0407	-0.1841	1.0000			
Daded	-0.1848	-0.1334	-0.0958	-0.3481	0.2936	1.0000		
agemo	0.1687	0.1247	0.0767	-0.0013	0.0324	0.0044	1.0000	
gender	0.0554	-0.0078	0.0827	0.0147	0.0425	0.0095	-0.0551	1.0000

### Regression Tables

```
. reg ARSK SPOLDSK WKSESQ5 Momed Daded agemo gender
```

Source	SS	df	MS	Number of obs = 1645		
Model	162.16975	6	27.0282917	F( 6, 1638) =	65.48	
Residual	676.089167	1638	.412752849	Prob > F =	0.0000	
Total	838.258917	1644	.509889852	R-squared =	0.1935	
				Adj R-squared =	0.1905	
				Root MSE =	.64246	

ARSK	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
SPOLDSK	.0103967	.0009969	10.43	0.000	.0084413	.012352
WKSESQ5	.0740112	.0129332	5.72	0.000	.0486438	.0993786
Momed	-.0300753	.0278021	-1.08	0.280	-.0846067	.0244562
Daded	-.091228	.028448	-3.21	0.001	-.1470263	-.0354298
agemo	.0270129	.0038399	7.03	0.000	.0194813	.0345444
gender	.10098	.0317345	3.18	0.001	.0387355	.1632245
_cons	-.1210599	.2628958	-0.46	0.645	-.6367073	.3945875

```
. reg ARS3 SPOLDSK ARSK WKSESQ5 Momed Daded agemo gender
```

Source	SS	df	MS	Number of obs = 1372		
Model	234.192411	7	33.4560587	F( 7, 1364)	=	47.79
Residual	954.845212	1364	.700033146	Prob > F	=	0.0000
Total	1189.03762	1371	.867277624	R-squared	=	0.1970
				Adj R-squared	=	0.1928
				Root MSE	=	.83668

ARS3	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
SPOLDSK	.0044179	.0014765	2.99	0.003	.0015215	.0073143
ARSK	.4804684	.0356397	13.48	0.000	.4105539	.550383
WKSESQ5	.0438993	.0187169	2.35	0.019	.0071821	.0806164
Momed	-.000403	.0390099	-0.01	0.992	-.0769289	.0761228
Daded	.0098902	.0401868	0.25	0.806	-.0689444	.0887248
agemo	.0017826	.0056199	0.32	0.751	-.0092419	.0128071
gender	.116372	.0454261	2.56	0.011	.0272595	.2054846
_cons	1.856671	.3815901	4.87	0.000	1.108104	2.605238

```
. reg ARS3 SPOLDSK WKSESQ5 Momed Daded agemo gender
```

Source	SS	df	MS	Number of obs = 1469		
Model	124.113287	6	20.6855478	F( 6, 1462)	=	26.39
Residual	1146.17539	1462	.783977692	Prob > F	=	0.0000
Total	1270.28867	1468	.865319259	R-squared	=	0.0977
				Adj R-squared	=	0.0940
				Root MSE	=	.88543

ARS3	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
SPOLDSK	.0096793	.0014447	6.70	0.000	.0068453	.0125133
WKSESQ5	.0844183	.0190014	4.44	0.000	.0471454	.1216913
Momed	-.0148611	.0401512	-0.37	0.711	-.0936213	.0638991
Daded	-.0519278	.0411864	-1.26	0.208	-.1327186	.028863
agemo	.0127281	.0056457	2.25	0.024	.0016535	.0238027
gender	.1641272	.0463336	3.54	0.000	.0732398	.2550146
_cons	1.939728	.3880428	5.00	0.000	1.178548	2.700908

Findings

Table 4

Independent Variables	Gr. 3 Literacy Achievement	Standard Error
Level of Spanish language ability- K	.010*	.001
Age in months	.013*	.006
Gender	.164*	.046
SES	.084*	.019
Mother's level of education	-.015	.040
Father's level of education	-.052	.041

\*significant at the .05 level

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