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# Does English Language Learner (ELL) Identification Predict College Remediation Designation? A Comparison by Race and Ethnicity, and ELL Waiver Status

*Stella M. Flores and Timothy A. Drake*

## INTRODUCTION

English language learners (ELLs) are one of the fastest growing student populations in the United States. The number of students in K-12 classified

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as ELL increased by 51.0% from 1998 to 2008, compared with a 7.2% increase in the total number of K-12 students during the same period (National Clearinghouse for English Language Acquisition, 2011). Key legislative and legal decisions (e.g., 1968 Bilingual Education Act, *Lau v. Nichols*, 1974, and Title III of No Child Left Behind) have increased educational access and services for ELLs at the K-12 level with the implied notion that this legislation would provide upward mobility toward outcomes such as graduation from high school and enrollment in postsecondary education (Moran, 1998). Having access to higher education not only represents the chance for ELLs to have economic and social mobility, but it also significantly benefits society as a whole (Gándara & Contreras, 2009). As a result, policymakers and educators have a strong incentive to focus on ELLs' access to postsecondary education (Contreras, 2011).

Although research on ELL students in the K-12 setting has increased substantially in the past decade, scholarly work documenting ELL experiences in higher education is relatively limited with a few exceptions (Bunch, 2008; Kanno & Cromley, 2012; Nuñez & Sparks, 2012). Part of the reason for this lack lies in the fact that data on ELLs's postsecondary educational experiences often confound international students (i.e., foreign-born students who intend to return to their country of origin) with ELLs (i.e., those who have attended U.S. K-12 schools and intend to remain here; Teranishi, Suárez-Orozco, & Suárez-Orozco, 2011). Furthermore, while the literature on immigrant students in higher education is growing, language issues are often just a part of the discussion rather than the main focus. Issues of generational status and citizenship are more frequently the primary focal points in the immigrant student story (Hagy & Staniec, 2002; Portes, Fernández-Kelley, & Haller, 2009). Finally, a disproportionate number of ELLs do not participate in higher education (Kanno & Cromley, 2012; Nuñez & Sparks, 2012), and those who do often enroll in two-year community colleges. A study by the National Center for Education Statistics estimates that nearly one-quarter of the nation's degree-seeking community college students come from an immigrant background (Horn, Nevill, & Griffith, 2006). Despite this demographic picture, community colleges remain an understudied area in higher education research, particularly in terms of how they specifically serve and respond to the needs of ELLs (Bunch & Endris, 2012).

The pathway to college for ELL students is not unlike that of many other underrepresented students, but research documenting their transition to college is generally limited to a small but growing body of literature that addresses ELL and other language minority students' period of transition to postsecondary education (Bunch, Wiley, Lee, & Rumberger, 2009; Callahan & Shifrer, 2012; Callahan, Wilkinson, & Muller, 2010; Kanno & Harklau, 2012; Rolstad, Mahoney, & Glass, 2005). Such works have analyzed courses

taken in high school and the type of postsecondary institutions attended by ELL students (e.g., two-year versus four-year). A key factor in the transition from high school to college for underrepresented students, particularly those who attend a community college, is the role of developmental education, also known as remediation. Little evidence exists on the detailed developmental coursework that ELLs who are entering college need. The aim of this analysis, therefore, is to contribute to the literature on the developmental education outcomes of ELL students.

Designed to help underprepared students strengthen the skills they need to do college-level coursework, developmental education is a multibillion-dollar investment that thus far has produced only mixed results (Bailey, Jeong, & Cho, 2010). There also is disagreement about what to call this type of education. Bailey, Jeong, and Cho (2010) note that practitioners often use the term “developmental education” to refer to the wide array of services available to students who are inadequately prepared to do college-level work, while the term “remediation” refers specifically to the coursework assigned to students who lack college-level skills.

For the purposes of this analysis, we follow Bailey, Jeong, and Cho (2010) and use the terms interchangeably, although some states, such as Texas, use “developmental education” exclusively, despite the interchangeable designation used nationally and by external analyses of that state’s developmental programs (Martorell & McFarlin, 2011). In any case, the policy debate surrounds remediation concerns—whether it should exist at all, given the level of monetary investment in programs that often are not considered effective (Martorell & McFarlin, 2011). Proponents argue that remediation is an essential part of expanding college access for traditionally underrepresented groups and an important component of serving communities’ workforce and economic needs (Parker, Bustillos, & Behringer, 2010). Critics argue that the costs of remediation, including those to the student, institution, and taxpayer, outweigh the benefits (Breneman & Haarlow, 1998; Saxon & Boylan, 2001). While this debate has led some states to cut funding for remedial education (Bettinger & Long, 2009), other states favor moving all remedial education to the community college or high-school level (Ignash, 1997).

Studying remedial education and its role in the transition between high school and college seems particularly important for ELLs and other underrepresented college students, as they are more likely than White or other non-ELL students to be designated as “lacking [the] skills necessary to perform college-level work at the degree of rigor required by the institution” (Parsad & Lewis, 2003, cited in Sparks & Malkus, 2013, p. 1). National-level data suggest that 36% of first-year college undergraduates have taken a remedial course, with variation by race, ethnicity, and location of the postsecondary institution (Ross et al., 2012). For example, White first-year students are

reported to take remedial courses at a lower rate (31%) than multiracial (33%), Asian (38%), Hispanic (43%), and Black (45%) first-year students.

In regard to immigrant status, recent work finds that Hispanic immigrants, both first- and second-generation, are more likely to indicate that they have enrolled in a remediation course than their Asian first- and second-generation immigrant counterparts (Staklis & Horn, 2012). Information on national rates of ELL-specific enrollment in remediation is not available since higher education institutions do not systematically collect information on those designated ELL. As such, there is very little quantitative research to date on the remediation entry and outcomes of students identified as ELL, which also means that little is known about the specific role language plays in the remediation story, especially in light of the important role certain racial, ethnic, and income categories seem to play.

### PURPOSE AND LOCATION OF THE STUDY

This study addresses the gap in the research literature by examining the connection between students' ELL status and their being designated as needing remediation as it relates to race, ethnicity, and income level. That is, we explore whether ELL status is strongly associated with being designated as needing remedial coursework, or whether factors such as race/ethnicity, economic status, or academic preparation play a more significant role in that designation.

ELL status, however, is not a monolithic characteristic. In fact, "ELL" is only one of many labels used for students in this population over the last 50 years. Initially referred to as "limited English speaking" children in the Bilingual Education Act of 1968, the list of terms for ELL students now includes "Total English Learners" which is a more comprehensive term that comprises both currently identified ELLs as well as former ELLs that have been reclassified as English-proficient (Hopkins, Thompson, Linqianti, Hakuta, & August, 2013; San Miguel, 2004). We use "ELL" in this analysis to refer to students who were identified as and participated in an English language program for various time frames. In addition, we use this label for consistency with other analyses on college access that use this term (Callahan, Wilkinson, & Muller, 2010).

ELL status also varies according to time spent receiving English language services, which has been shown to influence student outcomes (Flores, Batalova, & Fix, 2012; Robinson, 2011; Saunders & Marcelletti, 2013). Gándara and Rumberger (2009) document the lack of attention paid to giving ELL students adequate language instruction but also note the consequences of a student's remaining in an ineffective language program for too long. Recent work has suggested guidelines of approximately four to five years as being a

reasonable timeframe for moving students to English proficiency (Hopkins et al., 2013). To understand the impact of time spent in a program more fully, we investigate whether being designated as needing remediation differs according to time spent in an ELL program and whether any such differences apply equally to all ELL students by different race and ethnic categories.

In so doing, we build on previous work documenting the heterogeneity of ELL students in general but also of students designated as needing remediation by using our data to disaggregate the ELL label by race, ethnicity, income status, and time spent in a language program (Gándara & Rumberger, 2009; Hopkins et al., 2013; Valdés, 2001; Valdés & Figueroa, 1994). In addition, we examine remediation designation by ELL status in the core subject areas of math, reading, and writing. For example, we might expect that K-12 language services primarily designed to develop English language proficiency will influence outcomes in these subject areas differentially, with subjects specifically related to English (e.g., reading and writing) being affected more significantly than others (e.g., math).

To examine this relationship and disaggregate it by race and ethnicity, we constructed the following research questions:

1. Does the remediation designation differ for ELL college students and non-ELL students?
2. Among ELL students, does being assigned for remediation differ by factors such as time spent in an ELL program or race/ethnicity?
3. Are there differences between ELL students and non-ELL students in the type of remediation courses taken (e.g., math, reading, writing)? Do these differences vary by race/ethnicity?

To address these three questions of interest, we used a student-level administrative dataset from Texas that accounts for the pre-high school characteristics of the diverse Texas public school population. As the state with the second largest ELL P-12 enrollment, Texas offers a unique opportunity to examine these questions. Moreover, unlike many federal reports, this analysis does not rely on students to self-report that they are in a remediation course.

The college remediation path on its own is long and complex, including the process that begins with a student being designated as needing remediation, then enrolling in the required courses, and eventually completing the course of study. Previous research on Texas students who entered remediation indicates that they often did not enroll in the appropriate courses, likely due to their own error or a lack of appropriate counseling (Ochoa, 2012). Therefore, we focused our analyses on the first stage of remediation—being designated as needing the specialized course of study, based on test scores.

The location of our study—the state of Texas—is of particular importance, as the percentage of the state's student population identified as ELL rose from 6.9% in 1979 to just over 15% in 2005 (*U.S. v. Texas*, 2008). This

rate of increase is likely to continue, given projections for the state's growing Hispanic population. Texas currently has the second largest population of ELL students in the nation; it is a majority-minority state, Latinos being the largest minority; and, as of 2011, Hispanic students comprised the majority of all public school students in the state (Smith, 2013). In addition to its demographic relevance, Texas has one of the richest, most developed, and widely interconnected state administrative datasets on K-graduate school outcomes, which includes detailed information on ELL students and developmental education courses. To address our areas of interest, ELL student outcomes and their designation as needing remedial coursework accounting for high school academic preparation, the Texas database remains the most comprehensive.

Finally, Texas has particular importance, first, in terms of policy related to the developmental education debate, and second, in its movement toward using evidence-based approaches to transform this type of education into a more effective tool. Texas is one of the long-term participants in initiatives such as *Achieving the Dream*, a multiyear national initiative designed to improve outcomes for community college students, including those participating in remedial education, particularly students of color and low-income students (Bailey, Jeong, & Cho, 2010; Clancy & Collins, 2013). For these reasons, evidence-based research on developmental education and on ELL students, one of the most understudied and fastest growing populations, has the potential to make an important contribution to the "culture of evidence-based decision making" which the state's coordinating agencies and legislatures put in motion at the turn of the century (Clancy & Collins, 2013).

## LITERATURE REVIEW

The ELL student pathway to college completion is complex and varied as ELL-identified students are generally required to: (a) enter a language program in early elementary grades unless they receive a parent waiver that exempts them from participation; (b) be reviewed for English language proficiency through a state reclassification process that often varies by district as well as state regulations; (c) enter the pathway for college readiness coursework in high school to apply for and enroll in college; and (d) once enrolled in public postsecondary education, take a series of exams to evaluate whether they can begin taking credit-bearing courses for the purpose of completing a college degree at two- or four-year institutions.

Our examination of students along this long trajectory is therefore guided by research that follows students from the stage of ELL identification to the evaluation of readiness for college credit-bearing courses in postsecondary institutions. As such we build upon the works by Perna (2006), Adelman (2004), and Flores and Park (2013) that examine the influences of individual,

high school context, and curriculum factors (i.e., course signals for college readiness coursework). Our study also incorporates critical earlier stages of academic assessment for ELL students that include identification as an ELL student and outcomes related to the process of reclassification as English proficient (Robinson, 2011).

To connect the issues of ELL student achievement to the need for remedial coursework in college we begin with a summary of the average ELL student portrait. We then follow with three bodies of literature that include (a) ELL student efforts to transition to postsecondary education; (b) research examining the factors that are likely to predict remediation entry for under-represented students; and (c) an examination of the interaction between language, race, and remedial coursework.

### ***Portrait of the Average ELL Student***

ELLs are defined as P-12 students who are being served in language assistance programs, which can include English as a second language (ESL), bilingual education, and sheltered instruction, among others (U.S. Department of Education, n.d.). ELLs are predominately Latino, come from low-income backgrounds, and are concentrated in low-achieving, resource-poor schools (Fry, 2008; Klein, Bugarin, Beltranena, & McArthur, 2004). Cross-sectional data indicate that achievement levels for ELL P-12 students are among the lowest in the country. For example, data from the National Assessment of Educational Progress (NAEP) show that, of various student groups, ELLs have the highest percentage of individuals scoring below the proficient level (Fry, 2007). Furthermore, ELLs often have lower achievement levels than their non-ELL language minority peers (Callahan & Shifrer, 2012).

Exacerbating the complex outcomes of ELLs' underperformance is (a) the ELL label itself, which is, by design, temporary, as the goal is for students to be reclassified as fully proficient in English (Ragan & Lesaux, 2006); and (b) the diversity of the student population, including differences in race/ethnicity, national origin, immigrant generation status, and prior school experiences (Artiles, Rueda, Salazar, & Higareda, 2005; Flores, Batalova, & Fix, 2012).

### ***ELL Student Efforts to Transition to Postsecondary Education***

While research often focuses on the P-12 experiences of ELLs, a growing body of literature has begun to examine their postsecondary trajectories. Although often framed within a broad focus on linguistic minority (LM) students (i.e., any student who speaks a language other than English at home), the research base on LM students' postsecondary educational experiences includes work surrounding college preparation in high school, access to college, and their postsecondary attainment. Kanno and Harklau (2012), for instance, recently edited a 14-chapter volume dedicated to the preparation, access, and

persistence of LM students. Importantly, this work highlights a substantial achievement gap between LM students who received at least one course in English language instruction—those students most likely designated as ELL—and their LM peers who were not exposed to English language services in high school. This gap indicates that ELLs lack the academic preparation necessary to enter college (Callahan & Shifrer, 2012).

Nuñez and Sparks (2012) focus on the differences between LM and non-LM students who enroll in college and find that LM students tend to have lower high school GPAs than their non-LM peers, a finding that the authors attribute to lower academic preparedness. Data limitations in these analyses, however, prevent a more in-depth analysis of the role of early identification into ELL status as well as the length of time a student spends as an ELL student before the reclassification process to English-proficient status.

The transition of ELLs from high school to college offers numerous examples of the significant role English language proficiency plays in determining these students' higher education pathways. The critical factors include a decline in ELLs' educational identity from being good students to being among the "worst" (Harklau, 2000), dealing with complex institutional processes (Blumenthal, 2002; Bunch & Endris, 2012), ambiguous or variable testing procedures (Hughes & Scott-Clayton, 2010), and institutional conceptions (and misconceptions) about the nature of bilingualism, and the needs of the ELL student (Bunch & Panayotova, 2008; Shapiro, 2012). Central to this transition is the requirement many ELLs face in meeting institutionally defined English proficiency standards. Both two- and four-year institutions often rely on remedial ESL or basic writing courses to prepare ELL students who fail to meet these standards for college coursework (Kanno & Harklau, 2012).

### ***Predicting Remediation Entry***

Remedial or developmental education has long been a subject of higher education research. The number of studies is growing that explore the effectiveness of remedial education (Bettinger & Long, 2005; Boatman & Long, 2011; Calcagno & Long, 2008) and that also examine the predictors of need for remediation, including those related to minority status and poor academic preparation. For example, empirical analyses of Latino enrollment in remediation, a group that represents about 80% of ELLs (Payán & Nettles, 2008), found that 63% of all Latinos enroll in remedial coursework, compared with about half that number of Whites and Asians (Adelman, 2004). Moreover, Bahr (2010) suggests that Latinos are at a disadvantage when it comes to successfully completing remediation courses, largely due to their skill level upon entering college.

A lack of academic preparation is also a prominent feature in other remediation studies. For instance, students in both high- and low-income districts

in Ohio who did not complete the core high school academic courses were found to be twice as likely to enroll in remedial math and reading courses at college than their better prepared peers (Bettinger & Long, 2005). Additionally, Boatman and Long (2011) found that the success (or failure) of remediation depends on students' level of academic preparedness.

### ***Examining the Interaction between Language, Race, and Remediation***

Despite this attention in the literature, little is known about the role language plays in predicting the need for remediation. While it appears that minority and academically underprepared students are more likely to need remediation, we have yet to examine empirically how being a non-native speaker might predict the need for remedial coursework in college. ELLs are a particularly useful group to study for a number of reasons. First, as noted above, the majority of ELLs are poor, minority, and academically unprepared for college. ELLs also often attend two-year community colleges, which have higher rates of remedial enrollment (Attewell, Lavin, Domina, & Levey, 2006). Thus, having controlled for these factors, the ELL label will begin to capture the role language plays in predicting remedial eligibility.

Second, ELLs are hardly a homogeneous subgroup, as they represent a variety of racial/ethnic and linguistic backgrounds. Variation in the need for remediation by race/ethnicity within the ELL population is a similarly underexplored area in the quantitative literature. Recent work in other areas has found meaningful variation in ELL student achievement by national origin, generational status, and language background (Reardon & Galindo, 2009; Valdés, 2001; Valdés & Figueroa, 1994). Furthermore, ELLs often have varied levels of exposure to English language services, which also has been found to predict variation in achievement (Flores, Batalova, & Fix, 2012).

Of particular note are individuals who have been retained in ESL or other language services for a prolonged period of time, who are often among the lowest achieving of all student groups (Callahan & Shifrer, 2012). Thus, ELLs offer a unique chance to examine how race/ethnicity and language interact with K-12 language services to predict the need for remedial coursework in postsecondary education.

Finally, although designed primarily to develop English language proficiency, English language services often affect other subject areas, particularly those closely associated with English. Recent work (Scarcella, 2003) highlights the important difference between ELLs learning English and those learning academic English. More specifically, Scarcella (2003) develops a framework based on the important idea that English language courses should not only develop students' English language proficiency in reading, speaking, and listening, but also their "mastery of a writing system and its particular academic conventions" (p. iii). Moreover, in practice, K-12 English language services

often focus on developing students' English skills at the expense of learning academic content (Callahan & Shifrer, 2012). In many states, for example, the practice of removing ELLs from classrooms for sheltered language instruction has led to a loss of instruction in content areas outside of reading and writing (Gándara & Orfield, 2012). Accordingly, examining the need for remediation in subject areas outside of reading and writing would be an important contribution to the research literature, as would an examination of the meaningful differences in academic preparation by race/ethnicity and level of exposure to ELL services.

### RESEARCH CONTRIBUTION

We contribute to this literature by providing an exploratory portrait of factors that predict the need for remediation for any student ever identified as an ELL. ELL status, as we demonstrate, is not a permanent education label, and as many as 40% of those so designated transition out of ELL courses by the third grade (Mavrogordato, 2012), although some students retain this status into 12th grade (Flores, Batalova, & Fix, 2012). Our analyses enable us to assess whether either a brief time or an extended time in an ELL program contributes to the need for remediation. In addition, because of the heterogeneity of the ELL population, we examine whether designation into remedial coursework in college differs by race and ethnicity and remedial subject area.

At a broader level, we believe that exploring the connection between time spent in ELL services and postsecondary remediation offers a unique chance to examine the relationship between K-12 experiences and higher education opportunities for this under-evaluated population. Implications for this population's ability to achieve economic and social mobility—general benefits to society as a whole—will be tied to their progress in the U.S. educational system as it will also connect to their ability to enter and succeed in the workforce.

### RESEARCH DESIGN

#### *Data*

Data for this analysis were obtained from the University of Texas at Dallas Education Research Center. Data were secured through a state-mandated application process; they are confidential and to be used only on-site at approved secure facilities in one of the state's Educational Research Centers. The dataset includes student-level data collected from 1990 through 2008 and consist of administrative records from the state education agencies that oversee public K-12 schools (the Texas Education Agency) and postsecondary institutions (the Texas Higher Education Coordinating Board). We con-

structured longitudinal data files through available links across data files made through encrypted student identifiers. The data do include public charter school students but not those who attended a private K-12 institution.

We supplement this already rich dataset by including publicly available data from the National Center for Education Statistics, specifically the Common Core of Data (CCD), by matching school codes in the Education Research Center data to the Common Core to obtain relevant high school characteristics. We also include data from the Bureau of Labor Statistics to account for local employment trends, as they may play a role in a student's decision to enroll and remain enrolled in college (Lofstrom, 2007). Finally, we include data from the Texas Workforce Commission to document the impact on a student of working while in high school (Roksa, 2010). Previous work on Texas high school graduates indicates that, for Latino students, going to work is a more likely outcome than enrolling in college (Flores & Park, 2013).

A key advantage of the data is that they can be linked from K-12 sector to the state's postsecondary system and track the population of Texas students in public schools. In contrast, longitudinal datasets, such as the National Education Longitudinal Study, the Education Longitudinal Study of 2002, and the Beginning Postsecondary Student Longitudinal Study, must track students using other methods and then hope they will agree to participate in the data collection multiple times. As a result, these longitudinal surveys may suffer from significant sample attrition over time.

Finally, ELL identification in other datasets may not constitute a sufficiently large sample or may not follow the student over time and across the K-16 sector. By examining a specific cohort for an extended period of time starting in an early grade, we are also able to account for key ELL identification process details, such as the initial year in which a student was labeled as "limited English proficient" (or ELL, as defined above) and the actual number of years a student was labeled ELL across his or her educational trajectory.

Like any dataset, these data pose some limitations despite their significant advantages. For example, they include no information on parental education, parental income, or generational status. However, with the exception of North Carolina, few administrative data systems include detailed variables on parental education or immigrant status. The lack of information on parental status is likely due to data-collection efforts, and the lack of information on immigrant status is most likely due to the 1982 *Plyler v. Doe* decision, which prohibits schools from asking for citizenship information and using that information to make schooling decisions. However, given the differences in immigrant students' educational outcomes by country of origin, the disaggregation of ELL students by race and ethnicity provides a proxy snapshot of the schooling experiences of immigrant populations with the diverse origins of ELL status (Portes, Fernández-Kelly, & Haller, 2009).

In regard to other demographic data, a report from the national State Higher Education Executive Officers finds that approximately 13 states with student unit record data systems like the one available in Texas have access to an array of K-12 demographic data. However, only eight of these states have a more detailed level of data on items such as language spoken at home and qualification for free and reduced-priced lunch (Garcia & L'Orange, 2010). Texas is one of the few states with a finer degree of detail on information important for ELL students. The most viable proxy for parental income in these data is economic disadvantage status, in that it measures parental income as defined by federal standards for meeting free and reduced-price lunch requirements.

### **Sample**

Our sample includes all students who entered the first grade in 1995, graduated from high school in the spring of 2007, and entered college in the fall of 2007. As our outcome of interest is designation into college developmental coursework as per state requirements, we condition not only on high school graduation but also on college enrollment in the first fall semester after receiving a traditional high school diploma. Finally, we employ a cohort analysis approach similar to that used by Clotfelter, Ladd, and Vigdor (2009) with North Carolina state administrative data, which employs the strategy of “intact” cohorts, a designation for students who remained in their North Carolina system for the entire period of analysis. Our cohort is also intact in that it includes students who stayed in the Texas public K-12 system from first grade to college enrollment. We do not include students who failed a grade, thus increasing the selectivity of the cohort (Clotfelter, Ladd, & Vigdor, 2009). This factor has particular implications for Hispanic students, because they, as a group, are more likely to introduce new immigrants into the K-12 system at different time periods. Clotfelter, Ladd, and Vigdor’s (2009) examination of the racial and ethnic achievement gap found that the Hispanic-White gap is actually significantly smaller in an intact cohort analysis than in one that includes the constant influx of immigrants into a school system. As such, we consider our cohorts to be more advantaged than if we were to examine students from a cross-sectional perspective. While there are drawbacks relating to sample size and representativeness of the cohort by only keeping intact or “on-time” graduating students, this focus allows us to better assess the consistent influence of time in a language program, our key variable of interest in this analysis.

Ultimately, an advantage of the intact-cohort analysis approach is that it sheds particular light on ELL students who are newcomers to a school district at different points in the educational pipeline and on the national datasets that provide information on the ELL student trajectory. For example, while the NAEP data provide useful cross-sectional comparisons of ELL students

and non-ELL students, these analyses include newcomer students, students who have failed a grade, and/or incoming transfer students from other states, thereby masking any progress or the potential impact of programmatic decisions that might be tracked more effectively using a more focused student cohort analysis (Clotfelter, Ladd, & Vigdor, 2009).

Finally, unique data elements in the Texas dataset allow us to evaluate a distinct and highly under-evaluated category of an additional set of ELL-identified students known as “waiver students.” These are students deemed eligible for English language instruction but whose parents are allowed to waive these courses early in their elementary school career. We include only Hispanic students in the waiver group, due to sample size constraints. That is, we do not have a sufficient number of students in other race and ethnic groups who were identified as “waiver” students in our sample. As such our findings on waiver students are relegated to the Hispanic ELL population.

### DEPENDENT VARIABLES

Before students can take credit-bearing courses in Texas public higher education institutions, they must first be assessed for college readiness in reading, math, and writing through the Texas Success Initiative (TSI) exam. Students who do not pass one or more sections of this exam are required to enroll in the appropriate developmental education course. Noting that individual institutions may have higher standards, the Texas Higher Education Coordinating Board lists minimum passing standards for each TSI-approved exam, which includes the Asset, the Compass, the Accuplacer, and the Texas Higher Education Assessment (Texas Higher Education Coordinating Board, 2013). Students may be exempt from taking the Texas Success Initiative exam if they meet the following requirements: a composite score of 23 or higher, with at least a 19 on the English test or math sections; a combined verbal and math score of 1070, with a minimum of 500 on the verbal and/or math test; and a minimum score of a 2200 on both the English and/or math sections, with at least a 3 on the writing component of the 11th-grade state-mandated exam. Among other exemptions are having served in the military and transferring from a private or independent institution with appropriate coursework.

Our outcome of interest, then, is being designated as needing remedial coursework in math, reading, writing, both separately and in any combination which we categorize as “ever in developmental education,” as measured by the Texas Success Initiative exam. As noted earlier, our analysis does not examine whether students enrolled in the appropriate developmental course, whether they finished the course, and if they were retested in that subject so they could enroll in credit-bearing courses. We focus instead on whether having particular student characteristics influenced the likelihood of being designated as needing remedial coursework in college.

### ***Subsamples***

To analyze more closely the conflicting research on the appropriate amount of time a student should spend in English language instruction courses (Gándara & Rumberger, 2009; Robinson, 2011), we examine several subsamples of ELL students by race and ethnicity and by time spent in a program to determine how these characteristics influence a student's designation as needing remedial coursework. For example, we examine how long a student was labeled ELL, from one year to seven years, by racial and ethnic group status.

Our groups of interest include students who were (a) ever identified as ELL; (b) designated ELL for one to three years, due to the state-recommended limit on time in program; (c) designated ELL for four to six years; and (d) designated ELL for seven-plus years—i.e., a long-term ELL student. Critical to our sample is the fact that all of these students are moving through the school system in a timely manner, regardless of their short- or long-term ELL identification. One aim of this subsample analysis is to clarify how a student cohort that remains in the Texas public education system continually may fare in comparison to a cross-sectional review of previously provided student outcomes.

### ***Covariates***

For the purposes of these analyses, we include relevant covariates from the Education Research Center data that have been documented as influencing the ELL student pathway to reclassification, college enrollment, and general college readiness (Adelman, 2006; Perna, 2006; Robinson, 2011). Covariates include information on individual student demographics, such as race, ethnicity, age, gender, and economic status, as constructed by the state, such as the state-defined free or reduced-price lunch program (Hanushek, Kain, & Rivkin, 2009). We also include various constructions of ELL identification (labeled as “Limited English Proficient” in the dataset), which were our main independent variables of interest, as discussed above.

In regard to academic preparation, which is directly related to the need for remedial coursework, we include variables related to college readiness, such as whether a student took an AP/IB course (Adelman, 2004, 2006; Iatarola, Conger, & Long, 2011), student's score on the state-mandated math exam (Dee & Jacob, 2006), and whether a student took trigonometry (Adelman, 2006). As the high school context is likely to play a role in a student's likelihood of enrolling in college (Nuñez & Sparks, 2011), we include relevant school-level indicators such as per-pupil expenditure, high school size, percentage of minority enrollment in a high school, whether a school is located in an urban area (Fletcher & Tienda, 2010), and the local county unemployment rate (Lofstrom, 2007). As Texas divides its geographic areas into education service centers designed to serve the large number of districts more directly

and efficiently across regional boundaries, we also included a control for region used to incorporate fixed effects (Mavrogordato, 2012).

### ANALYTIC STRATEGY

We provide both a descriptive and a logistic regression analysis to answer our research questions. As noted earlier, our treatment groups include students with one to seven years of ELL instruction by race and ethnicity. Our comparison groups include college enrollees who are (a) not ELL students; (b) non-ELL Latino students; (c) non-ELL Asian students; (d) non-ELL Black students; and (e) a waiver group (Latino students only due to sample size limitations in the logistic regression analyses) that includes students who were identified as needing language services but whose parents waived participation in these programs. We also restrict our logistic regression analyses to Latino and Asian students, also due to data limitations.

Finally, it is important to note that this is not a causal analysis. However, these analyses will contribute to designing future interventions that account for the complex nature of ELL student designation, particularly by race, ethnicity, and time in a language program.

To answer our three research questions, we examine college enrollees, model college remediation designation, and the associated factors using a series of logistic regression models, specified as follows:

$$\ln \left( \frac{P}{1 - P} \right) = \alpha + \beta x$$

Under this specification, we estimate a series of  $\beta$  coefficients where  $P$  represents  $\Pr(y=1 \mid x)$  for our outcome of interest (remediation designation),  $\alpha$  represents a constant term, and  $x$  represents a vector of covariates including an indicator for our dependent variable of interest in each model.

### RESULTS

Our results section is organized into four parts. To provide a snapshot of enrollment locations by race/ethnicity and ELL status, we first present descriptive statistics on where students are likely to enroll. We next present descriptive statistics results by remediation designation status in any subject, and then by individual subject tested—i.e., math, reading, and writing. We present remediation results first by race/ethnicity and economic status, and then by level of participation in an ELL program (number of years and waiver status) within race/ethnicity. Third, we present our logistic regression results of remediation designation and discuss the influence of race, high school context, academic characteristics, and the differences among these subgroups by race and by time spent in an ELL program.

### ***Descriptive Results***

The first factor is the locations of college enrollment. Figure 1 presents a descriptive portrait of the postgraduation choices of the Asian and Latino high school graduates in our cohort by ELL status. As documented in previous work (Hagy & Staniec, 2002), Asian students are much more likely to enroll in four-year institutions than Hispanic students, who are most likely to enroll in a community college. Of interest where Asian students are concerned is that individuals who have ever been identified as an ELL student are less likely to enroll in a four-year institution than students who were enrolled in a language program for three years (50% versus 60%).

The Latino story differs importantly in terms of the institutional sector these students are most likely to enroll in. For this group, the rate of enrollment at two-year colleges is almost identical among students who were never identified as an ELL, were ever identified as ELL, or were identified as an ELL student for three years (31%, 31%, and 32%, respectively). Rates of four-year enrollment also range between 22% and 26% for all of these groups, whereas the percentage of Asian students enrolling in four-year institutions ranges from 40% to 56%. This portrait signals that remediation for most Latino students is likely to take place at the two-year college level, while the institutional sector where Asian students designated as needing remediation are likely to enroll is less certain.

### ***Remediation Designation by Student Characteristics***

As shown in other studies of enrollment in college remediation courses (Bahr, 2010; Parsad & Lewis, 2003), we found that students designated as needing remediation varied by race/ethnicity and economic status. Table 1 Panel A describes the percentage of students in our sample, by subject and race/ethnicity, who graduated from high school “on time” but who failed the Texas Success Initiative exam. Although there is variation across subjects, with more students failing math across race/ethnicity than other subjects, the overall patterns remain the same. African American and Latino students fail the exam at a much higher rate than White and Asian students.

This pattern also holds true for students who are economically disadvantaged. (See Table 1 Panel B.) In the case of economically disadvantaged Black high school graduates, on average more than half the cohort failed at least one of the Texas Success Initiative exams, compared with only one-fourth of their White and Asian peers. Table 1 (both panels) shows that, for each measure of remediation qualification, Black students are the group most likely to have the highest rate of entering remediation.

In sum, the average rate of remediation designation increases for all students when looking specifically at economic disadvantage status (from 25% to 40%), although the increase is most dramatic for White and Asian students. Interestingly, Black and Hispanic students identified as economi-

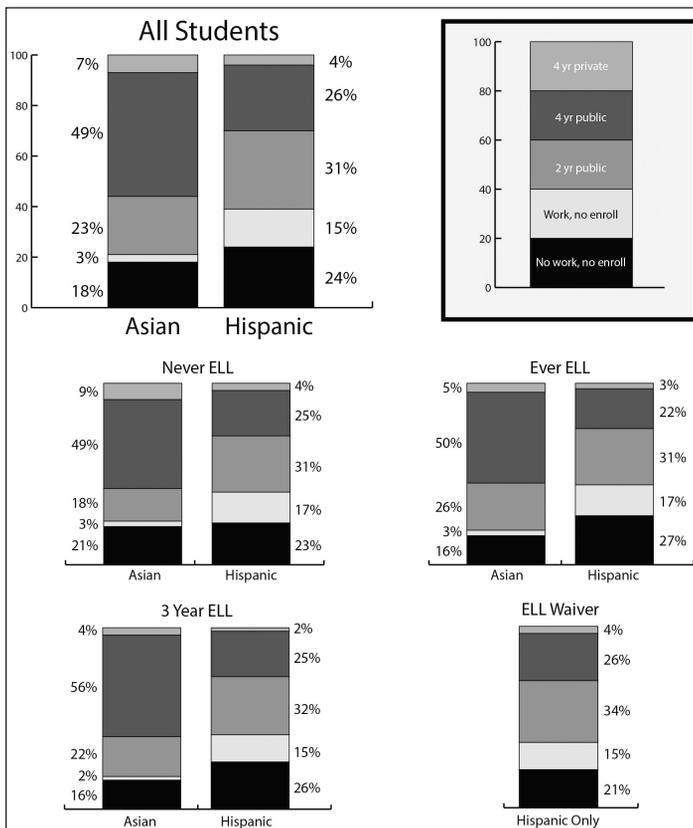


Figure 1.

cally disadvantaged are only slightly more likely to be classified as in need of remediation, suggesting that the economic status of these groups is relatively low-income, without large variation in income among each racial and ethnic group. (Compare Panel A to Panel B in Table 1.)

Table 2 presents the percentage of students who failed the Texas Success Initiative exam by subject, race/ethnicity, and time spent in an English language program. It is important to note that most students in the cohort who were formally designated ELLs were Latino (88%), whereas most of the non-ELL students were White (61%). On average, a higher percentage of ELL students were designated as in need of remediation in any subject than non-ELL students (37% versus 23%), with double the rate of failure by subject—20% versus 10% in reading and 18% versus 9% in writing, respectively. However, this trend differs markedly by race/ethnicity. Whereas White and Asian students show large ELL versus non-ELL gaps in performance, the gap

**TABLE 1**  
**REMEDIATION DESIGNATION (DE) BY RACE, ETHNICITY, AND ECONOMIC STATUS**

	Math DE			Reading DE			Writing DE			Ever D.E.			N
	Mean	S.D.		Mean	S.D.		Mean	S.D.		Mean	S.D.		
All	0.21 (0.41)		0.12 (0.32)		0.10 (0.30)		0.25 (0.43)		37,596				
White	0.13 (0.34)		0.06 (0.24)		0.05 (0.22)		0.16 (0.37)		21,997				
Hispanic	0.31 (0.46)		0.19 (0.39)		0.16 (0.37)		0.36 (0.48)		9,991				
Black	0.40 (0.49)		0.24 (0.43)		0.20 (0.40)		0.48 (0.50)		4,024				
Asian	0.13 (0.34)		0.10 (0.30)		0.09 (0.28)		0.16 (0.37)		1,494				

**Panel 1B. Remediation Designation, by Race/Ethnicity, and Economic Disadvantage**

	Math DE		Reading DE		Writing DE		Ever D.E.		N
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	
All	0.33 (0.47)	0.21 (0.41)	0.18 (0.38)	0.40 (0.49)	0.18 (0.38)	0.09 (0.29)	0.27 (0.44)	0.40 (0.49)	11,781
White	0.22 (0.41)	0.11 (0.31)	0.09 (0.29)	0.27 (0.44)	0.09 (0.29)	0.19 (0.39)	0.40 (0.49)	0.27 (0.44)	2,404
Hispanic	0.34 (0.47)	0.22 (0.41)	0.19 (0.39)	0.40 (0.49)	0.19 (0.39)	0.23 (0.42)	0.40 (0.50)	0.40 (0.49)	6,508
Black	0.43 (0.50)	0.28 (0.45)	0.23 (0.42)	0.53 (0.50)	0.23 (0.42)	0.14 (0.34)	0.26 (0.44)	0.53 (0.50)	2,396
Asian	0.20 (0.40)	0.16 (0.37)	0.14 (0.34)	0.26 (0.44)	0.14 (0.34)		0.26 (0.44)	0.26 (0.44)	451

Source: Authors' calculations using data from the Texas Education Agency and the Texas Higher Education Coordinating Board  
 Note: We use "remediation" and "developmental education" interchangeably in this analysis.

is not nearly as large for Latino students, and it is in the opposite direction with Black students. That is, the difference in the percentage of ELL versus non-ELL Latino students designated as needing remediation is not nearly as large as it is among White and Asian students. Among Black students, the ELL group is actually less likely to be in need of remediation than their peer non-ELL students, a trend documented in a previous comparison of this group of students regarding performance on K-12 state accountability exams (Flores, Batalova, & Fix, 2012).

Table 2 also shows that, on all three exams, students who were able to transition out of ELL status within three years of being identified—in other words, by grade 3—outperformed students who received any amount of ELL program exposure (i.e., were ever identified an ELL) and, in some cases, students who were never identified as ELL. This pattern holds for White, Latino, and Black ELL students. Interestingly, we find contradictory patterns in our ELL waiver group by race/ethnicity. Waiver students are less or equally likely to qualify for remediation than “ever ELL” students among White, Hispanic, and Black students, but the pattern changes within racial/ethnic groups when comparing waiver students to the ELL group who received three years of English language programs. For example, of students who received program services for three years, a lower percentage failed at least one of the Texas Success Initiative exams than waiver students. For Latinos in the sample, this pattern seems to be a little more pronounced and it occurs in each of the three tested subjects. Asian students, on the other hand, did not seem helped by participation in a language program and were apparently better off with the waiver. It should be noted that these figures are descriptive and do not account for selection bias between groups. Table 3 presents results from our logistic regression models that are designed to predict the likelihood of remediation designation by race/ethnicity and time spent in a language program, also accounting for high school preparation and contextual factors previously noted.

## LOGISTIC REGRESSION RESULTS

### *Remediation Designation by Subject Area*

We begin by presenting logistic regression results represented by our coefficients of interest—students who spent time in an ELL program compared to non-ELL students by race/ethnicity and waiver group status, accounting for key individual high school preparation and contextual variables. Table 3 shows that, among Hispanic students, students who were ever designated as ELL are more likely than non-ELL Hispanic students to need remediation in general and particularly in reading and writing. However, the data also indicate that the one- to three-year ELL group is actually significantly less

**TABLE 2**  
**REMEDIATION DESIGNATION IN COURSE TYPE**  
**BY RACE AND ELL STATUS**

	<i>All</i> <i>Students</i>	<i>White</i>	<i>Hispanic</i>	<i>Black</i>	<i>Asian</i>
	<i>Mean</i> <i>(SD)</i>	<i>Mean</i> <i>(SD)</i>	<i>Mean</i> <i>(SD)</i>	<i>Mean</i> <i>(SD)</i>	<i>Mean</i> <i>(SD)</i>
<b>Ever Designated for Developmental Education (DE)</b>					
Never ELL	0.23 (0.42) 32,969	0.16 (0.37) 21,870	0.34 (0.47) 6,347	0.48 (0.50) 3,985	0.11 (0.31) 687
Ever ELL	0.37 (0.48) 4,627	0.29 (0.46) 127	0.41 (0.49) 3,644	0.26 (0.44) 39	0.21 (0.41) 807
3 years ELL	0.32 (0.47) 1,509	0.17 (0.38) 24	0.34 (0.48) 1,238	0.09 (0.30) 11	0.20 (0.40) 236
ELL waiver	0.36 (0.48) 1,025	0.24 (0.44) 33	0.41 (0.49) 789	0.36 (0.50) 14	0.18 (0.38) 187
<b>Designated for Math DE</b>					
Never ELL	0.19 (0.40) 32,969	0.13 (0.34) 21,870	0.29 (0.45) 6,347	0.40 (0.49) 3,985	0.09 (0.29) 687
Ever ELL	0.30 (0.46) 4,627	0.24 (0.43) 127	0.34 (0.47) 3,644	0.26 (0.44) 39	0.17 (0.37) 807
3 years ELL	0.26 (0.44) 1,509	0.13 (0.34) 24	0.28 (0.45) 1,238	0.09 (0.30) 11	0.17 (0.38) 236
ELL waiver	0.30 (0.46) 1,025	0.18 (0.39) 33	0.34 (0.48) 789	0.36 (0.50) 14	0.14 (0.35) 187
<b>Designated for Reading DE</b>					
Never ELL	0.10 (0.31) 32,969	0.06 (0.24) 21,870	0.18 (0.38) 6,347	0.24 (0.43) 3,985	0.06 (0.24) 687
Ever ELL	0.20 (0.40) 4,627	0.15 (0.36) 127	0.22 (0.41) 3,644	0.08 (0.27) 39	0.13 (0.34) 807
3 years ELL	0.17 (0.38) 1,509	0.08 (0.28) 24	0.18 (0.39) 1,238	0.00 (0.00) 11	0.13 (0.34) 236
	0.20	0.15	0.23	0.07	0.08

Table 1, cont.

	<i>All Students</i>	<i>White</i>	<i>Hispanic</i>	<i>Black</i>	<i>Asian</i>
	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>
ELL waiver	(0.40) 1,025	(0.36) 33	(0.42) 789	(0.27) 14	(0.27) 187
<b>Designated for Writing DE</b>					
Never ELL	0.09 (0.28) 32,969	0.05 (0.22) 21,870	0.15 (0.35) 6,347	0.20 (0.40) 3,985	0.06 (0.23) 687
Ever ELL	0.18 (0.38) 4,627	0.16 (0.37) 127	0.20 (0.40) 3,644	0.03 (0.16) 39	0.11 (0.32) 807
3 years ELL	0.15 (0.36) 1,509	0.04 (0.20) 24	0.16 (0.37) 1,238	0.00 (0.00) 11	0.14 (0.34) 236
ELL waiver	0.16 (0.37) 1,025	0.09 (0.29) 33	0.18 (0.38) 789	0.07 (0.27) 14	0.09 (0.28) 187

Source: Authors' calculations using data from the Texas Education Agency and the Texas Higher Education Coordinating Board

Note: We use "remediation" and "developmental education" (DE) interchangeably in this analysis.

likely to be designated as needing remediation in math than non-ELL Hispanics and that there is no significant difference between them in the other subjects. The four- to six-year ELL group, however, as well as the seven-plus year group, is more likely to need remediation than their non-ELL Hispanic student counterparts. The data suggest that, among Hispanics, students with some exposure to ELL programming exhibit higher levels of academic preparation in these subjects over their non-ELL peers in terms of being designated as needing remediation.

However, Asian ELL students in each category of ELL participation are more likely than their non-ELL counterparts to be designated as needing remediation. Reading seems to be the subject for which Asian ELL students across all categories exhibit the greatest need for remediation—i.e., more than math and writing. Unlike their Hispanic counterparts, no Asian ELL student group exhibits a lower likelihood of remediation designation than their non-ELL Asian student counterparts.

The ELL waiver group, which for data reasons is composed only of Hispanic students, also has a nuanced and unexpected story. There is not a significant difference between ELL waiver students and students who have

**TABLE 3**  
**LOGISTIC RESULTS FOR REMEDIATION DESIGNATION**  
**BY COURSE, RACE AND WAIVER STATUS**

	<i>Ever DE</i> <i>b/se</i>	<i>Math DE</i> <i>b/se</i>	<i>Reading DE</i> <i>b/se</i>	<i>Writing DE</i> <i>b/se</i>
<b>Hispanic</b>				
Ever ELL	0.133** [0.04]	0.004 [0.04]	0.160*** [0.05]	0.229*** [0.05]
ELL: 1–3 yrs.	-0.032 [0.05]	-0.111* [0.06]	-0.105 [0.06]	0.014 [0.07]
ELL: 4–6 yrs.	0.190*** [0.05]	0.033 [0.06]	0.251*** [0.06]	0.308*** [0.07]
ELL: 7+ yrs.	0.722*** [0.12]	0.212 [0.11]	0.937*** [0.11]	0.906*** [0.11]
<b>Asian</b>				
Ever ELL	0.420** [0.15]	0.265 [0.16]	0.430* [0.18]	0.283 [0.20]
ELL: 1–3 yrs.	0.372* [0.16]	0.242 [0.18]	0.332 [0.20]	0.309 [0.22]
ELL: 4–6 yrs.	0.508** [0.19]	0.205 [0.21]	0.550** [0.21]	0.228 [0.25]
ELL: 7+ yrs.	1.298** [0.40]	1.050** [0.38]	1.579** [0.49]	1.176* [0.55]
<b>ELL Waiver (Hispanics Only)</b>				
Ever ELL	-0.127 [0.07]	-0.058 [0.08]	-0.088 [0.08]	-0.280** [0.09]
ELL: 1–3 yrs.	0.048 [0.10]	0.169 [0.11]	0.042 [0.12]	-0.038 [0.14]
ELL: 4–6 yrs.	-0.302** [0.11]	-0.201 [0.12]	-0.184 [0.13]	-0.510** [0.17]
ELL: 7+ yrs.	-0.236 [0.28]	-0.457 [0.27]	-0.208 [0.24]	-0.402 [0.29]

\* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Source: Authors' calculations using data from the Texas Education Agency and the Texas Higher Education Coordinating Board

Note: We use “remediation” and “developmental education” (DE) interchangeably in this analysis.

ever been identified as ELL in terms of their likelihood of needing remediation in any subject, except for writing, where waiver students are significantly less likely to need remediation. There also are no significant differences in all subject outcomes between the waiver group and the one-to-three-year ELL group. However, significant differences do emerge with the four-to-six-year ELL group in terms of exposure to language programming, in that the waiver group is significantly less likely to need remediation, particularly in writing.

TABLE 4  
 LOGISTIC RESULTS FOR REMEDIATION DESIGNATION (DE) BY COURSE  
 BY RACE AND ETHNICITY WITH CONTRIBUTION OF PRECOLLEGE CHARACTERISTICS

	Any Remediation/DE			Math DE			Reading DE			Writing DE		
	Hispanic	Asian	Waiver									
Ever ELL	0.133** [0.04]	0.420** [0.15]	-0.280** [0.09]	0.004 [0.04]	0.265 [0.16]	-0.058 [0.08]	0.160** [0.05]	0.430* [0.18]	-0.088 [0.08]	0.229*** [0.05]	0.283 [0.20]	-0.280** [0.09]
Age	0.231* [0.11]	0.325 [0.26]	0.267* [0.13]	0.156 [0.10]	0.332** [0.12]	0.005 [0.13]	0.338** [0.13]	0.116** [0.04]	0.348** [0.14]	0.311** [0.12]	-0.085 [0.45]	0.267* [0.13]
Male	0.129*** [0.04]	-0.001 [0.14]	0.402*** [0.07]	0.057 [0.04]	-0.149 [0.15]	0.065 [0.06]	0.078 [0.04]	-0.046 [0.16]	0.137* [0.06]	0.394*** [0.05]	0.079 [0.18]	0.402*** [0.07]
EconDis	0.112* [0.04]	0.199 [0.15]	0.366** [0.12]	0.114* [0.05]	0.054 [0.16]	0.181 [0.09]	0.213*** [0.05]	0.291 [0.17]	0.394*** [0.11]	0.193** [0.06]	0.251 [0.19]	0.366** [0.12]
AP/IB	-0.584*** [0.04]	-0.519** [0.17]	-0.678*** [0.08]	-0.492*** [0.04]	-0.189 [0.19]	-0.511*** [0.07]	-0.673*** [0.05]	-0.768*** [0.20]	-0.716*** [0.07]	-0.567*** [0.06]	-0.592* [0.24]	-0.678*** [0.08]
Math	-0.123*** [0.00]	-0.067*** [0.01]	-0.049*** [0.00]	-0.123*** [0.00]	-0.073*** [0.01]	-0.119*** [0.00]	-0.061*** [0.00]	-0.018* [0.01]	-0.062*** [0.00]	-0.049*** [0.00]	-0.031*** [0.01]	-0.049*** [0.00]
Trig	-0.528*** [0.04]	-0.443** [0.16]	-0.440*** [0.08]	-0.624*** [0.04]	-0.451* [0.18]	-0.580*** [0.07]	-0.266*** [0.05]	0.011 [0.20]	-0.165* [0.07]	-0.410*** [0.06]	0.481* [0.24]	-0.440*** [0.08]
PerPupil Exp (log)	0.306 [0.22]	1.367 [1.02]	0.511 [0.44]	0.602** [0.23]	1.248 [1.21]	0.707 [0.37]	0.434 [0.26]	1.945 [1.23]	0.207 [0.41]	0.471 [0.27]	3.142* [1.55]	0.511 [0.44]
SchSize	-0.013*** [0.00]	-0.015 [0.01]	-0.015*** [0.00]	-0.008** [0.00]	-0.009 [0.01]	-0.003 [0.00]	-0.014*** [0.00]	-0.007 [0.01]	-0.013*** [0.00]	-0.012*** [0.00]	0.004 [0.01]	-0.015*** [0.00]
Pct. Minority	0.012*** [0.00]	0.015*** [0.00]	0.009*** [0.00]	0.013*** [0.00]	0.014*** [0.00]	0.009*** [0.00]	0.010*** [0.00]	0.014*** [0.00]	0.009*** [0.00]	0.010*** [0.00]	0.019*** [0.00]	0.009*** [0.00]
Urban	0.173*** [0.05]	0.346* [0.15]	0.259** [0.09]	0.148** [0.05]	0.288 [0.17]	0.323*** [0.08]	0.240*** [0.05]	0.253 [0.18]	0.446*** [0.08]	0.083 [0.06]	0.255 [0.21]	0.259** [0.09]
Worked	0.238*** [0.04]	0.529*** [0.15]	0.104 [0.07]	0.214*** [0.04]	0.515** [0.16]	0.199** [0.06]	0.200*** [0.04]	0.534** [0.18]	0.188** [0.06]	0.103* [0.05]	0.399 [0.21]	0.104 [0.07]

City unemp rate	0.061** [0.02]	-0.535 [0.28]	0.152*** [0.03]	0.043 [0.02]	-0.613* [0.28]	0.071* [0.03]	0.095*** [0.02]	-0.21 [0.39]	0.147*** [0.03]	0.132*** [0.02]	-0.643 [0.40]	0.152*** [0.03]
Regional effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-3.164 [2.71]	-13.711 [9.82]	-10.066* [4.37]	-4.616 [2.67]	-12.161 [10.61]	-2.832 [3.89]	-9.933** [3.12]	-19.567 [10.74]	-8.418* [4.19]	-10.696*** [3.09]	-23.944 [15.06]	-10.066* [4.37]
N	18139	2234	7872	18139	2216	7872	18139	2234	7872	18139	2191	7872
chi2	3047.362	279.639	790.252	2796.667	218.781	2306.203	1934.443	159.147	1000.22	1288.642	160.517	790.252

\* p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001

Source: Authors' calculations based on [correct?] Texas Education Agency and Texas Higher Education Coordinating Board  
 Note: We use "remediation" and "developmental education" (DE) interchangeably in this analysis.

### ***Precollege Characteristics and Remediation Designation***

Previous studies using these data suggest that key individual and precollege determinants for college entry include being female, enrolling in college at a traditional age, having participated in a rigorous curriculum such as AP/IB courses or trigonometry, and having a higher score than average on the state math exam. Factors that lower the likelihood of college enrollment include having attended a high school in an urban area that has a large minority population (Flores & Park, 2013).

Among our college enrollees who are and are not identified as ELL students, we tested for factors that increased their likelihood of being designated as in need of remediation. Table 4 shows that the likelihood of remediation designation for Hispanic, Asian, and waiver students is similar to the findings presented in Table 3 but with the addition of precollege characteristics for students ever identified as ELL for any period of time, as compared to students within the same racial group not identified as ELL.

The data across these multiple comparison groups suggest three key trends in the likelihood of remediation designation. First, gender appears to play a greater role for Hispanic students than for Asian students, although the effect of gender is not consistent across all subjects. In particular, Latino males and Latino males with a waiver are more likely to require remediation in writing. Another important trend is that of high school size. The data suggest that the larger the high school, the lower the likelihood of entering remediation. Not surprisingly, taking AP/IB courses, as well as trigonometry, decreases the likelihood of entering remediation in reading for all groups, except Asians, for whom this factor has no effect. Attending a high-minority high school significantly increases the likelihood of remediation designation for all students, regardless of race, as does attending a high school in an urban location. Part-time employment while in high school raises the likelihood of entering remediation for Hispanics in all subjects and for Asians to a lesser degree (no effect for writing), and is inconsistent for waiver students.

The contribution of individual and precollege factors, however, is more nuanced when disaggregating ELL status within and across racial and waiver group status. Among Hispanics, for example, gender loses its status as a key predictor for remediation designation, except for writing, as does economic disadvantage status, except for reading. In other words, neither of these factors significantly increases the likelihood of remediation designation consistently when disaggregating by time spent in an ELL program (ever identified as ELL, one-to-three years, four-to-six years, and seven+ years). Key predictors of remediation designation across all the ELL levels, however, are participating in a rigorous curriculum (decreases likelihood of remediation designation) and attending a high-minority high school (increases likelihood of remediation designation). Similar to the race and ethnic comparisons, size of high

school attended also matters, as attending a larger high school decreases the likelihood of remediation designation among ELL students as well.

The individual and precollege factors that increase the likelihood of remediation designation for Asian students are distinct from those for Hispanic students. In terms of high school curriculum, taking AP/IB courses has an inconsistent effect on this outcome for Asians, suggesting that variations in course-taking for Asians may not be as large as they are among Hispanic students. In addition, while larger school size lowers the likelihood of being designated as in need of remediation for Hispanic students, this factor generally has no effect for Asian students in designating ELL status. Factors that do play a consistently significant role in predicting remediation designation for Asian students are attending a high-minority high school and part-time employment in high school, both of which increase the likelihood of remediation designation. While course-taking plays a role in the Asian student remediation story, it appears that the two factors that play the largest role in predicting the likelihood of remediation designation for Asian ELLs are the percentage of minority students attending a school and employment while in high school.

As noted previously, there is no difference in the likelihood of remediation designation between the ELL one-to-three-year group and the waiver group, but the waiver group manifests a difference with the ELL four-to-six-year group. In general, disadvantaged economic status has an inconsistent effect across the various ELL groups, although this is likely because there is not a wide variation in income status among Hispanic ELLs, Hispanic non-ELLs, and the waiver group (which is also comprised of Hispanic students). In general, waiver students are influenced more by curriculum than by high school context, in that math scores and taking AP/IB courses and trigonometry are more likely to predict the likelihood of remediation designation for this group than for non-waiver ELL students. Interestingly, school size, percentage minority, and urban location play some role, although it is not nearly as consistent or strong as for the Hispanic group previously assessed. Access to a strong curriculum appears to be the greatest predictor of a lower likelihood of remediation designation for this group of waiver students.

## DISCUSSION

The challenge of an analysis that attempts to unite two critical yet under-evaluated issues in the college-access trajectory of underrepresented students in U.S. higher education is to document that two seemingly distinct areas of research require additional attention—particularly in the areas of more cohesive policies and programs—in a time of scarce resources. In this case, the two issues are college remediation and the achievement of English language learners in the context of higher education.

At the policy and programmatic levels, two states with similar racial and ethnic populations have recently taken drastically different approaches to college remediation. Texas has streamlined its remediation policy and made it more transparent in House Bill 1244 (Texas Higher Education Coordinating Board, 2013), while new Florida legislation no longer requires students to take the state's placement exam or enroll in any remedial courses before taking credit-bearing courses (Fain, 2013). Although these states have two of the largest ELL student populations in the nation, they are going in drastically different directions in terms of remediation. We contribute to the issue by providing a portrait not only of the ELL population but also of the racial and ethnic differences manifest by this diverse population as they deal with the critically important element of developmental/remedial education in college.

We begin our discussion with the issues of race and ethnicity, as the data consistently show that the outcomes of both language achievement and assignment to developmental education programs vary by race and ethnicity. We measure these identifiers as race, ethnicity, and time spent in an English instruction program. Academically, underpreparation for college enrollment as identified by placement into remediation affects all racial and ethnic groups, but the issue is less researched among ELL students. The research on remediation has increased substantially in terms of greater demographic representation of students, programming options, organizational capacity to serve students, and increasingly large-scale analyses of both quasi-experimental and random experiments. However, we still know very little from a quantitative perspective about how these updated findings on remediation relate to the ELL population.

In terms of racial and ethnic differences within the ELL population, we see large variation between Asians and Latinos in our student cohorts. The results generally follow current trends of college enrollment and previous analyses that have accounted for race and ethnicity, although not ELL status (Hagy & Staniec, 2002). Asian students are more likely to attend four-year institutions, while Latino students are more likely to attend two-year institutions. Naturally, this finding suggests the mostly likely location for remediation instruction for each group (in four-year versus two-year institutions).

At the core of this analysis is the question of whether entering remediation—the most likely starting point for underprepared students, who are predominantly low-income and underrepresented in higher education—differs for ELL students according to their race and ethnicity. We found a few fundamental similarities across racial and ethnic groups who had been assigned ELL status, but the key story is that the factors that predict entry into remediation can differ distinctly by race and ethnicity. These findings call for further research to decipher the differences, not only by race and ethnicity but within ELL status. Moreover, remediation designation, as the data suggest, is also likely connected to organizational issues such as the high

school's size, location, and general capacity to train for college readiness. This finding is not surprising, except perhaps for the fact that even populations likely to achieve at a high level historically (e.g., Asian students) can face different futures in postsecondary education, depending on where they attend high school.

The finding that ELL students who enroll in college are more likely to be designated as needing remediation is also perhaps not surprising, given the odds of college entry for this population (Callahan, Wilkinson, & Muller, 2010). However, we found that Latino ELL students who participate in language instruction services for one-to-three years are less likely to be designated as needing remediation than some non-ELL Latinos. This finding suggests that some ELL instruction might have contributed to students' progress, or at least that such participation in instruction is not a key indicator of who will need remedial courses.

The finding that Asian ELLs do not outperform their non-ELL Asian peers in any category of language instruction suggests a different response to language programming as it relates to remediation entry for this population. That key difference among these two groups signals the need to disaggregate Asian groups and to further analyze Asian ELL students within the larger scope of the Asian "model minority" role in education (College Board, 2008). That is, as compared to the non-ELL Asian peers, Asian ELL students still confront important barriers to college readiness and enrollment.

Nonetheless, differences across the Asian and Latino ELL and non-ELL groups are substantial enough to also call for further study of the role that immigration policy plays for these two groups in Texas. Prior research documents the advantages and disadvantages of immigrant students' pre-migration characteristics and the influence these characteristics have on subsequent generations (Feliciano, 2006; Portes, Fernández-Kelly, & Haller, 2009). This finding raises the question of whether the quality of the education system in a student's country of origin affects his or her level of success in the United States—or, in this case, in Texas's system of ELL instruction and its subsequent effects on college readiness (or lack thereof) as indicated by designation into remediation.

Looking forward, we also note how the entering first-grade cohort we measured starting in 1996 may have changed relative to the cohort that began first grade in 2010. The Latino population entering school in 1996 likely included a larger number of immigrant students, while today's Latino first-grader is more likely to be a U.S. citizen, due to decreased rates of migration and increased border enforcement since 2007, although this group clearly is still in need of English language instruction (Bean et al., 2013). Similarly the predominantly Vietnamese Asian population that migrated to Texas prior to the early 1990s now includes many students who possess second-generation immigrant status. In addition, Asians have replaced Latinos as

the fastest growing race and ethnic group since 2000 and come with much higher education credentials than in previous decades, making them the most highly educated cohort of immigrants in U.S. history (Pew Research Center, 2013). In other words, the Asian migrants entering Texas today are different not only from Latinos but also from their Asian counterparts from previous decades.

One demographic fact that is present, regardless of race and ethnicity within immigrant or ELL status is that nearly a quarter of all children in the United States are children of immigrants, and their parents' incorporation into the United States in terms of employment, schooling options, racial and ethnic integration, and citizenship status has direct implications for their children whether they were born in the United States or elsewhere (Bean et al., 2013).

### CONCLUSION

This study contributes to the growing research on the college transitions of ELL students and to the literature on remediation entry, with implications for college-completion rates. While the literature on remedial education at the postsecondary level has addressed testing, sorting, and types of courses available to ELL students upon college entry (Blumenthal, 2002), no study to date has examined the likelihood of entering college-level remediation for students who have transitioned out of ELL status in K-12 or by the time spent in a language instruction program. Moreover, our examination of remediation trajectory outcomes by race/ethnicity reveals distinctly different stories for our diverse array of ELL groups.

While our results cannot be interpreted within a causal framework, our analyses suggest distinct differences across racial and ethnic groups within the ELL category. Interestingly, some precollege characteristics that appear to contribute significantly to remediation designation among Latino students have no effect for Asian students. The one consistent factor among both groups is the negative role of segregation in a high school, measured here by the percentage of Black and Latino students in the school environment. Ultimately, for Latino students with or without an ELL waiver, access to a rigorous curriculum remains one of the most prominent factors in achieving the status of not needing remedial education.

Our results do not relate to students who enter the public K-12 system in later grades. They do, however, contribute to the growing research utilizing local and state databases that disaggregate the ELL experience in ways that include various methods of instruction, time of entry into ELL program, and even the role of teacher preparation for ELL students (Conger, 2013; Master, Loeb, Whitney, & Wyckoff, 2012; Rios-Aguilar, González Canche, & Moll, 2012). Finally, while not all states provide the same level of detailed data

as Texas, similar analyses in states such as Arizona, Florida, New York, and California will help further clarify the ELL elementary-to-college-completion trajectory in ways that will provide more guidance to K-16 educators and stakeholders. In sum, as research on ELL students expands, so will their inclusion in analyses of the most critical issues facing higher education in the United States—that of K-12 academic preparation, college success, and the ability to contribute to the economic and social good of the nation.

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