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**‘Cooling Out’ Hispanic immigrant youth: An analysis of math course
placement in middle school**

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**‘Cooling Out’ Hispanic immigrant youth: An analysis of math course
placement in middle school**

by

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Abstract

‘Cooling Out’ Hispanic immigrant youth: An analysis of math course placement in middle school

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Though immigrant youth and families may view education as a path to social mobility, immigrant youth face a variety of barriers to academic achievement. While school programs, like language learning programs, should help students overcome barriers in education, like English fluency, these programs may also dampen educational prospects for youth. Youth already at a disadvantage and recent arrivals may be at the highest risk of experiencing disparities in K-12 education. This paper aims to analyze how schools shape the K-12 educational experiences of immigrant youth based on their time of migration to the U.S. through programs like Limited English Proficiency (LEP). Using data from a predominantly Hispanic Texas school district, I find that immigrant youth who arrive after first grade have less access to advanced math courses and, as a function of their LEP designation, are overrepresented in remedial math courses.

Theoretically, the findings suggest that recently arrived immigrant youths' educational trajectories may be dampened by their LEP designation in ways that have lasting effects on their educational prospects.

Table of Contents

List of Tables	6
Introduction	7
Shaping Immigrant Youth Trajectories in the U.S.	8
Study Context	11
Literature Review	12
Academic Achievement of Immigrants in K-12 Education	12
Accounting for Academic Outcomes of Immigrant Youth by Time of Arrival	14
Role of Language Learning Programs for Immigrant Youth Education	15
Course Placement and Academic Achievement for Immigrant Youth	17
Data & Methods	19
Data	19
Sample	20
Measures	21
Analytic Approach	24
Results	25
Course Placement for Immigrant Students	30
Course Advancement for Immigrant Students	33
Discussion	34
Limitations	37
Conclusion	40
Appendix	42
References	46

List of Tables

Table 1:	Descriptive Statistics of the Sample in 2011/2012 & 2012/2013 School Years by Immigration Background.....	27
Table 2a:	Average Marginal Effects for Math Course Placement in 2011/2012 School Year.....	28
Table 2b:	Average Marginal Effects for Math Course Placement in 2012/2013 School Year.....	29
Table 3:	Average Marginal Effects for Math Course Placement in 2012/2013 school year based on Fall 2011 LEP designation.....	31
Table 4:	Percentage of Students No Change in Math Course Placement between 2011/2012 and 2012/2013 School Year.....	32

INTRODUCTION

In 2021, 26.5% of school-aged children in the U.S. and 35.2% of school-aged children in Texas were immigrants or children of immigrants (Migration Policy Institute 2021). The growing number of immigrant youth has spurred researchers and policymakers to investigate trends in immigrant youth integration into the U.S. Of particular importance are K-12 schools, which structure the lives of immigrant youth and shape their social integration and future trajectories.

Immigrant youth face unique challenges in U.S. K-12 systems stemming from language barriers, student and parent unfamiliarity with school requirements, and differing levels of support from teachers and administrators (Crosnoe and López Turley 2011). Youth who migrate later in adolescence face additional difficulties often related to learning English and navigating U.S. schools (Cortes 2006; Fry 2007; Portes and Rivas 2011).

Even with the challenges that immigrant youth face, for some youth, K-12 schooling has been a vehicle for social mobility allowing youth to achieve higher levels of education and better jobs than their parents. Some immigrant youth benefit from their newcomer status and mobilize cultural capital and their parent's expectations to their advantage (Conger, Schwartz, and Stiefel 2011; Feliciano and Lanuza 2017; Keller and Tillman 2008; Lee and Zhou 2014). These youth have higher college attendance rates, grades, and test scores than their native peers and other immigrant youth. However, immigrant groups do not all experience an advantage. Hispanic immigrant youth, especially those from Mexico and Central America (Baum and Flores 2011) and undocumented Hispanic youth (Perreira and Spees 2015) face higher drop-out risks and lower college attendance rates.

Despite having equal hopes for social advancement through education and high educational expectations, Hispanic youth have lower academic outcomes than other native-born youth and immigrants. Researchers have explored how the neighborhood contexts of Hispanic youth may explain this difference (Perreira, Harris, and Lee 2006; Pong and Hao 2007). Research has also explored how teachers' perceptions of Hispanic youth as less college-bound have created gaps in access to resources and college-preparatory courses (Ochoa 2013). Hispanic youth in English

language learning programs may face additional disadvantages in accessing resources and more stigma from teachers (Shin 2018; Thompson 2015; Umansky 2016b).

The divergent outcomes for immigrant youth call into question the mechanisms in K-12 schools that set students on different academic trajectories than their peers. In this paper, I investigate the K-12 experiences of immigrant youth in a predominately Hispanic school district in Texas. I use data from researchers at the University of Texas at Austin collected between 2010 and 2013 in three middle schools in the 6th, 7th, and 8th grades in the Cave Creek School District (CCSD). Using these data, I analyze middle school math course placement based on immigrant youth's arrival time. Developmentally, middle school captures a unique moment in youth's lives, but in terms of math course placement also a vital time for determining a student's future academic trajectory (Wang and Goldschmidt 2003). I consider how school programs, specifically English language programs, shape differences in math course placement. I theorize how schools contribute to broader differences in social inequality between immigrant and native groups through their programs.

The analysis shows that immigrant students who arrived before first grade have similar math course placement to their U.S.-born peers. However, immigrant youth who arrived after first grade, even controlling for their designation as Limited English Proficient (LEP), were placed at higher rates in resource math than their U.S.-born peers. Additionally, all LEP-designated students had less chance of course placement into pre-AP math and greater course placement into resource math across all immigrant backgrounds. There is little course mobility or change in LEP designation for students between academic years, suggesting that initial math course placement and LEP designation may have lasting effects on immigrant youth's trajectories.

Shaping Immigrant Youth Trajectories in the U.S.

Immigrant youth and their parents tend to have high educational expectations (Kao and Tienda 1995, 1998). Many immigrant families, similar to non-immigrant families, view education for their children as a path to socioeconomic advancement in the U.S. However, there is a gap

between the returns of K12 education and expectations for Hispanic immigrant youth (Britton 2019; May and Witherspoon 2019; St-Hilaire 2002). Hispanic youth perform less well than other immigrant youth and tend to have lower educational expectations. Previous studies have linked Hispanic youths' divergent outcomes to the high probability of Hispanic youth being in low-resource schools (Pong and Hao 2007), the lower socioeconomic status of their parents (Aldous 2006; Kao and Tienda 1998; May and Witherspoon 2019), and the high number of Hispanic immigrant youth with precarious legal status (Perreira and Spees 2015). In 2016, the drop-out rate for Hispanic youth born outside the U.S. was 16.1% compared to 6.5% for Hispanic youth born inside the U.S. and 5% for all youth born outside the U.S. and 9.6% for all youth born inside the U.S. (de Brey et al. 2019).

In their theory of segmented assimilation, Portes and Zhou (1993) suggest that immigrants' assimilation processes are intertwined with their socioeconomic status, race and ethnicity, and context of reception. Segmented assimilation proposes that there are multiple paths to assimilation with divergent outcomes. It shows how across generations, some immigrants will assimilate into the American middle class in line with theories of straight-line assimilation. Other immigrants will experience downward assimilation, where they assimilate into lower social and economic positions with little mobility creating a perpetual lower class (Portes and Zhou 1993; Zhou 1997). Studies have employed segmented assimilation theory to understand the limited opportunities for social advancement that Hispanic immigrant youth receive from K-12 education (Feliciano and Lanuza 2016; Glick and Hohmann-Marriott 2007; Perreira et al. 2006). However, segmented assimilation theory does not necessarily explain how school level processes may create unequal outcomes for immigrant youth.

To better understand the role of school level processes, I turn to Clark's (1960) "cooling out" theory which proposed that the function of community colleges in the "college for all" era was to "cool out" students. In the college-for-all era, Clark (1960) conceptualized that many students expected to attend college, but not all students were equally prepared. Students who desired higher education but were at risk of academic failures attended community colleges where

they would be offered limited academic opportunities with the promise of advancement. These students then received signals overtime about their academic ability in community college courses or from advisors that eventually discouraged students from advancing beyond the community college setting academically. Essentially, the theory explains that community colleges serve to "cool out" students in higher education at risk of academic failure by providing some academic opportunities with the promise of advancement but signaling students about their academic ability over time to dampen their expectations. I consider Clark's (1960) theory concerning immigrant students' experiences in middle school.

In this paper, I specifically investigate the role of math course placement for immigrant youth based on their time of arrival in the U.S. Middle school course placement, especially math course placement due to the course sequencing of math classes, is influential in determining student access to college preparatory and advanced courses at the high school level and thus indicative of student chances of attending college (Wang and Goldschmidt 2003). English language programs are central to course placement of immigrant youth. Immigrant students typically have less access to advanced courses and college-preparatory coursework if enrolled in English language learning programs (Callahan 2005; Suárez-Orozco et al. 2010). Even at the middle school level, immigrant students in English language programs may be restricted to lower-level classes (Umansky 2016a). English language programs in K-12 are meant to help language learners gain skills for future advancement. Research shows that English language programs can be detrimental to student academic progress, though, with students carrying a lasting stigma associated with their language learning status (Shin 2018; Thompson 2015; Umansky 2016b). Furthermore, I analyze the lasting impact of Limited English Proficient (LEP) designation on student courses over multiple years.

I theoretically suggest that English language learning programs, or LEP programs, may unintentionally be serving the role of "cooling out" immigrant students in K-12 spaces. If immigrant youth enter K-12 with high educational expectations but are consistently blocked from access to high-level and college preparatory courses and material, students may receive this as a

signal that their academic abilities are not suited to advanced classes or, by extension college attendance. In this way, LEP designation may dampen student educational trajectories. The immigrant youth most at risk of receiving these signals through spending considerable time in English language programs are typically youth who migrated later in their adolescence. However, the effect may not be limited to more recent immigrants. Research has shown that many English language programs struggle to accurately assess student language ability, often haphazardly moving students in and out of language learning programs (Suárez-Orozco, Suárez-Orozco, and Todorova 2008). There is also significant racial and ethnic bias, to the disadvantage of Hispanic youth, in the teacher assessment of language ability (Umansky, Callahan, and Lee 2020). The "cooling out" of English language learner youth of Hispanic immigrant backgrounds by signaling their lesser academic ability in language learning programs may account for some disparities in their educational achievement later in their academic careers.

Study context

I analyze the role of middle school immigrant youth's time of arrival and LEP designation on their math course placement in the Cave Creek School District (CCSD). The CCSD is in central Texas near a major metropolitan area. There are three middle schools in CCSD and one high school. Researchers at the University of Texas collected data for this analysis in CCSD between 2010 and 2013. In 2013, the final year of data collection, 82% of students enrolled in CCSD were Hispanic, 10% were Black, and 6% were White. In that same school year, 51% of students in Texas were Hispanic. Though the district has no administrative count of the number of immigrant students, CCSD is in a community with a long history of receiving immigrants. Indeed, Texas has traditionally been an immigrant destination and one of the top six states with the largest population of immigrant children (Capps et al., 2005). In 2012, 34% of students in the CCSD were designated as English language learners, compared to 17% of all students enrolled in Texas. Despite being near a metropolitan area with a rapidly growing economy and major universities, the families in CCSD have not historically had equal access to the education and job opportunities of the region.

In 2012-2013, CCSD identified 88% of students as economically disadvantaged compared to 61% of Texas students in the same year.

The study context is relevant for considering immigrant youths' college trajectories and educational experiences. Immigrant youth are a vital demographic of Texas's future workforce. Legislatively, Texas recognized the importance of immigrant youth and expanded their ability to access higher education when Texas became one of the few states in the U.S. to provide in-state financial aid to undocumented immigrants (Flores 2010). The context matters for the programs provided in K-12 schools too. Studies have found that in traditional immigrant destinations, educators can address English language learners and immigrant needs better based on their ties to the community and institutional knowledge of working with these students, though some recent work has debated the effectiveness of new and traditional immigrant destinations for addressing the needs of newcomer immigrant youth (Ackert 2017; Dondero and Muller 2012; Perreira et al. 2010). The financial and educational capital networks available to immigrant students in traditional destinations may also help them overcome barriers from their status or background (Schmalzbauer and Rodriguez 2023).

LITERATURE REVIEW

Academic Achievement of Immigrants in K-12 Education

Immigrant youth face a variety of challenges in U.S. schools. Youth struggle to learn English and school norms, and depending on their previous education, they may be adjusting to unfamiliar classrooms or catching up on course material. Despite potential roadblocks, research has found that immigrant students broadly have higher rates of academic achievement, in terms of graduation rate, test scores, and college attendance, than their non-immigrant peers (Barnett, Sonnert, and Sadler 2012; Crosnoe and López Turley 2011; Feliciano 2005; Kihara 2021). The origins of the achievement seem to begin early in the educational experiences of youth and are visible in their test scores (Kihara 2021) and extend into their achievement in higher education classrooms (Barnett et al. 2012). A growing body of academic research suggests a myriad of social

factors influencing differences in academic outcomes for immigrant youth, especially as it intersects with racial and ethnic inequality (Feliciano 2005; Heard 2007; Perreira et al. 2006), parental expectations (Conger et al. 2011; Keller and Tillman 2008; Schmalzbauer and Rodriguez 2023), community and school networks (Schmalzbauer and Rodriguez 2023), immigrant selection (Feliciano and Lanuza 2017), documentation status (Perreira and Spees 2015), and country of origin (Baum and Flores 2011; Fishman 2020; Harris, Jamison, and Trujillo 2008).

The findings from these studies challenge researchers to consider how the educational attainment of immigrant youth may intersect with broader structures of inequality. For instance, the background of youth, especially their socioeconomic background and country of origin, may ease or exacerbate these challenges. Youth from low socioeconomic backgrounds families, similar to non-immigrant youth of low socioeconomic backgrounds, may be disadvantaged regarding parental involvement and parent knowledge of the school system (Crosnoe and López Turley 2011; Suárez-Orozco et al. 2008). Differences in immigrant educational achievement, such as gaps between Asian and Hispanic-origin immigrant youth, typically are accounted for by the socioeconomic background of the youth (Greenman 2013; Harris et al. 2008). Additionally, immigrants in the U.S. must contend with the U.S. racial hierarchy, which stratifies resources along ethnic and racial lines. For instance, Chinese and Vietnamese Asian American youth of the first and second generations achieve higher educational outcomes than their native-born peers (Lee and Zhou 2014, 2015). Meanwhile, Mexican immigrant youth experience a gap in achievement between native youth (Glick and Hohmann-Marriott 2007; Harris 2009).

As segmented assimilation theory (Portes and Zhou 1993; Zhou 1997) would suggest, the stratification of academic achievement along socioeconomic and racial, and ethnic hierarchies in the U.S. serves to perpetuate existing inequality for some immigrant groups. In this instance, particularly low-income Hispanic-origin youth have less access to social mobility through education. Hispanic youth face the highest drop-out rates and low college attendance rates compared to other racial and ethnic groups (de Brey et al., 2019). Hispanic earnings of 18-24-year-olds are also depressed compared to other groups (de Brey et al. 2019). While these findings

suggest a form of downward assimilation, even within Hispanic immigrant populations, there is variability in academic outcomes by students' time of arrival in the U.S.

Accounting for Academic Outcomes of Immigrant Youth by Time of Arrival

Immigrant students' experiences in schools diverge depending on their time of arrival and migration experiences. This is true in the U.S. and internationally. The Programme for International Student Assessment (PISA) reports in multiple years of data in OECD countries that among 15-year-old students, there is a gap between the reading and math (based on PISA assessment) performance of immigrant and native-born students, despite both having high educational expectations. First-generation students born outside the country whose parents are immigrants have the widest performance gap compared to native students. The skills gap is narrower between second-generation students born in the country whose parents are immigrants and native students (Borgonovi 2018; OECD 2006, 2012).

Similarly, research suggests that the drop-out rate of recently arrived immigrant youth may drive differences in drop-out rates for immigrant and native youth (Fry 2007). For instance, Hirschman (2001) found that Mexican, Central American, and South American Immigrants who begin their schooling outside the U.S. before migrating and then attend U.S. K-12 schools have higher attrition rates than their peers who emigrated to the U.S. before their formal education began. Research into the specific age that matters most for the time of arrival has found that youth who arrived before 5 to 6 years of age, around the time of first grade for U.S. K-12 students, have the greatest advantage compared to their immigrant peers (Chiswick and DebBurman 2004; Lemmermann and Riphahn 2018). Gaps between immigrant and native youth achievement in schools narrow the more time immigrant youth spend in U.S. K-12 schools (Cortes 2006). Not only does the time of arrival have implications for attrition and achievement, but for Mexican and Latin American migrants, more years of schooling in the U.S. are related to higher wages in adulthood (Gonzalez 2003). Notably, these trends do not suggest that non-U.S. schools are the

driving differences in achievement, but instead, time arrival for immigrant youth exacerbates barriers to achievement in the U.S.

Language acquisition is a critical distinguishing factor for youth's time of arrival. Youth arriving in the U.S. earlier in their adolescence have spent more time in U.S. K-12 classrooms and learning English (Conger 2009; Cortes 2006; Portes and Rivas 2011). English language acquisition is a key reason time of arrival matters for educational outcomes for immigrant youth. Developmentally, there is a critical age around 8 to 10 years old, when it is easiest for youth to learn English in schools (Basu 2018).

It is vital to explore the role of time of arrival for immigrant youth to understand divergent outcomes in Hispanic immigrant academic achievement. Youth who arrive later in their academic careers, that is, youth who experience schooling outside U.S. K-12, must learn new school norms and, depending on their background, a new language to succeed academically, which is more challenging for youth as they age. At middle school age, the timing of this study, immigrant youth are primarily beyond the critical age for language development and, depending on their exact age at the time of arrival, may have spent multiple years outside the U.S. K-12 system. For these students, English language, or Limited English Proficiency (LEP) programs will be crucial for shaping their academic prospects.

Role of Language Learning Programs in Immigrant Youth Education

Considering that language acquisition plays such a pivotal role in the academic outcomes of youth, English language learning programs that address language skills gaps are central to immigrant youth's schooling experiences. Immigrant students may enter the U.S. with differing levels of language proficiency. Depending on their age at arrival and family, students may have spent years in other classrooms speaking another language and continue to speak another language at home. In most U.S. schools, instruction is almost exclusively in English, requiring immigrant students to gain proficiency. There are various programs for language learners, which state and federal mandates structure in ways that lead to variable outcomes (López, McEneaney, and

Nieswandt 2015). There is research on how English language programs in schools, including Limited English Proficiency (LEP) and English as Second Language (ESL), among other programs, influence students' academic outcomes and the efficacy of these programs in helping students acquire language skills (Umansky 2016b). According to the Texas Education Agency, language proficiency programs in Texas are based on state-standardized reading assessments, teacher evaluation, parental approval, and assessment within the school. In CCSD, the setting of this study, the middle schools have a Limited English Proficiency (LEP) program which, following state guidelines, designates students as LEP.

Though students should, in theory, enter language programs, learn English, be evaluated on progress, and have an opportunity with language acquisition to leave language learning programs once they are no longer necessary, movement out of LEP programs may become disconnected from the language skills for students. Umansky et al. (2020) explore the reclassification of Chinese and Latinx English language learners, finding that gaps in the reclassification of youth grow in the middle school and elementary school levels as Chinese students are reclassified, potentially prematurely based on teacher bias or other unobserved factors, while Latinx students are less likely to be reclassified, even controlling for SES. Suárez-Orozco et al. (2008) found a surprising amount of haphazard movement of students among bilingual and mainstream classes. There was no clear system to identify student language skills, so few students moved out of classes when appropriate for their skill level. Furthermore, within the language classes, there was not consistent curricular preparation of students. So, language learners fell behind their classmates in non-language learning classes (2008:163). Despite policies on reclassification, adherence to the guidelines/criteria, especially those that include standards of achievement and teacher evaluation, vary in their ability to move students, or accurately assess their language skills (Estrada and Wang 2018). The concern is that students remain in language programs long past the time that there are helpful for their developmental needs. In the process, students have limited access to resources and coursework that would benefit their future academic development.

Even once students have left LEP or English language learning programs, being designated a language learner may have lasting effects. The label of English language learners may create stigma or a loss of status for students, which is particularly harmful to students with higher levels of fluency (Shin 2018; Thompson 2015; Umansky 2016b). Students in English classrooms, especially those who are also low-income and Hispanic, may be thought of by teachers as less suited to academically rigorous coursework, limiting their opportunities (Crosnoe 2020). A study in Texas, based on a cohort graduating in 2006, found that students who were English language learners were more likely to be economically disadvantaged after K-12. Hispanic students designated as language learners were also more likely to enter the workforce directly following K-12 rather than attend college (Flores, Batalova, and Fix 2012). LEP designation may also prevent students from being assessed for relevant learning disabilities as their status obscures other learning challenges (Hibel and Jasper 2012). Hispanic English learners tend to fare better in established immigrant destinations, like CCSD, potentially because youth and other students from immigrant backgrounds may benefit from the community. These schools may also have more established resources for immigrant students (Spees, Potochnick, and Perreira 2016).

Broadly, immigrant youths' designations as language learners, or in the case of CCSD, LEP, denotes student need for additional language assistance. Even though LEP is intended to help students with low English language levels succeed in schools, for U.S. immigrants, LEP programs facilitate unequal outcomes in K-12 schools. LEP programs may limit student course progression and access to college preparatory resources and isolate immigrant LEP students from their peers. Even if students do advance in their language skills, there may be lasting implications of being LEP-designated. In this paper, I question whether this designation for immigrant youth who arrive after first grade impacts their math course placement.

Course Placement and Academic Achievement for Immigrant Youth

The math course placement of immigrant youth in middle school has lasting effects on their educational trajectories and opportunities for social advancement. In 2016, Hispanic students in

K-12 were underrepresented compared to the national average and other racial and ethnic groups in advanced math and science courses in high school (de Brey et al. 2019). Past research has shown that Hispanic and English language learning students are consistently underrepresented in high school advanced math courses and overrepresented in lower-level or remedial classes (Wang and Goldschmidt 2003). The literature on disadvantages that immigrant youth face highlights ways that schools shape inequality for immigrant youth. Immigrant youth may have limited courses and course content opportunities depending on their language skills, which may place them on different tracks of achievement than their native-born peers (Callahan 2005; Suárez-Orozco et al. 2010). Even if students are academically high-achieving, Thompson (2015) finds that long-term English language learners are placed into lower-level classes based on their language designation despite their ability to succeed in grade-level and advanced courses. The consistent lower course placement levels may be because teachers perceive language learners as unable to perform in advanced courses (Kanno and Kangas 2014).

Though students should, in theory, enter language programs, learn English, be evaluated on progress, and have an opportunity with language acquisition to leave language learning programs once they are no longer necessary, Suárez-Orozco et al. (2008) found little movement for immigrant students out of language learning classrooms and for those who do move, haphazard movement between non-language and language classrooms. When language learners can enter higher-level classrooms, they are often ill-equipped to meet the expectations based on their previous classrooms, which may cause their grades to slip or move back into the ELL classrooms (Callahan 2005; Suárez-Orozco et al. 2008). Language learners tend to have lower math scores due to the limited math preparation in the classroom (Beal, Adams, and Cohen 2010; Mosqueda and Maldonado 2013).

Not only are English language learners offered different access to courses, but their classrooms and course content may also differ. Younger, less experienced teachers are often placed in language learning classrooms, affecting instruction quality (Dabach 2015). In math courses, language learners have lower test scores because students receive less than adequate math

instruction. Typically younger, less experienced are placed in language-learning classrooms (Dabach 2015). In the classrooms, language learners receive less coursework directed at college prep (Callahan 2005), especially if teachers perceive immigrant students as less likely to complete college (Blanchard and Muller 2015). Over their academic trajectories, lack of adequate math course content and access to college preparatory resources may prevent English language learners from developing plans to attend higher education and prepare them less for K-12 graduation (Kanno 2018).

This paper aims to model how the math course placement of immigrant students is a function of both their time of arrival and LEP status. Math course placement in middle school shapes students' future academic trajectories. However, immigrant students may have limited access to advanced courses and be overrepresented in remedial math depending on their time of arrival in the U.S. and LEP designation. In theory, LEP designation should help students gain language skills necessary for their academic progress. However, drawing on Clark's (1960) theory of cooling out and findings on the long-term effect of LEP designation on teacher perceptions of student academic ability, I hypothesize that LEP limits course placement over time, preventing immigrant youth from accessing advanced placement. Youth who arrived after first grade are at particular risk of experiencing this process due to their language skills compared to U.S.-born youth and immigrant youth who migrated before first grade. In general, Hispanic immigrant youth from low-socioeconomic backgrounds are at particular risk of placement in lower math courses and elevated risk for low rates of academic achievement.

DATA AND METHODS

Data

This paper aims to analyze how the time of arrival for immigrant youth and U.S. school structures, like LEP designation, impact youths' math course placement in middle school. For this analysis, I use data from the *Beyond Blackboards* project (see Blanchard et al. 2015). *Beyond Blackboards* is a project by researchers from the University of Texas at Austin that explored Texas

middle school students' knowledge and interest in STEM.¹ Researchers collected data in three middle schools in the Cave Creek School District (CCSD) in central Texas between 2010 and 2013. Data collection included six waves of surveys administered in English or Spanish each academic semester over three years.² At the end of the data collection period in 2013, researchers also obtained administrative records on participating students.³

The *Beyond Blackboards* project data provide an opportunity for a rich analysis of immigrant youth educational experiences well suited to the aims of this paper. The CCSD school district has a large population of immigrant students and English language learners, allowing for an analysis comparing immigrants by arrival time and Limited English Proficiency (LEP) status. Moreover, data include a survey measure of students' self-reported immigration background and time of arrival, allowing me to analyze the role of time of arrival in shaping educational outcomes. Most studies on immigrant education must use nativity or generational status to compare academic outcomes due to limited immigration background information on students. The multiple years of administrative data also allow me to examine course placement and LEP designation within school years and overtime for immigrant students to explore the potential implications of immigrant time of arrival and LEP on educational trajectories.

Sample

According to administrative reports, between 2010-2013, approximately 2,400 middle school students were enrolled yearly in CCSD middle schools. An average of approximately 2,100 middle school students per academic year participated in the Beyond Blackboards surveys and

¹ Researchers also implemented a robotics program in the CCSD middle schools as part of the project. For more information about the study design and robotics program, see Blanchard et al. (2015).

² The surveys were administered once per semester to all present middle school students. Students who did not take the survey or were absent during the day of program administration did not take a make-up survey.

³ The administrative records were collected at the end of the survey period. Students who had moved school districts between 2010 and 2013 or were no longer enrolled in CCSD in 2013 for any reason may not be included in the administrative records, even though students may have participated in the initial surveys. Only student observations with surveys and administrative records for the analysis years are included in the sample.

have complete administrative records. For this paper, I analyze two academic years of the Beyond Blackboards data: the 2011/2012 and the 2012/2013 school years. These two years have the most complete administrative records and student survey responses, especially for measures like immigration background. Additionally, I use two consecutive years to analyze changes in student course placement between academic years.

Students included in the sample of this paper have administrative records for math course placement and LEP designation and survey data on their immigration background and parental education during the 2011/2012 or 2012/2013 school year. Less than ten students were also excluded from the analysis because they did not advance grade levels between 2011/2012 and 2012/2013 school years. The sample includes 2,953 middle school students in CCSD total across two academic years, 2,032 students in 2011/2012 and 2,080 students in 2012/2013. There are 1159 students included in both the 2011/2012 and 2012/2013 school years.⁴

Measures

The primary variable of interest is math course placement in each academic school year. Math course placement is based on student administrative data from CCSD. In middle school, students in CCSD may be enrolled in grade-level math for their respective grade, resource math, or pre-AP math, which is Algebra I for eighth-grade students. In this school district, pre-AP math classes are advanced math classes that prepare students to take AP (Advanced Placement) courses at the high school level. Resource math is the remedial math class meant to provide additional student assistance. Grade-level math is the most common math course that most students will take as their math course. For the analysis, I predict math course placement for students in one of these three categories: resource math, grade-level math, or Pre-AP.

The key independent variable for the study is immigration background and time of arrival. I use a three-level categorical variable (1) born in the U.S.; (2) born abroad and migrated before first grade; and (3) born abroad and migrated after first grade. First grade is a key period for

⁴ I include a total breakdown of the students in each year and the overlapping students in Appendix 1.

measuring the time of arrival. Developmentally, as students age, it becomes more challenging to learn English and takes more time (Basu 2018). If students migrated before first-grade, barring migration, they also would have completed most of their schooling in U.S. schools.

This measure is based on self-reported semester survey responses by middle school students in CCSD. During four of the six semesters surveys (Fall 2011, Spring 2012, Fall 2012, and Spring 2013), students reported if they were: born in the U.S.; born abroad and migrated to the U.S. before first grade; born abroad and emigrated to the U.S. after first grade; or do not know. For the analysis, the measure for immigration background is equivalent to the last student semester. If the last survey response was "do not know," then the measure is the last response on immigration background that was not "do not know." Students who only answered with do not know or had no recorded answers for their immigration background were excluded from the analysis.

I use the last student survey response for time of arrival because even though time of arrival should not vary between surveys, unless students migrated between surveys, some students do change their immigration background between surveys. The middle school students reporting their immigration background and time of arrival are between the ages of 10 and 14 at the time of the semester surveys. Immigrant youth in this age group may be unaware of their immigrant background, both their status and the events around migration (Gleeson and Gonzales 2012). This may make them inaccurate reporters of their immigration background. Additionally, even for students who are aware of their background and time of arrival, the political climate of the U.S. and immigration system may encourage students of their own volition or parental instruction to misreport their immigration background, especially for families with precarious status. Given cross-border mobility in Texas, it is possible that students migrated across borders between semesters. However, the data showed that younger students in the sixth or the first semester of seventh grade were more likely to change their immigration status between semesters. The most common response pattern was sixth-grade students moving from selecting they were U.S. born to a category of immigrant. When the difference in immigration background response involved changing to do not know, the most common case was that students had another response, they

answered consistently in multiple semester survey years. However, if they changed to "do not know" in one or two years, I use the last year of reported immigration background, and for students who answered "do not know" for their last year, I use their last non-"do not know" response. I also assess if the analysis results vary if the current semester survey response or "do not know" is included in the models and find no significant change in the paper's findings.

The other key explanatory measure is Limited English Proficiency (LEP) designation. In Texas, students become Limited English Proficiency (LEP) designated in CCSD in middle school based on test results identification of language spoken at home, recommendations, and discussions between teachers, school staff, and parents. Parents can refuse LEP designation for their students, and teachers can recommend non-LEP status for students, even if test scores indicate otherwise. I label this variable LEP-designation because I measure if the school labels the student as needing language services, I am not measuring the language skills of students. In this way, I can investigate how being designated LEP may structure experiences rather than simply the limitations students may face from being language learners.

The administrative records from CCSD report if students in each semester are designated as LEP, non-LEP, or in first- and second-year monitoring. Students designated as monitoring have left the LEP program in the last one to two years, but the school is still evaluating their language skills. For the analysis, I construct a binary measure of if students are LEP designated, not including the monitoring designations, in the fall of the academic year. The reference category for all models for LEP designation is non-LEP designation.

Math course placement may also be associated with special education programs in K-12. In CCSD, students must be special education or LEP to be enrolled in resource math. However, students do not have to be enrolled in resource math if they are in special education or LEP programs. I do not include special education in the models for this study since most students in resource math are in Special Education. The coefficient and average marginal effects of Special education are large but do not change the significance of any other indicators in the model. Since I am interested most in LEP, and LEP does not mean students must be placed in resource math as

part of the program, but Special Education students are much more rarely found outside of resource math, I do not include it in the models.

To check the robustness of the findings, I also control in the analysis for other student characteristics, grade level, gender, ethnicity, and parental education. CCSD's administrative records report ethnicity and gender for students. For gender, the only options in the district are male and female. Female is the reference category in all models. For ethnicity, CCSD administrative data identified students as Hispanic, Black, White, Indian, Asian, and Pacific Islander. I collapse Indian, Asian, and Pacific Islander into one category due to small cell sizes. Hispanic is the reference category for ethnicity in the models. For grade level, I use students' reported grade level each year as a three-level categorical measure, either 6th, 7th, or 8th grade.

Finally, I control for socioeconomic variation in math course placement by measuring parents' education in the models. Students reported their parents' education on the semester surveys. In the first survey administered in the Fall of 2010, the survey asked students about their parent's highest level of education achieved. However, in every subsequent semester, the survey asked students about their mother and father's highest level of education completed. For the analyses, I use the last survey answer of the highest level of education achieved by either parent. I measure parental education as a binary of whether students reported that their parents had ever completed a bachelor's degree or higher.

Analytic Approach

To investigate the role of immigrant time of arrival on math course placement, I estimate multinomial logistic regression models predicting student math course placement in two academic school years. In Model 1, I show the relationship between immigrants' time of arrival and math course placement, specifically comparing immigrants to U.S.-born students. In Model 2, I include student LEP designation from the fall of each year to assess the role of LEP designation in explaining differences in math course placement. As a robustness check for other explanations, in Model 3, I control for student background characteristics and grade level.

To understand the long-term effects of immigrant time of arrival and LEP designation on student math course placement, I then use multinomial logistic regression to predict students' 2012/2013 math courses among students who answered the 2011/2012 sample (n=1,159). Due to the inclusion of just students present in 2011/2012, only 7th and 8th-grade students appear in this analysis, and the seventh grade is the reference category for the grade level. Mirroring the first model, I show the relationship between immigrants' time of arrival and math course placement in Model 1. I then include the Fall 2011 LEP designation for students in Model 2. Finally, I control for other background characteristics. I also show the proportion of students that did not change math classes between each school year by their immigration background, LEP designation, and background characteristics to reaffirm the findings from the regression.

I display the results of the multinomial logistic regressions as average marginal effects. For each multinomial logistic regressions, I predict math course placement, either grade level, resource, or pre-AP math, in an indicated school year with grade level math as the reference category. I show the relative risk ratios of math course placement in the appendix. The relative risk ratios show math course placement relative to the odds of placement into grade-level math. I use average marginal effects because these show the average probability of the observed outcome holding constant all other effects. By estimating the average marginal effects, I can also display the average probability for the reference group, grade-level math. The average marginal effects express the magnitude of the effect on math course placement. I interpret the table results as the average probability of observing placement into each course holding other values constant.

RESULTS

Table 1 displays descriptive statistics of the sample in the 2011/2012 and 2012/2013 school years by immigration background. Proportionally more immigrant students who migrated to the U.S. after first grade were in resource math than U.S.-born students and immigrant students who emigrated to the U.S. after first grade. Approximately 12% of students who migrated to the U.S. after first grade were in resource math in the 2011/2012 school year, compared to 4% of both U.S.-

born students and immigrant students who migrated before first grade. Additionally, 18% of immigrant students who arrived after first grade were in pre-AP math in the 2011/2012 and 2012/2013 school years, whereas around 33% of U.S.-born and immigrant students who migrated before first grade are in pre-AP math. The statistics present a clear pattern of disadvantage in math course placement by the time of arrival for immigrant students.

A potential mechanism for placement in resource math is student designation as Limited English Proficient (LEP). Table 1 shows that more immigrant students than U.S.-born students, in general, were designated as LEP in 2011/2012 and 2012/2013. A greater proportion of immigrant students who arrived after first grade are LEP designated, approximately 47%, compared to 35% of immigrant students who arrived before first grade in 2011/2012. More recently arrived immigrant students may be designated as LEP because of their English skills as recent migrants. However, not all LEP-designated students were placed in resource math. The proportion of immigrant students who arrived after first grade in LEP compared to those who arrived before first grade in LEP does not match the difference in the proportions of resource math or pre-AP math placement.

Table 1: Descriptive Statistics of the Sample in 2011/2012 & 2012/2013 School Years by Immigration Background

	Full sample		U.S. Born		Arrived Before First Grade		Arrived After First Grade	
	2011/2012	2012/2013	2011/2012	2012/2013	2011/2012	2012/2013	2011/2012	2012/2013
<i>Sample (%)</i>			80	80	12	12	8	7
<i>Math Course (%)</i>								
Resource Math	5	5	4	4	4	6	12	15
Grade Level Math	63	63	62	63	62	63	70	67
Pre-AP Math	33	32	34	33	33	31	18	18
<i>Fall LEP (%)</i>								
LEP Students	20	21	14	16	35	34	47	46
<i>Grade Level (%)</i>								
6 th Grade	37	32	38	33	33	31	30	26
7 th Grade	33	36	33	36	33	34	36	36
8 th Grade	30	31	29	30	34	35	34	38
<i>Gender (%)</i>								
Male	50	49	48	47	56	54	59	58
<i>Ethnicity (%)</i>								
Hispanic	82	82	80	80	93	88	87	84
Black Non-Hispanic	11	11	12	12	4	7	8	8
White Non-Hispanic	5	6	6	6	-	3	-	5
Other Non-Hispanic	2	2	2	2	-	-	-	-
<i>Parental Education (%)</i>								
Bachelor's degree or Higher	36	40	36	40	35	42	45	47
<i>N</i>	2032	2080	1622	1674	245	250	165	156

Note: All values rounded to the nearest 10. Blank cells are masked due to small cell size.

Table 2a: Average Marginal Effects for Math Course Placement in 2011/2012 School Year

<i>N</i> ==2032	Model 1			Model 2			Model 3		
	<i>Resource</i>	<i>Grade Level</i>	<i>Pre-AP</i>	<i>Resource</i>	<i>Grade Level</i>	<i>Pre-AP</i>	<i>Resource</i>	<i>Grade Level</i>	<i>Pre-AP</i>
<i>Immigration Background (U.S. Born==0)</i>									
Arrived before First Grade	0.002 (0.15)	0.006 (0.18)	-0.008 (-0.25)	-0.010 (-0.89)	-0.036 (-1.05)	0.046 (1.37)	-0.009 (-0.74)	-0.038 (-1.11)	0.047 (1.38)
Arrived After First Grade	0.082** (3.19)	0.079* (2.08)	-0.161*** (-4.99)	0.046* (2.22)	0.051 (1.26)	-0.097* (-2.53)	0.046* (2.25)	0.047 (1.16)	-0.093* (-2.42)
<i>Fall 2011 LEP (Non-LEP==0)</i>									
LEP				0.072*** (4.38)	0.173* (6.84)	-0.245*** (-11.46)	0.080*** (4.32)	0.169*** (6.43)	-0.249*** (-11.75)
Student Characteristics									
<i>Grade Level 2011/2012 (6th Grade==0)</i>									
7 th Grade							0.008 (0.69)	-0.014 (-0.56)	0.006 (0.25)
8 th Grade							-0.026* (-2.54)	0.088*** (3.45)	-0.062* (-2.54)
<i>Gender (Female==0)</i>									
Male							0.006 (0.68)	-0.040 (-1.90)	0.034 (1.68)
<i>Ethnicity (Hispanic==0)</i>									
Black Non-Hispanic							0.017 (0.90)	0.057 (1.69)	-0.074* (-2.50)
White Non-Hispanic							0.032 (1.04)	-0.109* (-2.15)	0.077 (1.66)
Other Non-Hispanic							0.033 (0.67)	-0.141 (-1.69)	0.108 (1.37)
<i>Parental Education (< Bachelor's==0)</i>									
Bachelor's degree or Higher							0.021* (2.08)	0.008 (0.38)	-0.029 (-1.37)

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2b: Average Marginal Effects for Math Course Placement in 2012/2013 School Year

<i>N</i> ==2080	Model 1			Model 2			Model 3		
	<i>Grade</i>			<i>Grade</i>			<i>Grade</i>		
	<i>Resource</i>	<i>Level</i>	<i>Pre-AP</i>	<i>Resource</i>	<i>Level</i>	<i>Pre-AP</i>	<i>Resource</i>	<i>Level</i>	<i>Pre-AP</i>
<i>Immigration Background (U.S. Born==0)</i>									
Arrived before First Grade	0.016 (1.04)	0.005 (0.15)	-0.021 (-0.67)	0.001 (0.04)	-0.030 (-0.90)	0.030 (0.91)	-0.002 (-0.15)	-0.025 (-0.76)	0.027 (0.84)
Arrived After First Grade	0.104*** (3.60)	0.046 (1.16)	-0.150*** (-4.56)	0.058** (2.61)	0.024 (0.58)	-0.083* (-2.11)	0.045* (2.17)	0.036 (0.86)	-0.081* (-2.05)
<i>Fall 2012 LEP (Non-LEP==0)</i>									
LEP				0.093*** (5.52)	0.178*** (7.41)	-0.271*** (-14.17)	0.107*** (5.39)	0.170*** (6.59)	-0.278*** (-14.65)
Student Characteristics									
<i>Grade Level 2012/2013 (6th Grade==0)</i>									
7 th Grade							0.034** (3.00)	0.012 (0.47)	-0.046 (-1.91)
8 th Grade							0.025* (2.22)	-0.024 (-0.89)	-0.002 (-0.07)
<i>Gender (Female==0)</i>									
Male							0.017 (1.75)	-0.031 (-1.45)	0.014 (0.69)
<i>Ethnicity (Hispanic==0)</i>									
Black Non-Hispanic							0.017 (0.80)	0.049 (1.44)	-0.066* (-2.28)
White Non-Hispanic							-0.002 (-0.10)	-0.009 (-0.19)	0.011 (0.26)
Other Non-Hispanic							0.044 (0.87)	-0.114 (-1.45)	0.070 (0.99)
<i>Parental Education (< Bachelor's==0)</i>									
Bachelor's degree or Higher							0.009 (0.93)	0.030 (1.40)	-0.039 (-1.94)

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Course Placement for Immigrant Students

Tables 2a and 2b present the results of multinomial logistic regressions predicting math course placement for students by the time of arrival in the 2011/2012 and 2012/2013 school years as the average marginal effects. Model 1 shows that students who arrived after first grade are, on average, approximately 8% more likely to be placed in resource math or grade-level math compared to U.S.-born students. Additionally, students who arrived after first grade are, on average, 16% less likely to be in pre-AP math than U.S.-born students. The findings suggest that immigrant students' arrival time puts them at a disadvantage in math course placement. Students who arrived in the U.S. after first grade are more likely to be in resource or grade-level math than pre-AP math. There is no significant difference between the placement of immigrant students who arrived before first grade and U.S.-born students.

LEP designation partially explains the gap in math course placement for immigrant students. Model 2 shows that LEP-designated students are, on average, 7% more likely to be placed into resource math and, on average, 17% more likely to be placed into grade-level math compared to non-LEP-designated students. On average, LEP-designated students are 24% less likely to be in pre-AP math than non-LEP-designated students. Previous studies have documented that LEP students have less access to advanced courses than their non-LEP peers, even if district policy allows them to enroll in advanced-level courses (Callahan 2005; Suárez-Orozco et al. 2008).

Model 3 shows the robustness of the findings against student background characteristics. Even controlling for student characteristics, LEP remains a key explanatory variable for students' differences in math course placement, as does the immigrant time of arrival, though to a smaller extent. I find similar patterns in the 2012/2013 school year analysis, displayed in Table 2b, as described in the 2011/2012 school year findings. There is a clear pattern in math course placement for immigrant students based on their time of arrival and connected to their LEP designation.

Table 3: Average Marginal Effects for Math Course Placement in 2012/2013 school year based on Fall 2011 LEP designation

<i>N</i> ==1159	Model 1			Model 2			Model 3		
	<i>Grade</i>			<i>Grade</i>			<i>Grade</i>		
	<i>Resource</i>	<i>Level</i>	<i>Pre-AP</i>	<i>Resource</i>	<i>Level</i>	<i>Pre-AP</i>	<i>Resource</i>	<i>Level</i>	<i>Pre-AP</i>
<i>Immigration Background (U.S. Born==0)</i>									
Arrived before First Grade	0.000	-0.011	0.011	-0.016	-0.046	0.062	-0.016	-0.046	0.062
	(0.01)	(-0.25)	(0.25)	(-0.95)	(-1.04)	(1.42)	(-0.95)	(-1.02)	(1.42)
Arrived After First Grade	0.093*	0.042	-0.135**	0.046	0.020	-0.066	0.042	0.017	-0.059
	(2.50)	(0.82)	(-3.03)	(1.58)	(0.37)	(-1.27)	(1.49)	(0.30)	(-1.12)
<i>Fall 2011 LEP (Non-LEP==0)</i>									
LEP				0.100***	0.140***	-	0.112***	0.132***	-0.244***
						0.239***			
				(4.13)	(4.11)	(-8.56)	(4.09)	(3.68)	(-8.73)
Student Characteristics									
<i>Grade Level 2012/2013 (7th Grade==0)</i>									
8 th Grade							-0.010	-0.025	0.035
							(-0.74)	(-0.89)	(1.31)
<i>Gender (Female==0)</i>									
Male							0.010	-0.015	0.005
							(0.76)	(-0.54)	(0.19)
<i>Ethnicity (Hispanic==0)</i>									
Black Non-Hispanic							0.039	0.012	-0.051
							(1.24)	(0.26)	(-1.25)
White Non-Hispanic							0.005	-0.088	0.083
							(0.12)	(-1.21)	(1.24)
Other Non-Hispanic							0.068	-0.042	-0.026
							(0.85)	(-0.37)	(-0.27)
<i>Parental Education (< Bachelor's==0)</i>									
Bachelor's degree or Higher							0.021	0.044	-0.065*
							(1.47)	(1.53)	(-2.40)

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: Percentage of Students No Change in Math Course Placement between 2011/2012 and 2012/2013 School Year by student characteristics

	No Change Math Course Placement
Sample (% no change)	94%
<i>Immigration Background</i>	
U.S. Born	94%
Migrated before First Grade	97%
Migrated After First Grade	97%
<i>Math Course</i>	
Resource Math	96%
Grade Level Math	96%
Pre-AP Math	90%
<i>Fall 2011 LEP Designation</i>	
LEP Students	98%
<i>Grade Level 2012/2013 School Year</i>	
7 th Grade	89%
8 th Grade	100%
<i>Gender</i>	
Male	93%
<i>Ethnicity</i>	
Hispanic	94%
Black Non-Hispanic	96%
White Non-Hispanic	92%
Other Non-Hispanic	100%
<i>Parental Education</i>	
Bachelor's degree or Higher	95%
<i>N</i>	1159

Note: All percentages rounded to the nearest 10.

In sum, students who arrived after first grade are more likely, on average, to be placed into resource math and grade-level math compared to their U.S.-born peers. Student LEP designation explains much of the gap in math course placement between immigrant students who arrived after first grade and U.S.-born students. However, it does not eliminate the immigrant time of arrival as an explanation either. However, the math course placement of students who arrived before first grade resembles their U.S.-born peers. Differences in grade level or student background do not explain these trends, and the differences in placement are consistent between school years.

Course Advancement for Immigrant Students

While I find a clear pattern of math course placement related to LEP and immigrant student time of arrival, in the final model, I show if there is a lasting impact of time of arrival and LEP on student course placement. Literature has previously suggested that students designated as language learners may carry an ongoing stigma (Shin 2018; Thompson 2015; Umansky 2016b) and have limited access to advanced or college-preparatory courses (Callahan 2005) even after leaving the LEP program.

In Table 3, I present the results of a multinomial logistic analysis that includes only the 1,159 students from the 2011/2012 school year who are also present in the 2012/2013 school year sample. I use students' Fall 2011 LEP designation in this analysis. Model 1 mirrors the findings from Table 2a to show that immigrant students who arrived after first grade are less likely to be placed into pre-AP math and more likely to be placed into resource math. Model 2 shows that these differences in math course placement for immigrant students who arrived after the first grade is explained by their Fall 2011 LEP status. This finding supports the literature suggesting a lasting impact of LEP designation on student course placement. Net of student characteristics, students designated at LEP in Fall 2011 are 11% more likely to be placed into resource math and 24% less likely to be placed into pre-AP math in the 2012/2013 school year than their non-LEP designated peers.

Table 4 displays the percentage of students who do not change math courses between the 2011/2012 and 2012/2013 school years by their demographic characteristics. Approximately 94% of students remain in the same math class in both years. Students designated as LEP in Fall 2011 remained in the same math class 98% of the time, and 86% of students designated as LEP in Fall 2011, remained LEP designated in Fall 2012. All eighth-grade students in 2012/2013 remained in the same math class.

Overall, immigrant students who migrated after first grade are at a disadvantage regarding their math course placement due to their time of arrival. The gap in math course placement partially functions through the LEP designation of students. LEP has a lasting effect on student math course placement between middle school grade levels. Even the LEP designation of students in the previous school year is related to a higher likelihood of placement in resource math and a lower likelihood of placement in pre-AP math. Most students do not change math classes between the 2011/2012 and 2012/2013 school years.

DISCUSSION

Generally, immigrant youth have higher educational expectations than native youth (Feliciano and Lanuza 2016). In CCSD, the semester surveys asked students each semester about the highest level of education students expected to achieve. Between Fall 2011 and Spring 2012, between 70 and 75% expected some college. In that same time period, most students, between 34% and 40%, expected to obtain higher than a master's degree. There is not significant variation in the educational expectations of youth by their immigration backgrounds. Despite youths' high educational expectations, the findings of this study suggest that not all students will be equally prepared during their K-12 education to attend college. Instead, the consistent placement of immigrant youth who arrived after first grade into lower-level courses is likely to limit their access to coursework that would prepare them for college and information about college (Callahan 2005; Suárez-Orozco et al. 2008), which prematurely limits their ability to plan and ultimately attend

college (Kanno 2018). Even though, at the middle school level, most students in CCSD intended to attend college.

In this paper, I aimed to explore the relationship between immigrant background, specifically time of arrival in the U.S., and math course placement. I show immigrant students who arrived after first grade are at a disadvantage in course placement as they are less likely to be in pre-AP math and more likely to be in grade level and resource math than U.S. born students. There is no statistical difference in math course placement between immigrant students who arrived after first grade and U.S.-born students. The findings support previous studies that have stressed that time spent in U.S. K-12 schools predicts differences in the academic outcomes of immigrant youth, and that youth who arrive later in their academic careers may be at a disadvantage in U.S. schools (Cortes 2006; Fry 2007; Hirschman 2001). It is possible that since the analysis only measures immigration background based on nativity and time of arrival in the U.S. that there are other significant effects on math course placement for the second-generation, the children of immigrants in CCSD. Other research has found differences for youth whose parents were born abroad (OECD 2006). However, if this were the case, this likely would not undermine the findings that youth who arrived after first grade are at the greatest disadvantage but may highlight additional ways that course placement is unevenly experienced by immigrant youth.

A typical explanation for the differences in achievement for immigrant youth by the time of arrival is differences in familiarity with English (Conger 2009; Cortes 2006; Portes and Rivas 2011). Schools designate students a Limited English Proficiency (LEP) to help students gain English proficiency. Through the designation, students are provided additional resources and monitored for their language skills. The results of this study show that LEP designation explains most of the differences in math course placement for immigrant students who arrived after first grade. LEP-designated students are less likely to be in pre-AP and more likely to be in resource math, regardless of their background. The placement of LEP students is still consistent with the current literature. Previous research has shown that English language programs are central to the course placement of immigrant youth. Immigrant students typically have less access to advanced

courses and are overrepresented in lower-level math courses if enrolled in English language learning programs (Callahan 2005; Suárez-Orozco et al. 2010; Umansky 2016a; Wang and Goldschmidt 2003). LEP designation does not entirely explain differences in math course placement for immigrant youth but does play a prominent role in the gap in math course placement.

The final finding of the paper speaks theoretically to the role of LEP and math course placement in the educational trajectories of immigrant youth. The results show that LEP predicts math course placement across multiple years and that few students, less than 6% overall, ever move math course levels between school years. The LEP program aims to help immigrant students gain English skills to succeed in K-12 classrooms. While the lack of advancement over one school year, found in this study, is not necessarily indicative of a pattern across K-12 for immigrant students, literature on the trajectories of immigrant students in English language programs has documented similar outcomes. The reclassification of English language learners does not necessarily match their language development skills but may result from teacher racial and ethnic bias or uneven evaluation criteria (Estrada and Wang 2018; Suárez-Orozco et al. 2008; Umansky et al. 2020). Differences in the content of English language learners' former curriculum may ill-prepare students for higher-level courses leading their grades to slip or students to move back to language learning classrooms (Beal et al. 2010; Callahan 2005; Mosqueda and Maldonado 2013; Suárez-Orozco et al. 2008). Teachers' perceptions of English language learners as unable to succeed in high-level classrooms may also prevent immigrant students from accessing other courses (Kanno and Kangas 2014). The concern is that students remain in language programs long past the time that there are helpful for their developmental needs. This limits their access to resources and coursework that would benefit their future academic development.

Underlying the process of immigrant math course placement, LEP programs, among other English language programs, may be involved in 'cooling out' (Clark 1960) immigrant students who arrived after first grade. LEP programs identify students who may be at the highest risk of low achievement or perceived to be at an increased risk based on their background, which, in this sample, are youth who are recent arrivals with low English fluency. Though LEP programmatically

provides resources for students to achieve academically, students are systemically blocked from accessing college preparatory resources in middle school through the consistent placement of immigrant students into low-level and grade-level math. Given the course sequencing of math, these students may also be blocked in high school too. The limited course options may shift student perceptions of academic aptitude, and college expectations may change as students remain in LEP programs. In this way, LEP designation may dampen student educational trajectories. The difference in educational outcomes reaches beyond the classroom and will continue to affect youth's social and economic integration outcomes, too, risking segmented assimilation (Portes and Zhou 1993; Zhou 1997).

Limitations

There are several limitations to this study. First, the data available in Beyond Blackboards are limited to a single school district, CCSD, over three years, meaning that the function of the LEP programmatically and students' experiences are confined to the context and programs of this district in Texas. Texas has one of the top five largest populations of immigrant youth, with 35.2% of school-aged children as immigrants or the children of immigrants residing in Texas in 2021 (Migration Policy Institute 2021). Thus, understanding the processes leading to unequal outcomes in Texas districts is important to the wider conversation about the experiences of immigrant youth. However, the findings should be interpreted as a glimpse into the ways that future studies may be able to investigate the role of LEP designation or other language learning programs and immigrant time of arrival in shaping the educational trajectories of youth. The findings justify that there are measurable ways in the administrative data of schools to show differences in educational access for language learners and that, due to the Beyond Blackboards survey element, they are likely related to the time of arrival. This trend is visible in math course placement in middle school. The findings set the stage for future research to examine beyond high school or college factors that may contribute to differences in attainment for youth too.

Though many immigrants and children of immigrants live in Texas, the category of immigrant is diverse, and the academic achievement of immigrant students is not uniform across countries of origin, race, ethnicity, or documentation status (Baum and Flores 2011; Feliciano 2005; Fishman 2020; Glick and Hohmann-Marriott 2007; Harris et al. 2008; Perreira and Spees 2015). This study can only measure status in the self-reported background of youth, which may be unreliable reporters, due to their age or deliberate misreporters, due to the sensitivity of immigration information. Based on the demographic make-up of the community around CCSD and the ethnicity of students, the study can make reasonable conjectures about countries of origin for immigrant youth, but not enough to be able to model potential variation between immigrant students or draw any conclusions. For the findings of this study, the limited information on the immigrant background is a shortcoming that does not challenge the validity of the results but suggests that additional structures of inequality may also need to be considered.

For example, students may misreport their immigration background if they have a precarious status, and precarious statuses, like being undocumented, affect the educational trajectories of youth and their family's socioeconomic background. Documentation status may intersect with arrival timing and language proficiency in important ways too as teacher perception of student academic aptitude and academic support may be linked to students being undocumented or perceived as undocumented (Enriquez 2017; Menjívar 2008). It is important to note that this affect exists both for students who have precarious status and since legality is a social construction linked to employment, race and ethnicity, and country of origin (Flores and Schachter 2018; Menjívar 2008; Sanchez and Romero 2010), for students perceived as undocumented. While it is important that future research measure documentation status on course placement, the fact that the perception of illegality may function similarly to actual documentation status, it is also possible that the effects of precarious immigration status would not alter the findings of the study. Furthermore, there is significant debate about when the educational life course of students' documentation status matters. For middle school youth, K-12 education may still theoretically

shield them from the negative effects of status in the K-12 environment, and students may be largely unaware of their status anyways (Gleeson and Gonzales 2012).

Finally, on immigration measures, the limited information on the immigrant background is comparable to that of other studies on immigrant youth in K-12. Since schools do not collect immigration information, researchers of K-12 education often assess immigration background using surveys. The Beyond Blackboards survey was able to capture the time of arrival. While researchers have examined the difference in youth integration based on generation (Chiswick and DebBurman 2004; Glick and Hohmann-Marriott 2007; Rumbaut 2004), age at arrival instead allows researchers to understand previous findings of generational gaps (Myers, Gao, and Emeka 2009). For instance, this study can link the findings of differences based on students arriving before or after first grade to their language development before first grade and the number of years potentially spent in the U.S. K-12 system (Chiswick and DebBurman 2004; Lemmermann and Riphahn 2018). The study cannot measure with certainty any cross-border movement of youth, which may be common given the proximity to the border. Still, I can use students' reports of their arrival time to understand this integration experience component in greater detail than previous research.

Another potential limitation is on families, communities, and teachers. Education research has long documented the significance of community and family on the educational outcomes of youth. For immigrant youth, high levels of educational attainment are often explained by youths' ability to mobilize cultural capital and their parent's expectations to their advantage (Conger et al. 2011; Feliciano and Lanuza 2017; Keller and Tillman 2008; Lee and Zhou 2014). Meanwhile, disparities in attainment are attributed to the school context (Pong and Hao 2007) and the socioeconomic background of youth and their families (Aldous 2006; Greenman 2013; Harris et al. 2008; Kao and Tienda 1998; May and Witherspoon 2019). This study has limited information about the parental background or the community in which immigrant youth live during their K-12 schooling. Despite new research that the success of immigrant youth in attending elite universities stems from a constellation of support from family, community, and school personnel

(Schmalzbauer and Rodriguez 2023), this study also does not measure this outcome. Past research has analyzed teacher perceptions of English language learners and teacher bias on academic outcomes (Ochoa 2013; Shin 2018; Thompson 2015; Umansky 2016b; Umansky et al. 2020). Future research should continue to explore these elements of the immigrant educational experience, especially concerning teachers, counselors, and parents' role in 'cooling out' immigrant youth.

CONCLUSION

In this paper, I investigated the math course placement of middle school immigrant students in a Texas school district by their time of arrival, with attention to their LEP designation. Middle school math sets the stage for students' educational pathways in high school and the chance of college (Wang and Goldschmidt 2003). In a study on Texas English language learners, researchers found that long-term language learners' math test scores plummeted during middle school (Flores et al. 2012), suggesting that middle school may also be a key moment for the future academic achievement of youth. The results of this paper show that immigrant students who arrived after first grade are disadvantaged in their middle school math course placement. Immigrant students who arrived after first grade are less likely to be in pre-AP math and more likely to be in grade level and resource math than U.S.-born students. LEP designation explains much of the difference in math course placement. The placement of students into math courses of different levels and their LEP designation are persistent across multiple years of middle school.

School programs like LEP should help students to overcome language barriers over time. However, as early as middle school, youth may have different access to courses than their peers due to their LEP designation. This early difference could explain later achievement gaps. The differences in courses offered to immigrant youth in LEP may be part of a 'cooling out' (Clark 1960) of immigrant youth designated as LEP. Their risk of low-academic achievement or the perception of this risk of achievement causes the students to be offered academic opportunities that, over time, will dampen their expectations. For example, placement into resource or grade-

level math instead of Pre-AP may dampen expectations of college for high school students (Karlson 2015).

The function of LEP as a 'cooling out' mechanism is particularly troublesome because LEP designation may not accurately reflect academic aptitude and skill. Movement from LEP programs may be less based on language skills and instead reflect teachers' racial and ethnic bias and perspectives about academic aptitude (Kanno and Kangas 2014; Umansky et al. 2020). The uneven access to course material and dampening of educational expectations over time may be part of a broader inequality in college access and high school graduation for Hispanic immigrant youth. It enforces a pattern of Hispanic immigrant youth integration into lower socioeconomic positions than their peers, an example of segmented assimilation (Portes and Zhou 1993; Zhou 1997). For the growing number of immigrant youth in the U.S., patterns of segmented assimilation enforced by U.S. schools risk their social and economic futures, potentially forcing them into a perpetual lower class.

APPENDIX

Table A1: Descriptive Statistics for each School Year and Overlap of students in both school years

	2011/2012 Wave	2012/2013 Wave	Both 2011/2012 and 2012/2013 Waves
<i>Immigration Background (%)</i>			
U.S. Born	80	80	80
Migrated before First Grade	12	12	12
Migrated After First Grade	8	7	7
<i>Math Course (%)</i>			
Resource Math	5	5	5
Grade Level Math	63	63	58
Pre-AP Math	33	32	37
<i>Fall LEP Designation (%)</i>			
LEP Students	20	21	20
<i>Grade Level (%)</i>			
6 th Grade	37	32	51
7 th Grade	33	36	49
8 th Grade	30	31	0
<i>Gender (%)</i>			
Male	50	49	49
<i>Ethnicity (%)</i>			
Hispanic	82	82	84
Black Non-Hispanic	11	11	10
White Non-Hispanic	5	6	4
Other Non-Hispanic	2	2	2
<i>Parental Education (%)</i>			
Bachelor's degree or Higher	36	41	39
<i>N</i>	2032	2080	1159

Note: All values rounded to the nearest 1

Table A2a: Multinomial Logistic Regression Results for Student Math Course Placement in 2011/2012 School Year, Relative Risk Ratios

<i>N</i> =2032	Model 1		Model 2		Model 3	
	<i>Resource</i>	<i>Pre_AP</i>	<i>Resource</i>	<i>Pre_AP</i>	<i>Resource</i>	<i>Pre_AP</i>
<i>Immigration Background (U.S. Born==0)</i>						
Arrived before First Grade	1.041	0.967	0.793	1.223	0.831	1.231
	(0.37)	(0.14)	(0.29)	(0.19)	(0.30)	(0.19)
Arrived After First Grade	2.769***	0.471***	1.992*	0.637*	2.030*	0.650
	(0.76)	(0.10)	(0.57)	(0.14)	(0.59)	(0.14)
<i>Fall 2011 LEP (Non-LEP==0)</i>						
LEP			2.620***	0.269***	2.925***	0.260***
			(0.60)	(0.04)	(0.73)	(0.04)
Student Experiences						
<i>Grade Level 2011/2012 (6th Grade==0)</i>						
7 th Grade					1.195	1.042
					(0.29)	(0.12)
8 th Grade					0.427**	0.710**
					(0.14)	(0.09)
<i>Gender (Female==0)</i>						
Male					1.220	1.192
					(0.27)	(0.12)
<i>Ethnicity (Hispanic==0)</i>						
Black Non-Hispanic					1.333	0.696*
					(0.50)	(0.11)
White Non-Hispanic					2.146	1.509
					(1.09)	(0.32)
Other Non-Hispanic					2.306	1.740
					(1.83)	(0.61)
<i>Parental Education (< Bachelor's==0)</i>						
Bachelor's degree or Higher					1.560*	0.891
					(0.35)	(0.09)
Constant	0.0628***	0.554***	0.0486***	0.639***	0.0362***	0.670***
	(0.01)	(0.03)	(0.01)	(0.04)	(0.01)	(0.07)

seEform in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Table A2b: Multinomial Logistic Regression Results for Student Math Course Placement in 2012/2013 School Year, Relative Risk Ratios

N=2080	Model 1		Model 2		Model 3	
	<i>Resource</i>	<i>Pre_AP</i>	<i>Resource</i>	<i>Pre_AP</i>	<i>Resource</i>	<i>Pre_AP</i>
<i>Immigration Background (U.S. Born==0)</i>						
Arrived before First Grade	1.366 (0.40)	0.929 (0.14)	1.053 (0.32)	1.156 (0.18)	0.989 (0.30)	1.141 (0.18)
Arrived After First Grade	3.151*** (0.82)	0.508** (0.11)	2.256** (0.61)	0.689 (0.16)	1.921* (0.54)	0.682 (0.16)
<i>Fall 2012 LEP (Non-LEP==0)</i>						
LEP			3.019*** (0.63)	0.207*** (0.04)	3.555*** (0.81)	0.196*** (0.03)
Student Experiences						
<i>Grade Level 2012/2013 (6th Grade==0)</i>						
7 th Grade					2.056** (0.54)	0.824 (0.10)
8 th Grade					1.854* (0.51)	1.022 (0.13)
<i>Gender (Female==0)</i>						
Male					1.462 (0.30)	1.094 (0.11)
<i>Ethnicity (Hispanic==0)</i>						
Black Non-Hispanic					1.285 (0.47)	0.721* (0.11)
White Non-Hispanic					0.962 (0.52)	1.054 (0.22)
Other Non-Hispanic					2.294 (1.53)	1.491 (0.50)
<i>Parental Education (< Bachelor's==0)</i>						
Bachelor's degree or Higher					1.158 (0.24)	0.828 (0.08)
Constant	0.0695*** (0.01)	0.525*** (0.03)	0.0492*** (0.01)	0.626*** (0.03)	0.0215*** (0.01)	0.712** (0.08)

seEform in parentheses, *** p<0.001, ** p<0.01, * p<0.05

Table A3: Multinomial Logistic Regression Results for Student Math Course Placement in 2012/2013 School Year for only students present in 2011/2012 cohort using Fall 2011 LEP, Relative Risk Ratios

N=1159	Model 1		Model 2		Model 3	
	Resource	Pre_AP	Resource	Pre_AP	Resource	Pre_AP
<i>Immigration Background (U.S. Born==0)</i>						
Arrived before First Grade	1.023	1.050	0.771	1.303	0.767	1.303
	(0.41)	(0.20)	(0.31)	(0.26)	(0.31)	(0.26)
Arrived After First Grade	2.525**	0.569*	1.771	0.762	1.718	0.785
	(0.83)	(0.15)	(0.61)	(0.21)	(0.60)	(0.22)
<i>Fall 2011 LEP (Non-LEP==0)</i>						
LEP			2.779***	0.301***	3.174***	0.293***
			(0.72)	(0.06)	(0.89)	(0.06)
Student Experiences						
<i>Grade Level 2012/2013 (7th Grade==0)</i>						
8 th Grade					0.872	1.166
					(0.22)	(0.15)
<i>Gender (Female==0)</i>						
Male					1.217	1.039
					(0.30)	(0.13)
<i>Ethnicity (Hispanic==0)</i>						
Black Non-Hispanic					1.702	0.818
					(0.69)	(0.17)
White Non-Hispanic					1.239	1.478
					(0.95)	(0.44)
Other Non-Hispanic					2.474	0.968
					(2.03)	(0.48)
<i>Parental Education (< Bachelor's==0)</i>						
Bachelor's degree or Higher					1.337	0.750*
					(0.33)	(0.10)
Constant	0.0909***	0.576***	0.0689***	0.658***	0.0512***	0.670***
	(0.01)	(0.04)	(0.01)	(0.05)	(0.01)	(0.08)

seEform in parentheses, *** p<0.001, ** p<0.01, * p<0.05

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