Early Bilingualism and Foreign Language Learning in Secondary School

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by

My Viet Ha Nguyen
Bachelor of Science
Liberty University, 2018

Director: Adam Winsler, Professor
Department of Psychology

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Fairfax, VA

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ABSTRACT

EARLY BILINGUALISM AND FOREIGN LANGUAGE LEARNING IN SECONDARY SCHOOL

My Viet Ha Nguyen, M.A.

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Thesis Director: Dr. Adam Winsler

Early exposure to multiple languages shapes children's experiences and language background as well as influences later functioning. Prior research indicates that students who speak a minority language at home experience unique benefits when learning an additional third language (L3) in school. In the context of the United States, where foreign language learning is not mandatory, it is challenging to directly examine this relationship. Not all students decide to take a foreign language course, and it is assumed that those who enroll in these courses differ from those who do not in several unique ways. Earlier findings reveal that student characteristics may influence their motivation to learn a foreign language. Thus, the present study examined the relationship between student's early language status (monolingual, dual language learner [DLL], and bilingual) and later foreign language course enrollment and performance in middle and high school.

The current research used prospective longitudinal data from the Miami School Readiness Project (MSRP) with an ethnically diverse and low-income population. A total of 33,247 students (58.8% Latino, 33.4% Black/African American, 6.9% White/Asian/other; 81.8% free/reduced lunch) who attended public school pre-K or received subsidies for center-based family childcare in the community were assessed for school readiness at age four and prospectively followed through high school. School record data indicated DLL status in kindergarten, early English proficiency, and foreign language course taking in middle and high school. Hierarchical regression analyses were run to predict foreign language course enrollment and performance in middle or high school as the outcomes, with students' demographic, school readiness, and elementary school academic performance as covariates. Results suggested complex relationships among different factors; however, early language status significantly predicts later enrollment and performance in foreign language courses, even after controlling for student demographic, school readiness skills, and early academic achievement. Early bilinguals were more likely to take foreign language courses than DLLs, who enrolled in such courses more than monolingual students, controlling for all other factors. The same pattern favoring bilinguals, then DLLs, then monolinguals was found for performance in foreign language courses. I explored the findings in detail pertaining to general foreign language enrollment, as well as performance and enrollment across different level and languages. Limitations and implications were discussed.

Keywords: bilingualism, DLL, foreign language learning, SLA

INTRODUCTION

Over 21% of the United States' population speaks a non-English native language at home (U.S. Census Bureau, 2017a). Furthermore, 9.1% of students in public schools are identified as English language learners (ELLs) or dual language learners (DLLs) (National Center for Education Statistics [NCES], 2018). DLLs are defined as children who acquire a native language at home and actively learn English in school (American Institutes for Research, 2014). The number of DLLs is growing rapidly, with an increase of over 200,000 students between 2014 and 2015, double the increase of DLL students between 2005 and 2013 (NCES, 2018). While there exist an increasing number of studies examining DLL general achievement and performance as well as language learning in early development (Barac et al., 2014; Davison et al., 2011; Hammer et al., 2011; Grimm et al., 2018; Halle et al., 2012; Kim et al., 2014; Prevoo et al., 2016), less research examined later multiple language learning in this population. Thus, the present study explored the relationship between children early language exposure and later foreign language learning in secondary school. Specifically, does student language background in kindergarten predict enrollment and performance of foreign language in middle school and high school?

Early Multiple Languages Exposure and Later Language Learning

Early exposure to multiple languages can be beneficial for children. The brain is tuned by experience, and bilingual individuals are provided with an optimal condition to

facilitate language learning and mastery. Prior evidence supports a link between second language learning and neuroplasticity, as L2 acquisition has been associated with both structural and functional changes in the human brain (Costa & Sebastián-Gallés, 2014; Li et al., 2015). Furthermore, the age at which individuals acquire their L2 also contributes to this change (Hernandez & Li, 2008).

Bilinguals may learn both languages *simultaneously* early in life, or *sequentially*, with the L2 learned after L1 native proficiency is reached. Interestingly, within a group of sequential bilinguals, age of acquisition is associated with more left lateralization of the brain (Klein et al., 2014). Particularly, those who acquire an L2 later have a thicker left inferior frontal gyrus (IFG) – an area that relates to language production and comprehension – and lower functional resting connectivity between the left and the right IFG compared to bilinguals who are proficient at L2 early in life (Berken et al., 2016; Klein et al., 2014). These results suggest that sequential language learners learn L2 explicitly instead of implicitly, unlike simultaneous bilinguals and monolinguals. Hence, early dual language input is beneficial for optimizing brain function for language processes, perhaps allowing for efficiency in regulating and switching between two languages (Berken et al., 2017).

Being exposed to and mastering two languages early in life can benefit the acquisition of other languages. Sequential bilingual adults who learn a third language (L3) later in life have an enlarged cortical thickness in the IFG compared to simultaneous bilinguals with a late-learned L3 (Kaiser et al., 2015). Thus, combined with the findings from Klein et al. (2014), these results suggest that early dual language input creates structural differences in the brain that persist over time. Simultaneous bilinguals, compared to sequential bilinguals,

are more efficient in managing two languages and become more receptive to the addition of a third language (Kaiser et al., 2015). In addition, Bartolotti and Marian (2017) revealed that during L3 acquisition, bilinguals employ both L1 and L2. Indeed, research supports that bilingualism is positively associated with learning a novel, third language.

Within the first few years, infants undergo dramatic changes in the ability to distinguish different phonemes, and they gradually lose the capability to discriminate phonemes in a non-native language (Kuhl, 2010). The *perceptual wedge hypothesis* states that language and neural processing in bilinguals and multilinguals is shaped by their experiencing different phonetic stimuli early in development (Pettito et al., 2012). Thus, receiving input from multiple languages allows for an advantage for both infants and adults in phoneme discrimination, which can facilitate word learning in other languages. Indeed, bilingual infants are better at distinguishing novel contrasts in L3 phonemes than monolinguals (Singh, 2018). In addition, bilingual adults are superior compared to their monolingual counterparts in L3 word learning (Antoniou et al., 2015).

Another potential explanation for bilingual advantages in multiple language learning lies within the development of metalinguistic awareness. Particularly, early findings reveal that bilingual children are superior compared to monolinguals in both processing and analyzing linguistic input (Bialystok et al., 2012; Campbell & Sais, 1995; Cummins, 1978). Recent findings also revealed that the metalinguistic awareness development of individuals who received early exposure to multiple languages, both formally and at home, facilitates bilinguals' learning of an L3 (Hofer & Jessner, 2019; Huang, 2018; Kopečková, 2018; Kuo et al., 2016; Park & Starr, 2015). Indeed, early and prolong exposure to multiple languages

appeared beneficial for language learning in general, and addition language acquisition in particular.

The bilingual experience sometimes encompasses both learning the language orally and acquiring literacy. Particularly, bilingualism and biliteracy positively facilitate L3 acquisition (Sanz, 2000). A question of interest is whether a native language must be learned in both manners to produce the advantage. Biliterate bilinguals who learned both Russian (L1) and Hebrew (L2) in school scored higher in literacy measures of English (L3) compared to both monolinguals and mono-literate bilinguals (Schwartz et al., 2007). Similarly, within groups of bilinguals, those who learned the language academically as well as orally outperformed those who acquired L1 only orally (Keshavarz & Astaneh, 2004). However, overall, when comparing groups of homogenous Turkish-Persian bilinguals, Armenian-Persian bilinguals, and Persian monolinguals, bilinguals have higher performance than monolinguals on English (L3) vocabulary tests (Keshavarz & Astaneh, 2004). Even though these findings emphasize the importance of dual immersion language programs, only knowing L2 orally still provides some benefits for language learning later.

Other evidence indicates that degree of bilingualism, L2 proficiency, as well as exposure to L1 contribute to the relationship between bilingualism and third language acquisition. German 6th graders who speak another language at home were compared with German monolingual peers on learning English as a foreign language (Maluch et al., 2015). After controlling for several covariates, including SES, age, gender, general cognitive abilities, and parental education, bilingualism was significantly linked to L3 learning. Furthermore, language of instruction (L2) proficiency was the most prominent predictor for

L3 achievement (Maluch et al., 2015). Other findings support the notion that L2 competence instead of L1 competence affect L3 proficiency when the native language is a minority language (Edele et al., 2018; Maluch et al., 2016). Interestingly, when taking level of home language exposure into account, speaking a minority language at home predicts L3 proficiency in 6th grade but not 8th grade (Maluch et al., 2016). By secondary school, it is more important to have the majority (in these cases, the L2) also spoken at home to facilitate additional foreign language (L3) learning. Similarly, Hopp and colleague found that once SES is controlled for, vocabulary in the minority language of bilinguals in grade 3 significantly predicts foreign language learning achievement, and bilinguals outperform monolinguals (Hopp et al., 2019). However, by grade 4, proficiency in the majority language is a better predictor for bilinguals to perform well in L3 language learning. The authors argue for the importance of explicitly fostering L1 at home and school due to its positive effect on later language learning (Hopp et al., 2019).

Taken together, the above-mentioned research emphasizes both early and continuous exposure to multiple languages. In contexts where children's home languages are minority languages in society (e.g. Spanish in the U.S.A.), becoming proficient in the instructional language (L2) is beneficial for later foreign language acquisition. Interestingly, in the context of Miami-Dade County Florida, 73.8% of people speak a language other than English at home, and 65.3% of the county population speaks Spanish (US Census, 2017b). In this instance, the student's language of instruction may differ from the majority's language, and children can be exposed to Spanish both at home and outside of school. The level of exposure to L1 and L2 in this setting may differ from prior studies in other developed

countries and can influence foreign language learning differently. Thus, the present thesis studied the relationship between early bilingualism and later foreign language learning in Miami, Florida to determine, among other things, whether previous findings are replicated in this unique sample.

Bilingualism and Cognitive Abilities

Research suggests that language learning is also related to cognitive abilities (Kidd et al., 2018). Particularly, evidence indicates the link between children language development with working memory (Caplan & Waters, 1999; Jones et al., 2007; Just & Carpenter, 1992) and executive function (Novick et al., 2014; Trude & Nozari, 2017; Woodard et al., 2016). In addition, this effect can be extended to second language acquisition to varying degrees (Darcy et al., 2015), while also dependent on individuals' language aptitude and proficiency level (Li, 2015; Serafini & Sanz, 2016). Indeed, a comprehensive review indicated that multilingualism has both a direct and indirect effect on novel language acquisition, and cognitive factors are part of the indirect mechanism allowing bilinguals and multilinguals to effectively learn additional languages (Hirosh & Degani, 2018).

Notably, prior studies demonstrate the association between bilingualism and advantages or benefits in executive function (EF) (Bialystok et al., 2007; Barac et al., 2014; Mishra et al., 2012; Suarez et al., 2014; Vega & Fernandez, 2011). However, recent evidence had called such a relationship into question, revealing the lack of evidence of a bilingual advantage (de Bruin et al., 2015; Lehtonen et al., 2015; Paap et al., 2015; von Bastian et al., 2017). Indeed, even within studies that demonstrate a bilingual effect, the relationship between bilingualism and EF is not straightforward. For instance, degree of second language

(L2) proficiency predicts scores on EF tasks, with higher proficiency associated with better scores (Luo et al., Bialystok, 2010; Mishra et al., 2012; Singh & Mishra, 2012, 2013; Tse & Arriba, 2015). Hence, the degree to which bilinguals may benefit from their language experience is influenced by individual differences and environmental factors.

In research that focuses on DLL students, the rate at which DLL children achieve English proficiency predicts later academic achievement (Halle et al., 2012). Similar math and reading skills are found in DLLs who are proficient in English by kindergarten entry compared to native English-speaking children. Students who demonstrate such proficiency only later show inferior performance compared to their peers and have lower math scores throughout schooling (Halle et al., 2012). Indeed, while acquiring two languages early may bring unique advantages to bilinguals, early English proficiency, when English is the language of instruction, is related to superior academic achievement in elementary school (Rozell et al., 2018).

Evidence also supports the positive link between L1 proficiency in DLLs and academic achievement (Han, 2012). Particularly, the process of learning L2 is benefited from good control of L1 (Ordóñez et al., 2002), and higher Spanish proficiency in low-income children is associated with a faster rate of attaining English proficiency throughout elementary school (Winsler et al., 2014). These students resemble balanced bilinguals – individuals who are highly proficient in both languages. Some recent research indicates that balanced bilingualism is associated with superior performance in EF tasks (Goriot et al., 2018; Iluz-Cohen & Armon-Lotem, 2013; Yow & Li, 2015), and these results replicate in samples of children from low-income families (Thomas-Sunesson et al., 2018).

As the relationship between bilingualism and cognitive abilities is unclear and can be bidirectional, it is challenging to determine whether student multiple language learning later in life is driven by their general aptitude for learning or specific language background and experience. Thus, the present study explored whether student early language experience can predict later multiple language learning, even when accounting for children's early skills and achievement.

Enrollment in Foreign Language Courses

In the context of the United States, where foreign language (FL) learning is not always required in middle school and high school, fewer studies focus on student enrollment in FL courses at these levels. Foreign language enrollment is associated with better performance on college entrance standardized tests such as the Standardized Assessment Test (SAT) (Cooper, 1987; College Entrance Examination Board, 2005). In particular, SAT verbal performance was significantly related to whether students enroll in foreign language courses as well as the length of FL study after controlling for SES and prior verbal ability (Cooper, 1987). Indeed, colleges and university entrance requirements typically include two to three years of FL (Glynn, 2012). Information about FL enrollment in postsecondary institutions is systematically collected (Welles, 2002) and analyzed (Bain, McCallum, Bell, Cochran, & Sawyer, 2010); however, less research focuses on the enrollment of secondary school students.

In a study that examined factors contributing to the enrollment of FL courses in U.S. high schools, analyses reveal that whether the school offered FL courses and whether they are required significantly predicted course enrollment (Finn, 1998). Student characteristics

including race/ethnicity, gender, and education tracks also play a role in student choice of taking a FL course (Finn, 1998; Farkas, 2003; NCES, 2007; Peters, 1994; Tatum, 1997). Through examining high school transcripts of over 20,000 students across the U.S. who graduated in 1994, Finn (1998) found that compared to male students, female students enroll in more foreign language courses, learn a greater number of languages, and generally study foreign language for a greater length of time. Furthermore, African American students took a significantly smaller number of FL courses compared to White students. Also, there is overrepresentation of White students and an absence of students of color in college preparatory courses including FL (Farkas, 2003; NCES, 2007). Finally, being placed in a 'higher' academic track also was related to student enrollment in foreign language courses (Finn, 1998).

Interestingly, students discontinue taking foreign language courses if they have another course they prefer in middle school and if they lose interest in high school (Lemke, 1993). Indeed, some of the motivation for students to take a FL course in the context of little exposure to the target language (e.g. English monolinguals learning French) include interest in the foreign language and people, cultural and intellectual values, and the new information received using the new language (Dörnyei, 1990).

Even though learning foreign languages could be beneficial for later academic achievement, not all students choose to take these courses unless they are mandatory. A recent report revealed that less than 20% of all students from K-12 in the United States enroll in any kind of foreign course; in certain states (e.g. Arizona, Arkansas, New Mexico), the percentage is below 10% (American Councils for International Education [ACIE], 2017).

This number is highly different compared to the percentage of students taking foreign courses in other developed countries in the European Union such as France (99.7%), Czech Republic (98.7%), Germany (62.1%), or Finland (98.6%) (Eurostat, 2017). In general, prior research on foreign language learning and performance is conducted in countries where learning English as a foreign language is mandatory. Thus, in the context of the United States where the majority of people have English as their first and only language, foreign language learning generally is not required for students and leads to the low percentage of enrollment.

Theories concerning motivation for language learning indicated that key reasons for students wanting to learn a foreign language course include their experience, background knowledge, and attitude (Dörnyei, 1998; Oxford & Shearin, 1994; Wesely et al., 2012). Even though previous studies focus on external factors and student characteristics that influence student choice of taking FL, no study has focused on students' language background as being informally and/or formally exposed to multiple languages early in life as a predictor. Hence, the current study attempts to understand the relationship between student language background as being monolinguals, bilinguals, or dual language learners early on and their later enrollment and performance in FL courses in middle school and high school.

The Present Study

The current study used data from the Miami School Readiness Project (MSRP), which is a longitudinal study tracking student in the Miami Dade County Public Schools (MDCPS). The data comprised of five cohorts of children who attended pre-K programs in Miami from 2002 to 2006 and have been followed for 15 years (Winsler et al., 2008). In essence, MSRP is a cohort-sequential, longitudinal design study. The population of the study

is diverse, with the majority of the population in the project being Hispanic/Latinos and over 80% of the sample coming from a low-income background.

Rozell et al. (2018) examined the relationship between the grade at which DLLs achieved English proficiency and later academic achievement in elementary school using MSRP data. DLLs as defined in this study are any students whose first language is not English and must enroll in an English proficiency for Speakers of Other Languages (ESOL) program. Students are tested yearly to determine English proficiency, and they are deemed proficient in English if they achieve level 5 (highest level) in the test and they no longer enroll in the ESOL program (Rozell et al., 2018). In the present study, similar criteria were adopted with slight modification. *Monolingual* students are those whose home language is English as reported by parents. For students whose first language is different from English, students were deemed as *bilinguals* if they were proficient in English by the end of kindergarten and *DLLs* if they were not.

While there are numerous studies focusing on L3 performance as an outcome of bilingualism (Antoniou et al., 2015; Edele et al., 2018; Keshavarz & Astaneh, 2004; Hopp et al., 2019; Maluch et al., 2015; 2016; Schwartz et al., 2007), fewer studies focus on the type of L3 language courses students choose to take. Unlike previous studies on L3 acquisition where students are required to take the language course, high school and middle school students in Miami-Dade County are not required but strongly encouraged to take FL courses (Miami-Dade County Public Schools Curriculum Bulletin [MDCPS-CB], The School Board of Miami-Dade County, Florida, 2019-2020). Taking FL (two courses sequentially in the same language) is emphasized for state university admission as well for advanced programs

(i.e. International Education, International Baccalaureate). In addition, the majority of people in Miami-Dade County speak Spanish, which suggests that taking a Spanish course might be preferred over other language courses. Thus, students in Miami whose home language is Spanish would also be exposed to their L1 outside of the home environment.

In contrast to previous research on the influence of bilingualism on L3 learning that examined a minority home language (Maluch et al., 2015; 2016; Hopp et al., 2019), students in the current study would potentially learn L3 while having a majority L1 (Spanish) which differs from the instructional L2 (English). In the context of Miami, a student whose home language is Spanish would have an L1 as the majority language in their environment. Schools in Miami have English as the official instructional language; thus, the student obtains L2 as English. They may then choose to enroll in another foreign language course such as Italian, making it an L3. These differences in settings may influence language learning differently in our sample compared to the environmental influences in previous research. On the other hand, if the student's home language is Italian (L1) and they obtain the instructional language being English (L2), living in a majority Spanish-speaking environment may influence whether they choose to take Spanish for foreign language learning (L3). For these reasons, analyses in the present study examined L3 learning of bilinguals in a novel and unique environmental context.

In addition to exploring the association between student early exposure and later language learning, student characteristics were included in the analyses. Winsler et al. (2014) suggests that children's early socioemotional skills are associated with a faster rate of students achieving proficiency in the instructional language (English – L2). Combined with

prior research indicating the link between bilingualism and cognitive abilities, student school readiness measures which assess children's early cognitive and socio-emotional skills were included as covariates to address whether they associate with later foreign language course choice and performance.

Furthermore, as mentioned above, Rozell et al. (2018) investigated the link between student rate of becoming proficient in the instructional language (English – L2) and elementary academic achievement. Thus, it is reasonable to assume that student general language learning may relate to early academic achievement. Other studies conducted using the same dataset also indicate that elementary academic achievement are unique predictors of middle school and high school courses enrollment, especially in courses that are not required such as arts and music courses (Alegrado & Winsler, 2019; Winsler et al., 2019), or courses in specific academic tracks such as gifted courses (Ricciardi, 2018). For example, if a student does not perform well in class, they may fail and must retake a mandatory course. If so, electives such as foreign language classes are not prioritized and will not be taken by the student. For these reasons, student elementary school academic achievements were taken into account when examining predictors for foreign language enrollment and performance.

The present study addressed the following research question: 1) How many students chose to take foreign language courses in middle and high school? 2) When taking into account various child-level covariates (demographic information, early school readiness, and elementary academic achievement), does child language status (monolingual, DLL, and bilingual) in kindergarten predict later foreign language enrollment? 3) Similarly, does children's language status (after accounting for child-level covariates) predict performance in

these courses? and finally, 4) What is the relationship between performance in Spanish and performance in other non-Spanish courses of students who enrolled in both type of classes? Does student language status influence this relationship?

METHOD

Participants

A subset of students from the Miami School Readiness Project (MSRP; Winsler et al., 2008) was analyzed in the present thesis. The MSRP follows five cohorts of children from 2002 to 2007 in Miami-Dade County from the age of four throughout high school. Children were enrolled in public school pre-K programs or qualified to receive childcare subsidies for low-income families at age 4 (Winsler et al., 2008). School readiness assessments were administrated at age four to students to evaluate their cognitive, language, socio-emotional, and motor skills. School information, including grades, courses taken, and standardized test scores, was collected yearly beginning in kindergarten (Winsler et al., 2008, 2012, 2014).

For the purpose of the current study, the sample includes students who a) had end-of-the-year GPA data in 6th grade (the first grade of middle school) or later, since 6th graders are presented with their first opportunity to take foreign language classes, and b) students whose early language status could be determined (N = 33,247, see Table 1). The sample was 47.7% female with 81.8% of students in poverty as defined by receiving free or reduced lunch in 6th grade. Students in the sample are ethnically diverse, with 58.8% Hispanic/Latinx, 33.4% Black/African American, and 6.9% White/Asian/other. I used the data obtained in 2016-2017, during which some students in our sample are still completing high school. Cohort A

and B had completed 12th grade (n = 11,833; 35.6%), while the other three cohorts had only completed 11th (cohort C), 10th (cohort D), and 9th (cohort E) grade.

Table 1. ***Demographic Information of Full Sample***

Total Sample	N = 33,247
Has 6th Grade Data	n = 31,641
Has 7th Grade Data	n = 31,090
Has 8th Grade Data	n = 29,648
Has 9th Grade Data	n = 24,652
Has 10th Grade Data	n = 18,494
Has 11th Grade Data	n = 11,174
Has 12th Grade Data	n = 4,965
Gender	
Male	17,303 (52.3%)
Female	15,753 (47.7%)
Ethnicity	
Hispanic	19,414 (58.8%)
Black	11,349 (34.4%)
White/Asian/Other	2,272 (6.9%)
Poverty status (6th grade)	
Received Free/Reduced Lunch	25,942 (81.8%)
Did not receive free/reduced lunch	5,788 (18.2%)
Disability status (6th grade)	
Has a disability	5,604 (18.1%)
Non-disabled	25,298 (81.9%)
Language Status (end of K)	
Monolingual	13,794 (41.5%)
Dual language learner	14,274 (42.9%)
Bilingual	5,179 (15.6%)
	M (SD)
School Readiness Skills (Nat. Percentiles)	
LAP-D (1-99 scale)	
Cognitive Skills	51.97 (30.38)
DECA (1-99 scale)	
Social Skills (TPF)	58.79 (28.09)
Behavioral Concerns	46.88 (29.54)
5th Grade Elementary Academic Achievement	
FCAT Math (1-5 scale)	2.08 (1.28)
FCAT Reading (1-5 scale)	2.10 (1.27)
GPA (0-4 scale)	3.18 (.53)

Measures

Language Status

Students were classified into one of three categories: English monolingual, dual language learner (DLL), or bilingual. ELL status of children (as defined by the school) in the MSRP is determined by the school district if parent report indicated there was a primary home language different from English, in which case English proficiency assessment scores were obtained between kindergarten and fifth grade for those receiving bilingual education (Kim et al., 2014). Students complete a yearly proficiency test to determine English proficiency for Speakers of Other Languages (ESOL), either the Miami-Dade County Oral Language Proficiency Scale-Revised ([M-DCOLPS-R]; Abella, Urrita, & Schneiderman, 2005) between 2003 and 2007 and/or the Comprehensive English Language Learning Assessment ([CELLA], Florida Department of Education [FDOE], 2015) between the years of 2006 and 2015.

The M-DCOLPS-R has 25 items ranging from 1-25, with each correct answer corresponding to one point. A score of 20 or above is equivalent to ESOL level 5, indicating that the student has sufficient English proficiency as demonstrated in understanding and linguistic control of vocabulary, structure, and pronunciation. The CELLA was developed by the Educational Testing Service, and has four subtests including listening, speaking, reading, and writing (FDOE, 2015). Regardless of assessment used, there are five consistent ESOL levels into which students are classified: Novice (Level 1), Low Intermediate (Level 2), High Intermediate (Level 3), Advanced (Level 4), and Independent (Level 5). Student ESOL level

was provided by the school each year, and students exit the ESOL program when they reach level 5.

For the purpose of the current study, monolingual students are those whose home language reported by parents at pre-K and kindergarten was English and who never enrolled in bilingual education services. Students who had another non-English home language and had yet to reach ESOL level 5 by the end of kindergarten were considered *DLLs*. Children with other home languages who were "proficient" in English by kindergarten (reached level 5 or were never enrolled in ESOL programs) were considered *bilinguals*. A language status variable was created using the combined information of *home language*, *ELL status* (Kim et al., 2014), and *ESOL level* in kindergarten. A master home language variable was created using the home language reported by parents in either kindergarten or first grade (for those who didn't have one for K). All students whose home language was English and were never enrolled in the ESOL program were given a value of 1 = *monolingual* for language status (*n* = 13,794; 41.5%). Students whose home language was not English and were enrolled in ESOL programs with English proficiency less than 5 at the end of kindergarten were given a value of 2 = *DLL* (*n* = 14,274; 42.9%). The rest of the students who were never enrolled in an ESOL program or who reached ESOL level 5 by kindergarten were given a value of 3 = *bilingual* (*n* = 5,179; 15.6%).

Child-Level Covariates

Demographic.

Gender. Gender information was obtained using school records with 1 = male, 0 = female.

Race/Ethnicity. The school district collected race/ethnicity of students. In the current analysis, race/ethnicity is coded into three categories: "Hispanic" (58.8%, *n* = 19,414) "Black" (34.4%, *n* = 11,349), and "White/Asian/Other" (6.9%, *n* = 2,272).

Reduced/Free Lunch Status. Student's lunch status serves as a proxy for poverty. Poverty status is determined by a student's eligibility for free or reduced lunch in 6th grade, using family meal application completed by the primary caregiver at the beginning of the year. To qualify for free lunch, students must be at 130% of the federal poverty line; to qualify for reduced-price lunch, students must be at 185% of the poverty line. Free/reduced lunch status was coded as 1 = yes (*n* = 25,942 82%) and 0 = no (*n* = 5,788, 18%).

Disability Status. Every year, the district identifies students who have autism, visual impairment, deafness, brain injury, specific learning disability, intellectual disability, speech/language disorder, emotional disturbance, or another health impairment, and these were coded under primary exceptionality (not including gifted status). Disability status in 6th grade was coded as 0 for a student not determined to have any of the described exceptionality statuses and 1 for students who had at least one of these codes.

School Readiness.

Cognitive skills at age 4. Children were administered The Learning Accomplishment Profile-Diagnostic (LAP-D; Nehring, Nehring, Bruni, & Randolph, 1992) at the beginning (September/October) and end (April/May) of pre-kindergarten year. The LAP-D is a national norm-reference developmental assessment which contains four domains: cognitive, language, fine motor, and gross motor. Assessments were given in either English or Spanish based on child's strongest language as determined by the assessor and their teachers, and children were

individually assessed (Winsler et al., 2008). For the purpose of the present study, percentile scores from the cognitive subscale were used to measure children's cognitive skills at age 4.

Socio-emotional skills and behavior at age 4. At the beginning and end of the pre-kindergarten year, the Devereux Early Childhood Assessment (DECA; LeBuffe & Naglieri, 1999) was filled out by parents and preschool teachers to measure children's socio-emotional skills and behavior problems. The DECA is a nationally standardized assessment available in English and Spanish with 37 items in four subscales: initiative, attachment, self-control, and behavior concerns. DECA scores were determined as two main constructs: *total socioemotional protective factors*, (27 items assessing initiative, attachment, and self-control) and *behavioral concerns* (10 items identifying problematic behaviors).

The DECA is frequently used to measure socio-emotional skills in early childhood (Stewart-Brown & Edmunds, 2003). In addition, even in ethnically diverse and low-income children, the scale retains its integrity, an important factor for the present sample of interest. In the MSRP, internal consistency alpha ranges from .71 to .94 (Crane, Mincic, & Winsler, 2011). Prior research using the same dataset demonstrated that early socio-emotional skills influence DLL students' speed of English acquisition (Winsler et al., 2014). Thus, students' DECA scores (*social skills* and *behavior concerns*) from the latest time point were included in the analyses. In particular, preschool teacher's DECA ratings at the end of pre-K were used (n = 19,159; 69.7%); if this score were missing, teacher's DECA rating at the beginning of pre-K were used (n = 8,321; 30.3%).

Elementary Academic Achievement.

Fifth Grade Standardized Test Scores. Students completed the state-wide Florida Comprehensive Assessment Test (FCAT) beginning in third grade to assess achievement in several subjects (FDOE, 2019a). Both a standard score and a proficiency category were given to students, with proficiency ranging from 1 (little success with the challenging content) to 5 (success with the most challenging content) (FDOE, 2019a). The FCAT is a high-stakes test which determines students' retention within some grades. In the 2010-2011 school year, the state of Florida changed the standardized test from the FCAT to the very different FCAT-2 (FDOE, 2019a). Thus, students in our sample will have taken only one of these tests within 5^{th} grade but some took different versions of the test. Due to this discrepancy, FCAT proficiency ordinal scores (1-5 scale) were included in our analyses instead of the standard scores (which were on different scales). In the current sample, 53.4% of the students took FCAT-1 (n = 16,262), and the rest took FCAT-2 (n = 14,182, 46.6%) in 5^{th} grade.

For the purpose of the present study, the FCAT (English) reading score in fifth grade was used as a covariate measure of prior academic language performance. The reading subtest consists of three subsections – Word Study Skills, Sounds and Letters, and Sentence Reading (in English) – in order to assess vocabulary, phonemic awareness, decoding, phonics, and comprehension at age-appropriate levels (Pearson Assessments, n.d.). In addition, I conducted additional analyses replacing the reading score with the math score. Theoretically, the FCAT math score would demonstrate student general ability, while the FCAT reading score is more influenced by student English language skills. I examined how these different, albeit highly related constructs (Pearson's correlation ranging from .63 to .89

for math and reading; Roseboom, 2016) with students' later foreign language performance and selection.

Fifth Grade Grade Point Average (GPA). Teacher-assigned grades across all subject areas for each year of students are provided by schools in the Miami-Dade County and we converted these to a 5-point scale: 4.0 = A, 3.0 = B, 2.0 = C, 1.0 = D, 0.0 = F and calculated the overall average (GPA) across all subject/course areas. Student GPA in 5th grade was used as a covariate measure of overall academic performance.

Foreign Language Learning

The MSRP tracked five cohorts of students for over 15 years from 2002-2016. Thus, the first cohort of students reached 6th grade (the grade at which middle school begins in Miami) in 2009. By 2013, all five cohorts had reached middle school and were presented with the opportunity to take middle school and later high school foreign language courses. In the present study, student's enrollment and performance in these classes were determined at each grade level and combined to create overall variables determining if students had ever taken any foreign language course of different kinds and average performance in these courses.

Enrollment. Foreign language (FL) course information was obtained every year beginning in middle school. Since the majority language in Miami is Spanish, I explored Spanish courses separately from other languages. For this reason, I created four different variables to determine students' enrollment, as described below (Error! Reference source not found.).

Table 2. ***Foreign Language Enrollment Flags***

Language Status	Language		Enrollment Flags			
	Home	FL Course	Ever FL	Spanish	Non-Spanish	Additional Language
Monolingual	English	Spanish	1	1	0	1
		Non-Spanish	1	0	1	1
DLL/ Bilingual	Spanish	Spanish	1	1	0	0
		Non-Spanish	1	0	1	1
	Non-Spanish	Spanish	1	1	0	1
		Non-Spanish	1	0	1	1
Any	Any	None	0	0	0	0
		Both*	1	1	1	1

Note. * Enrollment in both Spanish and non-Spanish courses

Total FL Enrollment. Students were flagged if they had ever taken a foreign language course any time between 6th and 12th grade, regardless of the type of language (1 = yes, 0 = no).

Total enrollment was also used to determine access to FL courses. In particular, student flag of enrollment was aggregated by school ID for each grade and combined across each school level (middle school vs. high school) to create a variable indicating whether a school ever had any student enrolled in FL courses in our sample. If the final flag is 0, this would indicate that student may not have access to FL at their particular school. Almost all students (92.5%) attended a middle school, and 100% attended a high school that offered FL courses.

Spanish Enrollment. Students were flagged if they had ever taken a Spanish course any time between 6th and 12th grade (1 = yes, 0 = no).

Non-Spanish FL Enrollment. Students were flagged if they had ever taken a non-Spanish foreign language course any time between 6th and 12th grade (1 = yes, 0 = no). Other foreign language courses that appeared on the transcripts included French, German, Chinese, Russian, Latin, Italian, Greek, Japanese, Portuguese, and Hebrew.

Additional FL Enrollment. Students were flagged if they had ever taken a foreign language course different from both their home language and the instructional language (English) any time between 6th and 12th grade (1 = yes, 0 = no). If students were English monolinguals, they were flagged if they took any FL language course (L1 = English, L2 = other). For DLLs and bilinguals, if students' home language was Spanish, they were flagged if they took a non-Spanish foreign language course (L1 = Spanish, L2 = English, L3 = other); if a student's home language was not Spanish or English, they were flagged for having taken additional FL courses if they took a Spanish course (L1 = other, L2 = English, L3 = Spanish). Table 2 describes students' flags for the enrollment variables based on their language status and course(s) taken.

Performance. Student received a grade for each foreign language course they took (original performance obtained in letter grade – A, B, etc. and converted to a 0 - 4 scale). Grades across all courses were average to create the performance variable. Interestingly, of the 19,752 student who enrolled in some type of foreign language courses, 17.9% (3,543) took more than one language course within a year. Similar distinctions between different

types of language course enrollment were used to created four performance variables as below:

Total FL Performance. Students average performance across all foreign language courses between 6th and 12th grade, regardless of the type of language.

Spanish Performance. Students performance across all Spanish courses between 6th and 12th grade.

Non-Spanish FL Performance. Students' average performance across all types of non-Spanish foreign language course between 6th and 12th grade.

Additional FL Performance. Students' average performance across all *additional FL courses* (as per Table 2) between 6th and 12th grade.

RESULTS

RQ1: How many students chose to take foreign language courses in secondary school?

The first research question was answered using descriptive statistics. Primary frequencies were used to analyze the number of students taking FL courses in each grade level. Table 3 depicts the number and proportion of students enrolled in foreign language courses in secondary school (grade 6-12), broken down by grade and FL type. The 33,247 students with data across 6-12th grade in the present study attended 369 schools in total (including middle schools and high schools). Overall, 19,752 (59.4%) enrolled in some type of FL course at least once from G6 to G12. More specifically, 15,840 (47.7% of the whole sample) enrolled in a Spanish course; 6,600 (19.9%) enrolled in a non-Spanish FL course; and 12,498 (37.6%) enrolled in an additional FL course, defined as a language different from both the home and instructional (English) language.

Further broken down by school level, of the 32,779 students who had middle school data (Table 3**,** 'Ever in Middle School') 27% enrolled in some kind of foreign language course at some point between 6th and 8th grade; 21% enrolled in some type of Spanish course; 9% enrolled in some type of non-Spanish FL course; and 16% enrolled in some type of additional FL course (course enrollment are not mutually exclusive, refer to Error! Reference source not found.). Of the 25,060 students who had high school data, 66% enrolled in some type of foreign language courses, 52% enrolled in Spanish courses, 19% enrolled in non-

Spanish FL courses, and 41% enrolled in additional language courses. Overall, the percentage of students enrolled in Spanish courses is higher, sometimes over twice the percentage of students enrolled in non-Spanish FL courses across all grades.

Table 3. Proportion of *Enrollment* in Foreign Language course*s in Secondary School* by Year and Type of Course

	Ever in Middle School		Ever in High School		Ever in Secondary School	
Total	32,779		25,060		33,247	
Type of Course	*N*	%	*N*	%	*N*	%
Any FL course	8,873	27.1%	16,463	65.7%	19,752	59.4%
Spanish	6,763	20.6%	12,700	51.6%	15,840	47.7%
Non-Spanish	2,924	8.9%	4,658	19.5%	6,600	19.9%
Additional Language*	5,154	15.7%	9,924	40.8%	12,498	37.6%

	Grade 6		Grade 7		Grade 8	
Total	31,641		31,090		29,648	
Type of Course	*N*	%	*N*	%	*N*	%
Any FL course	5,369	17%	5,368	17.3%	5,414	18.3%
Spanish	3,817	12.1%	3,791	12.1%	4,053	13.7%
Non-Spanish	1,916	6.1%	1,899	6.1%	1,595	5.4%
Additional Language*	3,232	10.2%	3,154	10.1%	2,929	9.9%

	Grade 9		Grade 10		Grade 11		Grade 12	
Total	24,652		18,494		11,174		4,965	
Type of Course	*N*	%	*N*	%	*N*	%	*N*	%
Any FL course	7,807	31.7%	9,780	52.9%	6,206	55.5%	2,584	52%
Spanish	5,355	22.1%	7,115	40.1%	4,691	44.2%	2,056	44.4%
Non-Spanish	2,521	10.7%	2,760	16.9%	1,550	16.8%	542	14.2%
Additional Language*	4,523	18.9%	5,594	32.5%	3,786	37.2%	1,609	36.5%

Notes: *Additional language is defined as L2 for monolinguals and L3 for bilinguals and DLLs.

Course categories are not mutually exclusive, a student can enroll in both Spanish and non-Spanish courses. Percentage is calculated using the total sample for that grade/time period.

Looking only at students who enrolled in foreign courses (*n* = 19,752, Table 4), 80.19% of these students enrolled in Spanish courses (*n* = 15,840), while 33.41% enrolled in non-Spanish courses (*n* = 6,600; categories are not mutually exclusive). Notably, 63.27% enrolled in an *additional* language course, which refers to monolingual taking an L2 and DLL/bilinguals taking an L3. Similar patterns were found across different grade level. Between 6th and 12th grade, the percentage of student taking Spanish ranged from 68.59% to 79.57%, taking non-Spanish courses ranged from 20.98% to 35.69%, and taking additional language courses ranged from 54.1% to 62.27% (Table 4).

RQ2: When taking into account various child-level covariates, does student language status in K predict later foreign language enrollment?

Bivariate analyses

For research question 2 regarding enrollment in FL in secondary school, bivariate analyses were first conducted to analyze enrollment by students' demographic, language status, home language, early readiness skills, and elementary academic achievement through a series of chi-squares for categorical predictors and t-tests for continuous predictors. Then, for questions 2 and 3, the data were analyzed using a series of hierarchical multiple regression (either logistic for enrollment or linear for performance) to examine the relationship between early language experience and later foreign language learning, with many covariates included (demographics, school readiness, and elementary academic achievement). Additional analyses were included limiting the sample to DLLs and bilinguals with students' home language (binary Spanish vs. non-Spanish) and ESOL level (continuous scale 1-5) as predictors instead of categorical language status.

I first analyzed various factors that could influence student enrollment in foreign language courses using chi-squares (categorical predictors) and independent t-tests (continuous predictors). Table 5 to Table 7 shows the bivariate relationship between student enrollment in FL with categorical (gender, ethnicity, poverty status, disability status, language status, and home language) and continuous/ordinal (ESOL level, cognitive skills, social skills, behavior concerns, GPA, math, and reading scores) variables, first by total enrollment, then broken down by language type.

Ever Enrollment. Across all types of FL courses ever (Table 5), there appeared to be a gender difference in FL enrollment with a higher proportion of females enrolled (65%) compared to males (55%), $\chi^2(1) = 350.71$, $p < .001$. For ethnicity, Hispanic (65%) and White/Asian/Other (67%) students had comparable enrollment across all FL courses, however, Black students had lower enrollment rates (49%), $\chi^2(2) = 874.26$, $p < .001$. Poverty status was also related to FL enrollment, as 59% of students in poverty enrolled compared to 66% who did not receive free and reduced lunch, $\chi^2(1) = 105.06$, $p < .001$. In addition, an enrollment disparity in FL courses was also seen for disability status, with students with disabilities enrolled in FL course less often (29%) compared to students not disabled (67%), $\chi^2(1) = 2{,}839.56$, $p < .001$.

Student early language status was significantly associated with enrollment in FL courses, $\chi^2(2) = 822.33$, $p < .001$. Early bilinguals had the highest percentage of enrollment (72%), followed by DLLs (63%), followed by monolinguals (51%). Students' home language also predicts enrollment in FL courses, as students who spoke Spanish at home during preschool had the highest proportion of enrollment (66%), followed closely by students

whose home language was other (63%), with student where English was the home language being the least likely to take FL courses (52%), $\chi^2(2) = 624.24$, $p < .001$. Interestingly, English proficiency (ESOL level) in kindergarten of students who enrolled in ESOL programs (1-5 scale; monolinguals were excluded) was significantly higher for students who enrolled later in some type of FL course during middle school and high school than those who did not, $t(25{,}080.98) = 23.58$, $p < .001$, $d = .28$.

Students who enrolled in foreign language courses in secondary school also differed from students who did not on earlier school readiness and achievements, as seen in Table 5. Children who later enrolled in any FL courses between 6th and 12th grade had significantly higher scores in school entry cognitive skills ($t(14{,}306.43) = 25.71$, $p < .001$, $d = .38$) and social skills ($t(20{,}793.54) = 23.85$, $p < .001$, $d = .30$), as well as fewer behavior concerns ($t(21{,}179.26) = -26.92$, $p < .001$, $d = .34$). Similarly, those who enrolled in FL later achieved better academic achievement by the end of elementary school than those who did not, evident in GPA ($t(13{,}529.74) = 40.34$, $p < .001$, $d = .58$), math ($t(27{,}125.38) = 55.56$, $p < .001$, $d = .63$), and reading ($t(26{,}873.1) = 57.35$, $p < .001$, $d = .65$) scores. In summary, the bivariate results clearly suggest that students who take foreign language courses in secondary school are those who are already more advantaged and doing better academically early on in school.

Enrollment by Language. Bivariate analyses were conducted between all predictors and enrollment in Spanish, non-Spanish, and additional language courses (Table 6 and Table 7). Overall, a similar pattern was found across different type of classes, as lower proportion of males, student with a poverty status, and student with a disability status enrolled in foreign language course of various types. Interestingly, while Black students had the lowest

proportion of enrollment in both Spanish and non-Spanish course, a higher proportion of Black student enrolled in additional language compared to Hispanic student (Table 6). Finally, across all language enrollment, compared to student who did not enroll in FL courses, student who enrolled had significantly higher cognitive and social skills, lower behavior concerns, and higher elementary academic achievement (Table 7).

In terms of language status, bilinguals had the highest proportion of enrollment for both Spanish and non-Spanish courses, followed by DLLs, and monolinguals had the lowest proportion of enrollment (Table 6). Within additional language enrollment, bilingual consistently enrolled at a higher rate that DLLs (monolingual enrollment in these courses is equal to overall enrollment proportion). Student home language also related to enrollment in various course type. In Spanish courses, students with a Spanish home language had the highest rate of enrollment (52.1%). In addition, in both non-Spanish and additional language courses, the highest proportion of enrollment came from students with a home language different from English and Spanish (26%). In additional language courses, Spanish student had the lowest proportion of enrollment.

Hierarchical Regression Analysis

A series of hierarchical logistic regression analyses was conducted to analyze the factors predicting enrollment in foreign language courses in general (and in each type of course) using a combination of the predictor variables. The first block of analyses examined demographic variables (gender, ethnicity, poverty, disability status) and student language background. Block 2 consisted of early school readiness skills at age 4, including cognitive skills, social skills, and behavior concerns. Finally, elementary school academic achievement

was added in block 3, with 5th grade GPA, math, and reading scores. Since math and reading scores are highly correlated (r (28,975) = .94, $p < .001$), I included these scores separately in two different models to reduce multicollinearity.

Analyses with full sample. First, analysis was done with the full sample of students, with language status as a predictor in step 1.

Ever foreign language enrollment. Table 8 shows the results of the hierarchical logistic regression for any enrollment ever in foreign language where odds ratios (OR) are provided. An odds ratio greater than 1 indicates an increase in the odds of taking a foreign language course in middle or high school and an odds ratio less than 1 indicates a decrease in the odds of taking a foreign language course compared to the denominator group in the contrast. For categorical variables, *OR* is a function of being on one level of the variable (i.e. reduced/free lunch = yes) compared to the other (reduced/free lunch = no). For continuous variables, *OR* indicates the increase/decrease in odds of FL enrollment with a 1-point increase in the predictor.

Overall, in model 1, poverty, disability status, gender, race/ethnicity, and language status were each unique predictor. Both White/Asian and Hispanic students had similar odds of enrolling in FL courses, and both were significantly more likely to take FL than Black students. Black students had 37% lower odds than White/Asian students, and 35% lower odds than Hispanic students for FL enrollment. Males had 18% fewer odds of taking FL than females. In addition, poverty appeared to hinder students' choice of enrolling in FL, as students who receive FRL had lower odds of taking a FL course than those who do not (*OR* = .631, $p < .001$). Similarly, students with disabilities had significantly lower odds of FL

enrollment compared to those who did not (*OR* = .331, $p < .001$). Of primary interest, controlling for the other demographic variables, bilinguals had the highest odds of enrollment, followed by DLLs, and then monolinguals. Those who were proficient in English early on in K (bilinguals) had 46% higher odds of enrollment than DLLS who were still developing English skills. Student language status appeared is a unique predictor even after controlling for other demographic variables, providing evidence that FL enrollment being influenced by early language exposure.

In model 2, when student school readiness skills were added to the model, only early cognitive skills and behavior concerns significantly predicted later FL enrollment. A 1-point increase in cognitive skills at age 4 was associated with .004 increase in enrollments odds, while a 1-point increase in behavior concerns was associated with .004 decrease in enrollment odds. In other words, a student at the 25th percentile of compared to a student at the 50th percentile (a 25-point difference) in behavior problems at school entry had a 10% increase chance (25 x .004) of enrolling in foreign language in secondary school. Gender, ethnicity, poverty, disability status, and language status remained significant predictors controlling for school-entry skills (although the DLL/bilingual contrast was no longer significant).

In the last block, student elementary academic achievement was entered. GPA and standardized test scores significantly predicted the odds of taking a FL course in middle or high school. A 1-point increase in GPA (e.g. moving from a C to a B) was associated with more than double an increase in the odds of enrolling in FL. Similarly, a 1-point increase in test scores increased the odds of enrollment by about 40% for both math and reading.

Interestingly, disability status and early behavior concerns, remained significant, while gender, ethnicity, poverty status, and cognitive skills (significant in previous steps) no longer predicted enrollment after 5th grade achievement was entered. With all other variables controlled for in the model, it is important to note that early language status still significantly predicted later enrollment in FL courses, which was consistent with my hypothesis. Bilinguals and DLLs had similar odds of enrollment, but both groups had higher odds than monolinguals of taking FL courses later, suggesting that early exposure to multiple languages contributes to desire for foreign language education.

Spanish course enrollment. Table 9 shows the results of models predicting enrollment in any Spanish courses across secondary school. In model 1, similar results were found as ethnicity, poverty status, disability status, and language status uniquely predicted enrollment. However, gender was not related to the odds of enrollment in Spanish courses. Notably, for Spanish classes, Hispanic and White/Asian students had similar odds of enrollment, both higher than Black students (by 35% and 23% respectively). For language status, the only difference in odds of enrollment exist between bilinguals and monolinguals (13% higher odds for bilinguals).

In model 2, early cognitive skills and behavior concerns significantly predicted Spanish course enrollment as was the case for overall FL enrollment. However, language status was no longer a significant predictor after school readiness skills were entered. In model 3, 5th grade GPA, math and reading scores, ethnicity, lunch status, disability status, and behavior concerns significantly related to odds of enrollment in Spanish courses, and the rest of the covariates were no longer significant. Interestingly, after school performance was

held constant, ethnic differences became significant, with Hispanic students being more likely than both White/other and Black students to take specifically Spanish courses.

Non-Spanish FL course enrollment. Similar results were found for models predicting enrollment of non-Spanish courses compared to general FL enrollment (Table 10). In model 1, all demographic predictors and language status were significantly associated with odds of enrollment in non-Spanish courses middle school and high school, except for poverty status which was unrelated to non-Spanish course enrollment. Similar to findings for Spanish courses, Black students had the lowest odds of enrollment, lower than both Hispanic and White/Asian students (by 35% and 32% respectively). DLLs and bilinguals had similar odds of enrollment, and both had more than twice the odds of enrollment over monolingual students.

In model 2, only cognitive skill at age 4 was a significant predictor. Finally, in model 3, elementary academic achievements (GPA, math, and reading) significantly predicted later enrollment of non-Spanish courses, as well as all significant predictors in model 2 except for cognitive skills. These findings suggest that for non-Spanish courses, early exposure to multiple languages significantly predicts later course enrollment, after controlling for other covariates including demographic and elementary achievement.

Additional FL course enrollment. Additional language was defined as L2 for monolinguals and L3 for DLLs and bilinguals. Some opposite trends were found when predicting the enrollment of additional foreign language courses (Table 11). Hispanic students were less likely to take additional FL courses compared to White and Black students. Monolinguals had the higher odds of enrollment compared to both DLLs and

bilinguals, who exhibited similar odds. This may be due to the coding of the variable, given that *any* language other than English counted as an additional language for monolinguals, but for DLLs and bilinguals it had to be a rarer L3 language to count.

Analyses within DLLs and Bilinguals. The above analyses examined language background as a categorical variable (monolinguals, bilinguals, DLLs; n = 13,645). Additional analyses were conducted limiting the sample to DLLs and bilinguals to examine more closely the role of home language and English proficiency in Kindergarten (as a continuous variable) in predicting later enrollment in foreign language courses (n = 6,025). Essentially, the same models were run as above but the sample was limited to DLLs and bilinguals with Spanish home language (1 = yes, 0 = no) and English proficiency in Kindergarten (range 1-5) replaced language status as predictors. Only reading scores were included in these models.

Overall, similar findings were found compare to the analyses with to full sample (Table 12-Table 15). However, home language (whether it was Spanish or other) was not a significant predictor of enrollment within the subsample of students who were exposed early to multiple languages. English proficiency in Kindergarten was not related to later FL course taking. The only instance where having a Spanish home language mattered was for additional FL course taking (which in this subsample is equivalent to a known L3), where having Spanish as the home language significantly lower the odds of enrollment is L3 FL courses. Thus, having a rarer home language (non English or Spanish) was linked with taking L3 courses later, probably because Spanish, an obvious and frequently available and popular choice for a foreign language course in this context, counts as an L3 for that group.

RQ3: When taking into account various child-level covariates, does student language status in K predict later foreign language *performance*?

The above analyses all had to do with selection into FL courses. Here, I examined whether performance in FL courses differed as a function of early language status. Similar to the analyses predicting enrollment, a series of hierarchical linear multiple regression models was run with similar step sequences, first in the full sample of FL course takers (n = 10,089), then later limited to DLLs and bilinguals (n = 8,740). Table 16 - Table 20 show the models predicting student performance in foreign language class for the full sample (with betas as the coefficient listed rather than odds ratios).

Analyses with full sample.

Total foreign language performance. Demographic and language status were entered in step 1 as predictors (Table 16). The model significantly predicted average performance (GPA) across all foreign language courses taken by students, $F(7,10,081) = 140.83$, $p < .001$, $R^2_{adjusted} = .088$. Specifically, White and Asian students earned significantly higher average grades than both Hispanic ($B_{Hispanic/White} = -.152$, $p < .001$) and Black students ($B_{Black/White} = -.265$, $p < .001$). In addition, Hispanic students also outperformed Black students ($B = .113$, $p < .001$). On average, female students scored .38 higher GPAs compared to male students ($p < .001$), students in poverty scored .31 SDs lower than student who did not ($p < .001$), and disabled student had lower performance than students not diagnosed with a disability ($B = -.266$, $p < .001$). More importantly, after controlling for demographic covariates, language status significantly predicted student performance in FL courses. Monolinguals underperformed compared to both DLLs ($B_{DLL/monolingual} = .131$, $p < .001$) and bilinguals

($B_{bilingual/monolingual}$ = .204, p < .001), and bilinguals also outperformed DLLs ($B_{DLL/bilingual}$ = -.074, p < .001).

In step 2, early school readiness skills were added to the model, and the model significantly predicted student performance in language courses (F(10,10078) = 121.91, p < .001, $R^2_{adjusted}$ = .107), and significantly improved the prediction compared to model 1 (R^2_{change} = .019, p < .001). Cognitive skills (B = .003, p < .001), social skills (B = .001, p = .002), and behavior concerns (B = -.002, p < .001) were all significant predictors. Students with higher cognitive skills and socials skills at age 4 outperformed students with lower scores in these skills. In addition, students with lower behavior problems in preschool had higher average scores in FL courses compared to those with higher behavior concerns. Demographic factors remained significant. Of note, with school-entry skills added, there were no longer significant differences between DLLs and bilinguals in FL GPA (B = -.025, p = .29). Thus, once early school readiness was added to the model, students who were exposed to multiple languages early on performed similarly within their own group and consistently outperformed monolinguals.

The last model added the influence of 5th grade achievement on middle school and high school FL performance. Model 3 significantly predicted students' performance in foreign language courses (F(12,10076) = 151.05, p < .001, $R^2_{adjusted}$ = .22), above and beyond compared to the previous model (R^2_{change} = .113, p < .001). Academic achievement at the end of elementary significantly predicted students' performance in FL courses. GPA (B = .683, p < .001), math (B = .024, p < .001), and reading scores (B = .027, p < .001) were associated with better performance all across all FL courses. Interestingly, ethnicity, disability status,

and early cognitive skills were no longer significant predictors in this model with 5th grade performance added. Overall, language status remained a significant predictor of performance in FL courses taken in middle schools and high school in the expected direction, suggesting that early language exposure may influence later language learning.

Spanish performance. Similar patterns were found for average Spanish course performance across middle school and high school. Overall, model 1 significantly predicted performance ($F(7,8109) = 123.75$, $p < .001$, $R^2_{adjusted} = .096$), and all the same predictors were significantly associated with student grades in Spanish courses. In terms of language status, while both bilinguals ($B = .199$, $p < .001$) and DLLs ($B = .155$, $p < .001$) outperformed monolinguals, they achieved similar grades in these courses ($B = -.044$, $p = .08$). In model 2, all the early school readiness skills significant predicted Spanish performance, as children with higher cognitive and social skills at age 4 achieved higher grades in Spanish courses over 7 years later. However, by model 3, only behavior concerns remained a significant predictor ($B = -.001$, $p = .018$). In addition, the only differences in performance pertaining to ethnicity existed between Black and White/Asian students, with the latter group earning .076 higher on average in Spanish grades ($p = .043$). Disability status was no longer a significant predictor in this step ($p = .9$). Furthermore, elementary academic achievement significantly predicted grades in Spanish courses, and DLLs and bilinguals consistently outperformed monolinguals after controlling for other covariates (Table 17).

Non-Spanish FL performance. Similar pattern of results was found for performance in non-Spanish courses compared to Spanish and any FL courses. By model 3, significant differences in performance were found between Hispanic and Black students ($B_{Hispanic/Black} = -$

.221, $p < .001$), male and female students ($B_{male} = -.273$, $p < .001$), students who received free and reduced lunch and those who did not ($B = -.146$, $p < .001$). In addition, GPA ($B = .933$, $p < .001$), math ($B = .047$, $p < .001$), and reading scores ($B = .052$, $p < .001$) significantly predicted grades across non-Spanish FL courses. Most importantly, DLLs and bilinguals had comparable performance in these courses, and both outperformed monolinguals (Table 18).

Additional FL performance. Interestingly, when examining performance in additional language courses, language status was no longer a significant predictor by step 3. These results suggested that DLLs and bilinguals do not necessarily perform better nor worse in learning an L3 compared to monolinguals' performance in L2 (Table 19).

Analyses within DLLs and Bilinguals. Identical to analyses for predicting enrollment, the sample was then limited to DLLs and bilinguals with different language background predictors (home language and ESOL level instead of language status). In general, similar patterns were found for all covariates (Table 20-Table 23). Within the sample of students whose home language was different from English, by the last step of analyses, English proficiency in kindergarten was a unique positive predictor for performance across all FL courses in middle school and high school ($B = .017$, $p = .002$). The effect was consistent for Spanish courses ($B = .015$, $p = .01$), non-Spanish courses ($B = .021$, $p = .041$), and L3 courses ($B = .028$, $p < .001$). Notably, home language significantly predicted performance in Spanish and L3 courses. Students whose home language was Spanish earned, on average, .081 higher grades (0-4 GPA scale) in Spanish courses ($p = .012$) and .256 lower grade in L3 courses compared to students with a different home

language. In other words, it appeared that DLLs and bilinguals in our sample with a non-Spanish home language performed better in Spanish than Spanish-speaking students in non-Spanish courses.

RQ4: What is the relationship between performance in Spanish and performance in other non-Spanish courses of students who enrolled in both type of classes? Does student language status influence this relationship?

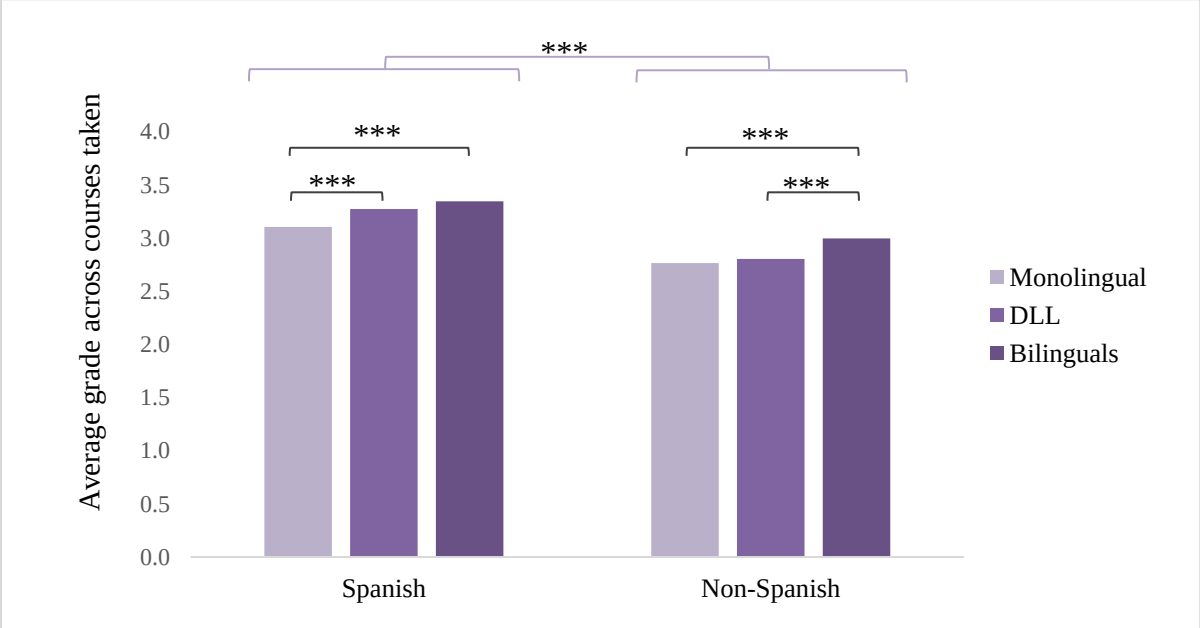
For the final questions regarding students who enrolled in both Spanish and non-Spanish FL courses, Pearson correlations, dependent t-tests, and multivariate analysis of covariance (MANOVA) were conducted for students' grade in these courses. Within our sample of students, 2,688 enrolled in both Spanish and non-Spanish courses in secondary school. I found that student performance in these courses related to each other, as student who performed well in Spanish courses also performed well in their non-Spanish courses ($r(2,587) = .41$, $p < .001$) (Figure 2). Paired sample t-tests revealed that Spanish grades ($M = 3.26$, $SD = .88$) were significantly higher than non-Spanish course grades ($M = 2.84$, $SD = 1.12$), $t(2,588) = 19.043$, $p < .001$, $d = .42$. Hence, consistent with our hypothesis, students appeared to perform better in Spanish courses compared to non-Spanish courses (Figure 1).

Finally, I ran a one-way MANOVA with student language status as the predictor and average grades across Spanish and non-Spanish courses as outcome (Figure 1). There was a statistically significant difference in language course performance based on student language status, $F(4, 5134) = 8.115$, $p < .001$; Wilk's $\Lambda = 0.988$, partial $\eta^2 = .006$. More specifically, language status had a statistically significant effect on average grades of both Spanish ($F(2,$

2586) = 11.236; $p < .001$; partial $\eta^2 = .009$) and non-Spanish courses ($F(2, 2586) = 8.029$; $p < .001$; partial $\eta^2 = .006$).

Post-hoc analyses revealed that the average grades across Spanish courses were different between monolinguals and DLLs ($p = .001$), between monolinguals and bilinguals ($p < .001$), but not between DLLs and bilinguals ($p = .239$). The average grades across non-Spanish courses were statistically significantly different between monolinguals and bilinguals ($p = .001$), between DLLs and bilinguals ($p < .001$), but not between monolinguals and DLLs ($p = .769$). In sum, of the sample of students who enrolled in both Spanish and non-Spanish courses, both bilinguals and DLLs outperformed monolinguals in Spanish courses, while bilinguals outperformed both monolinguals and DLLs in non-Spanish courses.

Figure 1. ***Average grades across Spanish courses and non-Spanish courses by student Language Status***



DISCUSSION

The current study was the first of its kind to consider student early language exposure as a factor contributing to students' choice of enrolling in foreign languages, especially in the context of the United States where foreign language (FL) learning is encouraged but not required. In addition, one of the main questions was not only whether language status predicts enrollment and performance in FL classes, but also if the effect is still present once early skills and academic achievement are accounted for.

Overall, in our sample of students in Miami Dade County, students who had higher general abilities were more likely to enroll in and have better performance in FL courses. Interestingly, language status remained a unique predictor after controlling for student covariates. Consistent with our expectation, we found that bilinguals had the highest odds of enrolling in FL courses, follow by DLLs, and monolinguals. Furthermore, bilinguals and DLLs both outperformed monolinguals in FL courses, regardless of whether the FL course was Spanish or non-Spanish. Findings also reveal different nuances pertaining to the type of languages student took, as further described below. In general, our results offer novel findings to support the benefit of early exposure to two languages, as well as emphasizing support for the home language of minority students.

FL Rates of Enrollment

There is little research on course-taking in FL courses during secondary school. A 10-year initiative proposed in 2014 noted that a future goal for FL learning is that "100% of learners in U.S. education system with exposure to international perspectives, culture and/or language" (Abbott et al., 2013, p. 5). Currently in the U.S., only 20% of students across the country enroll in some type of foreign language sometime between K-12 (AICE, 2017). Our findings cannot be compared directly to these reports, as rates of enrollment were not broken down by school level and by states. The most recent reports available for high school enrollment only have data available in 2009, when 88.5% of all high school graduates took some kind of foreign language course in high school (NCES, 2018). This is higher than the findings in the present study, with only 65.7% of high school students in our sample enrolling sometime in high school.

Prior research and reports about FL enrollment generally focus on undergraduate and graduate students (Looney & Jusin, 2019). Even when data are collected between K-12, the emphasis is typically placed on high school course-taking instead of at earlier levels (AICE, 2017; Met & Brandt, 2017; NCES, 2018). The present study is one of the few that has rates of enrollment for middle school students. Indeed, a much lower percentage of students enrolled in middle school (27.1%), and this number is lower than national estimates in 2008, which show that within middle schools that offered FL, 36% enrolled (Pufahl & Rhodes, 2011). Thus, our results suggest similar trends in enrollment of foreign languages in middle school and high school, as the rates of enrollment in middle school are less than half the rate in high school.

Interestingly, Kissau and colleagues (2015) argued that students who a learn a new language beginning in middle school have higher proficiency and motivation than those who start learning FL in high school with similar levels of experience. Furthermore, their qualitative interviews showed that students who started later in FL courses felt overwhelmed by class demands in high school and were more anxious than earlier starters in oral communication in the foreign language (Kissau et al., 2015). Since our findings reveal similar enrollment trends as prior research, we argue that students should be introduced and encouraged to enroll in FL classes as early as middle school.

It must be noted that rates of enrollment in our sample were lower compared to prior research with national samples. A potential explanation comes from the nature of the sample, as the majority of students were from low-income families, which may serve as a barrier for enrolling in FL courses. Notably, only 4 out of 50 states in the U.S. have FL enrollment as a requirement for high school graduation by 2014 (Met & Brandt, 2017), and these courses are not mandatory in the state of Florida (FDOE, 2019b) at the time of the present study. Courses that are deemed as *electives* may not be of primary priority for students in poverty, resulting in lower percentages of enrollment in our sample. Indeed, analyses revealed that students who met the requirement for reduced and free lunch were less likely to take FL compared to students who did not. Interestingly, the Modern Language Association (Looney & Jusin, 2019) revealed that enrollment in FL courses for students in higher education decreased overall by 9.2% from 2013 to 2016. While our analyses did not account for whether student enrollment decreases across the years, it is possible that these trends also exist within

secondary schools and helps to explain the slightly lower rate of enrollment in the present sample.

As expected, the majority of students who enrolled in foreign courses chose Spanish courses (80.19%) in this community. These findings are consistent with national data depicting Spanish as the most popular foreign language (69% K-12) and Spanish is the most widely taught language in all states and federal districts (AICE, 2017). Especially in the context of Miami, where the majority language is actually Spanish, it is unsurprising that most students decided to enroll in these courses. Around 30% of students who took FL courses enrolled in one of the other languages: French, German, Chinese, Russian, Latin, Italian, Greek, Japanese, Portuguese, and Hebrew. According to national data, the next most enrolled language courses after Spanish is French, followed by German and Chinese. While the current analyses did not provide any distinction between heritage language classes and foreign language classes, Spanish is overwhelmingly popular among students of all levels, and our data support these notions. Indeed, learning Spanish could be considered an advantage in terms of communication in the context of South Florida.

Gender

Both bivariate and multivariate analyses revealed unique contributions of gender for course-taking and performance in FL. Specifically, male students were less likely to enroll and consistently underperformed compared to female students in FL courses, regardless of language type. Prior research reports similar results, as more female students typically enroll in advanced courses including FL (Corra et al., 2011). Female students are reported to be more confident (Nikitina, 2007), demonstrate a higher level of motivation (Öztürk & Gürbüz,

2013; Shaaban & Ghaith, 2000), have a positive attitude (Kobayashi, 2002), and tend to outperform male students in FL learning (van der Slik et al., 2015). While learning strategies may contribute to the gender differences in FL learning, social elements and student personal beliefs that those who are adept in science subjects are less able to learn languages may also contribute to these differences observed (Kobayashi, 2010; Nikitina, 2007). Indeed, even though we had a higher percentage of male students in the total sample, more female students enrolled in FL (see **Table** 1 and **Table** 5). It is crucial that school systems and teachers encourage all students to take FL and not only female students, in order to provide all with equal opportunity to be exposed to and gain benefit from learning a new language.

Ethnicity

We found that White and Asian students had similar enrollment rates as Hispanic students across all types of FL courses, including Spanish and non-Spanish courses. Even in this sample where over 60% of students were Hispanic, White and Asian students still had slightly higher rates (albeit not significant) of taking FL courses. Indeed, an overrepresentation of White students and a relative absence of students of color in college preparatory courses including FL is reported elsewhere (Farkas, 2003; NCES, 2007; Peters, 1994; Tatum, 1997). In addition, Black/African American students in our study were the least likely to take FL courses compared to both Hispanic, White, and Asian students, even after controlling for poverty status and other factors. In addition to enrollment, ethnicity was significantly related to performance in FL courses, with White and Asian students having the highest average performance, followed by Hispanic, and Black students. These findings are consistent with previous research, both at the secondary level and college level (NCES 2007,

2009). African American students, while not necessarily opposed to FL learning and certainly being able to achieve success in these courses, chose to enroll in them at smaller rates than other students (Baggett, 2016; Moore & English, 1998; Moore, 2005; Pratt 2012). Despite having positive attitudes about language learning, "Black students in the past were usually counseled out of the foreign language field with the reasoning that the subject would be too difficult and that they would never need it" (Hubbard, 2014, p. 300). These practices contributed to the belief historically that there may be little to no benefits in studying FL for academic purposes (Schoener & McKenzie, 2016).

In addition, the low rates of enrollment in foreign language courses may be a result of their not doing as well in school compared to their peers for a variety of reasons, which could lead Black students to have fewer elective course options due to the need to take remedial courses. In particular, when only demographic information was included in the analysis, Black students had 37% and 35% lowers odds than White and Hispanic students, respectively, and this effect remained consistent even when early skills were controlled for in the model. Indeed, this appears to be the case because once 5th grade academic achievement was added into the model, odds of enrollment were similar across all ethnicities. Perhaps only Black students who are doing well in school feel up to the task of adding a foreign language. Even when they successful in earlier courses, Black students may believe they will perform poorly at higher levels, thus discontinuing enrollment in FL courses (Glynn, 2008). Hubbard (1980) emphasized that learning foreign languages is especially beneficial for minority students as it can create better future opportunity for economic security, advancement, as well as job prospect. Thus, we argue that in schools that are racially diverse,

it is important for teachers and counselors to encourage students of color to enroll in FL and not simply disregard them in order to focus on courses that are deemed more academically important.

Notably, differences in the odds of enrollment were found in the current thesis between Hispanic and White students for enrollment in Spanish vs. additional language courses. Hispanic students were more likely to take Spanish courses and less likely to take an additional language course compared to White students, suggesting that this group of students may be enrolling primarily in heritage language courses. Even while Black students consistently had the lowest odds of enrollment across all languages, a much higher percentage of Black students enrolled in additional languages (46%) compared to Spanish courses (13%), when these numbers for Hispanic students are 31% and 24% respectively. Indeed, analyses within DLLs revealed that students whose home language was Spanish had lower odds of enrolling in an L3 compared to their counterparts (Table 15). Thus, a large group of our sample can be deemed *heritage language learners* and not necessarily *foreign language learners* (Kelleher, 2010). However, we are unsure whether students' enrollment in Spanish courses were technically enrolled in a "heritage language" program. Nonetheless, about half of the students with a Spanish home language in our sample enrolled in Spanish language courses across middle school and high school (**Table** 6). These are promising numbers since students who speak a minority language at home are generally encouraged to take heritage languages as they may benefit the development of student's cultural identity in addition to better heritage language maintenance (Leeman, 2015).

Poverty

Poverty was a significant predictor for FL enrollment and performance; however, the findings were somewhat complex. Specifically, students who came from low-income backgrounds were less likely to enroll in FL courses as well as underperform compared to their peers with more resources. However, in the third block of variables entered into the regression model where elementary school academic achievement was included, the effect of poverty disappeared for general FL and Spanish enrollment yet remained significant for performance in all courses. Interestingly, no effect of poverty was found in non-Spanish course enrollment. Reasons for the differences in the effect of poverty in course-taking between different languages are unclear. It is possible that enrollment in non-Spanish courses is driven more by personal interest and motivation of students and income background does not influence their choices of enrollment. In addition, a very low percentage of students enrolled in non-Spanish language courses, making it harder to obtain statistical significance across poverty groups. Finally, the majority of students in our sample came from a low-income background, and those who already speak a heritage language may find it unnecessary to enroll in Spanish classes given their usual course load.

Findings on performance differences are largely consistent with prior research on the relationship between poverty and achievement, specifically in language development (Hoff, 2013). It must be noted that the effect on performance remained significant even when 5th-grade variables were taken into account, suggesting that students in poverty do not necessarily underperform in language courses due to a lack of academic competence. One explanation for the differences in the performance of children from different income

backgrounds could be the nature of FL courses as electives. Students in poverty may have additional responsibilities in the household or experience additional stress that prevent them from devoting time to schoolwork (Jensen, 2009). Thus, students in poverty may simply lack the time to practice when learning languages or the financial means to buy supplementary materials and online or real coaching/tutoring, which leads to disparities in performance.

Another explanation for poverty effects may be the role of early language development. Research suggests a long-lasting effect of SES on first language ability and academic achievement (Walker et al., 1994). Particularly, home language is a key predictor of later school outcome, and constraints related to poverty can compromise early language growth, as well as later success in reading and spelling achievement in school. Early differences in language and reading-related achievement persist over time and are not affected much by later schooling (Walker et al., 1994).

Our findings suggest that SES may influence language learning much later on in development, across middle-school and high-school. Children from low-income backgrounds might be exposed to language less in their early development compared to their peers (Schwab & Lew-Williams, 2016), which leads to lower language skills in elementary school. Since our models did not include early language skills but only cognitive skills, we cannot definitively conclude that the effect of poverty cannot be accounted for by language skills prior to school entry. Nonetheless, evidence emphasizes the role of early language exposure for later language learning and development. In addition, as high-poverty schools generally have lower enrollment and resources dedicated to FL learning (Sung et al., 2006), we argue

that educators and policymakers must take these issues into account to improve FL education in high-poverty secondary schools.

Special Education

Students with disabilities had significantly lower rates of enrollment in FL courses compared to their typically developing peers. Specifically, only 29% of students with a disability in our sample enrolled in at least one foreign language course, similar to prior findings of enrollment of students with learning disabilities in high school (26%; Shifrer et al., 2013). Challenges in FL learning for such students have been linked to specific language disability (DiFino & Lombardino, 2004), general learning disability (Sparks et al., 1992), and even attention deficit hyperactivity disorder (ADHD; Sparks et al., 2005). Students classified as having a learning disability often believe they lack the academic skills to succeed in the FL classroom and feel less positive about FL learning despite wanting to learn a foreign language (Sparks et al., 1993). Hence, students with disabilities may be actively choosing not to enroll in FL courses due to these perceptions. In addition, it is possible that this group of students might be behind their peers academically and must enroll in remedial courses, which leave them with fewer possibilities for electives. However, it must be noted that within our model, disability status remained a significant predictor even when elementary academic achievements were taken into account. Thus, these findings give more support to the idea that students diagnosed as having a disability were actively choosing not to enroll in or counseled out of FL courses if teachers belief in the myth that these courses are inherently more challenging for them (Sparks, 2016).

In terms of predicting performance in FL courses, disability status was initially a significant predictor for performance when only demographic and school readiness skills were included in the model. However, when 5th grade academic performance was taken into account, disability status was no longer related to performance in FL courses. Once student 5th-grade performance was controlled for, students with disabilities performed similarly to their peers. This supports the idea that in reality, students with disabilities although they are more likely to struggle academically in general, do not have a particular challenge when it comes to L2 learning (Sparks, 2008, 2016). More importantly, research suggests that grades in FL courses for students with a learning disability are similar to normal students who are simply low-achieving (Sparks et al., 2008), and the majority of students with a disability who completed these course achieve a grade of C or higher at the post-secondary level (Sparks et al., 2002, 2003). Enrollment in FL courses may be discouraged in schools for students with learning disabilities due to false assumptions about students' abilities (Sparks, 2016). FL courses are beneficial to all students, as well as students with a disability as they can provide pragmatic, cognitive, and cultural gains (Sparks, 2016). Hence, the present findings provide some evidence to dispute faulty beliefs regarding abilities to learn foreign languages among students with disabilities and argue that schools should encourage FL enrollment for these students.

School Readiness and Elementary School Achievements

In general, early cognitive and social skills predicted later foreign language learning, as students with higher skills early in life were more likely to enrolled in and outperform those with initially lower skills. However, once elementary school academic achievement

was added into the models, the effect of both cognitive and social skills in preschool disappeared. Thus, it appears that academic performance by the end of elementary school is a better predictor of both course enrollment and performance than school readiness, with higher GPA and standardized test scores predicting greater FL course-taking and FL achievement. Interestingly, we ran both reading and math scores in different models to determine whether these two different skills differentially influenced later FL learning. Findings suggest that reading and math scores accounted for virtually the same variance across models, provide some evidence supporting the relationship between language learning and general cognitive abilities (Ellis, 2004).

Another finding of importance is the effect of behavior problems at age 4. Notably, even when 5th-grade school performance was included in the model, preschool behavior concerns, but not social skills, significantly predicted middle school and high school enrollment and performance in FL courses. These results provide additional support for the effect of behavior problems on L2 English acquisition found among DLLs in earlier works with the same MSRP sample (Winsler et al., 2014), providing evidence of seemingly long-lasting influence of behavior regulation skills on later language learning. Potentially, students with lower behavior concerns at age 4 developed better self-control earlier in life and had better inhibitory skills, which in turn made them more equipped for multiple language learning later on. Hence, our findings somewhat support a bi-directional relationship between bilingualism and cognitive abilities (Cox et al., 2016). Particularly, children who have better skills become more equipped in language learning and are more proficient in multiples

languages early (Kim et al., 2014), which also provide them with an experience that further advance their cognitive abilities (Bialystok et al., 2007).

It is also possible that those who have higher self-regulation are more successful in learning foreign languages (Wang et al., 2009). However, the effect of behavior problems was not present for enrollment and performance in specifically non-Spanish courses. It is unclear whether the differences stem from the fundamental differences between languages, the context of Miami, or student other characteristics such as motivation. In addition, due to existing differences between enrollment numbers for various language types, non-significant findings could stem from a much smaller sample size used in analyses of other non-Spanish courses. Hence, future research should explore these particular interactions between predictors of course-taking and performance in *non-majority*, *non-instructional* language classes. Nonetheless, our findings demonstrate confirmation for the relationship between cognitive and social skills with language learning and further extend these effects to foreign language selection and achievement.

Language Background

The most important finding of the present study, however, and related to the central goals, was that student early language exposure significantly predicted both enrollment and performance in foreign language classes, even after demographic information, school readiness skills, and elementary school achievement were included in the model. Both bilinguals and DLLs were more likely to enroll in FL courses, and outperformed monolinguals in our sample. Perhaps being exposed to multiple languages early in life allows students to have an optimal condition to naturally learn languages. Indeed, the human brain is

continuously shaped by experience, and bilingualism significantly relates to both structural and functional neurological changes (Berken et al., 2017). Early multiple language exposure creates differences in cortical areas that persist overtime (Klein et al., 2014), allowing the bilingual brain to be more receptive to learning a novel language (Kaiser et al., 2015) comparing to monolinguals. Furthermore, it is possible that both cognitive abilities and bilingual experience are at play, and later language learning is the results of a combined effect (Hirosh & Degani, 2018).

It could also be that students who learn both languages early and continuously seemed to continue their interest in taking language courses due to their early exposure. In this notion, being a simultaneous or an early sequential bilingual may allow the child to have experiences that would later be part of his or her motivation to learn languages, consistent with the language learning motivation theories described in Oxford and Shearin (1994). Indeed, research show that there exists an interplay between language background (monolinguals, bilinguals, and multilinguals), personal motivation based on various aspects of self, and foreign language choices (Thompson, 2017). Therefore, our results offer novel findings to support the benefit of early exposure to two languages in life, as well as provide some support for the maintenance of the home language of minority students.

Interestingly, the odds of enrolling for specifically Spanish courses were the same for all language groups (monolinguals, DLLs, bilinguals). Perhaps in this instance, it is not that DLL or bilingual students lose motivation to learn Spanish, but English monolinguals gain this interest. As previously mentioned, a majority language in Miami is Spanish. Thus, monolingual students in this area may also get exposed to this language on a regular basis,

and therefore choose to take these courses formally in middle school and high school, which are also more readily offered than any other foreign language courses (AICE, 2017). However, DLL and bilinguals consistently outperformed monolinguals even in Spanish courses, suggesting a lasting effect of early language exposure to later language learning. Interestingly, this presents conflicting evidence compared to prior findings on Spanish heritage speakers in college-level Spanish courses. Potowski (2002) found that bilinguals, while having better oral skills, believe that their nonnative peers are stronger in grammar knowledge, resulting in nonnative speakers having higher grades in these courses. It is possible that at the college level, teachers and teaching assistants exhibit a higher level of expectation for heritage speakers (Potowski, 2002), but not yet at the level of secondary school. In addition, heritage language courses are beneficial to heritage learners and these students may perform better in these types of courses (Kondo-Brown, 2010; Matthew & Matthew, 2004). However, the data used in the current analysis did not include information of whether the Spanish courses student enrolled in were heritages language courses or not.

Most of the results discussed above had to do with group comparisons (i.e. bilinguals, DLLs, vs, monolinguals). However, we also performed supplemental analyses continuously just within the DLLs and bilinguals together to see whether odds of enrollment and performance in FL courses were related to stronger English (L2) proficiency in kindergarten. When limiting our analyses to only having children with early multiple language exposure, ESOL level did not predict language enrollment. However, English proficiency by kindergarten predicted performance in FL courses, suggesting that emergent bilinguals who

become proficient in their second language earlier retain benefits in their later language learning, even when cognitive abilities were taken into account.

Interesting results emerged when we examined additional language courses. These courses are deemed as L2 for monolinguals and L3 for bilinguals and DLLs. Findings revealed that monolinguals have similar performance in their L2 learning compared to DLL and bilinguals in L3 learning (Table 19). Our results are consistent with prior studies about L3 learning in context where all students have to enroll in FL classes, i.e. comparing L2 learning of monolinguals to L3 learning in bilinguals (Edele et al., 2018; Hopp et al., 2019; Maluch et la., 2016). Earlier in development, L3 learning by bilinguals is fostered by a strong L1 (minority home language); however, by the end of elementary and early middle school, L2 proficiency is a better predictor (Edele et al., 2018; Hopp et al., 2019). Indeed, within our sample of DLL and bilinguals, English proficiency by the end of kindergarten as well as English reading skills in 5th grades were significant predictors for L3 learning (Table 23). It is also possible that our results show the same effect as Bice and Kroll (2019), who note that monolinguals experience benefit in language learning due to living in a linguistically diverse context. Thus, the present findings reveal complex relationships between student language background, early second language skills, and later foreign language learning. Notably, DLLs and bilinguals who have a non-Spanish language at home significantly outperformed those who did not in L3 acquisition. Hence, results support potential benefits of multiple language exposure early in development, as well as promoting the acquisition of minority home language.

Finally, our findings reveal the potential contribution of language learning contexts. The study takes place in Miami, an environment where the majority language (Spanish) differs from the instructional language (English), and students may also have an additional minority language at home. Thus, consistent with expectation, analyses within the group of students who enrolled in both Spanish and non-Spanish courses revealed significant differences in performance. Students performed better, on average, in their Spanish courses compared to non-Spanish courses, although grades between courses were correlated. The results provide evidence supporting individual differences in language learning ability, as well as emphasize the benefit of consistent language exposure in language learning. In Spanish courses, both bilinguals and DLLs outperformed compared to monolinguals; however, in non-Spanish courses, bilinguals outperformed both monolinguals and DLLs. Perhaps becoming proficient in two languages prior to formal education allows these students to have an optimal condition to naturally learn languages and become more adept in language learning, even when the language learned is unfamiliar in the environment. For these reasons, we argue that home languages should be maintained and fostered, and at the same time, caregivers should seek opportunities to expose children to the instructional language.

Limitations

One of the limitations comes from the nature of the sample. While the data have many advantages, including a longitudinal design and large sample that is linguistically and ethnically diverse, the findings may not be generalizable to other contexts that lack these characteristics. Especially in the context of the United States, the present study encompasses a somewhat unique environment, and our results may not hold true in areas where the

majority of students are not Latinx. In addition, the study did not explore data in a multilevel way to account for potential variance attributed to classrooms and schools. Specifically, we did not take into account whether different schools have different policies on requirements for FL. While the majority of our students had access to some type of foreign language course (92.5% in middle school and 100% in high school), they are more likely going to have the opportunity to take Spanish over non-Spanish courses. Hence, enrollment for non-Spanish courses may be driven largely by school factors and school offerings and not necessarily just by the student choice. Also, we do not have measures of early home language competency, which has been previously linked to later language learning (Davison et al., 2011; Relyea & Amendum, 2019). In addition, we lack information about DLL and bilingual students' proficiency in L1 (Spanish) in middle school and high school.

Implications and Future Directions

In sum, the present study investigated the association between student language status of being monolinguals, dual language learners, or bilinguals in kindergarten and their later enrollment and performance in foreign language courses across middle school and high school. We found unique effects of early exposure to two languages on students' enrollment as well as performance, where bilinguals were the most likely to take foreign language courses, followed by DLLs, and monolinguals. Understanding the factors contributing to why certain children choose to enroll in FL is beneficial for researchers who are interested in the bilingual population as well as educators and policymakers concerned with educational outcomes.

The current work contributed to the literature in multiple ways. We have a longitudinal design with a large sample (over 30,000 students) which provides extensive power for complex analyses with numerous predictors and outcomes. In addition, the MSRP included students largely in poverty from diverse ethnically and linguistically diverse backgrounds, including a less studied group of students in bilingualism research such as Latino students in the context of a majority Spanish speaking community with English as the typical instructional language. However, due to the uniqueness of our sample, generalization must be carefully taken into account as findings may not necessarily replicate in other cultural contexts. Nevertheless, our findings support prior research and theories pertaining to bilingualism and should help advance future research on this topic. Our findings provide rich information about the relationship between various factors contributing to foreign language learning, including student characteristics, early cognitive and social skills, and prior academic achievement. It must be reiterated that FL is generally not required in the region of our study at the secondary school level. This characteristic enabled us to explore the relationship between FL enrollment and language background and offer a novel perspective on bilingualism.

Beyond implications for bilingualism research, the present study also contributes to examination of foreign language learning and education. We replicate earlier findings that identified the discrepancy in student enrollment in FL courses as related to background characteristics (gender, SES, and ethnicity). In addition, we offered a new factor to be considered when conducting FL research – early language status of students. As student background influences their decision to enroll in FL, teachers and counselors in this

community and others can adapt these ideas and strengthen recruitment effort for FL learning. Evidence suggests that not only is FL learning beneficial and associated with later academic benefits (Cooper, 1987) and gains in metacognitive awareness (Le Pichon et al., 2010; Yelland et al., 1993), it is also linked with cultural and social advantages (Wight, 2015). Specifically, students who learn foreign languages have better potential employment (Bordia & Bordia, 2015), develop healthy and strong cultural identity as well as cross-cultural awareness (Knutson, 2006). FL learning may even promote creativity and divergent thinking in students (Ghonsooly & Showqi, 2012). All in all, it is recommended that educators actively encourage students to take foreign language courses even when they are not mandatory.

Future research can extend the present study in several ways. Performance in language courses, for example, could be compared between students who began FL enrollment in middle school vs. high school (early vs. late starters). Furthermore, research with the same sample can explore predictors of student persistence in foreign language enrollment over time. Students must enroll in at least two courses in the same language for college entry requirements, but it would be interesting to see if they continue their enrollment. Another possibility would be to look at enrollment by school year instead of by grade level, to examine historical trends in foreign language enrollment. In addition, analyses can explore the interaction between different factors of interest (such as early cognitive skills and bilingual status) and explore these effects on both student performance and enrollment in foreign language courses. Finally, it should be possible to explore whether the effect of early bilingualism and cognitive abilities extends to other more general measures of student

achievement (overall GPA as well as math and reading test scores). This would be an important area for future research.

Conclusion

Foreign language learning is beneficial for students in multiple ways. The current study contributes to both the literature on bilingualism and foreign language education as our findings revealed the link between early language background and later enrollment and performance in foreign language courses. Results emphasized the role of early and continuous exposure to multiple languages early in life and provide some support for maintenance and fostering of students' minority home language. Finally, our research encourages parents, educators, as well as policy makes to promote foreign language enrollment in all students, especially those who are typically underrepresented in these courses.

APPENDIX

Table 4. ***Proportion of Enrollment by Type of Language of the Students who Enrolled in Foreign Language Courses***

	Enrolled in Middle School		Enrolled in High School		Enrolled in Secondary School	
Total	8,873		16,463		19,752	
Type of Language	*N*	%	*N*	%	*N*	%
Spanish	6,763	76.22%	12,700	77.14%	15,840	80.19%
Non-Spanish	2,924	32.95%	4,658	28.29%	6,600	33.41%
Additional *	5,154	58.09%	9,924	60.28%	12,498	63.27%

	Grade 6		Grade 7		Grade 8	
Total Enrolled	5,369		5,368		5,414	
Type of Language	*N*	%	*N*	%	*N*	%
Spanish	3,817	71.09%	3,791	70.62%	4,053	74.86%
Non-Spanish	1,916	35.69%	1,899	35.38%	1,595	29.46%
Additional *	3,232	60.20%	3,154	58.76%	2,929	54.10%

	Grade 9		Grade 10		Grade 11		Grade 12	
Total Enrolled	24,652		18,494		11,174		4,965	
Type of Language	*N*	%	*N*	%	*N*	%	*N*	%
Spanish	5,355	68.59%	7,115	72.75%	4,691	75.59%	2,056	79.57%
Non-Spanish	2,521	32.29%	2,760	28.22%	1,550	24.98%	542	20.98%
Additional *	4,523	57.94%	5,594	57.20%	3,786	61.01%	1,609	62.27%

Notes: *Additional language is defined as L2 for monolinguals and L3 for bilinguals and DLLs.

Course categories are not mutually exclusive, a student can enroll in both Spanish and non-Spanish courses. Percentage is calculated using the total sample for that grade/time period.

Table 5. ***Bivariate Correlates of Any Foreign Language Course Enrollment in Secondary School by Course Type and Student Demographic***

Variables	Enrolled	
	n	%
Total	19,752	59.4%
Gender***		
Male	9,479	54.8%
Female	10,224	64.9%
Ethnicity***		
Hispanic	12,643	65.1%
Black	5,517	48.6%
White/Asian/Other	1,534	67.5%
Poverty status (6th grade) ***		
Received Free/Reduced Lunch	15,191	58.6%
Did not receive free/reduced lunch	3,812	65.9%
Disability status (6th grade) ***		
Has a disability	1,624	29%
Non-disabled	17,062	67.4%
Language Status (end of K) * **		
Monolingual	7,017	50.9%
Dual language learner	9,028	63.2%
Bilingual	3,707	71.6%
Home Language ***		
English	7,088	51.9%
Spanish	10,648	66.1%
Others	1,298	62.8%

	Not Enrolled			Enrolled			*d*
	n	*M*	*SD*	*n*	*M*	*SD*	
[a] ESOL level in K***	5,175	3.66	1.14	9,802	3.93	1.03	.26
School Readiness at age 4							
Cognitive Skills ***	7,097	44.56	30.11	13,450	55.88	29.79	.38
Social Skills ***	10,295	53.56	28.69	17,185	61.93	27.25	.30
Behavior Concerns ***	10,295	53.04	29.67	17,185	43.18	28.84	.34
5th Grade Academic Achievement							
GPA ***	7,790	2.98	.56	16,557	3.28	.49	.58
Math ***	10,555	1.59	1.00	18,451	2.36	1.34	.63
Reading ***	10,584	1.60	1.00	18,467	2.39	1.32	.65

Note. *p<.05, **p<.01, ***p<.001.

[a] ESOL level of student enrolled in the ESOL program, scale from 1 (beginner) – 5 (independent)

Table 6. ***Bivariate Correlates of Foreign Language Course Enrollment in Secondary School by Course Type and Student Demographic***

Demographic	Spanish		Non-Spanish		Additional Language	
	n	%	*n*	%	*n*	%
Total	15,840	47.7%	6,600	19.9%	12,498	37.6%
Gender***						
Male	7,670	44.3%	3,057	17.7%	5,925	34.3%
Female	8,137	51.7%	3,525	22.4%	6,573	41.7%
Ethnicity***						
Hispanic	10,092	52%	4,664	24%	5,963	30.7%
Black	4,460	39.3%	1,445	12.7%	5,202	45.8%
White/Asian/Other	1,248	54.9%	470	20.7%	1,333	58.7%
Poverty status (6^{th} grade)	***		*		***	
Received FRL	12,093	46.6%	5,170	19.9%	9,405	36.3%
Did not receive FRL	3,148	54.4%	1,226	21.2%	2,587	44.7%
Disability status (6th grade) ***						
Has a disability	1,321	23.6%	438	7.8%	872	15.6%
Non-disabled	13,659	54%	5,874	23.2%	10,965	43.3%
Language Status (end of K) ***						
Monolingual	5,893	42.7%	1,675	12.2%	6,636	48.1%
Dual language learner	7,035	49.3%	3,488	24.5%	4,052	28.4%
Bilingual	2,912	56.2%	1,437	27.8%	1,810	35%
Home Language ***						
English	5,982	43.8%	1,693	12.4%	7,088	51.9%
Spanish	8,402	52.1%	4.132	25.7%	4,132	25.7%
Others	888	43%	537	26%	1,298	62.8%

Table 7. ***Bivariate Correlates of Foreign Language Course Enrollment in Secondary School by Course Type and Early Skills and Achievement***

Spanish Courses

	Enrolled			Not Enrolled			
	n	*M*	*SD*	*n*	*M*	*SD*	*d*
ESOL level in K***	7,653	3.94	1.04	7,321	3.74	1.11	0.19
School Readiness at age 4							
Cognitive Skills ***	10,887	55.96	29.78	9,659	47.47	30.42	.28
Social Skills ***	13,794	61.92	27.13	3,683	55.65	28.69	.22
Behavior Concerns ***	13,794	43.16	28.80	13,683	50.63	29.81	.25
5th Grade Academic Achievement							
GPA ***	13,272	3.28	0.49	1,074	3.07	0.56	.40
Math ***	14,813	2.37	1.34	4,192	1.78	1.15	.47
Reading ***	14,824	2.39	1.31	4,226	1.80	1.15	.48

Non-Spanish Courses

	Enrolled			Not Enrolled			
	n	*M*	*SD*	*n*	*M*	*SD*	*d*
ESOL level in K***	3,797	3.95	1.02	11,171	3.80	1.09	0.14
School Readiness at age 4							
Cognitive Skills ***	4,472	55.85	29.91	16,063	50.88	30.42	.16
Social Skills ***	5,750	62.33	27.46	21,700	57.85	28.19	.16
Behavior Concerns ***	5,750	42.44	28.76	21,700	48.06	29.64	.19
5th Grade Academic Achievement							
GPA ***	5,675	3.31	0.48	18,665	3.14	0.54	.32
Math ***	6,206	2.45	1.38	22,792	1.98	1.24	.37
Reading ***	6,212	2.49	1.34	22,831	2.00	1.23	.4

Additional FL Courses

	Enrolled			Not Enrolled			
	n	*M*	*SD*	*n*	*M*	*SD*	*d*
ESOL level in K***	4,587	3.99	1.00	10,382	3.77	1.10	0.20
School Readiness at age 4							
Cognitive Skills ***	8,700	57.45	29.94	11,833	47.92	30.06	.32
Social Skills ***	10,886	62.01	27.43	16,564	56.67	28.32	.19
Behavior Concerns ***	10,886	43.63	29.02	16,564	49.02	29.68	.18
5th Grade Academic Achievement							
GPA ***	10,598	3.27	.50	13,730	3.12	0.55	.30
Math ***	11,714	2.39	1.35	17,270	1.86	1.19	.42
Reading ***	11,726	2.43	1.32	17,303	1.88	1.18	.45

Note. *p<.05, **p<.01, ***p<.001.

[a] ESOL level of student enrolled in the ESOL program, scale from 1 (beginner) – 5 (independent)

Table 8. ***Logistic Regression Predicting Any Foreign Language Enrollment in Secondary School*** (*n* = 13,645)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographics						
[a] Ethnicity						
Hispanic/White	.856	.094	.898	.095	1.014	.098
Black/White	.634***	.093	.686***	.093	.928	.098
Hispanic/Black	1.350***	.057	1.310***	.057	1.093	.06
Male	.827***	.041	.873***	.042	.990	.044
Received FRL	.631***	.062	.682***	.062	.895	.065
Special Education	.331***	.079	.381***	.080	.525***	.084
[a] **Language Status**						
DLL/Monolingual	1.606***	.058	1.685***	.058	1.677***	.061
Bilingual/Monolingual	1.824***	.070	1.777***	.070	1.561***	.072
DLL/Bilingual	.548***	.062	.948	.063	1.074	.065
School Readiness at age 4						
LAP-D Cognitive Skills			1.004***	.001	1.001	.001
DECA Social Skills			1.001	.001	.999	.001
DECA Behavior Concerns			.996***	.001	.997***	.001
Elementary academic performance						
GPA in 5th grade					2.124***	.046
[b] Reading 5th grade					1.411***	.018
[b] Math in 5th grade					1.408***	.019

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), I ran another regression model flipping the reference group.

[b] Math and Reading scores were run in different models to avoid multicollinearity.

Table 9. ***Logistic Regression Predicting Spanish Language Courses Enrollment in Secondary School*** (*n* = 13,645)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographics						
[a] Ethnicity						
Hispanic/White	1.048	.079	1.081	.079	1.174*	.081
Black/White	.776***	.079	.818*	.080	.988	.082
Hispanic/Black	1.351***	.051	1.321***	.051	1.188***	.052
Male	.947	.036	.987	.138	1.064	.037
Received Free/Reduced Lunch	.680***	.051	.712***	43.059	.832***	.053
Special Education	.437***	.078	.481***	85.619	.591***	.081
[a] **Language Status**						
DLL/Monolingual	1.040	.051	1.066	.051	1.045	.052
Bilingual/Monolingual	1.128*	.059	1.106	.059	1.008	.060
DLL/Bilingual	.922	.051	.964	.051	1.037	.052
School Readiness at age 4						
LAP-D Cognitive Skills			1.002***	.001	1.000	.001
DECA Social Skills			1.001	.001	1.000	.001
DECA Behavior Concerns			.997***	.001	.998***	.001
Elementary academic performance						
GPA in 5th grade					1.562***	.040
[b] Reading 5th grade					1.207***	.015
[b] Math in 5th grade					1.205***	.015

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), we ran another regression Model flipping the reference groups.

[b] Math and Reading scores were ran in different models to avoid multicollinearity.

Table 10. ***Logistic Regression Predicting Non-Spanish Language Courses Enrollment in Secondary School*** (*n* = 13,645)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographics						
[a] Ethnicity						
Hispanic/White	.863	.087	.879	.087	.942	.088
Black/White	.654***	.090	.670***	.090	.784***	.092
Hispanic/Black	1.319***	.060	1.312***	.060	1.202***	.061
Male	.858***	.040	.867***	.041	.916***	.042
Received Free/Reduced Lunch	.949	.055	.973	.055	1.109	.057
Special Education	.487***	.108	.509***	.110	.613***	.111
[a] **Language Status**						
DLL/Monolingual	2.067***	.059	2.108***	.060	2.098***	.060
Bilingual/Monolingual	2.063***	.066	2.049***	.066	1.914***	.066
DLL/Bilingual	1.002	.052	1.029	.052	1.096	.053
School Readiness at age 4						
LAP-D Cognitive Skills			1.002***	.001	1.000	.001
DECA Social Skills			1.000	.001	.999	.001
DECA Behavior Concerns			.999	.001	1.000	.001
Elementary academic performance						
GPA in 5th grade					1.435***	.048
[b] Reading 5th grade					1.178***	.017
[b] Math in 5th grade					1.146***	.016

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), we ran another regression Model flipping the reference groups.

[b] Math and Reading scores were ran in different models to avoid multicollinearity.

Table 11. ***Logistic Regression Predicting Additional Foreign Language Enrollment in Secondary School*** (*n* = 13,645)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographics						
[a] Ethnicity						
Hispanic/White	.426***	.082	.440***	.083	.467***	.084
Black/White	.705***	.084	.740***	.085	.913	.087
Hispanic/Black	.605***	.051	.594***	.051	.511***	.053
Male	.877***	.036	.901**	.037	.976	.038
Received Free/Reduced Lunch	.715***	.050	.749***	.051	.894*	.052
Special Education	.386***	.087	.422***	.088	.534***	.090
[a] **Language Status**						
DLL/Monolingual	.425***	.051	.437***	.051	.412***	.052
Bilingual/Monolingual	.465***	.058	.456***	.058	.394***	.060
DLL/Bilingual	.913	.050	.959	.051	1.045	.052
School Readiness at age 4						
LAP-D Cognitive Skills			1.003***	.001	1.001	.001
DECA Social Skills			1.000	.001	.999	.001
DECA Behavior Concerns			.998**	.001	.998*	.001
Elementary academic performance						
GPA in 5th grade					1.646***	.043
[b] Reading 5th grade					1.259***	.015
[b] Math in 5th grade						

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), we ran another regression Model flipping the reference groups.

[b] Math and Reading scores were ran in different models to avoid multicollinearity.

Table 12. ***Logistic Regression Predicting Any Foreign Language Enrollment of DLLs and Bilinguals in Secondary School*** (n = 6,025)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographic						
[a] Ethnicity						
Hispanic/White	.532*	.246	.546*	.247	.608	.254
Black/White	.490**	.266	.517*	.268	.639	.278
Hispanic/Black	1.086	.161	1.055	.161	.951	.168
Male	.805***	.067	.845*	.069	.952	.072
Received Free/Reduced Lunch	.705***	.102	.740**	.102	.907	.106
Special Education	.310***	.120	.351***	.122	.505***	.127
Language Background						
ESOL Level (1-5 scale)	1.042	.033	.992	.034	.944	.036
Spanish Home Language	1.202	.142	1.200	.143	1.112	.149
Early School Readiness						
LAP-D Cognitive Skills			1.005***	.001	1.002	2.338
DECA Social Skills			.999	.001	.998	2.334
DECA Behavior Concerns			.996***	.001	.996***	6.921
Elementary Academic Achievement						
GPA in 5th grade					2.216***	.075
[b] Reading 5th grade					1.369***	.030

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were included to avoid multicollinearity.

Table 13. ***Logistic Regression Predicting Spanish Course Enrollment of DLLs and Bilinguals in Secondary School*** (n = 6,025)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographic						
[a] Ethnicity						
Hispanic/White	.981	.165	.997	.166	1.058	.167
Black/White	.722	.185	.748	.186	.834	.189
Hispanic/Black	1.359*	.130	1.332*	.130	1.269	.132
Male	.948	.054	.983	.055	1.035	.057
Received Free/Reduced Lunch	.724***	.079	.743***	.079	.812**	.080
Special Education	.506***	.115	.547***	.117	.658***	.119
Language Background						
ESOL Level (1-5 scale)	1.020	.027	.994	.028	.972	.028
Spanish Home Language	1.145	.114	1.141	.114	1.114	.116
Early School Readiness						
LAP-D Cognitive Skills			1.002***	.001	1.001	.001
DECA Social Skills			1.000	.001	1.000	.001
DECA Behavior Concerns			.997***	.001	.997*	.001
Elementary Academic Achievement						
GPA in 5th grade					1.387***	.062
[b] Reading 5th grade					1.161***	.023

Note. *p < .05, **p < .01, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were included to avoid multicollinearity.

Table 14. ***Logistic Regression Predicting Non-Spanish FL Course Enrollment of DLLs and Bilinguals in Secondary School*** (n = 6,025)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographic						
[a] Ethnicity						
Hispanic/White	.667*	.161	.680*	.162	.723*	.164
Black/White	.705	.185	.723	.186	.825	.188
Hispanic/Black	.946	.137	.941	.137	.876	.139
Male	.877*	.056	.885*	.057	.937	.058
Received Free/Reduced Lunch	.930	.077	.947	.077	1.051	.078
Special Education	.379***	.155	.397***	.156	.492***	.158
Language Background						
ESOL Level (1-5 scale)	1.004	.028	.982	.029	.956	.029
Spanish Home Language	1.224	.120	1.224	.120	1.201	.121
Early School Readiness						
LAP-D Cognitive Skills			1.003**	.001	1.001	.001
DECA Social Skills			1.000	.001	.999	.001
DECA Behavior Concerns			1.000	.001	1.000	.001
Elementary Academic Achievement						
GPA in 5th grade					1.477***	.068
[b] Reading 5th grade					1.178***	.024

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were included to avoid multicollinearity.

Table 15. ***Logistic Regression Predicting L3 Enrollment of DLLs and Bilinguals in Secondary School*** (*n* = 6,025)

	Model 1		Model 2		Model 3	
	OR	*SE(B)*	*OR*	*SE(B)*	*OR*	*SE(B)*
Demographic						
[a] Ethnicity						
Hispanic/White	.620**	.177	.632	.178*	.664*	.181
Black/White	.531**	.214	.545	.214**	.609*	.219
Hispanic/Black	1.167	.150	1.160	.150	1.090	.152
Male	.880*	.056	.890	.057*	.950	.059
Received Free/Reduced Lunch	.918	.078	.937	.078	1.052	.080
Special Education	.379***	.151	.400	.152***	.508***	.154
Language Background						
ESOL Level (1-5 scale)	1.004	.028	.979	.029	.950	.030
Spanish Home Language	.120***	.134	.119	.134***	.109***	.137
Early School Readiness						
LAP-D Cognitive Skills			1.003	.001**	1.001	.001
DECA Social Skills			1.000	.001	.999	.001
DECA Behavior Concerns			.999	.001	1.000	.001
Elementary Academic Achievement						
GPA in 5th grade					1.551***	.068
[b] Reading 5th grade					1.196***	.024

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were included to avoid multicollinearity.

Table 16. ***Multiple Regression Predicting Overall Foreign Language Performance in Secondary School*** (*n* = 10,089)

	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.152***	.036	-.081	-.119***	.036	-.063	-.047	.034	-.025
Black/White	-.265***	.037	-.132	-.214***	.037	-.107	-.019	.035	-.010
Hispanic/Black	.113***	.025	.060	.095***	.025	.050	-.028	.023	-.015
Male	-.388***	.017	-.215	-.358***	.017	-.198	-.271***	.016	-.150
Received Free/Reduced Lunch	-.306***	.023	-.136	-.256***	.023	-.114	-.126***	.022	-.056
Special Education	-.266***	.046	-.056	-.170***	.046	-.035	.010	.043	.002
[a] **Language Status**									
DLL/Monolingual	.131***	.025	.072	.168***	.025	.092	.157***	.023	.087
Bilingual/Monolingual	.204***	.028	.092	.192***	.027	.086	.136***	.026	.061
DLL/Bilingual	-.074***	.023	-.040	-.025	.023	-.013	.021	.022	.012
School Readiness at age 4									
LAP-D Cognitive Skills				.003***	<.001	.102	.001*	<.001	.024
DECA Social Skills				.001**	<.001	.035	<.001	<.001	.009
DECA Behavior Concerns				-.002***	<.001	-.058	-.001*	<.001	-.023
Elementary academic performance									
GPA in 5th grade							.683***	.019	.370
[b] Reading 5th grade							.024***	.007	.034
[b] Math in 5th grade							.027***	.006	.040
R^2	.088			.107			.220		
R^2 **change**				.019***			.113***		

Note. *p < .05, **p < .01, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), we ran another regression Model flipping the reference groups.

[b] Math and Reading scores were ran in different models to avoid multicollinearity.

Table 17. ***Multiple Regression Predicting Spanish Course Performance in Secondary School*** (*n* = 8,117)

	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.132***	.039	-.073	-.103**	.039	-.057	-.033	.037	-.018
Black/White	-.299***	.040	-.155	-.253***	.040	-.131	-.076*	.038	-.040
Hispanic/Black	.168***	.027	.092	.151***	.027	.083	.043	.026	.024
Male	-.383***	.019	-.220	-.355***	.019	-.203	-.274***	.018	-.157
Received Free/Reduced Lunch	-.261***	.024	-.122	-.219***	.025	-.103	-.105***	.023	-.049
Special Education	-.261***	.049	-.056	-.175***	.049	-.038	-.006	.047	-.001
[a] **Language Status**									
DLL/Monolingual	.155***	.027	.088	.187***	.027	.106	.181***	.025	.103
Bilingual/Monolingual	.199***	.030	.092	.189***	.030	.087	.141***	.028	.065
DLL/Bilingual	-.044	.025	-.025	-.002	.025	-.001	.040	.024	.023
School Readiness at age 4									
LAP-D Cognitive Skills				.003***	<.001	.087	<.001	<.001	.016
DECA Social Skills				.001*	<.001	.031	<.001	<.001	.006
DECA Behavior Concerns				-.002***	<.001	-.062	-.001*	<.001	-.028
Elementary academic performance									
GPA in 5th grade							.623***	.021	.348
[b] Reading 5th grade							.016*	.007	.023
[b] Math in 5th grade							.017*	.007	.026
R^2		.096			.111			.210	
R^2 **change**					.016***			.099***	

Note. *p < .05, **p < .01, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), we ran another regression Model flipping the reference groups.

[b] Math and Reading scores were ran in different models to avoid multicollinearity.

Table 18. ***Multiple Regression Predicting Non-Spanish Foreign Language Course Performance in Secondary School*** (n = 3,458)

	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.211**	.074	-.090	-.171*	.074	-.073	-.092	.067	-.040
Black/White	-.186*	.079	-.072	-.137	.079	-.053	.129	.072	.050
Hispanic/Black	-.025	.051	-.011	-.034	.051	-.015	-.221***	.047	-.095
Male	-.417***	.035	-.197	-.378***	.035	-.179	-.273***	.032	-.129
Received Free/Reduced Lunch	-.401***	.047	-.150	-.332***	.047	-.124	-.146***	.043	-.054
Special Education	-.323***	.101	-.052	-.212*	.101	-.035	-.005	.092	-.001
[a] **Language Status**									
DLL/Monolingual	.166***	.051	.079	.205***	.050	.098	.168***	.046	.080
Bilingual/Monolingual	.266***	.056	.108	.244***	.056	.098	.153**	.051	.062
DLL/Bilingual	-.101*	.043	-.048	-.038	.043	-.018	.016	.040	.007
School Readiness at age 4									
LAP-D Cognitive Skills				.004***	.001	.118	.001	.001	.021
DECA Social Skills				.001*	.001	.038	<.001	.001	.007
DECA Behavior Concerns				-.002*	.001	-.049	-.001	.001	-.015
Elementary academic performance									
GPA in 5th grade							.933***	.038	.420
[b] Reading 5th grade							.047***	.013	.057
[b] Math in 5th grade							.052***	.012	.067
R^2		.075			.095			.247	
R^2 **change**					.021***			.152***	

Note. *p < .05, **p < .01, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), we ran another regression Model flipping the reference groups.

[b] Math and Reading scores were ran in different models to avoid multicollinearity.

Table 19. ***Multiple Regression Predicting Additional Foreign Language Course Performance in Secondary School*** (n = 6,513)

	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.182***	.042	-.095	-.147***	.042	-.077	-.089*	.039	-.047
Black/White	-.221***	.043	-.114	-.169***	.043	-.087	.040	.040	.021
Hispanic/Black	.039	.029	.020	.022	.029	.012	-.129***	.027	-.067
Male	-.428***	.023	-.222	-.394***	.023	-.205	-.299***	.022	-.155
Received Free/Reduced Lunch	-.362***	.030	-.156	-.300***	.031	-.129	-.149***	.029	-.064
Special Education	-.209***	.064	-.039	-.105	.064	-.019	.051	.060	.009
[a] **Language Status**									
DLL/Monolingual	-.012	.030	-.006	.027	.030	.013	.007	.028	.003
Bilingual/Monolingual	.090*	.036	.034	.077*	.035	.029	.014	.033	.005
DLL/Bilingual	-.102***	.036	-.049	-.049	.036	-.024	-.008	.033	-.004
School Readiness at age 4									
LAP-D Cognitive Skills				.004***	<.001	.109	.001*	<.001	.025
DECA Social Skills				.001*	<.001	.030	<.001	<.001	.006
DECA Behavior Concerns				-.002***	<.001	-.054	-.001	<.001	-.019
Elementary academic performance									
GPA in 5th grade							.723***	.025	.372
[b] Reading 5th grade							.039***	.009	.053
[b] Math in 5th grade							.042***	.009	.059
R^2	.087			.105			.220		
R^2 **change**				.019***			.115***		

Note. *p < .05, **p < .01, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black) and the third language status contrast (DLL/Bilingual), we ran another regression Model flipping the reference groups.

[b] Math and Reading scores were ran in different models to avoid multicollinearity.

Table 20. ***Multiple Regression Predicting Any Foreign Language Performance of DLLs and Bilinguals in Secondary School*** (n = 8,740)

	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.137***	.039	-.074	-.107**	.039	-.057	-.036	.036	-.019
Black/White	-.259***	.039	-.131	-.208***	.038	-.105	-.019	.036	-.009
Hispanic/Black	.122***	.031	.066	.101***	.031	.055	-.017	.029	-.009
Male	-.394***	.018	-.220	-.362***	.019	-.202	-.276	.018	-.154
Received Free/Reduced Lunch	-.312***	.024	-.143	-.260***	.024	-.119	-.126***	.023	-.058
Special Education	-.270***	.049	-.057	-.172***	.049	-.036	<.001***	.046	<.001
Language Background									
ESOL Level	.022***	.006	.052	.020***	.006	.047	.017**	.005	.040
Home Language	.046	.032	.026	.072*	.032	.040	.054	.030	.030
School Readiness at age 4									
LAP-D Cognitive Skills				.003***	<.001	.101	.001	<.001	.020
DECA Social Skills				.001*	<.001	.026	<.001	<.001	.002
DECA Behavior Concerns				-.002***	<.001	-.062	-.001*	<.001	-.025
Elementary academic performance									
GPA in 5th grade							.667***	.021	.365
[b] Reading 5th grade							.025***	.007	.035
R^2	.091			.109			.219		
R^2 change				.018***			.110***		

Note. *p < .05, **p < .01, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were ran to avoid multicollinearity.

Table 21. ***Multiple Regression Predicting Spanish Course Performance of DLLs and Bilinguals in Secondary School*** (n = 7,056)

	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.120**	.042	-.067	-.094*	.041	-.053	-.028	.039	-.015
Black/White	-.291***	.041	-.153	-.246***	.041	-.129	-.079*	.039	-.041
Hispanic/Black	.171***	.033	.096	.152***	.033	.085	.051	.031	.029
Male	-.378***	.020	-.218	-.348***	.020	-.201	-.272***	.019	-.157
Received Free/Reduced Lunch	-.268***	.025	-.130	-.224***	.026	-.108	-.108***	.024	-.052
Special Education	-.268***	.052	-.059	-.180***	.052	-.039	-.023	.050	-.005
Language Background									
ESOL Level	.021***	.006	.051	.018**	.006	.045	.015*	.006	.038
Home Language	.070*	.034	.040	.095**	.034	.055	.081*	.032	.047
School Readiness at age 4									
LAP-D Cognitive Skills				.002***	<.001	.084	<.001	<.001	.013
DECA Social Skills				.001**	<.001	.027	<.001	<.001	.004
DECA Behavior Concerns				-.002***	<.001	-.063	-.001*	<.001	-.027
Elementary academic performance									
GPA in 5th grade							.596***	.022	.337
[b] Reading 5th grade							.016*	.008	.023
R^2		.097			.112			.203	
R^2 **change**					.015***			.092***	

Note. *p < .05, **p < .01, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were ran to avoid multicollinearity.

Table 22. ***Multiple Regression Predicting Non-Spanish Foreign Language Course Performance of DLLs and Bilinguals*** (*n* = 2,970)

	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.190*	.080	-.083	-.149	.080	-.065	-.056	.072	-.024
Black/White	-.181*	.083	-.071	-.128	.083	-.050	.141	.076	.056
Hispanic/Black	-.009	.066	-.004	-.022	.065	-.009	-.198***	.060	-.086
Male	-.439***	.037	-.208	-.402***	.037	-.191	-.286***	.034	-.136
Received Free/Reduced Lunch	-.396***	.049	-.153	-.328***	.049	-.126	-.128**	.045	-.049
Special Education	-.313**	.111	-.050	-.199	.111	-.032	.006	.101	.001
Language Background									
ESOL Level	.031**	.011	.062	.027*	.011	.053	.021*	.010	.041
Home Language	.037	.064	.017	.063	.064	.029	.016	.058	.007
School Readiness at age 4									
LAP-D Cognitive Skills				.004***	.001	.120	.001	.001	.014
DECA Social Skills				.001	.001	.025	<.001	.001	-.007
DECA Behavior Concerns				-.002*	.001	-.053	-.001	.001	-.018
Elementary academic performance									
GPA in 5th grade							.953***	.042	.432
[b] Reading 5th grade							.050***	.014	.059
R^2		.077			.097			.258	
R^2 **change**					.021***			.160***	

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were ran to avoid multicollinearity.

Table 23. ***Multiple Regression Predicting L3 Performance of DLLs and Bilinguals in Secondary School*** (*n* = 5,835)

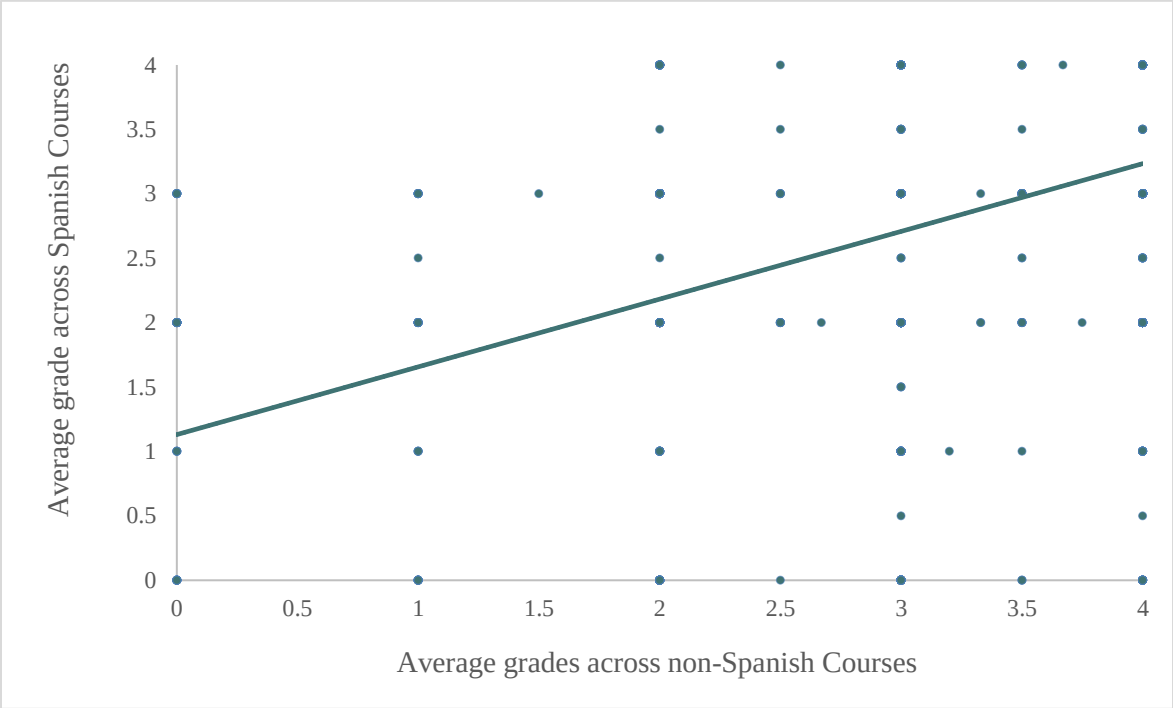
	Model 1			Model 2			Model 3		
	B	*SE(B)*	*β*	*B*	*SE(B)*	*β*	*B*	*SE(B)*	*β*
Demographics									
[a] Ethnicity									
Hispanic/White	-.098*	.045	-.051	-.068	.045	-.036	-.007	.042	-.003
Black/White	-.238***	.044	-.123	-.187***	.044	-.096	.018	.042	.010
Hispanic/Black	.140***	.035	.073	.119***	.035	.062	-.025	.033	-.013
Male	-.438***	.024	-.228	-.403***	.024	-.210	-.307***	.023	-.160
Received Free/Reduced Lunch	-.342***	.032	-.150	-.282***	.032	-.124	-.124***	.030	-.055
Special Education	-.218***	.068	-.040	-.114***	.068	-.021	.038	.064	.007
Language Background									
ESOL Level	.030***	.008	.065	.030***	.008	.065	.028***	.007	.062
Home Language	-.233***	.041	-.115	-.213***	.041	-.104	-.256***	.038	-.126
School Readiness at age 4									
LAP-D Cognitive Skills				.003***	<.001	.103	.001	<.001	.016
DECA Social Skills				.001*	.001	.030	<.001	<.001	.004
DECA Behavior Concerns				-.002***	<.001	-.052	-.001	<.001	-.016
Elementary academic performance									
GPA in 5th grade							.725***	.027	.376
[b] Reading 5th grade							.040***	.010	.052
R^2	.095			.112			.229		
R^2 **change**				.018***			.117***		

Note. *$p < .05$, **$p < .01$, ***$p \leq .001$.

[a] To analyze the third ethnicity contrast (Hispanic/Black), we ran another regression Model flipping the reference groups.

[b] Only Reading scores were ran to avoid multicollinearity.

Figure 2. ***Correlation between average grades across Spanish and non-Spanish courses***



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CURRICULUM VITAE

My Viet Ha Nguyen graduated from Hanoi - Amsterdam High School for the Gifted, Hanoi, Vietnam, in 2014. She received her Bachelor of Science from Liberty University in 2018.