Benefits of bilingualism: Evidence from Mormon missionaries[1]

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Abstract

Several studies have argued that learning a foreign language has the potential to increase the general cognitive ability and test scores of students. In this analysis, the Mormon missionary program is used to test whether or not students who were assigned to learn a foreign language performed better in college. The results indicate that the increase in GPA due to serving a Mormon mission is the same for students that were assigned to a foreign-speaking mission relative to students that were assigned to an English-speaking mission. These results are robust to controlling for factors such as choice of major and class load. [JEL Classification: I20]

Keywords: Educational Economics; Human Capital;

1. Introduction

Foreign language study has become an integral part of our society. Foreign exchange and study abroad programs, school curricula, private classes, books, and CDs all provide help to native English speakers to learn a second language. Recent empirical work has focused on the direct benefits of studying a foreign language in the United States. Estimates suggest that there exists a 2-3% wage premium among non-immigrants for foreign language ability (Altonji 1995 and Saiz and Zoido 2005). However, the channel through which foreign language study affects future wages is unclear. An expanding literature suggests an indirect effect from learning a foreign language is an increase in general cognitive and academic ability. These studies typically find that students who have spent more time studying a foreign language receive higher grades and score better on standardized tests. However, these studies may suffer from endogeneity bias if academically advanced students are more likely to study a foreign language.

In order to achieve unbiased estimates of the effect of learning a foreign language on academic performance in other areas, a proper treatment and control group is needed. Theoretically, we would like to randomly assign one group of students to learn a foreign language and compare their future academic outcomes to a control group that was not assigned to learn a foreign language. This analysis uses data on Brigham Young University (BYU) students who took two years off of school to serve a full-time mission for the Church of Jesus Christ of Latter-day Saints (commonly known as the Mormon or LDS Church). Mormon missionaries do not choose their mission location or the language to be spoken, but rather receive an assignment. These assignments are used in this analysis as a natural experiment which produces variation in foreign language

learning across individuals. An individual, fixed-effects framework is used to compare the difference in pre and post mission college grades for students that served foreign-speaking missions relative to students that served English-speaking missions.

The results indicate that while students' GPAs improve substantially after serving an LDS mission, students who were assigned to speak a foreign language improved no more than did those that were assigned to speak English. Precision is such that a .1 or more increase in GPA due to foreign language study can be rejected at the 5% level. These results are robust to potential confounders such as class load and choice of major. While the effect of learning a language on college GPA is zero overall, students studying humanities' subjects appear to benefit slightly from learning a foreign language. A further finding of this study is the dramatic increase in GPA for students who choose to serve a mission. Using variation in the timing of when missionaries are called, it is found that serving an LDS mission increases GPA by .24 for males and .11 for females.

The outline of this paper proceeds as followed: Section 2 contains a literature review. Section 3 provides a description of the Mormon missionary program. Section 4 describes the data and empirical strategy used in the analysis. The results from the empirical analysis are presented in Section 5. Section 6 discusses the results and concludes.

2. Literature review

Benefits of bilingualism is not a new topic in economics. Several studies have attempted to find a relationship between bilingualism and wages. While most of these studies focus on the benefits of English proficiency among immigrants (McManus,

Gould, and Welch 1983, Chiswick and Miller 1995, Angrist and Lavy 1997, and Dustmann and van Soest 2002), some work has looked at the benefits of learning a second language for non-immigrants. Saiz and Zoido (2005), using both panel methods and the propensity score, find a 2%-3% wage premium for college graduates who speak a second language. Altonji (1995) uses variation in high school curricula to estimate the effect of additional years of foreign language study on wages. He found that an additional year of foreign language study in high school results in a 1.7% increase in wages (higher than the marginal return to additional math, science, or English classes).

A growing literature suggests that one channel through which learning a foreign language can provide economic benefits is by increasing academic abilities as a whole. Cook (1997) claims that foreign language study results in "increased metalinguistic awareness of phonology, syntax, and the arbitrary nature of meaning, and gains in cognitive flexibility". Cooper (1987) finds that additional years of foreign language study in high school results in higher SAT math and verbal scores. Olsen and Brown (1992) found that for all ability levels, foreign language study led to an increase in ACT scores. Numerous other studies have found a link between language study and subsequent academic success (College Board 1983, College Entrance Examination Board 1982, Hakuta 1986, Rosenbusch 1995, Weatherford 1986).

While these studies provide suggestive evidence that foreign language impacts cognitive ability, endogeneity of foreign language study may be serving as a bias. It is possible that students that learn a second language are different from other students in either their own personal abilities or in the institutions in which they find themselves.

This endogeneity may lead to misguided estimates of the effect of foreign language study on future academic performance.

3. Missionary program

The Church of Jesus Christ of Latter-day Saints currently has 56,000 missionaries serving in 165 countries around the world. 75% of these missionaries are single, young men, 18% are single, young women, and 7% are older couples.[2] All young men that are members of the LDS church are asked to prepare to serve as a missionary for two consecutive years when they turn 19 years old. It is not considered obligatory for young women to serve as missionaries, but they are given the option of serving an 18 month mission upon reaching the age of 21 if they so desire. The missions are financed by the missionaries themselves often with the help from their families.[3]

As a young man approaches the age of 19 (or a female, 21), he has an interview with a local ecclesiastical leader to determine if he is willing and worthy to be called to serve a mission.[4] He then fills out a missionary application providing information on church attendance, church assignments, and high school grades. This application is sent to LDS church headquarters located in Salt Lake City, Utah. Church authorities in Salt Lake City process the application and decide in which of the 330 geographic missions worldwide each individual should serve. The decision of where each individual should serve is based on a prayerful consideration of the individual's application and the number of missionaries needed by each geographic mission. The future missionary then receives a letter in the mail instructing him on the location that he has been called to and the language that he will learn. He is given a day (usually 2-4 months after the letter is sent)

in which he is to report to the Missionary Training Center (MTC) in Provo, Utah to begin his mission.[5]

If the missionary is called to an English-speaking mission, he will typically spend 2-3 weeks in the MTC for training and religious study. Missionaries that are called to foreign-speaking missions spend a total of 8 weeks in the MTC to aid them in learning the new language (50 different languages are taught in the Provo MTC). The missionaries are then flown to their assigned geographic location. A mission president presides over each mission (approx. 200 missionaries) and assigns the incoming missionaries a companion – typically a missionary with more experience – and a city to serve in.

The missionaries spend the next two years proselytizing and performing community service. The duties of missionaries are standardized across all countries. All missionaries (those in foreign-speaking missions and English-speaking missions) study the same set of handbooks and instructions and perform the same type of service for the two years while on their mission. They are required to adhere to a strict schedule that provides time for language and religious study while proselytizing 60-65 hours each week. While on their mission, they are not allowed to study any books or academic material outside of their personal religious and language study. When two years are completed, missionaries return home to pursue vocational, academic, or other personal goals. Due to studying and speaking to people each day in a foreign country, nearly all those that serve foreign-speaking missions return home with a strong working ability of the language that they learned.

4. Data and empirical strategy

This analysis uses data on students from Brigham Young University, a large, private university in Provo, Utah owned by the LDS Church. Approximately 98% of the students are members of the LDS church. More than 80% of the male and 12% of the female students at BYU serve full-time church missions. Administrative data were made available for 1,700 students who started as first-time freshman in the fall of 1997 or 1998 and graduated by the summer of 2005.[6] For this analysis, the data are restricted to the 696 US citizens that served LDS missions while in college.[7] The analysis focuses only on the grades received during full-time enrollment in winter or spring semesters.

[Insert Table 1 here] Table 1 provides summary statistics of this sample broken down by whether or not individuals served a foreign-speaking mission.[8] The summary statistics provide evidence that while missionaries who serve foreign-speaking missions have slightly higher high school outcomes, whether you are assigned to speak a foreign language or not is largely random. Because some high school information is available on the missionary application, it seems possible that you are slightly more likely to be assigned to speak a foreign language if you had better grades in high school. For this reason, it is important that this analysis controls for individual fixed effects. Data on the primary emphasis or major is also known for each semester in which the individuals were enrolled in classes. Table 2 presents the number of individuals enrolled in each school before and after their missions. There is no evidence that serving a foreign-speaking mission increases an individuals' likelihood of switching to a different major (such as humanities as one might expect).[9] [Insert Table 2 Here]

The econometric specification that this study employs takes advantage of the panel design of the data. A fixed effects model is used where the fixed effects control for individual-specific and semester-specific unobserved heterogeneity. The semester-specific fixed effects do not represent a specific calendar semester, but rather represent which semester each student is working on (e.g. 3rd semester since starting school).[10] The econometric specification used is the following,

$$(1) \qquad Y_{i,j} = \alpha_{i,j} + PostMission_{i,j}\beta + Bilingual_{i,j}\gamma + \varepsilon_{i,j}$$

where $Y_{i,j}$ represents either total credits taken or the GPA received by individual *i* in semester *j*. Post-mission is a dummy variable that equals one if semester *j* is after the individual served a mission. Bilingual is a dummy variable that equals one if semester *j* is after the individual served a foreign-speaking mission.

It is important to think about what variation is being used to identify the two key variables in the model. 96% of the male students in this sample left on their missions either between their 1st and 2nd full semesters or their 2nd and 3rd semesters. Thus nearly the entire result on GPA of being post-mission is being identified by the difference in 2nd semester GPA between those that left on their mission just before compared to just after their 2nd semester (while controlling for 1st semester GPA by way of the individual fixed effect).[11] Women usually leave for their missions sometime between their 4th and 6th semester. Thus the post-mission effect for women is being identified off of the grades received during these semesters. The estimate on the bilingual variable is being identified by where the student happened to be assigned to serve a mission. The consistency of this estimate relies on the assumption that assignment is random after taking into account pre-mission college GPA.[12]

5. Results

[Insert Table 3 here] Table 3 presents the empirical results of the specification in Equation (1). Column (1) and column (5) indicate the effect of serving a mission and learning another language on college GPA for men and women respectively. The results indicate that taking 2 years off of school (1.5 years for women) to serve an LDS mission results in a statistically significant increase in GPA of .24 for men and .11 for women. The point estimates on going to a foreign-speaking mission are small and insignificant for both men and women. After controlling for the benefit of serving a mission, the results suggest that there is no extra benefit to having learned a foreign language. A GPA benefit of .1 or greater from learning a foreign language can be rejected at the 5% confidence level.

Columns (2)-(4) and (6)-(8) of Table 3 provide robustness checks on the effect of learning a foreign language. It is possible that the individuals that serve foreign missions are likely to choose a college major that is related to their language skills. If these classes are graded harder, then any foreign language benefit would be hidden by the difficultness of the selected major choice. In columns (2) and (4), the results are presented while controlling for the school in which the primary emphasis is located. Controlling for school of major fixed effects causes the point estimates of serving a mission to come down slightly but remain statistically significant. The effect on learning a foreign language does not change and remains insignificant.

The zero effect that is found on the bilingual coefficient could result from students that served foreign-speaking missions deciding to take heavier class loads when

they return from their missions. Columns (3), (4), (7), and (8) provide the results from the regression of the number of credits taken per full semester on serving a mission and learning a foreign language. After serving a mission, males on average take .8 more credits per semester and females take .5 more credits per semester. The effect on males is significant at the 1% level. There is no evidence that students who learn a foreign language on their mission take more credits than students who speak English on their missions.

[Insert Table 4 here] While there is no evidence that learning a foreign language is beneficial to students overall, it is possible that it is helpful to specific students who are studying subjects that require strong language skills. To test this, the sample is reduced to students who started school with a humanities' subject as their declared major.[13] All of these individuals chose to be humanities' majors before knowing if they would be sent on a foreign or an English-speaking mission. Table 4 describes the results of serving a mission and learning a foreign language on the college GPA of students who were declared humanities' majors before their mission. Because only one male in the sample started as a humanities' major and did not serve a foreign-speaking mission, it is impossible to calculate an effect of learning a foreign language on GPA for the men. However, columns (1) and (2) indicate that the effect of serving a mission for this sample of students is between .27 and .33. These results are significant at the 5% level and are slightly larger than the effect of serving a mission for the general student population. For women, the point estimates for serving a mission are negative (-.06 and -.11) while the point estimates of learning a foreign language are positive (.11 and .16). These results are consistent with the story that learning a foreign language is somewhat beneficial to

humanities' majors. The negative effect on serving a mission is consistent with the idea that if a humanities' major serves a mission that is not foreign-speaking, they actually do worse in their classes relative to their classmates, many of whom did serve foreign-speaking missions.

[Insert Table 5 here] Under the hypothesis that learning a foreign language has an impact on general cognitive ability, we would expect to find an effect directly after learning the new language. The results presented in Table 3 include all semesters for which students took classes where (at least for the men) the treatment of learning a new language occurred primarily (96% of the time) between the first and third semesters. One may worry that including all eight or more semesters in the analysis may cause noise at best or misguided estimates at worse. Column (1) of Table 5 presents the results of serving a mission and learning a new language on college GPA while restricting the sample to the first four college semesters for each individual. The results remain unchanged from those using all semesters. Columns (2), (3), (6), and (7) of Table 5 provide evidence for the effect of serving a mission and learning a new language on low and high ability students. Columns (2) and (6) restrict the sample to students who received a high school GPA and ACT score below the sample average and Columns (3) and (7) restrict the sample to students who received a high school GPA and ACT score above the sample average. The results suggest that lower ability students are more likely to benefit from serving a mission than higher ability students (the effect of learning a new language continues to be insignificant). However, these results should be interpreted with care given the fact that GPA is truncated at 4.0, leaving the higher ability students with less room to improve.

Is learning certain languages more beneficial than others? Unfortunately, dividing foreign languages into groups can become somewhat arbitrary. However, one such cut that might be looked at is the difference between romance languages relative to other languages. Spanish, French, Portuguese, and Italian in this situation are included as romance languages. Columns (4) and (8) of Table 5 include separate dummy variables indicating whether the student served a bilingual mission using a romance language or not. The results show no difference in post-mission GPA across the two groups. A further concern that can be addressed is if the students already knew the language they were called to learn from high school classes. If this is the case, the effect may be biased downward. Columns (5) and (9) test for a differential effect between being sent on a foreign-speaking mission that uses a language commonly taught in high schools (Spanish, French, or German) or not. Once again, no significant difference is found between these two groups.

6. Discussion and conclusion

This analysis uses data on BYU students, some of whom were assigned to learn a foreign language on their LDS mission, to test whether learning a foreign language affects general academic ability. Contrary to the existing literature, the results provide no evidence that learning another language increases cognitive ability.

One potential critique may be the external validity of these results given that BYU students are not a random population group. BYU students have in general performed better academically than the general student population.[14] Furthermore, this study only shows that learning a foreign language around the age of twenty does not affect academic

performance. While these critiques may have merit, the results of this analysis do have direct applicability to foreign language study at the high school level and above (where a large amount of foreign language study takes place including study abroad, foreign exchange programs, and high school and college curricula). These results can add to the current debate regarding the expansion of foreign language study in high schools.[15]

An interesting finding in this analysis is the effect of serving an LDS mission (whether foreign-speaking or English-speaking) on academic performance. After serving a mission, male students on average take 0.8 more credits each semester and still increase their GPA by .24 relative to students who haven't quite left on their missions. Female students (who leave on their mission at the age of 21 as opposed to 19) take an average of 0.5 more credits and increase their GPA by .11. It is not possible using these data to identify the factors that are driving this large increase in GPA. Most likely, the result is a combination of having two more years to mature along with the skills and work ethic developed due to the rigor of serving an LDS mission. Future research may want to consider the effects of taking time off of school before attending college (vacationing, military service, internships, etc.). Given the research that has been done looking at the effect of college grades on future wages (Grogger and Eide 1995, Loury and Garman 1995, Jones and Jackson 1990, Wise 1975), taking time off for an LDS mission or other activities may be in a student's financial best interest.

The results from this analysis do not suggest that there are not substantial benefits to learning a foreign language. Benefits such as an increased capacity to communicate with people of diverse nationalities and a better understanding of other cultures are surely important. Furthermore, job-specific foreign language requirements may give an edge to

people who are bilingual when applying for jobs. However, this analysis does suggest that the benefit of learning another language on general cognitive abilities and academic performance is limited.

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[2] Statistics can be found at www.lds.org

[3] A charitable fund created from donations by church members is sometimes used when a missionary and his/her family are not capable of paying their own mission expenses. Furthermore, the cost of every mission is the same. Each family basically pays the cost of an "average mission" so that everyone can plan on the amount that they need to save.

[4] A potential missionary must be living in accordance with the guidelines that the church establishes in areas such as faithfulness, church attendance, chastity, tithing, healthy lifestyle (no tobacco, alcohol, illegal drugs) among others.

[5] Recently, several other Missionary Training Centers have been constructed all over the world which serve as training centers for specific groups of missionaries.

[6] Data was requested for all incoming freshman students in 1997 and 1998 with several variables of interest (grades by semester, act score, whether or not they served a mission, graduation date, etc.). The 1,700 observations that were made available are all 1997 and 1998 freshman for which there was no missing data. For example, if a particular semester's grades were missing, the data was not provided. Furthermore if the individuals did not have a graduation date, they were dropped from the dataset before it was sent to me.

[7] Because of the fixed effects framework that is used, the data is restricted to people who went to school at least one semester before their mission and at least one semester after their mission.

[8] The data does not explicitly tell what language the missionary was called to speak. However, the data provides the location of the mission. An English-speaking mission is defined as a mission served in the United States, Canada, Australia, or England. A small sample of missionaries who serve in these countries are called to speak foreign languages (for example Spanish in Texas). As a robustness check, the analysis was performed by dropping all individuals that served in California, Texas, and Canada (the places that are most likely to have foreign speaking missionaries). The results were not affected (contact the author if interested in seeing these results).

[9] One important aspect of the data is what credits are included in the GPA. Many missionaries that return from foreign-speaking missions are able to "test out" of several beginning and intermediate foreign language classes. Grades are given for these classes and count on your cumulative GPA. However, the measure of GPA that is used in this study is the per-semester GPA of classes that students actually sit in on and do not include the grades received from classes that were tested out of. This way, the analysis does not pick up the effect of testing out of several classes by knowing a foreign language and can focus on the effect of learning a language on general cognitive ability.

[10] These fixed effects control for changes in GPA that can be caused by finishing general education classes and starting into classes devoted to a specific major.

[11] While date of birth is not available in the data, the variation in mission leave time is most likely generated by small differences in age of college freshman. Because you are not eligible to serve a mission until you turn 19, most LDS college students that plan on serving a mission continue in school until they turn 19 years of age.

[12] In order for the estimate to be biased, assignment to a foreign-speaking mission would have to be positively correlated with the expected change in GPA across semesters.

[13] The college of humanities includes all foreign language majors (Italian, French, Spanish, etc.) as well as majors like English, English literature, and linguistics that require strong language skills.

[14] The average ACT score at BYU is 27 compared to the national average of 21.

[15] The Goals 2000: Educate America Act (Goals 1994) that was signed into law in 1994, appropriated money to deliver grants to schools to help them reach certain educational goals. In this Act, schools were challenged to improve their foreign language programs along with other standard subjects like math, science, and English.

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Table 1 Summary statistics

	Males			Females		
	All	English-speaking mission	Foreign-speaking mission	All	English-speaking mission	Foreign-speaking mission
	(1)	(2)	(3)	(4)	(5)	(6)
ACT composite	28.7	28.5	28.7	27.1	26.9	27.3
	(3.2)	(3.4)	(3.2)	(3.1)	(3.3)	(3.0)
High school GPA	3.76	3.71	3.77	3.76	3.76	3.76
	(0.24)	(0.25)	(0.23)	(0.22)	(0.25)	(0.21)
Number of full semesters taken before graduation	7.8	7.5	7.8	7.0	7.0	6.9
	(2.1)	(2.1)	(2.1)	(2.0)	(1.9)	(2.1)
Average number of credits taken per semester	13.7	13.8	13.7	13.7	13.7	13.6
	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)	(1.5)
Average GPA per semester	3.56	3.55	3.56	3.51	3.48	3.53
	(0.29)	(0.29)	(0.29)	(0.34)	(0.39)	(0.30)
Average number of semesters taken before mission	1.54	1.49	1.55	4.25	4.41	4.15
	(0.66)	(0.60)	(0.67)	(1.67)	(1.61)	(1.71)
Number of students	423	77	346	273	104	169

Notes: Observations include all students in the sample that went on an LDS mission sometime between their first and last semester at Brigham Young University. Standard deviations are presented in parenthesis.

Table 2 Major choice

	First semester		Last semester	
College	English-speaking	Foreign-speaking	English-speaking	Foreign-speaking
% Art & comm.	18.2	7.8	11.6	4.5
% Bio. & ag.	3.3	4.9	6.1	4.5
% Business	0	0	10.5	8.5
% Education	5	3.9	5.5	3.9
% Engineering	10.5	17.5	6.1	15
% Social sciences	14.4	6.6	20.4	11.8
% Health sciences	2.2	1.9	7	4.1
% Humanities	2.2	5.4	12	12.2
% Inter. studies	0	0.8	0.6	2.3
% Law	0	0	2.2	3.1
% Management	13.8	7	6.6	8.4
% Mathematics	10.5	17.8	7.2	15.7
% Nursing	1.7	1	0.6	1.2
% Open major	18.2	25.4	3.4	4.9
Observations	181	515	181	515

Notes: Observations include all students in the sample that went on an LDS mission sometime between their first and last semester at Brigham Young University.

Table 3 The effect of serving a mission and being bilingual on college outcomes by gender

	Dependent variable							
	Males				Females			
	GPA	GPA	Credits taken	Credits taken	GPA	GPA	Credits taken	Credits taken
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-mission	0.244	0.200	0.814	0.830	0.112	0.106	0.530	0.479
	[.049]***	[.047]***	[.313]***	[.314]***	[.034]***	[.034]***	[.327]	[.329]
Bilingual	-0.015	-0.011	-0.098	-0.235	-0.016	-0.016	-0.387	-0.503
	[.047]	[.045]	[.289]	[.294]	[.036]	[.036]	[.335]	[.332]
Individual F.E.	X	X	X	X	X	X	X	X
Semester F.E.	X	X	X	X	X	X	X	X
School of major F.E.		X		X		X		X
R-squared	0.536	0.567	0.376	0.403	0.595	0.605	0.290	0.321
No. observations	3698	3698	3698	3698	2021	2021	2021	2021

Notes: Observations are semester-level data on all students in the sample that went on an LDS mission sometime between their first and last semester at Brigham Young University. The dependent variable for columns (1), (2), (5), and (6) is the GPA (out of 4.0) for the given semester. The dependent variable for columns (3), (4), (7), and (8) is the number of credits taken for the given semester. Robust standard errors are presented in brackets below the estimates.

*** significant at 10%, ** significant at 5%; *** significant at 1%**

Table 4 The effect of serving a mission and being bilingual on college outcomes of humanities majors

	Dependent variable: GPA			
	Males		Females	
	(1)	(2)	(3)	(4)
Post-mission	0.335	0.271	-0.060	-0.110
	[.142]**	[.118]**	[.092]	[.110]
Bilingual	--	--	0.108	0.158
			[.089]	[.094]*
Individual F.E.	X	X	X	X
Semester F.E.	X	X	X	X
School of major F.E.		X		X
R-squared	0.579	0.739	0.598	0.632
No. observations	117	117	181	181

Notes: Observations are semester-level data on all students in the sample that went on an LDS mission sometime between their first and last semester at Brigham Young University and had declared a major within the school of Humanities in their first semester. The dependent variable is the GPA (out of 4.0) for the given semester. Robust standard errors are presented in brackets below the estimates.
*** significant at 10%, ** significant at 5%; *** significant at 1%**

Table 5 Alternative specifications and robustness checks

	Dependent variable = Semester GPA								
	Males					Females			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post-mission	0.212	0.244	0.110	0.245	0.245	0.141	0.030	0.112	0.112
	[.049]***	[.099]**	[.048]**	[.049]***	[.049]***	[.079]*	[.036]	[.034]***	[.034]
Bilingual	0.008	0.109	0.031			0.006	-0.032		
	[.049]	[.101]	[.046]			[.078]	[.039]		
Bilingual (romance language)				-0.012				-0.017	
				[.049]				[.041]	
Bilingual (non-romance language)				-0.028				-0.013	
				[.054]				[.042]	
Bilingual (high school language)					-0.018				-0.023
					[.051]				[.044]
Bilingual (not high school language)					-0.015				-0.011
					[.050]				[.040]
Individual F.E.	X	X	X	X	X	X	X	X	X
Semester F.E.	X	X	X	X	X	X	X	X	X
First 4 semesters only	X								
Below average student		X				X			
Above average student			X				X		
R-squared	0.639	0.550	0.530	0.536	0.536	0.592	0.572	0.595	0.595
No. observations	2014	898	1438	3698	3698	548	717	2021	2021

Notes: Observations are semester-level data on all students in the sample that went on an LDS mission sometime between their first and last semester at Brigham Young University. The dependent variable is the GPA (out of 4.0) for the given semester. Column (1) restrict the sample of semesters to the first four semesters taken by each student. Columns (2) and (6) restrict the sample to students whose high school GPA and ACT score were both below the sample average. Columns (3) and (7) restrict the sample to students whose high school GPA and ACT score were both above the sample average. Columns (4) and (8) include a dummy variable indicating that the student served a foreign-speaking mission using a romance language (Spanish, Italian, Portuguese, or French) and a dummy variable indicating that the student served a foreign-speaking mission using a foreign language other than a romance language. Columns (5) and (9) include a dummy variable indicating that the student served a foreign-speaking mission using a language often learned in high school (Spanish, French, or German) and a dummy variable indicating that the student served a foreign-speaking mission using a foreign language other than a language often learned in high school. Robust standard errors are presented in brackets below the estimates.
*** significant at 10%, ** significant at 5%; *** significant at 1%**