EFFECTS OF SECOND LANGUAGE ACQUISITION ON KNOWLEDGE OF FIRST LANGUAGE GRAMMAR

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Abstract

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In the study of cross-lingual interaction, linguistic research has mainly focused on three areas: L1 transfer to L2, subtractive bilingualism, and additive bilingualism. Of these three areas, the latter is the least studied. There are many theories involving additive bilingualism, though little research to back them up. One of the more prominent of these theories is called the "Cummings Interdependence Hypothesis," which suggests that L2 acquisition and growth can actually improve L1 skills. This research study was designed to explore Cummings Interdependence Hypothesis by focusing on the following question: Does the acquisition of a second language improve knowledge of L1 grammar? This study employed a quantitative ex-post-facto study model. A two sectioned survey, with a total of 22 questions (16 multiple choice and 6 fill in the blank) was administered to 94 voluntary high school students. Responses were anonymous and divided into control and experimental groups based on whether or not students had experience with second language acquisition. Total correct answers from both groups were compared, and the results were clear: students with second language acquisition scored significantly higher than students in the experimental group on questions designed to measure understanding of L1 grammar. The average score of the students with ASL experience was 31.4%, higher than their non ASL experienced peers. The difference between groups was outside the range of one standard deviation and was therefore statistically significant. In conclusion, this study tentatively suggests that ASL leads to improved ability in L1 grammatical skills.

Table of Contents

List of Graphs and Tables

Introduction

In the area of linguistic research, there are three main fields of study concerning the relationship between a person's native language and second language: L1 transfer to L2, subtractive bilingualism, and additive bilingualism. Of these three areas, the latter is the least-studied topic. Previous additive bilingual studies have mostly focused on the recognition of homophones to further the theory of language non-selective lexical access. However, there are very few studies looking at how additive bilingualism affects knowledge of L1 grammar. It is no secret that American students have inadequate grammar and literacy skills: the United Nations ranks the United States as forty-ninth out of 156 member countries with regard to this area. Clearly, it is extremely important that researchers and educators find ways to improve our nation's language skills. Therefore this research study focused on the following question: Does the acquisition of a second language improve knowledge of L1 grammar?

Terms overview: L1 (native language), L2 (second language), ASL (acquiring a second language), Attrition (language loss), Lexical (concerning words), Subtractive Bilingualism (replacing L1 with L2), Additive Bilingualism (adding L2 but not replacing L1), Transfer (when L1 properties influence L2 learning), Interlingual Homophones (words from two separate languages that sound the same but have different meanings), Subphonemic Differences (in this context, accent), Language Non-Selective Lexical Access (a theory that bilinguals have parallel access to both L1 and L2 lexicons), Theoretical Grammar (the study of grammar in general – not applied to specific language).

Literature Review

Transfer

Language "transfer" can be defined as using the constructs of L1 to influence the acquisition of L2. One demonstration of this is in the area of grammar: research shows that individuals learning L2 initially analyze the grammar using knowledge of L1 grammar (Schwartz and Sprouse, 1994). This is often referred to as the "Full Transfer/Full Access Hypothesis" and is a widely-accepted theory in linguistics. There are two areas of transfer: positive and negative. Positive transfer occurs when both native and second languages have cross-linguistic similarities. In this case, ASL happens with relative ease. Negative transfer, however, occurs when L1 and L2 do not have similarities and ASL is impeded (Tran, 2005). Transfer is observed in all areas of language such as syntax, morphemes, phonemes, and semantics (Ghilzai, 2010).

A specific example of transfer is in the area of syntax. Studies have shown that similar syntactic properties between languages positively influence a learner's ASL (Alison, 2005; Juffs, 1996; Osterhauf, 2004; Bialystok, 2008). In other words, the similarities between the syntax configurations of two languages affect the ease at which a learner can acquire the second language. A native English speaker, for example, would have a much easier time learning German (positive transfer) than they would Japanese because of the correlation of syntax. Conversely, a Chinese speaker would have a much harder time learning German than Japanese because of the deviation in syntax (negative transfer).

Due to negative transfer, there is a widely-held belief among educators that L1 should be eliminated from an L2 classroom. Researchers, however, disagree. S.P. Corder

found that L1 is the starting point at which learners acquire L2 (Corder, 1967). Without this standard, learners must develop an entirely new mental structure which is more difficult and time-consuming than using an existing structure (Gabrielle, 2005). This was demonstrated in a research situation when two groups of L2 French learners solved grammar tasks: the group that was allowed use of both L1 and L2 performed markedly better than the group only allowed to use L2 (Scott & De la Fuente, 2008). Researchers across the board believe that positive transfer outweighs the effects of negative transfer in the learning process.

Subtractive Bilingualism

The second realm of ASL study involves subtractive bilingualism. When an individual is immersed in an L2-dominant environment, L1 attrition is almost unavoidable. Studies have consistently shown that immersion in an L2-dominant environment causes a cognitive shift away from the native language (Cuza, 2010; Isurin, 2007; Bar-Shalom & Zaretsky, 2008). Ludmila Isurin (2007) set out to ascertain if this attrition still occurred in environments where bilinguals had strong motivation to maintain their native language. For this study, Isurin chose a relatively small group of ten Russian-English speakers and an even smaller group of three Russian monolinguals. The ten bilingual participants were chosen because they lived in America but used Russian on a daily basis as they taught Russian language to university students. The monolingual participants were individuals living in St. Petersburg. Isurin collected samples of semi-spontaneous L1 speech on routine topics such as housing. She also collected samples of prompted, specialized topics such as technology. After transcribing and analyzing the data, Isurin's results clearly showed that bilingual deviations, code-switching, and

borrowing occurred at a much higher rate than with monolinguals. This difference was even more pronounced when participants were describing specialized topics: monolinguals had morphosynatactic deviation in less than 1 percent of their speech, while bilinguals deviated nearly 24 percent of the time. This occurred in instances such as "HA account-AX 'O" when the English term 'account' was given Russian case and gender markings. Daily practice of using L1, however, noticeably slowed this attrition (Bar-Shalom et al., 2008).

Interestingly, L1 attrition resulting from subtractive bilingualism mirrors actual language disorders. Raquel Anderson (1999) conducted a case study which showed that L1 loss occurred in a manner comparable to that of a language disability. Her results also confirmed previous research in which L1 attrition occurred mainly on a grammatical level. Verb morphology and inflection, clitics, prepositions, and articles were the main error patterns observed. Other researchers have noticed similar morphological deviations but have added lexical errors (Bar-Shalom et al., 2008).

A similar phenomenon occurs when different dialects are exposed to an L2-dominant environment. "Lexical leveling" occurs when L1 dialects become streamlined and begin to exhibit a heavy use of borrowing and code-switching. In an important study, Ana Celia Zentella (1990) looked at four Hispanic-American immigrant populations (Puerto Ricans, Cubans, Dominicans, and Columbians) in New York City and their particular dialect of Spanish (L1). In her study, Zentella tracked how each group's dialect changed after arriving in America and living among other Spanish populations. Zentella's conclusion was that L1 linguistic leveling was nearly universal when a group lived among other dialects or languages. She provided several linguistic and social hypotheses

for why this might occur. Linguistically, words that are used infrequently are phased out. ("Clothespin," for example, has given way to "dryer.") If an L1 dialect does not have a word for "dryer," a speaker would borrow it from either English or a different dialect of Spanish. In addition, words that have double meanings often necessitate borrowing from English in order to avoid confusion and offense among mutual Spanish speakers. Socially, individuals are inclined to borrow words from dominant social groups. The rate of borrowing has a strong negative correlation to the socio-economic status of the group. Dominicans, for example, had the highest poverty rate of the four groups studied, and they had the lowest average income. They also had the highest level of dissatisfaction with their dialect as well as the highest rate of borrowing and code-switching.

An early indicator in L1 attrition is the use of borrowing and code-switching. Linguists consider this to be a sign of cognitive shift away from L1. Alejandro Cuza (2010) conducted a research study looking specifically at whether or not Spanish-English bilinguals undergo a cognitive shift using present tense. English and Spanish present tenses differ in that the English language does not have an ongoing interpretation--and must use present progressive--while Spanish does. Cuza collected data from two groups of participants: long-term bilingual Spanish immigrants and a control group of Spanish monolinguals. He then gave three separate tasks using present tense: acceptability judgment, elicited production, and truth-value judgment. The results of this experiment reinforced the conclusions of several other studies: Spanish-English bilinguals undergo noticeable attrition in the Spanish present tense due to the deviation in semantic values of the two languages. Eventually, the dominant language values (in this case L2) replace the native language values.

Additive Bilingualism and Cross-Lingual Interaction

It is important to note, however, that attrition only occurs in instances of subtractive bilingualism. When an L2 is practiced in addition, but does not replace L1, this is known as additive bilingualism. This is the third and least-studied area of research. James Cummins (1979) developed a nominal theory known as the "Linguistic Interdependence Hypothesis" (LIH) that is a cornerstone in additive bilingual research. Cummins posits that if L1 is sufficiently developed prior to exposure to L2 (and is then not replaced by L2), then both language skills can mutually grow. Cummins adds to LIH with the "Threshold Hypothesis" (alternately called "Additive Bilingual Enrichment Principal"). The Threshold Hypothesis suggests that if an individual attains a high level of proficiency in both languages, both L1 and L2 will benefit. Conversely, if an individual maintains a low level of proficiency in both languages, this will result in great cognitive defects. Evidence of the Threshold Hypothesis has been found in several studies (Bylund, Abrahamsson, & Hyltenstam 2012; Gabrielle, 2005; Hu 2010). Cummin's premise is built on Noam Chomsky's theory of "Universal Grammar" (1966) in which all languages share certain qualities, and the ability to learn them is hardwired into the human brain.

Additive bilingual studies also focus on cross-lingual interaction. One such area of interaction is known as the "interlingual homophone effect." Several researchers have looked at how bilinguals react to interlingual homophones or homographs and have theorized as to whether language-nonselective-lexical access is present (Gaskell & Marslen-Wilsen, 1997; Schulpen, Dijkstra, Schriefers & Hasper 2003). Another related area of research looks at salient language cues such as subphonemic differences to see

whether these signals influence a listener's decision of which lexicon to access. A recent study of Dutch-English bilinguals sought to answer both of these questions (Lagrou, Hartsuiker & Duyck, 2011). The conclusions from this study were both interesting and surprising. In answer to the first question, researchers found that bilingual listeners had lexical access that was highly language-nonselective; in other words, the level of cross-lingual phonological interference in bilinguals was high. Researchers drew this conclusion after finding clear evidence of a "homophone effect." Homophones were slower to be recognized than control words in both a second language (E1) and a native language (E3). However, the "homophone effect" was completely absent in the control experiment with monolinguals (E2). In answer to the second question, the researchers concluded that subphonemic differences did not influence lexical access of the listener. This indicated that salient language cues such as an accent did not influence lexical access of the listener.

A handful of studies have been done researching the effect of second language acquisition on standardized test scores. Although several studies had mixed or inconclusive results (Genesee & Lambert, 1983; Turnbull, Hart & Lapkin, 2003), the majority of studies (Armstrong & Rogers, 1997; Cade, 1997; Carr 1994, Sheridon, 1973) have concluded that ASL increases scores on various types of standardized tests. E.A. Rafferty (1986) conducted one such study on third through fifth graders in public schools across Louisiana. He found that students who participated in a thirty minute foreign language programs every week earned higher scores on the Basic Skills Language Arts test than did a parallel group that did not participate. Both groups were otherwise matched in academic abilities, previous test scores, race, sex and grade level. Rafferty

concluded after extensive analysis that studying a foreign language can help students acquire English language arts skills and math skills as well.

In addition to studying the effect ASL has on standardized test scores, researchers have also conducted focused studies on the impact language learning has on the development of reading abilities and linguistic awareness. D'Anguilli, Siegel and Serra (2001) piloted a study on 81 English speaking Canadian youth. These children (ages 6-7) attended a daily Italian language class beginning in first grade. A control group consisted of 81 monolingual students matched in age, sex, socio-economic level, and previous test scores. Three years later both group's reading abilities were tested. Researchers found a significant difference in test scores between the two groups and concluded that the acquisition of a second language improves reading ability in individuals. Several similar studies (Demont, 2001; Diaz, 1982; Garfinkel & Tabor, 1991) have corroborated these findings.

Additive bilingualism and cross-lingual interaction is one of the least-studied areas of bilingual research, and studies such as D'Anguilli et al. (2001) and Rafferty (1986) are few and far between. Though numerous theories exist concerning cross-lingual interaction (Chomsky, 1966; Cummins, 1979; etc.), there is little evidence to support them. Overall, there is a noticeable gap in current research, and more studies need to be conducted before educators can fully understand this field. My research study will help to explore this under-studied area in linguistics and will focus specifically on Cummin's Linguistic Interdependence Hypothesis.

Research Question

This research study is focused on the following question: Does the acquisition of a second language improve knowledge of first language grammar? A secondary question was developed after participants in the experimental group indicated differing levels of ASL abilities. The secondary question is as follows: Do individuals with a higher level of second language abilities show more improvement than their peers with lower (but still present) levels of second language ability?

Methodology

Method and Rationale

This study employed a quantitative research design, as qualitative assessment of language ability is subjective and often unreliable. Therefore, a quantitative assessment was a better choice and had the added benefit of being generalizable, unlike qualitative methods or case studies. This study was designed as an ex-post-facto research model. A pre-test, post-test, non-equivalent study would have been the best design as it would have minimized or eliminated several variables. However, given the window of time, the ex-post-facto method was the most feasible option.

This study took the form of a 22 question pencil and paper test. The initial six questions were in fill-in-the-blanks format and were used to determine posttest control and experimental groups. The remaining sixteen multiple-choice questions measured L1 grammatical ability. All participants were volunteers whose Junior and Senior-level classes were chosen out of convenience at a public high school. All participants received the same test which was both administered and collected by myself in the same ten minutes.

Sample

This study was intended to be conducted at Kamiak High School in Mukilteo, Washington. However, due to a mid-practicum switch of cooperating teachers and schools, it was carried out at Tahoma Senior High School in Covington, Washington. Although technically located in Covington, Tahoma H.S. serves the populations of Maple Valley and Kent as well. This is a mainly rural and suburban area in which the median income is around $65,000 a year. The population of Covington itself is mainly Caucasian, with 76% of residents being white, 4% African American, 9% Asian, and 9% Hispanic. In 2011, Family Circle Magazine selected Maple Valley as one of the ten best "family cities" in America. This was due to the low crime rate and prevalence of nature trails and parks.

Both the control and experimental group were chosen out of convenience: students in classes whose teachers agreed to take part in this study, and students who themselves agreed to take part comprised the sample size. Participants received no compensation. Overall, five classes of Juniors and Seniors (a total of ninety-four students) at Tahoma Senior High participated in the study by taking the survey in Appendix A. Fifty of the students were male while forty-four were female. Of these ninety-four students, three were disregarded for responses indicating that English was their second language, five were dismissed for being incomplete, and four were dismissed for falling outside the range of two standard deviations from the group mean. In total, eighty-two completed surveys were used to compile data.

Instrumentation

This research was designed as an ex-post-facto study because of time constraints. It was designed to test participant's abilities in English as a first language grammar skill, and did so through questions on English grammar. Data was collected through the survey in Appendix A that I both designed created. Altogether the study employed a 22 question pencil and paper test. The initial six questions determined posttest control and experimental groups while the remaining sixteen multiple-choice questions measured L1 grammatical ability. Questions were designed so that there were four possible options to each question: one correct answer, two wrong answers, and a "not sure" answer. The theoretical basis for the questions was Noam Chomsky's theory of Universal Grammar and Cummin's Interdependence Hypothesis (see more about this in the literature review section). Questions were intended to test knowledge of grammatical principles foremost and included questions on topics such as noun gender, post-fixes, syntax and homophones. These grammatical principals tested were ones that theoretically (according to Cummin and Chomsky) would improve upon acquisition of a second language.

All participants in this study were volunteers whose Junior and Senior-level classes were chosen out of convenience at Tahoma Senior High School and were neither rewarded nor penalized in any manner for choosing to opt-in or opt-out of the study. As a researcher my role was to hand out, collect and score the survey and consent forms. I also graded, recorded and calculated all scores on the survey.

Analysis/Validity

All surveys (regardless of grouping) were scored in the same manner and at the same time. An answer key was referenced and all surveys were scored by the same

researcher. Out of sixteen multiple-choice survey questions, scores were based on whether participants answered the question correctly or not. If a participant marked an answer right, they were given one point. If a wrong answer was marked, they were given zero points. If a participant did not mark an answer to a question, it was marked wrong. If a participant left two or more answers blank, their survey was disregarded (see next paragraph.)

After surveys were collected, they were scored and divided into control and experimental groups. Of the 92 participants who originally took the test, only 86 responses were analyzed. The rest were disregarded for one of the following two reasons: First, only surveys in which the participant answered affirmatively that English was their native language were considered because this survey was designed for individuals whose first language is English. Second, only surveys that were complete (missing fewer than two answers) were considered valid because part D of every question gave the option of answering "not sure." A skipped answer thus indicated a lack of effort or attention and more than one missing answer would suggest that the participant's answers would not accurately reflect their true grammar ability. Overall, three surveys were disregarded for indication that English was not the participant's native language and five surveys were disregarded for being incomplete.

The remaining surveys were sorted into either the control or experimental group. Because the research question centered on whether or not ASL improved knowledge of first language grammar, students were divided up by their experience with ASL. Section 1 of the survey dictated how this was determined. Students who indicated that they did not have ASL experience were placed in a control group. This was decided by whether or

not a student answered "no" to all questions (2, 2a, 2b, 3, and 4) in Section 1. If so, they were placed in the control group. If students answered "yes" to *any* of the questions in 2, 2a, 2b, 3, and 4, they were placed in the experimental group, as this indicated that yes, they had ASL experience. 25 surveys were placed in the control group while 61 were placed in the experimental group.

An unexpected result of this survey was that some students answered both "yes" and "no" to questions in Section 1. Several causes could account for this. One might be the wording of the questions and lack of specificity for desired answers. For example, many students wrote responses such as "kinda," "sort of," and "not well" to questions 2, 2a and 2b. This indicates a perceived lower level of fluency than a native speaker might have, but familiarity with ASL nonetheless. These individuals were placed in the main experimental group along with the responses that gave solid affirmatives to all parts of Section 1.

However, due to this unexpected development of mixed yes and no answers in Section 1, a second subset research question was developed after the experiment was conducted: "Do individuals with a higher level of L2 abilities show more improvement than their peers with lower (but still present) levels of L2 ability?" For this question, the control group remained the same and was comprised of responses from participants who indicated that they had no L2 acquisition. The experimental group however, was broken down into two subsets. Subset 1 consisted of thirty-two students who gave mixed or inconclusive answers other than "yes" and "no"; such as "a little bit" or "fairly well". These responses represented participants with ASL experience, but with a lower perceived ability and fluency level. Subset 2 consisted of twenty-nine students who

answered "yes" to all questions in Section 1. This subset represented students with a higher perceived ability and fluency level.

Survey scores were then entered in to an online standard deviation machine (Online Chart Tool, 2008) which calculated mean (average), standard deviation, variance (standard deviation), population standard deviation, and variance (population standard deviation.) Results were calculated and recorded. Next, scores in the experimental group were separated into experimental subsets 1 and 2 and subsequent results were calculated and recorded. Finally, all data groups were combined a results were calculated and recorded.

Next, data from each group was systematically eliminated for falling outside of two standard deviations from the mean. This reduced aberrations in the data and streamlined the results to include 95.45% of the responses. (The standard confidence interval primarily used to calculate margin of error in the scientific and research community is calculated the same way). Each group (control, experimental, subset 1, subset 2, and all participants) was calculated separately to find specific data. Firstly, two standard deviations above and below the mean of each group was found. Secondly, all data that fell outside this range was eliminated from the data set. Thirdly, new data sets were inputted into the standard deviation calculator and results were recorded.

Researcher bias was accounted for and minimized by designing an anonymous study to quantitatively measure data. Although quantitative data studies can still be manipulated by researchers, the null hypothesis here was maintained by measuring data through outside standards of measurement such as the two-standard-deviation cut-off the is commonly used by researchers in the scientific community.

Data

There were 94 total surveys taken by participants. Of these, three surveys were dismissed for indication that the participant was an English Language Learner. An additional five surveys were dismissed for incomplete (missing more than two) answers. In total, 86 surveys were recorded as raw data. This data set can be found in Appendix B. Next, data was sorted into groups and inputted into a standard deviation calculator. This can be seen in Table 1:

Table 1: Data Calculations (before exclusions)

Group	All Participants	Control	Experimental	Experimental Subset 1	Experimental Subset 2
Mean	9.44186	6.12	10.80328	10.15625	11.51724
Standard Deviation (SD)	3.373237	2.16641	2.7858	2.81825	2.61344
Variance (SD)	11.37893	4.69333	7.76066	7.94254	6.83005
Population SD	3.3536	2.12264	2.76287	2.77387	2.56798
Variance (population SD)	11.24662	4.5056	7.63343	7.69434	6.59453

Next, two standard deviations above and below the means of each group were calculated. Results that fell outside this range were then excluded. These calculations can be found in Table 2 below:

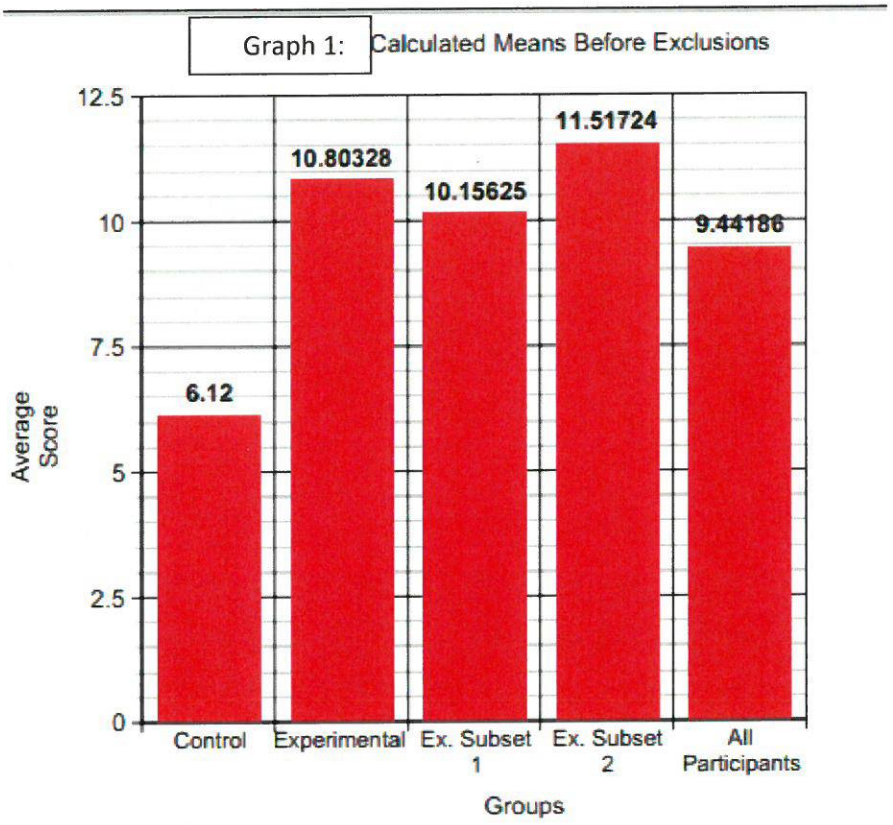
Table 2: Standard Deviation Exclusion Calculations				
Group	**2 SD**	**+2 SD**	**-2 SD**	**Exclusions**
Control	4.33282	10.45282	1.78718	0
Experimental	5.5716	16+ (above limit)	5.23168	3
Experimental Subset 1	5.6365	15.79275	4.51975	2
Experimental Subset 2	5.22688	16+ (above limit)	6.29036	2
All Participants	6.746474	16+ (above limit)	2.695386	0

After data was eliminated for falling outside the range of two standard deviations, the new data sets were inputted into the standard deviation calculator. The results from the Control Group remained the same, as there were no exclusions. The remaining groups with new calculations are listed in Table 3 below:

Table 3: Data Calculations (after exclusions)					
Group	**All Participants**	**Control**	**Experimental**	**Experimental Subset 1**	**Experimental Subset 2**
Mean	9.44186	6.12	11.15517	10.6	11.75
Standard Deviation (SD)	3.373237	2.16641	2.36051	2.28337	2.33532
Variance (SD)	11.37893	4.69333	5.57199	5.21379	5.4537
Population SD	3.3536	2.12264	2.77387	2.24499	2.29324
Variance (population SD)	11.24662	4.5056	7.69434	5.04	5.25893

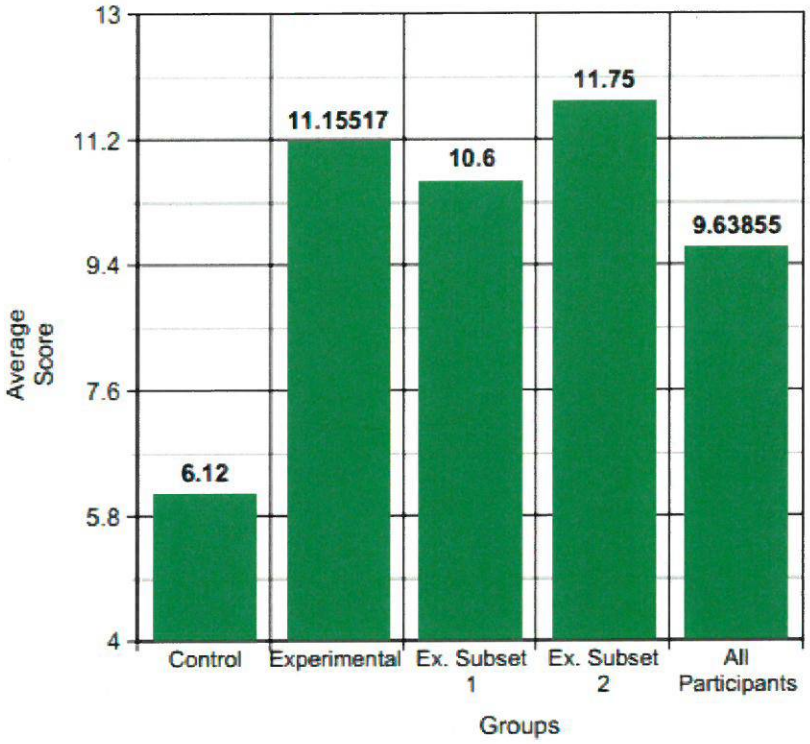
Analysis

After sorting, calculating, and organizing data, the first factor analyzed was the variance of data groups. A high level of variance would suggest that the test given was at an appropriate level for the participants. A low level of variance would suggest that the test given was either too easy or too hard and was thus nullifying the results. The level of variance in this study for all participants was at a level of 11.38, which means that there was over an 11-point range (out of 16) in scores. This suggests that the questions in the study were neither too easy nor too hard for the majority of participants. The level of variance for the control, experimental, ex. subset 1 and ex. subset 2 were at levels ranging from 4.7 and 7.9, thus showing a normal distribution of scores. Table 1 (page #######) shows the variance values (rounded to the hundredth). Next, the average mean score from each group was analyzed. Graph 1 shows the average mean scores from all groups and subsets before the standard deviation exclusions.



Graph 2 shows the average mean scores from all groups and subsets after standard deviation exclusions.

Graph 2: Calculated Means After Exclusions



Graph 2 provides a useful visual to represent the difference in mean scores from the control and experimental groups. This graph best illustrates the ranges of mean scores between all groups and subsets. Table 4, however, calculates these percentage differences between groups in even more detail.

Table 4 – Percentage of Difference in Mean Group Scores					
Percentile Difference in Means	**Control**	**Experimental**	**Experimental Subset 1**	**Experimental Subset 2**	**All Participants**
Control	n/a	31.4%	28%	35.1%	21.9%
Experimental	31.4%	n/a	3.4%	3.7%	9.5%
Experimental Subset 1	28%	3.4%	n/a	7.1%	6.1%
Experimental Subset 2	35.1%	3.7%	7.1%	n/a	13.2%
All Participants	21.9%	9.5%	6.1%	13.2%	n/a

As can be seen, there is a 31.4% difference in mean scores between the control and experimental groups. Furthermore, there is a 35.1% difference in mean scores between the control and experimental subset 2 group. Finally, there is a 7.1% difference between the mean scores of experimental subsets 1 and 2. Although this study cannot say with any certainty that ASL (or any other factor) is the causation of the difference between group scores, what it does illustrate is that there is a noticeable difference between groups. Is this difference important and does it have any relevant meaning to Cummin's Hypothesis and the research question? Unfortunately, I cannot say and do not know. I did not run the relevant tests to determine what degree of difference would suggest significance. What can be said, however, is that the difference in means between groups as well as the levels of variance within each group does not contradict previous studies such as D'Anguilli et al. (2001) and Rafferty (1986) in which a positive correlation between ASL and L1 grammar ability was found.

Implications/Recommendations

Results from this research study align with (though do not corroborate) previous studies that suggest that the acquisition of a second language positively impacts first language grammar skills. Future studies need to be done in order to positively say whether or not Cummin's Hypothesis is valid. However, the findings from previous studies hold much promise for gains in American student's English grammar acquisition. As can be seen through countless polls, research studies, and standardized tests, it is evident that our students are falling steadily behind their peers in grammar acquisition. Educators, lawmakers, parents, and school administration more often than not disagree about the best way to implement better grammar instruction into the American educational system. If it is true that the acquisition of a second language does positively impact first language skills, a simple yet effective way to build first language grammar skills in American schools would be to begin the process of learning a second language as early as possible. Educators can do this by requiring foreign languages to be a *mandatory* requirement in American public schools beginning at an early age. Doing so would boost grammar scores as well as improve other standardized test scores as well (Carr, 1994., Armstrong & Rogers, 1997). In addition, educators and administrators should avoid treating foreign language classes as electives or simply requirements for students on the college-track. Instead, all students should be required to study at least one foreign language from kindergarten onwards and this requirement should be given the same level of deference as traditional core classes such as math and English.

Further research needs to be done to the findings of this study. This study should be viewed more as a starting point, as there are several major threats to validity that could

not be neutralized due to the research design and time constraints. Furthermore, although the difference between means and the levels of variance are interesting, the relevant tests were not done to show whether or not these numbers were at any significant level. Therefore, results from this study are to be interpreted tentatively and should be further researched before solid conclusions are reached. A pre-test, post-test, non-equivalent study would be the ideal design were further studies to be done on these topics as it would neutralize a larger number of potential threats to validity than this current study.

As the original research question stemmed from the Linguistic Interdependence Hypothesis and its relevance to grammar, an insightful follow-up study might focus on what specific aspects of grammar ASL affects the most, i.e. semantics, phonetics, morphemes, etc. Another important follow-up study could focus on whether or not certain languages are more beneficial than others to supplement as a second language to English. Several studies have shown that positive transfer can occur between languages (L1 to L2) with cross-linguistic similarities (Alison, 2005; Juffs, 1996; Osterhauf, 2004; Bialystok, 2008). However, does the opposite hold true? Can an L2 with cross-linguistic similarities to an individuals' L1 actually benefit native language skills more than an L2 with dissimilar cross-linguistic features? This field of additive bilingualism holds much promise for researchers seeking to find answers to cross-linguistic dilemmas.

Conclusion

This study set out to research the question of whether or not the acquisition of a second language leads to improved first language grammar skills. Findings align with and do not contradict previous studies which show that ASL experience positively correlates with increased first language grammar abilities. Further research needs to be done to

validate these findings and this study should be viewed as a starting point, as there are several major threats to validity that could not be neutralized due to the research design and time constraints. Therefore, results from this study are to be interpreted tentatively and should be further researched before solid conclusions are reached. However, there is a mounting pile of evidence suggesting that acquisition of a second language positively helps first language grammar skills.

References

Anderson, R. (1999). Impact of first language loss on grammar in a bilingual child. *Communications Disorders Quarterly*, *21*(1), 4-16. doi: 10.1177/152574019902100102

Armstrong, P., & Rogers, J. (1997). Basic skills revisited: The effects of foreign language instruction on reading, math, and language arts. *Learning Languages* , *2*(3), 20-31. Retrieved from http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=EJ575427&ERICExtSearch_SearchType_0=no&accno=EJ575427

Bar-Shalom, E., & Zaretsky, E. (2008). Selective attrition in Russian-English bilingual children: Preservation of grammatical aspect. *International Journal of Bilingualism*, *12*(4), 281-326. Retrieved from http://search.proquest.com.nu.idm.oclc.org/docview/217374477/fulltextPDF/13AC3A2EB6B4049BC5C/5?accountid=28772

Bilash, O. (2009). Cummins interdependence hypothesis. Retrieved from http://www2.education.ualberta.ca/staff/olenka.bilash/Best of Bilash/iceberg.html

Bobb, S. C. (2008). *Morphology in bilingual language processing: The role of second language proficiency in acquiring grammatical gender.* (Doctoral dissertation), Available from Proquest. Retrieved from http://nu.idm.oclc.org/login?url=http://search.proquest.com.nu.idm.oclc.org/docview/304507976?accountid=28772

Bylund, E., Abrahamsson, N., & Hyltenstam, K. (2012). Does first language maintenance hamper nativelikeness in a second language?: A study of ultimate attainment in early bilinguals. *Studies in Second Language Acquisition* , *34*(2), 215-241. doi: http://dx.doi.org/10.1017/S0272263112000034

Cade, J.M. (1997). The foreign language immersion program in the Kansas City, Missouri Public Schools 1986-1996. Dissertation Abstracts International – A 58(10) 3838. Retrieved from http://www.docstoc.com/docs/129309501/Welcome-to-Ebinport

Carr, C. G. (1994). The effect of middle school foreign language study on verbal achievement as measured by three subtests of the Comprehensive Test of Basic Skills. Dissertation Abstracts International – A 55(07), 1956. Retrieved from http://www.cornellcollege.edu/classical_studies/amici/world%20language%20advisory%20report.pdf

Chomsky, N. (1966). The current scene in linguistics: Present directions. *College English*, *27*(8), 587-595. Retrieved from http://www.jstor.org/stable/374695

Corder, S. P. (1967). The significance of learners' errors. *International review of applied linguistics*, *5*(4), 161-170. Retrieved from http://www.scribd.com/doc/54466787/Corder-S-P-1967-the-Significance-of-Learners-Errors-International-Review-of-Applied-Linguistics-5-161-169

"Create Online Charts and Graphs." *Online Charts and Graphs*. Zygomatic, 2013. Web. 11 July 2013. <http://www.onlinecharttool.com/graph/view/a024e0475837>.

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, *49*(2), 222-251. Retrieved from http://www.jstor.org/stable/1169960.

Cuza, A. (2010). The l1 attrition of the Spanish present tense. *Hispania*, *93*(2), 256-272. Retrieved from http://www.jstor.org/stable/25703435

D, A., Siegel, L., & Serra, E. (2001). The development of reading in English and Italian in bilingual children. *Applied Psycholinguistics*, *22*(4), 479-507. doi: 10.1017/S0142716401004015 Demont, E. (2001). Contribution de l. *International Journal of Psychology*, *36*(4274-285), doi: 10.1080/00207590042000137

Diaz, J. (1983). The effects of a dual language reading program on the reading ability of Puerto Rican students. *Reading Psychology*, *3*(3), 233-238. Retrieved from http://web.ebscohost.com.nu.idm.oclc.org/ehost/detail?vid=9&sid=e9aa2da9-673f-4af0-b9c0-fbc0687d1aa6@sessionmgr13&hid=23&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ==

Gabriel, A. (2005). *The acquisition of aspect in a second language: A bidirectional study of learners of English and Japanese.* (Doctoral dissertation), Available from Proquest. (3187373) Retrieved from http://search.proquest.com.nu.idm.oclc.org/dissertations/docview/193966779/abstract/13ABFBD4425710B0A90/1?accountid=28772

Garfinkel, A., & Tabor, K.E. (1991). Elementary school foreign languages and English reading achievement: A new view of the relationship. Foreign Language Annals, 24(5), 375-382. from Linguistics and Language Behavior Abstracts database. Retrieved from http://www.actfl.org/advocacy/discover-

languages/advocacy/discover-languages/what-the-research-shows/studies/supporting3sthash.iVdWx7Fv.dpuf

Gaskell, M.G., & Marslen-Wilson, W.D. (1997). Integrating form and meaning: A distributed model of speech perception. *Language and Cognitive Processes, 12,* 613-656. Doi: 10.1080/016909697386646

Genesee, F., & Lambert, W. E. (1983). Trilingual education for majority-language children. *Child Development,54*(1), 105-114. doi: 10.2307/1129867 Ghilzai, S. A. (2010). *The role of transfer in the acquisition of l2 possessives by German, Greek, Japanese & Chinese l1 speakers.* (Doctoral dissertation), Available from Scribd. Retrieved from http://www.scribd.com/doc/46478946/12

Gigi , L., & Bialystok, E. (2008). Common and distinct cognitive bases for reading in English–Cantonese bilinguals. *Applied Psycho-linguistics*, *29*(2), 269-289. doi: http://dx.doi.org/10.1017/S0142716407080125

Haak, L., & Leino, W. (1963). *The teaching of Spanish in the elementary schools and the effects on achievement in other selected subject areas.* Informally published manuscript, University Minnesota, Saint Paul, Minnesota, Available from ERIC. Retrieved from http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED001301&ERICExtSearch_SearchType_0=no&accno=ED001301

Hu, C. F. (2010). Phonological bases for l2 morphological learning. *Journal of Psycho-lingual Research,39*(4), 305-322. doi: http://dx.doi.org.nu.idm.oclc.org/10.1007/s10936-009-9143-1

Isurin, L. (2007). Teachers' language: L1 attrition in Russian-English bilinguals. *The Modern Language Journal,91*(3), 357-371. Retrieved from http://www.jstor.org/stable/4626045

Juffs, A., & Harrington, M. (2011). Aspects of working memory in l2 learning. *Language Teaching*, *44*(2), 137-166. doi: http://dx.doi.org.nu.idm.oclc.org/10.1017/S0261444810000509

Lagrou, E., Hartsuiker, R. J., & Duyck, W. (2011). Knowledge of a second language influences auditory word recognition in the native language. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *37*(4), 952-965. Retrieved from http://psycnet.apa.org/?&fa=main.doiLanding&doi=10.1037/a0023217

Rafferty, E. (1986). *Second language and basic skills in Louisiana.* (Doctoral dissertation), Available from ERIC. Retrieved from http://www.eric.ed.gov/PDFS/ED283360.pdf

Scott, V., & De la Fuente, M. S. (2008). What's the problem? L2 learners' use of the l1 during consciousness-raising, form-focused tasks. *The Modern Language Journal*, *92*(1), 100-113. Retrieved from http://www.jstor.org/stable/25172995

Schulpen, B., Dijkstra, T., Schriefers, H.J., & Hasper, M. (2003). Recognition of interlingual homophones in bilingual auditory word recognition. *Journal of Experimental Psychology: Human perception and Performance, 29,* 1155-1178. Doi: 10.1037/0096-1523.29.6.1155

Sheridan, R. (1976). Augmenting reading skills through language learning transfer. FLES Latin program evaluation reports, 1973-74, 1974-75, 1975-76. Available from

ERIC database. Retrieved from http://www.actfl.org/advocacy/discover-languages/advocacy/discover-languages#sthash/iVdWx7Fv.dpuf

"Standard Deviation - Calculator." *Standard Deviation Calculator*. Easycalculation.com, n.d. Web. 11 July 2013. <http://easycalculation.com/statistics/standard-deviation.php>.

Turnbull, M, Hart, D., & Lapkin, S. (2003). Grade 6 French immersion students' performance on large scale reading, writing, and mathematics tests: Building explanations. Alberta Journal of Educational Research, 49(1), 6-23. Retrieved from http://ajer.synergiesprairies.ca/ajer/index.php/ajer/article/view/354

Tran, T. (2005). *An exploration of the relationship between Vietnamese students' knowledge of l1 grammar and their English grammar proficiency*. (Doctoral dissertation), Available from Proquest. (California) Retrieved from http://www.eric.ed.gov/ERICWebPortal/search/detailmini.jsp?_nfpb=true&_&ERICExtSearch_SearchValue_0=ED516275&ERICExtSearch_SearchType_0=no&accno=ED516275

Zentella, A. C. (1990). Lexical leveling in four New York City Spanish dialects: Linguistic and social factors. *Hispania*, *73*(4), 1094-1105. Retrieved from http://www.jstor.org/stable/344311

Appendix A – Research Survey

Section 1

1. Is English your native language?

2. Can you carry on a conversation in a language other than English?

   2a. Can you read in a language other than English?

   2b. Can you write in a language other than English?

3. Have you ever studied a foreign language in school?

4. Have you ever studied a foreign language outside of school?

Section 2

1. What is a noun?
   a. An action word
   b. A descriptive word
   c. People, place or thing
   d. Not sure

2. Do English nouns have genders? Yes No Not Sure

3. Nominative, Accusative, Dative and Genitive are all categories of _____?
   a. Verbs
   b. Nouns
   c. Adjectives
   d. Adverbs
   e. Not sure

4. What is a homophone?
   a. Two words that sound the same but have different meanings
   b. Words that rhyme
   c. Two words that mean the same thing
   d. A person afraid of homosexuals
   e. Not sure

5. Which of these is a prefix?
   a. -fy (simplify, magnify, identify…)
   b. – vers – (controversial, adversary…)

c. re- (rewrite, restart, replant…)
d. Not sure

6. Which of these is a postfix?
   a. -ize (realize, fertilize, standardize…)
   b. – man - (adamant commandment…)
   c. de- (depose, depress, derange…)
   d. Not sure

7. Which word is a possessive pronoun?
   a. You
   b. It
   c. The
   d. Mine
   e. Not sure

8. What is syntax?
   a. What words mean
   b. The study of sounds
   c. How words combine to make sentences
   d. A tax on sinful people
   e. Not sure

9. Which of the following is an irregular past-tense verb?
   a. Wanted
   b. Wash
   c. Sang
   d. Not sure

10. Which word is an article?
    a. A/an
    b. Me
    c. You
    d. Not sure

11. Which word is a pronoun?
    a. Excellent
    b. Cow
    c. Ran
    d. Me
    e. Not sure

12. What is a phoneme?
    a. A small segment of sound
    b. A word that has two meanings
    c. Words that begin with the same letter

d. Not sure

13. What are adjectives?
    a. An action word
    b. Person, place or thing
    c. A descriptive word
    d. Not sure

14. What is are conjunctions?
    a. Words that rhyme
    b. Words that link words, sentences, clauses or phrases
    c. Words that are combined (don't, haven't, isn't, etc.)
    d. Words that express agreement
    e. Not sure

15. Which sentence follows a Subject-Verb-Object pattern?
    a. Loves apples he.
    b. Apples, he loves.
    c. He loves apples.
    d. He apples loves.
    e. Not sure

16. Which of these words is a compound?
    a. Bittersweet
    b. Squish
    c. Running
    d. Comprehend
    e. Not sure

Appendix B - Raw Data Scores

The raw scores of All Participant surveys are listed as follows:

6, 4, 6, 10, 7, 10, 5, 9, 3, 8, 6, 9, 7, 7, 4, 6, 3, 5, 7, 3 , 6, 8, 4, 3, 7, 13, 11, 12, 8, 8, 15, 12, 12, 8, 9, 15, 9, 13, 10, 13, 8, 8, 13, 9, 13, 4, 3, 8, 8, 10, 11, 8, 10, 13, 11, 8, 12, 14, 15, 11, 12, 11, 12, 11, 15, 13, 9, 9, 13, 14, 9, 8, 13, 11, 12, 12, 13, 11, 11, 13, 14, 8, 5, 6, 14, 15

Raw data scores of surveys sorted into Control Group:

6, 4, 6, 10, 7, 10, 5, 9, 3, 8, 6, 9, 7, 7, 4, 6, 3, 5, 7, 3, 6, 8, 4, 3, 7

Raw data scores of surveys sorted into Experimental Group:

13, 11, 12, 8, 8, 15, 12, 12, 8, 9, 15, 9, 13, 10, 13, 8, 8, 13, 9, 13, 4, 3, 8, 8, 10, 11, 8, 10, 13, 11, 8, 12, 14, 15, 11, 12, 11, 12, 11, 15, 13, 9, 9, 13, 14, 9, 8, 13, 11, 12, 12, 13, 11, 11, 13, 14, 8, 5, 6, 14, 15

Raw data scores of surveys from Experimental Group into Experimental Subset 1:

13, 11, 12, 8, 8, 15, 12, 12, 8, 9, 15, 9, 13, 10, 13, 8, 8, 13, 9, 13, 4, 3, 8, 8, 10, 11, 8, 10, 13, 11, 8, 12

Raw data scores of surveys from Experimental Group into Experimental Subset 2:

14, 15, 11, 12, 11, 12, 11, 15, 13, 9, 9, 13, 14, 9, 8, 13, 11, 12, 12, 13, 11, 11, 13, 14, 8, 5, 6, 14, 15

Scores after exclusions

Results of All Participants Group two-standard-deviation exclusion calculations:

2 standard deviations: 6.746474

2 standard deviations above mean: 16+ (upper limit – no exclusions)

2 standard deviations below mean: 2.695386 (no exclusions)

Control Group scores with exclusions stayed the same (as there were no exclusions)

6, 4, 6, 10, 7, 10, 5, 9, 3, 8, 6, 9, 7, 7, 4, 6, 3, 5, 7, 3, 6, 8, 4, 3, 7

Experimental Group scores with exclusions:

13, 11, 12, 8, 8, 15, 12, 12, 8, 9, 15, 9, 13, 10, 13, 8, 8, 13, 9, 13, 8, 8, 10, 11, 8, 10, 13, 11, 8, 12, 14, 15, 11, 12, 11, 12, 11, 15, 13, 9, 9, 13, 14, 9, 8, 13, 11, 12, 12, 13, 11, 11, 13, 14, 8, 6, 14, 15

Experimental Group Subset 1 scores with exclusions

13, 11, 12, 8, 8, 15, 12, 12, 8, 9, 15, 9, 13, 10, 13, 8, 8, 13, 9, 13, 8, 8, 10, 11, 8, 10, 13, 11, 8, 12

Experimental Group Subset 2 scores with exclusions:

14, 15, 11, 12, 11, 12, 11, 15, 13, 9, 9, 13, 14, 9, 8, 13, 11, 12, 12, 13, 11, 11, 13, 14, 8, 6, 14, 15

All Participant Group scores with exclusions

6, 4, 6, 10, 7, 10, 5, 9, 3, 8, 6, 9, 7, 7, 4, 6, 3, 5, 7, 3, 6, 8, 4, 3, 7, 13, 11, 12, 8, 8, 15, 12, 12, 8, 9, 15, 9, 13, 10, 13, 8, 8, 13, 9, 13, 8, 8, 10, 11, 8, 10, 13, 11, 8, 12, 14, 15, 11, 12, 11, 12, 11, 15, 13, 9, 9, 13, 14, 9, 8, 13, 11, 12, 12, 13, 11, 11, 13, 14, 8, 6, 14, 15