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Transfer of Arabic Grammatical Knowledge to Spanish Subject-Verb Agreement

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Transfer of Arabic Grammatical Knowledge to Spanish Subject-Verb Agreement

Abstract

In the field of second language acquisition (SLA), research has shown that one's first language (L1) has proven to positively and negatively transfer to one's second language (L2). A possible area of transfer is subject-verb agreement. Transfer becomes much more difficult when two languages utilize different writing scripts. What remains unknown, and what the present study aims to determine is if transfer of subject-verb agreement can occur between two languages that use different writing scripts. This study examines five L1 Arabic/English participants in their acquisition of Spanish subject-verb agreement by recording their reaction time for reading Spanish sentences with subject-verb (dis)agreement. A control group of three L1 English participants were presented with the same sentences and their reaction time was also recorded. The reaction times of the participants revealed that the L1 Arabic/English speakers spent more time analyzing the verb disagreement than did the L1 English speakers. The results show that these L1 Arabic/English participants are sensitive to subject-verb disagreements.

Keywords: second language acquisition, transfer, writing scripts

Introduction

When we study human language, we are approaching what some might call the human essence, the distinctive qualities of mind that are, so far as we know, unique to [humans].

(Chomsky, 1968, p. 100)

Many factors affect the way in which adult learners acquire a second language (L2). Second language acquisition (SLA) has been extensively studied (Krashen, 1981; Cummins, 1979, 1981) within the last 40 years. Currently, there is a continuous debate in research and in literature regarding whether there is a universal strategy for processing grammatical structures during second language acquisition or if it is language-specific. That is, do all second language (L2) learners process some grammatical structures similarly or does this process vary depending on their first language (L1)? What remains further unknown is whether transfer of skills pertaining to certain grammatical forms can occur across different writing scripts. The present study explores adult SLA in terms of the principles of transfer-particularly basic subject-verb agreement between Arabic and Spanish.

Redundant cues (e.g., subject and verb agreement: both convey a subject/person doing an action) are ideal linguistic features to study regarding language processing because they are a key part of language acquisition. Redundant cues also exist in multiple languages with varying writing scripts- including Arabic and Spanish.

Arabic, an Afro-Asiatic language and Spanish, an Indo-European language, are two interesting languages to study concurrently because the two languages share a rich and complex history.

Between the years 711 and 1492, much of the Iberian Peninsula was ruled by Arab Muslims (Watt, 1965). During this time, the Arab people planted their religion, culture, and language in what is present-day Spain. Arabic greatly influenced Spanish, the language that is spoken there and in many other regions of the world today. For many years, Arabic was being spoken in the same region as Spanish. Because of this, Spanish began to absorb Arabic traits. Modern Spanish is thus a mixture of Old Castilian Spanish and the Mozarabic dialect of Arabic which it partially absorbed.

Even though Arabic made an impact on the Spanish language, the two languages' writing scripts remained different. Because Arabic and Spanish use different writing scripts, it typically would be considered very difficult to acquire one of these languages from the other (Gor and Vatz, 2009). However, because of their history in sharing a geographic location and their shared use of complex verb conjugations, it is provocative to hypothesize that Arabic skills could potentially transfer to Spanish instead of being a challenge as previously noted.

This study examines the possible transfer of Arabic grammatical knowledge (the L1) to Spanish (the L2) subject-verb agreement. I hypothesize that those with fluency in Arabic (a language with different verb conjugations for every subject) will exhibit transfer of knowledge to Spanish subject-verb agreement, another language with verb conjugations for every person (e.g., for the verb 'to be': I am, you are, he/she is, we are, etc.). In other words, L1 Arabic/English speakers will be sensitive to (or notice) Spanish subject-verb (dis)agreements. I hypothesize that this transfer will occur even though Arabic and Spanish use different writing scripts. L1 Arabic/ English bilinguals may also

be sensitive to this disagreement. If participants indeed show transfer, this information may affect how foreign languages are taught to those who already know languages with distinct verb conjugations, like Arabic to Spanish, and lead to more research in connections between these and other languages with dissimilar writing scripts.

Background

Second Language Acquisition

Second language acquisition (SLA) is a relatively new field of study (Gass & Selinker, 2008). Consequently, there is still much debate regarding certain aspects of SLA. Although research is far from finding a complete theory, SLA has been defined and explained by many. Gass and Selinker (2008), two leading researchers in SLA, explain that second language acquisition is the process of learning another language after the primary, native language has been learned. The primary language one acquires is referred to as the L1. The non-native language that is learned after the acquisition of the first language is called the L2. The term "second" in the phrase SLA is general enough to apply to the acquisition of any language after the acquisition of the native language (Koda, 2009). In other words, it can apply to the third, fourth, or fifth learned language.

When one learns his/her L1, he/she learns it by maintaining meaningful interactions with those around him/her in which the focus of every single exchange is communicative in nature. Because of this natural and practical communication, children can create and develop grammatical rules to assist them in their language knowledge and in their language usage (Gass & Selinker, 2008). However, the situation for adult L2 learners is different, as their interactions are generally without context, thereby making SLA more difficult for them.

Subject-Verb Agreement

Specific subject–verb agreement is a common grammatical feature that is often found in most Indo-European languages. However, Nayan (2009) explains that subject-verb agreement poses difficulty in both the L1 and in SLA (Hoshino, Dussias, & Kroll, 2009).

In languages such as English and Spanish, if the subject is singular, the verb must be singular. By contrast, if the subject is plural, the verb must be plural (Hoshino, Dussias, & Kroll, 2009). As illustrated in Table 1, Spanish has six different regular verb forms while English has just two: live and lives. In Spanish, the subject affects the form of the verb.

Table 1: Subject-Verb Agreement in English and Spanish

	English	Spanish
Singular	I live	(Yo)* Vivo
	You live	(Tú)* Vives
	He lives	(Él)* Vive
	She lives	(Ella)* Vive
Plural	We live	(Nosotros)* Vivimos
	You (all) live (Spain)	(Vosotros)* Vivís
	They live	(Ellos)* Viven [masc.]
		(Ellas)* Viven [fem.]
	You (all) live	(Ustedes)* Viven

*In Spanish, the subject pronoun can be omitted in some cases because it is considered to be redundant. This is illustrated by the parentheses in Table 1.

Unlike English, Spanish shares some of these characteristics with Modern Standard Arabic (MSA) (Gass, 1988; Abdelkader, 1988). MSA is the customary version of Arabic. It is the universal language of the Arabic-speaking world that is understood by all Arabic speakers (Omniglot). MSA verbs show marking for tense, voice, gender, number, person, and mood making it an incredibly rich grammatical structure.

Similarly, Spanish verbs are marked for tense, mood, person, and number. These many markings result in about 50 conjugations per verb. Nouns in Spanish and Arabic are marked for gender and number (Huffman, 1977).

Acquiring a Language with a Different Writing Script

A writing script is a standardized form of recording and transferring the communication of messages in a language. Such communication is achieved by visually encoding and decoding a set of signs or symbols, both known as characters (Omniglot, 2014). Writing scripts require four basic elements (Koda, 2009). The first requirement of a writing script is a set of defined symbols. Each symbol is known as a character. The second requirement of a writing script is at least one set of rules (orthography) that is understood and utilized by a common group. This set of rules assigns meaning to base elements, or graphemes (the smallest unit of meaning in a written language), their order and their relation to one another. The third requirement needed in a writing script is a language whose structures can be learned, taught, or deciphered by the interpretation of these elements and rules. Finally, a writing script requires a physical representation of the aforementioned symbols on a permanent medium, as to preserve its existence.

As explained by Koda (2009), there are three different types of writing scripts: alphabetic, syllabic, and logographic. In the alphabetic writing script, each symbol represents a phoneme. In the syllabic writing script, individual symbols denote distinct syllables. In the logographic writing script, characters correspond with the meaning and sound of a morpheme.

Gor and Vatz (2009) argue that an L2 writing script can support language learning if said script is similar to the writing script of the L1. By contrast, an L2 writing script can hinder language learning if the writing script is vastly different from the L1. This is especially true in terms of written input. Learners attempting to acquire a language with a new writing script will experience more difficulties accessing written input than if the input used the same writing script as their L1 (Gor and Vatz, 2009). This, then, could potentially slow the rate of acquisition as a whole for the language learner. According to Everson (2011), American language learners spend an average of 600 hours (approximately 6 months) studying a Western European language (e.g., Spanish, French, Italian) to gain professional proficiency and general competence in the language. By contrast, it takes American adult learners an average of 2 years (more than 2,500 hours) to achieve the same proficiency in a “challenging” (249) language such as Arabic, Chinese, or Korean. For the current research, it is important to consider whether the participants' proficiency in English and Arabic will affect how they decode and process subject-verb agreement in their L2 (Spanish).

Transfer

While the role of different writing scripts has been proposed to account for the difficulties in acquiring an L2, another area of research that has been widely investigated in SLA is that of transfer. Gass and Selinker (2008) explain transfer to be the learning of task A affecting the learning of task B. Though transfer can apply to many subjects, the present study specifically pertains to transfer of language. Woodrow (1927) was one of the first to explore language transfer. He conducted research centered on the ability to memorize prose more easily if the subjects had prior experience in memorizing poetry. The experiment aimed to determine if poetry memorization and the skills associated with it transferred to the memorization of prose. What he found was that his hypothesis was supported. The results showed that the participants who had experience in memorizing poetry had an easier time memorizing prose than those who had no prior experience. The skills associated with learning task A transferred to the completion of task B.

According to the behaviorist theory of learning, the more knowledge and skills a person acquires, the more likely it becomes that his/her continued learning will be shaped by his/her previous knowledge and skills. This theory of transfer can be applied specifically to learning languages as in Woodrow's research. When an adult learns a new language, he/she uses the skills he/she has learned in his/her L1 and applies them to the acquisition of the L2 (Gass & Selinker, 2008). According to Cummins (1981), literacy skills transfer if students are given sufficient exposure to the target language.

Transfer, especially in language, can be positive or negative (Gass & Selinker, 2008). Positive transfer (facilitation) occurs when both languages have similar structures. Such similarities improve the learner's performance in the L2 because they are able to recall and use old habits/strategies from the L1. Negative transfer, on the other hand, occurs when learners use structures from their L1 in producing their L2 incorrectly. An example that applies to both positive and negative transfer is the use of cognates. In positive transfer, learners of an L2 can use words from their L1 that sound similar to produce the L2. For example, a person whose L1 is English could positively transfer the word "air" from English to "aire" in Spanish because of their similarities in spelling and pronunciation. However, false cognates lead to negative transfer to the target language. The English word "embarrassed" sounds like the Spanish word "embarazada," but does not transfer because "embarazada" means "pregnant," not "embarrassed" as one would most likely assume. Negative transfer, such as the previously presented example, impedes a person's learning of the L2. According to Gass (1988), transfer most frequently occurs among languages that are perceived as close in structural form and as having similarities in words and pronunciation. Examples of close languages are Spanish and Italian or Dutch and German.

However, research has been conducted on adult SLA transfer using languages that are not perceived as typographically similar. In a 2010 study conducted by Ellis and Sagarra, adult SLA was analyzed in terms of language transfer. The study explored language transfer of cue bias using morphological cues (verbal inflections) and lexical cues (adverbs) to temporal reference. It aimed to determine if strategies of SLA

transferred from the native language to the target language. This exploration was conducted by examining L1 Chinese/English and L1 English speakers learning L2 Latin. The results of the study revealed that adult L2 learners focused more on lexical cues than morphological ones. As a result of their L1 experience, adult language learners knew that there were reliable lexical means for expressing time (e.g., yesterday) rather than focusing on the verb's conjugation. The results exhibited transfer of cue biases among and between languages that are not considered similar. Although Ellis and Sagarra focused their study on rich versus impoverished verbal conjugations, they did not consider if the different writing scripts of the L1s played a role in the participants learning to read Latin.

That noted, what remains unknown, and what the current study aims to determine, is if transfer of subject-verb agreement can occur between two languages that use different writing scripts.

Method

Research Question

The specific research question this study addresses is as follows: Does having Arabic as one of their L1s affect how subject-verb agreement is processed in Spanish, a language with a different writing script?

The hypothesis is that the L1 Arabic/English participants will be sensitive to (or, innately perceive) the subject-verb disagreement in a set of stimuli and will rely on the verb as demonstrated by longer response times. The hypothesis is based on previous research that has suggested that positive transfer occurs if both languages share common features (Gass & Selinker, 2008). Moreover, the L1 English participants will be

less sensitive to the disagreement and will rely on the subject as found in previous research.

Participants

Five L1 Arabic/English participants were recruited to complete the present study. That is, all participants were raised with Arabic and English as a native language. Two of the five participants have familial roots in Syria, one participant has one parent from Morocco and the other is from the United States, and two participants have two parents from Algeria. All participants' families moved to the United States prior to having children (i.e., the participants), learned to speak English, and raised said children in a simultaneous (not sequential) bilingual Arabic and English household. Four of the five participants learned how to write in Arabic at home from their parents, and one of the five learned to write in Arabic with a tutor at a special after school program. Participants were required to both speak and read Arabic as an L1, but not know any Spanish. All participants were between the ages of 18 and 25. These are ideal participants because they already know how to read in English and decode the Roman alphabet but do not know what linguistic features are important to decode in Spanish such as subject-verb agreement.

In order to determine that it was indeed knowledge Arabic transferring to Spanish and not simply good memorizers completing the experiment, I used a control group (n=3) of L1 English-speakers (ages 18-25) who have never taken a foreign language (Spanish, or otherwise) before and conducted the same experiment.

Materials and Procedure

All participants were volunteers to the experiment. All completed an informed consent form that was approved through the Bridgewater State University Institutional Review Board (see Appendix A) and then completed a brief language background questionnaire to confirm their eligibility in the experiment. They received a short packet of training materials (see Appendix B) that they were to review for exactly one week. The training materials consisted of basic training on Spanish subject-verb agreement structures and noun-adjective agreement. The training materials began by explaining that verb conjugation refers to the process of changing a verb form to provide information about the action being performed. Following said explanation, the materials provided a description of subject pronouns and how they compare to their English equivalents. Next, participants learned what an infinitive was and how to conjugate an infinitive to match a subject pronoun. They were each provided with a list of ten verbs that they had to use to learn how to conjugate a verb correctly. The materials also included ten nouns and two adjectives for the participants to learn. Finally, the participants learned one preposition. After studying these materials, participants were expected to know how to form many different sentences based on the provided information.

After participants studied the materials for one week (20 minutes a day, or a total of 2.3 hours), they returned to complete the experiment and they were given an examination to gauge how accurately they knew the nouns and adjectives (see Appendix C). This brief examination included pictures of the nouns with the word for each noun in Spanish. The participants were to connect the image to the word. The

vocabulary examination also included 6 true or false questions pertaining to adjectives and their agreement with nouns.

Provided that the participants scored an 80% or better on this vocabulary check, the experiment continued and they were examined using software that gauges reaction time to collect data on the transfer of subject-verb agreement. The purpose of the vocabulary examination was to ensure that longer response times on the target regions could be attributed to their sensitivity to the error and not to being unfamiliar with the target item.

The software used to conduct the examination was E-Prime: E-Studio version 2.0 which monitors the precise response time and accuracy of presented stimuli. Reaction times (RTs) are measured in milliseconds (ms) – 1/1000 second. This ensures complete accuracy in data collection. Participants were given explicit directions regarding the use of the software verbally and were able to read the instructions as well before the procedure began. If participants had any doubts about their task, they were allowed to clarify before beginning the experiment.

Participants were then presented with one Spanish sentence at a time in the Moving Windows paradigm within E-Prime. The paradigm mirrors natural reading by focusing the attention of the reader to where the sentence will be located and presenting one word at a time at the speed in which the participant feels most comfortable reading. The sentences were presented in the following structure: Subject + Verb + Determiner + Noun + Adjective.

The participant tapped the space bar to receive the next word as he/she read the sentence word by word at their own pace. The subjects in the experiment sentences

were limited to the “Él” (“he”) and “Yo” (“I”) forms because the corresponding verb conjugations have the same amount of letters in the conjugated form. For example: Yo hablo, Él habla. The verb “Hablar” when conjugated to match the subject Él and the subject Yo maintains the same amount of letters (five). In addition, each of these subject pronouns only has two letters. The verbs used in the experimental sentences were high-frequency verbs and the sentences were simple (See Appendix D for complete list). The majority of nouns presented were cognates. Participants were given an equal number of correct and incorrect subject-verb agreements and were asked after each sentence if the sentence was grammatically correct (if the subject matched the verb). The software logged their reaction time (how much time the participant spent on each critical region) as well as their responses to the presented question.

In addition to the experimental stimuli (n=30), there were 30 distractors that contained noun-adjective (dis)agreement. The purpose of the distractor sentences was for the participants to be distracted from the aim of the experiment (sensitivity to subject-verb (dis)agreement). The experiment was conducted using E-prime: E-Studio version 2.0- Professional on a Personal Computer with the participant and the experimenter in the room. The participant and the experimenter sat across from each other so that only the participant could see the screen of the computer. All participants were rewarded with a Bridgewater State University mug filled with sweets for their participation.

During analysis, special attention was paid to the response time of the participants in their answers to the question (“Was the sentence grammatically

correct?"). Special attention was also paid to the first text presented (the subject), the second text presented (the verb), and the third text presented (the determiner).

Results

Independent Samples T-tests were run to compare response times for grammaticality (correct versus incorrect) and part of speech (subject, verb, and verb +1) between L1 Arabic and L1 English participants.

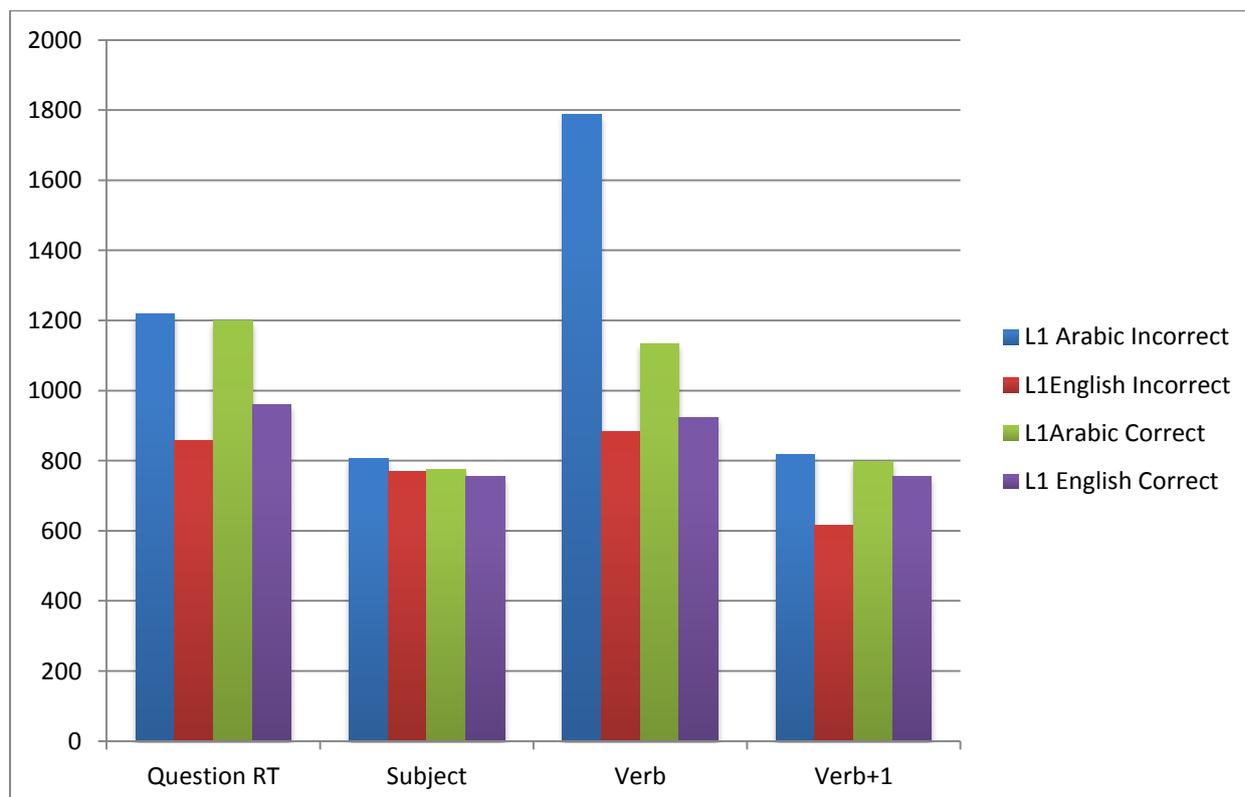
Before the inferential statistics are presented below, the descriptive statistics are provided in Table 2 and Table 3 and represented graphically in Figure 1.

Table 2: Descriptive Statistics for L1 Arabic/English ($n = 5$)

	Mean RT (in milliseconds)	Standard Deviation
Grammatically Incorrect Sentence	1218.42	553.34
Subject	806.94	157.09
Verb	1787.62	566.70
Verb+1	817.57	240.95
Grammatically Correct Sentence	1198.56	642.47
Subject	776.61	158.30
Verb	1132.72	531.77
Verb+1	799.28	178.16

Table 3: Descriptive Statistics for L1 English (n = 3)

	Mean RT (in milliseconds)	Standard Deviation
Grammatically Incorrect Sentence	856.30	32.22
Subject	770.96	170.44
Verb	882.43	217.75
Verb+1	615.06	171.06
Grammatically Correct Sentence	959.19	227.65
Subject	755.73	63.90
Verb	922.83	142.20
Verb+1	753.97	408.19

Figure 1: Descriptive Statistics for Each Variable and Group

*Note: The terms “incorrect” and “correct” in the key above refer to the grammaticality of the experimental stimulus. Therefore, *L1 Arabic Incorrect* refers to the average milliseconds an L1 Arabic speaker responded to a grammatically incorrect sentence.

There was no significant difference in the scores for response time (RT) on question response time if grammatically incorrect for L1 Arabic/English ($M = 1218.42$, $S.D. = 553.34$) nor for L1 English ($M = 856.30$, $S.D. = 32.22$), conditions; $t(6) = .029$, $p = .315$.

There was no significant difference in the scores for RT on question response time if grammatically correct for L1 Arabic/English ($M = 1198.56$, $S.D. = 642.41$) nor for L1 English ($M = 959.19$, $S.D. = 227.65$), conditions; $t(6) = .094$, $p = .567$.

There was no significant difference in the scores for RT on the subject pronoun response time if the sentence was grammatically incorrect for L1 Arabic/English ($M = 806.94$, $S.D. = 157.09$) nor for L1 English ($M = 770.93$, $S.D. = 170.44$), conditions; $t(6) = .305$, $p = .771$.

There was no significant difference in the scores for RT on the subject pronoun response time if the sentence was grammatically correct for L1 Arabic/English ($M = 776.61$, $S.D. = 158.30$) nor for L1 English ($M = 755.73$, $S.D. = 63.9$), conditions; $t(6) = .213$, $p = .839$.

There was significant difference in the scores for RT on the verb response time if the sentence was grammatically incorrect for L1 Arabic/English ($M = 1787.62$, $S.D. = 566.70$) but there was no significant difference in the scores for RT on the verb response time for sentences that were grammatically incorrect L1 English ($M = 882.43$, $S.D. = 217.75$), conditions; $t(6) = 2.585$, $p = .041$.

There was no significant difference in the scores for RT on the verb response time if the sentence was grammatically correct for L1 Arabic/English ($M = 1132.72$, $S.D. = 531.77$) nor for L1 English ($M = 922.83$, $S.D. = 142.20$), conditions; $t(6) = .650$, $p = .540$.

There was no significant difference in the scores for RT on the Verb+1 (V+1) response time if the sentence was grammatically incorrect for L1 Arabic/English ($M = 817.57$, $S.D. = 240.95$) nor for L1 English ($M = 615.06$, $S.D. = 171.06$), conditions; $t(6) = 1.260$, $p = .255$.

There was no significant difference in the scores for RT on the V+1 response time if the sentence was grammatically correct for L1 Arabic/English ($M = 799.28$, $S.D. = 178.16$) nor for L1 English ($M = 753.97$, $S.D. = 408.19$), conditions; $t(6) = .334$, $p = .830$.

Discussion

The research question of the present study aimed to examine if having Arabic as one of their L1s affects how subject-verb agreement is processed in Spanish, an L2 with a different writing script.

The hypothesis that the L1 Arabic/English participants would be sensitive to the subject-verb disagreement was supported. The results revealed that the L1 Arabic/English participants were sensitive to the subject-verb disagreement and spent more time on the verb than did their L1 English counterparts.

There was no significant difference in the amount of time participants (L1 Arabic/English or L1 English) spent answering the question pertaining to grammaticality of the sentence that followed the stimuli. This suggests that all of these learners of a second language spent an appropriate and equal amount of time contemplating the grammatical structure of a sentence. This can be explained because

all participants, control and experimental, are in the beginning stages of second language acquisition and have only recently begun to learn the language. It would appear, then, that knowledge of Arabic has no significant effect on how quickly or accurately grammaticality as a whole is understood at the beginning stages of SLA.

There was also no significant difference in the amount of time participants (L1 Arabic/English or L1 English) spent viewing the first presented stimuli (the subject of the sentence). This result was expected because neither group of participants knew what verb was to follow the subject.

There was a significant difference in the scores for RT on the second presented stimuli (the verb) if the sentence was grammatically incorrect for L1 Arabic/English participants. This result supports the hypothesis of the current study. It is intriguing because, as previously noted in literature, differences between writing scripts affect the way students learn foreign languages (Gor and Vatz, 2009). One would assume that because Spanish and Arabic use different writing scripts, it would be challenging for a native speaker of one to learn the other. However, the current results suggest otherwise. In the current sample pool (n=5), the L1 Arabic/English participants were more sensitive to subject-verb agreement than were the L1 English participants.

This sensitivity is likely the effect of the experimental group's L1 (Arabic) in processing the L2 (Spanish). The results suggest that reading and grammar skills (specifically subject-verb agreement) are transferable across writing scripts.

There was no significant difference in response time of the participants in the processing of the subject-verb agreement (Verb+1). This region was examined to

consider delayed processing as it was a possibility for participants to press the space bar in e-prime too quickly and realize only after passing the verb that the agreement with the subject (dis)agreed. There was no evidence of delayed processing and there was no significant difference in response time between L1 Arabic/English and L1 English participants. This could, however, be a factor in future research with a larger pool of participants.

Limitations and Future Research

As does all research, the current study presents a few limitations. One of the limitations of the study is the sample size. With five L1 Arabic/English participants reading 30 experimental sentences (for a total of 150 stimuli) and three L1 English participants reading 30 experimental sentences (for a total of 90 stimuli), the sample size of the experiment is still relatively small. Because of the sample size, the research cannot currently be applied to the broader population. In future research, a larger experimental group will be used, accompanied by a control group with the same number of participants. With a larger control group exhibiting the same results, it would be valid to say that in general, knowledge of Arabic grammatical structures positively transfers to Spanish subject-verb agreement, and that a different writing script does not affect SLA in this regard.

Another limitation of the current study is using bilingual participants. Because all the participants in the experimental group had an L1 of Arabic and an L1 of English, it is a possibility that the writing script difference may not be as significant as previously thought. The bilingual participants have already learned the Roman Alphabetic writing script when they acquired English as an L1, so acquiring Spanish did not necessarily

involve learning a new writing script, but did involve learning to decode new linguistic information (i.e., Spanish subject-verb agreement) in a new language. In future research, an L1 Arabic-only group would more clearly show the effects of reading a brand new writing script. Nonetheless, it is imperative to note that even though the L1 Arabic/English participants have two first languages, they still processed the subject-verb disagreement differently than the L1 English control group participants. That is, L1 Arabic/English participants spent a longer amount of time reading the verbs that disagreed with the subject. Although the different writing scripts may not be as significant as first thought, the longer response times of the L1 Arabic/English participants on the verb when compared to the L1 English control participants were significant.

In future research, it will also be important to more clearly outline exactly what grammaticality means for each participant. The feedback asked of each participant was followed by the question: "Was the sentence grammatically correct?" One participant viewed a small portion of the stimuli and answered the question a few times before realizing what "grammatical" meant. After the experiment, a participant from the control group explained that they answered "no" to the question when prompted because of the context rather than the grammaticality. For example, one of the experimental sentences is "Ella lee el libro bonito" (in English, "She reads the pretty book"). Although the sentence is grammatically correct, the participant responded "no" to the question because that participant believed that books could not be pretty. When analyzing the data, all incorrect answers were not considered when looking at averages. That is, if a participant answered the question incorrectly (i.e., responded that a

grammatically correct sentence was incorrect or responded that a grammatically incorrect sentence was correct), the response time was removed from the data and not factored into the mean response times. In future experiments, I will explain to all participants that they are looking for grammaticality and not semantic meaning in order to maximize the number of correct responses analyzed.

In future research, it will be relevant to determine if L1 Spanish speakers learning L2 Arabic will exhibit the same transfer that occurred in the current study. Because of the similarities between the two languages, it is feasible to assume that L1 Spanish speakers could more easily learn Arabic even though Arabic uses a different writing script. Alternatively, there may only be one-way transfer and it is only easier to learn the Roman alphabet than non-Roman alphabets.

Another facet of future study could include examinations of Arabic transferring to other parts of Spanish grammar. Perhaps subject-verb agreement is not the only grammatical feature that these two languages share. Other commonalities between the two languages could potentially transfer from one to the other such as flexible syntax (subject-verb-object and verb-subject-object), n-final plural conjugations, adverb-verb agreement as Ellis and Sagarra (2010) studied, or the omission of the personal pronoun. Because the two languages share these grammatical features, it is plausible to expect that experimentation with these features would reveal that further transfer exists between the two languages, regardless of their having different writing scripts. Alternatively, this potential future study may reveal that only certain elements transfer and that a hierarchy exists with regard to the ease of certain elements transferring depending on their saliency.

Conclusion

The results revealed that these L1 Arabic/English participants did indeed exhibit transfer from Arabic to Spanish subject-verb agreement even though the two languages do not share a similar writing script. The participants' knowledge of Arabic allowed them to more easily grasp the subject-verb agreement than the L1 English control group for the latter does not have such strong subject-verb agreement.

This information is significant in many ways. First, it may affect how foreign languages are taught to those who already know languages with distinct verb conjugations, like Arabic to Spanish and lead to more research in connections between these and other languages with dissimilar writing scripts. For example, Spanish language instructors may not need to focus so strictly on subject-verb agreement when instructing students who speak Arabic because this language skill is transferable. By focusing certain aspects of language education on those who know languages that are proven to transfer to others, we can help more effectively and efficiently develop new second language acquisition and second language instructional skills and strategies.

Secondly, these results could also be used to search for more links between languages in future research. SLA is a growing field of study and if more connections between languages can be discovered, perhaps more individuals will be motivated to learn other languages that share a connection with their own. This could help to develop a more complete theory of SLA.

The results show that there lies a connection between an Afro-Asiatic language (Arabic) and an Indo-European one (Spanish) even though they have dissimilar writing

scripts. Through language, we are able to break down geographical barriers and create sociological bridges. By discovering a link between these two distinctively different languages, we have can make communication between the two cultures easier and more accessible. Furthermore, it may be possible to discover that Arabic transfers even further to other Romance languages. Communication is essential in today's world and if we can make said communication easier, it will improve the effectiveness of our interactions with others.

As Chomsky (1968, p. 100) notes, the study of language is essentially the study of the human essence. Complex languages are unique to humans and by studying the complexity of and connections between languages, we are learning more about the human race. If we continue to examine and study languages, we will learn more about the cultures and the individuals of the world.

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Appendices

Appendix A: Institutional Review Board Consent Form

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The Acquisition of Spanish by L1 Arabic Speakers

You are invited to participate in a research study designed to investigate the effects of having Arabic as a first language on learning Spanish as a second or third language. You will be asked to learn a few simple phrases in Spanish that consist of a noun (subject), verb, and prepositional phrase. About a week later, you will return to read sentences on a computer word-by-word while the amount of time you spend reading each word is recorded. Upon completing this test, you will perform a multiple-choice test to see how well you remembered the Spanish you were asked to learn. Your participation in the first meeting will last approximately 10 minutes. You may study the materials for approximately 2 hours (there is no maximum amount of time that you can study the material; just be sure that you've learned all of the words and phrases). The meeting one week later will last approximately 40 minutes. For participating, you will receive a small gift (USB drive). There are no foreseeable risks to your participation in this research project. Individually, you will benefit and learn some new Spanish vocabulary. Society will benefit as a result of your participation because the results may speak to how to teach Spanish as a second or third language. The information you provide will be collected anonymously, and no information about you will be revealed at any stage in

the collection, analysis, or publication of this research. The University Institutional Research Board may have access to this data, as permitted by law. Your participation in this study is voluntary and you may stop participating at any time without incurring any penalties. You are free to decline to answer any questions that make you uncomfortable. Any questions you have about this research can be answered now or later by Dr. Ryan LaBrozzi (ryan.labrozzi@bridgew.edu; 508-531-1477). If you have any questions about your rights as a research participant, you may contact the BSU Institutional Review Board at 508-531-1242 and any questions will be addressed in confidence by members of the IRB committee, who also reviewed and approved this study. By continuing and accepting the materials, you acknowledge that you understand the purpose of the study and your questions have been answered in language that you understand.

Signature

Date

Jennifer Herzog or Dr. Ryan LaBrozzi

Date

Appendix B: Experiment Training Materials

Spanish Regular Verbs in the Present Tense

Verb conjugation refers to the process of changing a verb form to provide information about the action being performed. The form of the verb can give us some idea about who is performing the action, when the action is being performed, and the relation of the verb to other parts of the sentence.

Who is doing the action?:

A pronoun is a word that replaces a person's name, so a "subject pronoun" is a pronoun that replaces the name in the subject of a sentence. The following are the subject pronouns in both languages:

Singular Pronouns: One person/thing		Plural Pronouns: More than one person/thing	
yo	<i>I</i>	nosotros	<i>we all/guys- both genders/males</i>
		nosotras	<i>we gals - females</i>
* tú	<i>you (informal)</i>		
* usted (Ud.)	<i>you (formal)</i>	ustedes (Uds.)	<i>you all/guys/gals (formal)</i>
él	<i>he</i>	ellos	<i>they - both genders/males</i>
ella	<i>she</i>	ellas	<i>they - females</i>

The Infinitive of a verb:

"To talk" is the infinitive form of the verb in English. It is the basic form of the verb, by itself conveying no information about the verb action. The same things are true of Spanish infinitives; they convey no information about the verb action, and they can be used as nouns. Infinitives in Spanish always end in -ar, -er or -ir. The verb for "to talk" is hablar.

Conjugation:

Conjugation refers to the manipulation of a verb in order to give us more information about who is performing the action. In Spanish, various endings are attached to verbs to indicate who is speaking for first-, second-, and third-person forms in the singular and plural. For regular verbs, the -ar, -er or -ir at the end is replaced with the appropriate ending.

That is, one would remove the -ar, -er, or -ir from the end of the verb and replace it with the new ending according to what subject from the table above they want to use.

Examples: HABLAR – HABL is the root, AR is the ending to be dropped. yo hablo, I talk; tú hablas, you (singular) talk; él habla, he talks; ella habla, she talks; nosotros hablamos, we talk; ellos hablan, they talk; ellas hablan, they talk (females).

The chart below shows what endings match with the table of subject pronouns. These are the endings that replace the -ar, -er, and -ir at the end of the verbs

PRESENT TENSE OF AR, ER AND IR VERBS			
	<u>AR</u>	<u>ER</u>	<u>IR</u>
Yo	o	o	o
Tú	as	es	es
Él/Ella/Ud.	a	e	e
Nosotros(as)	amos	emos	imos
Ellos/Ellas/Uds.	an	en	en

Your Task:

Please study the following list of 10 verbs and verb conjugations:

abrir (to open)	escribir (to write)	mirar (to watch)
beber (to drink)	escuchar (to listen)	vivir (to live)
caminar (to walk)	leer (to read)	
comer (to eat)	limpiar (to clean)	

Vocabulary:

In order to create more complex sentences, we need to learn vocabulary. Please study the list of vocabulary below in order to help you put together sentences in Spanish.

Nouns:

La casa	The house	La música	The music
El agua	The water	El libro	The book
La calle	The street	El apartamento	The apartment
La comida	The food	La televisión	The television
El papel	The paper	La ciudad	The city

Adjectives:

Adjectives are frequently descriptive. That is, most often adjectives are used to describe a noun, or distinguish the noun from a group of similar objects. In Spanish, most adjectives change form, depending upon whether the word they modify is masculine or

feminine. That is, phrases that start with **EL** are masculine and the nouns with them will end in **O** (**el chico**). Nouns that start with **LA** are feminine and the nouns that come with them will end in **A** (**la chica**). Notice the difference between "the tall boy" and "the tall girl" below:

el chico alto

la chica alta

Please memorize the list of adjectives below in order to create more complex sentences in Spanish.

Bonito/a Pretty

Pequeño/a Small

Feo/a Ugly

Limpio/a Clean

Prepositions

In Spanish, the word "en" means "in".

Example: Ella vive **en** la casa – She lives **in** the house

Appendix C: Vocabulary Check for Participants

Thesis E-Prime Test: Vocabulary Check

Directions: Match the image to the Spanish word below by drawing a line connecting the word to the picture



La Casa

El Agua



La Calle



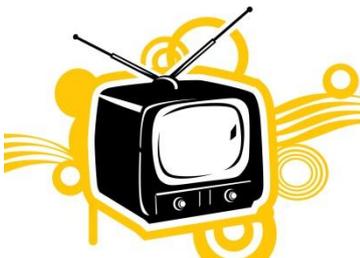
La Comida



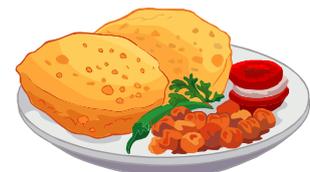
El Papel



La Música



El Libro



El Apartamento



La Televisión



La Cuidad

True or False:

1. Bonita = pretty _____
2. "la música" can be described with the word pequeña _____
3. The sentence "el libro limpio" makes sense _____
4. Feo = ugly _____
5. "la casa" can be described with the word bonita _____
6. The sentence "el apartamento limpio" makes sense _____

Appendix D: Stimuli with Correct and Incorrect Subject-Verb Agreement

Note:

* denotes incorrect subject-verb agreement in stimuli and incorrect noun-adjective agreement in distractors.

Stimuli:

- | | |
|---|-----------------------------------|
| 1. Él abre el libro pequeño | 17. Yo bebo el agua limpia |
| 2. *Yo abre el libro pequeño | 18. * Él bebo el agua limpia |
| 3. Él vive en la ciudad bonita | 19. Él limpia el apartamento feo |
| 4. *Yo vive en la ciudad bonita | 20. *Yo limpia el apartamento feo |
| 5. Yo camino en la ciudad | 21. Yo vivo en la casa |
| 6. *Él camino en la ciudad | 22. * Él vivo en la casa |
| 7. Yo escucho la música fea | 23. Él camina por la calle |
| 8. *Él escucho la música fea | 24. *Yo camina por la calle |
| 9. Yo escribo en el libro | 25. Yo leo el papel pequeño |
| 10. * Él escribo en el libro | 26. * Él leo el papel pequeño |
| 11. Él come la comida en la
cafetearía | 27. Yo escribo en la casa |
| 12. *Yo come la comida en la
cafetería | 28. * Él escribo en la casa |
| 13. Yo leo el papel | 29. Él vive en la ciudad |
| 14. * Él leo el papel | 30. *Yo vive en la ciudad |
| 15. Él mira la televisión bonita | |
| 16. *Yo mira la televisión bonita | |

Distractors:

1. Ellos escuchan la música fea
2. *Ellos escuchan la música feo

- | | |
|---|---|
| 3. Nosotros leemos el libro
pequeño | 16. *Nosotros escribimos la música
feo |
| 4. *Nosotros leemos el libro
pequeña | 17. Ellos beben el agua limpia |
| 5. Tú escribes en el papel pequeño | 18. *Ellos beben el agua limpio |
| 6. *Tú escribes en el papel pequeña | 19. Yo camino en la calle limpia |
| 7. Ellas viven en la ciudad bonita | 20. *Yo camino en la calle limpio |
| 8. *Ellas viven en la ciudad bonito | 21. Ella vive en la casa fea |
| 9. Ellas limpian el apartamento feo | 22. Yo limpio la casa fea |
| 10. *Ellas limpian el apartamento fea | 23. Nosotros vivimos en el
apartamento pequeño |
| 11. Yo vivo en el apartamento
pequeño | 24. Yo escucho la música fea |
| 12. *Yo vivo en el apartamento
pequeña | 25. Él mira la televisión pequeña |
| 13. Tú caminas en la calle bonita | 26. Ellos viven en la ciudad pequeña |
| 14. *Tú caminas en la calle bonito | 27. Ellas viven en la ciudad bonita |
| 15. Nosotros escribimos la música
fea | 28. Ella lee el libro bonito |
| | 29. Ellos caminan en la calle pequeña |
| | 30. Yo como la comida bonita |