CONTEXTUAL EFFECTS OF VARYING AMOUNTS OF LANGUAGE-MIXED TEXT ON TRANSLATION AND COMPREHENSION BY MONOLINGUALS AND BILINGUALS

by

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Abstract

The present study examined the effects of discourse context information on English Monolinguals' and Spanish-English Bilinguals' ability to 1) translate Spanish and Finnish vocabulary words and 2) comprehend inferential and factual comprehension questions based on language-mixed prose. Language-mixed (i.e., codeswitched) prose varied in the number of foreign words presented in each sentence (i.e., 0, 1, 2, or 3 words per sentence). Results indicated that Monolinguals and Bilinguals' ability to translate Finnish words from pre-test to post-test increased due to their use of contextual information as an aid in translation. Furthermore, Monolinguals' translation accuracy increased from pre-test to post-test when tested on Spanish vocabulary words, but Bilinguals' translation difference scores did not increase from pre-test to post-test, due to their high prior knowledge of Spanish. Monolinguals and Bilinguals' comprehension accuracy was high throughout all conditions, even when tested on material conveyed by Finnish and Spanish words. Results from the study suggest that the use of language-mixed prose does not necessarily impair comprehension or translation ability for Monolinguals or Bilinguals, but in fact provides the context to help translate foreign vocabulary words and draw pragmatic inferences and factual information from text. The findings from this study are of importance in suggesting that, through the use of written contextual information, it is possible to learn basic foreign language vocabulary. Implications for foreign language learning, language-mixing as a mode of communication, and models of language acquisition and lexical access are discussed.

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Contextual effects of Varying Amounts of Language-Mixed Text on Translation and Comprehension by Monolinguals and Bilinguals

In the United States in 2000, 26,446,692 individuals spoke a non-English language within the home, most often Spanish but also other European or Asian languages (US Census Bureau, 2000). As the use of languages other than English within the home continues to rise, there is also increasing use of non-English, especially Spanish, words or phrases in major media sources (e.g. television, radio, and newspapers). One of the fundamental questions raised by such language switching is the effects on comprehension of mixed-language text by Bilingual and Monolingual individuals and how they use the discourse context to infer the meaning of foreign words in written text.

Is discourse context information a critical component for the interpretation of foreign words embedded in English text? The primary purpose of the thesis is to investigate the usefulness of discourse context information in helping an individual to translate unfamiliar words embedded in English text. Furthermore, one style of language discourse which rarely is utilized within the literature of language learning is the use of codeswitching (i.e. language mixing or language switching) as a critical component within discourse formats. The present study utilized language-mixed text as a means to identify: 1) the effects of language-mixed text on the ability to comprehend text and to translate language-switched vocabulary; and 2) the usefulness of context information as a tool for comprehension and ability to translate given information.

Discourse Contextual Learning

One of the most important aspects of language comprehension and disambiguation is the use of contextual information as a means of comprehending information which is being provided

to the listener or to the reader. Many context cues exist within given sentences either in speech or in text. Context cues may consist of a variety of elements within a sentence, including both semantic and syntactic cues. For example, there are global semantic cues to underlying meaning which are provided in the sentence. Also, syntactic contextual cues are utilized during comprehension of text. The specific words and syntactic structures in a sentence may be used by the individual to comprehend the overall message, correctly infer missing information, and in some instances identify the correct meaning of ambiguous information from text, such as translating a foreign word which may be ambiguous to the non-native speaker, (Singer & Donlan, 1989).

Linguistic context is defined as the information which is explicitly provided and available for the listener/hearer in a situation in which this information is needed for comprehension. Two distinct types of contexts are mentioned within the psycholinguistic literature (Clark & Carlson, 1981), incidental context and intrinsic context. Intrinsic context refers to information which does not appear directly in the story or speech but rather is assumed by the individual (i.e., inferred). This information is available for use in the cognitive process of comprehension, including the drawing of inferences. This thesis focused on the use of intrinsic context, in that the information which is not being provided directly to the reader needs to be utilized for inferential comprehension.

Contrary to intrinsic context information, incidental context refers to the additional information which is provided in the text and is available to the individual, but is not selected for the comprehension process (Clark, 1977; Clark & Carlson, 1981). Although the incidental context it is not immediately selected, it may be accessed at a later time if the individual needs

that information for comprehension. The information which is not necessary for comprehension but still given by the speaker or discourse text is known as the incidental context. For example, in "Billy will be starting his first day of college tomorrow and is excited about meeting new friends", the incidental context would be information such as "first day of college is tomorrow" which may not be central information for comprehension at a specific time, but may be recalled at a later time if needed. If the main purpose of the sentence is to inform the reader/hearer that Billy is excited about meeting new friends, then all other information becomes incidental context information. However, if the purpose of the sentence is to inform the reader/hearer that Billy is staring college tomorrow, then the incidental context would be that he is excited about meeting new friends. Additionally, the intrinsic context would be the information which was not given but is generally inferred by the reader. In this case the individual may infer that Billy has recently graduated from high school. Based on this situation, the information which the present comprehension/memory task focused on was the use of the intrinsic context of the sentence for the purposes of comprehension.

According to Tabossi (1988), the use of context information is helpful in computing the meaning of ambiguous or unfamiliar words. Since words in a foreign language are at best ambiguous, and more likely entirely opaque, to the non-speaker of the language, how useful will such context information be in allowing the reader or hearer to determine the meaning of the unfamiliar word? Furthermore, it has been postulated that lexical access for recognition and comprehension is quicker for both listeners and readers when they are provided with concurrent contextual information (Seidenberg, Waters, Sanders & Langer, 1984). By having contextual information available to the reader or listener, there should be facilitation in comprehending and

recalling information, due to the critical information which is given by the provided text discourse. According to Altarriba et al. (2002), the use of contextual information is critical in helping to interpret ambiguous information, such as foreign language word(s). This indicates that discourse context is providing critical information to the reader/hearer in which guessing or correctly identifying the meaning of unfamiliar or ambiguous word(s) is more probable. Furthermore, support has been found for learning non-familiar words, in the reader's L1, from written context, suggesting that individuals with low knowledge of non-familiar vocabulary are able to use contextual information from written text as a means to increase their vocabulary knowledge (Nagy, Anderson, & Herman, 1987; Nagy, Herman, & Anderson, 1985). A critical question which arises from these findings is if individuals are able to use written context information for learning non-familiar vocabulary from foreign languages?

Drawing on previous research with contextual information and lexical access, the present study examined and compared Monolingual and Bilingual individuals' ability to translate foreign words embedded in English text. The foreign words embedded in the English text would operate as, at best, ambiguous, and more likely, totally unfamiliar word to the non-fluent foreign language speaker. One primary goal of the study was to identify if there is a limit in the amount of information which can appear in a foreign language (e.g., 0, 1, 2, or 3 words per sentence) without interfering with comprehension and word translation ability. By examining such processes, we should be able to gain a greater understanding of the effects of language-mixed text on Bilinguals' comprehension and translation ability and as well as determine the level at which Monolingual individuals fail to comprehend information due to the large number of unfamiliar words from a foreign language into the text.

Language Translation

Sometimes individuals may encounter a foreign language which they may have some familiarity; other times they may have little or no familiarity at all. One aspect which needs to be considered is not only the ability of the individual to accurately understand the message which is being provided to them in a foreign language but also their ability to understand key discourse context which may lead to the understanding of the unfamiliar words. Research on language translation must consider the L1 language (i.e., primary language) and L2 language (i.e., secondary language) which a Bilingual individual may know. Bilinguals may encounter various situations in which one or both languages may need to be accessed to fully understand the critical information and message which is being transmitted to them. Bilinguals may encounter situations in which their non-dominant (i.e., L2 language) is being accessed, but there may be some deficiency in their L2 language (e.g., non-familiarity of terminology) relative to their L1. In such situations Bilinguals may attempt to access their primary language (i.e., L1) in an attempt to correctly identify unfamiliar words and correctly compute the intended message. The translation of words from L2 (i.e., secondary language) to L1 (i.e., primary language) is known as backward translation, while translation from L1 to L2 is known as forward translation (Duyck & Brysbaert, 2004).

According to Kroll and de Groot's (1997) Hierarchical Model of Memory, there are two separate lexicons (e.g., L1 and L2) associated with the semantic system. Within this model, links between the L1 and the semantic system (i.e., word meanings) are more strongly associated than the links which are associated with the semantic system and the individual's L2. The associated links between the L1 and the semantic system are stronger due to the high degree of fluency (i.e.,

knowledge) of L1 which creates a strong association between the word and its meaning. When considering the use of word-word translation the association between the L1 and the L2 lexical item is stronger than the connection between the semantic system and the L2. This stronger association between the L1 and the L2 lexical items is strongest due to the learning of items for the L2 from direct translation and association with word items from the L1. Findings have suggested that word translation is slower for forward translation (i.e., translation from L1 to L2) than for backward translation (i.e., L2 to L1), thus indicating a stronger link between L2 to L1 than for L1 to L2 (Kroll & Stewart, 1994, Basnight-Brown & Altarriba, 2007).

A plausible extension of the above findings for word translation is that, through the use of contextual information, the link between L1 and the semantic system would be strengthened even further, and there may be an increased association for the L2 to the semantic system, which would allow the Bilingual individual to access the appropriate information of the L2 words with greater ease. In considering the case of Monolinguals, when encountering situations which may require translation of a somewhat familiar language (e.g., Spanish for a Monolingual North American), the link between L2 to the semantic system would be very low and close to having no association but their link between L1 to L2 may have some strength in its association. The weak link from L1 to L2 and no association at all between L2 and the semantic system may be due to their basic knowledge of L2 vocabulary which is only based on the direct translation to L1; but when combining vocabulary knowledge to the semantic system, the association may be absent due to their lack of semantic knowledge (i.e., no knowledge of word meaning and uses). It may be possible that, with the use of contextual information, the associated links between L1 and L2 and between L2 and the semantic system may become strengthened. A possible type of text

which may be beneficial, but has been largely ignored within the psycholinguistic literature, is the use of language-mixing (i.e., codeswitching) as a means to test the strength of the associated links for Bilinguals and Monolinguals. With the use of language-mixed prose there may be an increased use of contextual information for translation and strengthening the semantic system and its associated links.

Codeswitching in Speech and Text

One of the most interesting aspects of language production and language comprehension is the use of multiple languages by both Bilinguals and Monolinguals. Codeswitching (i.e. language switching) is defined as the use of two or more languages during the same conversational discourse (Grosjean, 1982). Many different styles of codeswitching are recognized within the psycholinguistic literature; specifically, two forms of codeswitching are extensively used within this particular research area. The first type, which is the most frequent, is known as Intra-Sentential Codeswitching. Here the speaker or writer, depending on the modality which they are using, uses two different languages (e.g. English and Spanish) within the same sentence. By switching languages within the same sentence one language is used at the beginning of the sentence but the second language may be used to complete the sentence or the sentence may further extended and the first language may be used again after using the second language as a means to complete the sentence. An example of Intra-Sentential Codeswitching would be: "Yo quiero ir a la tienda but not with you porque no me gustas." As can be seen, there is a distinct break within the sentence in which either a new language system is being introduced and may be used to complete the sentence or the original language is reintroduced.

The second type of codeswitching which is found in the literature is known as Inter-Sentential Codeswitching. In this type of codeswitching the language switching occurs only between sentences. An example of Inter-Sentential Codeswitching would be: "¿Hola, como están? Is everyone doing great?" The language switch occurs at the sentence boundary but does not mean that the conversation could not be returned to the original language in which the conversation was initiated (Joshi, 1982). Codeswitching is not only a phenomena applied to two language systems; researchers have encountered this phenomena with Trilinguals and individuals who are knowledgeable in five or six languages (Grosjean, 1982).

Additionally, codeswitching does not only need to involve a Bilingual individual, even though Bilingual or multilingual individuals are the most frequent users of codeswitched communication styles. Monolingual individuals are also able to do very limited amounts of codeswitching for numerous reasons. The majority of Monolinguals who language switch do so because they may have knowledge of certain words or certain concepts that they may feel are relevant in their communication with another individual. An example of this occurrence is when a Monolingual individual is conversing with an individual who is Bilingual and uses simple common words, such as "hola" or "adios", within that conversation.

However, only the use of codeswitching by Bilinguals has been studied in the research literature. Within this area of research, the most frequent justification as to why Bilingual individuals use this form of communication is to compensate for the deficiency in one or both language systems. Although this view has been generally accepted within the psychological literature and the general public, there is no clear support for this interpretation (Grosjean, 1982; Heredia & Altarriba, 2001). Furthermore, the use of language switching has also grown in

popularity throughout media sources but especially through bilingual comedy shows. In recent years, comedy shows such as “Mind of Mencia” or “The Original Latin Kings of Comedy” have grown in popularity and are known for language switching during the course of programming. Although language switches during these programs may not occur during every conversation throughout the show, they do periodically and frequently occur during programming.

One question that arises from the use of multiple languages within conversations is how Monolingual hearers or readers comprehend and recall the information presented in part by various words in a foreign language. If Monolingual individuals show comprehension deficits due to such language switching, how much critical information could be language switched without affecting comprehension and ability to translate? Moreover, could varying amounts of language switching (e.g., 0, 1, 2, or 3 words per sentence) have a significant impact on comprehensibility and memory by both Bilinguals and Monolinguals? Furthermore, could such language-mixed prose actually be a way for Monolinguals to learn vocabulary in a second language?

An aspect which is frequently ignored within the language mixing literature is the syntactic structure of mixed language. Previous research has used a method of randomly introducing foreign language words into sentences (e.g. every certain number of words or at certain parts of a sentence) but when Bilingual participants are tested with such stimuli, the deficits which may be encountered may not be due entirely to the introduction of a foreign language but also to the unclear structure of the sentence which may lead to non-coherent sentences (Kolers, 1966). An example given by Kolers (1966) “Drop of ice se collaient à son cloak,” in which the beginning part of the sentence is in English and the remainder in French, but

there is no structured switch of primary content words, as is normally found in real life language-switching to the language switch. One way to maintain the surface structure syntax with the use of multiple languages is through the use of substituting only content words, not entire phrases, with their equivalent translation of the foreign language, while maintaining the syntactic structure and all of the function words from the original language. This procedure, using equivalent word translations of content words (i.e. nouns, verbs, adverbs, and adjectives), was the primary technique utilized for the creation of the present study's stimuli.

No previous research has examined Monolinguals' comprehension, memory, or translation ability with codeswitched material in written or oral material presentation. The research comparing Monolinguals and Bilinguals has focused primarily on the equivalence of these two groups on single language text but has ignored mixed language prose (Mack, 1986; Amrhein, 1999). Research within the area of codeswitching has primarily focused on comprehension, memory, and word recognition by Bilingual, not Monolingual, individuals (Macnamara & Kushnir, 1971; Huerta-Macias & Quintero, 1992; Li, 1996; Altarriba & Gianico, 2002). The present study looked at both Monolinguals and Spanish-English Bilinguals with language-mixed text with words in either Spanish or Finnish.

Language Interference

A key issue within the psycholinguistic literature is the use of multiple cognitive resources (e.g., accessing two language systems) and its possible negative effects (e.g., interference) on performance on language tasks and various other cognitive tasks. One question focused on in this study was whether discourse context reduces the effects of interference from two separate language systems in comprehension and translation tasks for Bilinguals.

Interference is commonly defined as errors or mistakes in the use of a second language in which the primary language (usually L1) influences the learning or accessing of information which is integrated or learned in a secondary language (usually L2) (Lott, 1983; Ellis, 1997; Hamers & Blanc, 2000). Due to the knowledge of two or more languages, there may be a negative transfer of information from the language not in use into the language which is currently being utilized by the individual, which may then lead to errors in comprehension or production. With the introduction of information from another language (e.g., such as with language-mixed text), there is a higher probability of mistakes due to the interference caused by the language not in use. By having the individual encounter multiple languages as with language-mixed text or speech, the individual is forced to access the multiple inputs which may thus create negative transfer and disrupt comprehension and translation. Interference due to negative transfer may depend on various factors which may include nature or topic of the conversation, and/or the proficiency level of the Bilingual. Within the literature of bilingualism and language translation, one of the predominant topics of interest is the effects of the L1 on the L2, specifically on the ability of an individual to accurately comprehend and translate information.

Interference most often occurs when there is a deficiency in one of the secondary languages and compensation occurs in which the primary language(s), in which the individual is more fluent, thus interrupting the processing of the secondary language and in a sense taking over the task at hand. In the instance where an individual has knowledge of more than two language (i.e. Multilingual or Polyglot), the native language, or whichever language the individual is most fluent in, is most likely to interfere with the production and comprehension of a less dominant language (Proverbio, Roberta & Alberto, 2007). Errors made by the individual

due to the interference of the primary language on the learning or task demands of the secondary language are known as negative transfer. The negative transfer of one language to the secondary language should be reduced when the similarity between the two languages is less; for example, Spanish is more similar to English than either is to Finnish. Thus, language cognates, words in one language which are similar orthographically (i.e. words have similar letter structures) and/or phonetically (i.e. words have similar pronunciations in both languages) to the same words with equivalent meanings in another language, should have a higher degree of positive transfer than words which are non-cognates or especially those which are false cognates (Carroll, 1964). For example, the English word "Program" and the Spanish word "Programa" are cognates because they are similar in their letter sequence and in their pronunciation in both languages, which may lead to facilitation in translation and comprehension ability. Conversely, false cognates are words in two languages which may have similar orthographic and phonetic structures but have completely different meanings in both languages may lead to negative transfer in task performance. For example, the word "Pan" in Spanish means "Bread" but "Pan" in English refer to "Cooking vessel". Furthermore, according to Beardsmore (1982), the closer two languages are structurally similar to one another, the greater the potential interference or negative transfer of L1 on L2, which may be significantly influenced by possible false cognates.

For the present studies, all non-cognates were used, in order to reduce the amount of both positive and negative transfer which might occur with cognates or false cognates, respectively. Additionally, by having non-cognates, which do not phonetically or orthographically resemble their translation in the other language, there should be less probability of translating or comprehending the given material simply due to the similarity of words in the primary language.

Although interference was not directly examined, implications to interference theory are discussed based on the findings from the study

Inferences in Language Comprehension

A secondary concern addressed in the proposed studies will be the drawing of pragmatic inferences from text discourse. Inferences may be defined as the activation of information which is not explicitly stated within discourse, but which the reader/hearer concludes or deduces from the text. As well, inference, as defined by Rickheit, Schnotz, & Strohner (1985), involves the deduction by first comprehending the explicit information provided, followed by the use of contextual information within the discourse to determine or conclude further relationships between events or information which has been explicitly provided. Inferences are highly dependent on context information especially through the use of top-down processing to infer missing information and provide a logical connection between explicit and implicit text discourse (Adams, 1979; Harris, 1981).

Prior research has focused on text inferences with the use of situational context in which individuals are given clear instructions as to the purpose of reading discourse text and the effects of instructions on memory accuracy for inferences (Black, 1981). Results indicate that, depending on the instructions given to participants when reading text (e.g., evaluation of understandability, preparation for memory test, or preparation to write an essay), participants' inference drawing may substantially change due to the nature of the task given. These results suggest that, by withholding instructional information from participants as to the true nature of the tasks, such as the type of comprehension task which they will be completing later in the study, it may then be possible to decrease the availability of situational context factors in creating

errors (e.g., inappropriate drawing of inferences) or increases response accuracy due to priming effects, expectations, and prior knowledge of the task on behalf of the participant (Black, 1981).

One key question which will be addressed in the proposed studies is how does language mixing in text affect the drawing of pragmatic inferences from written text for the purposes of language comprehension? For example, "Billy went to la escuela to pick up some things, pero estaba cerrada for some reason." Will the use of a foreign language within otherwise Monolingual prose disrupt inference processing, by which the individual should be able to infer that the school was closed because it was possibly a weekend or after hours?

Language Strategies

The use of language strategies in learning a second language or in the comprehension of language itself is critical for any individual. Language strategies are defined as aids in the learning process by which individuals may utilize numerous techniques including reasoning and analysis (Cognitive strategies); storage of information (Memory strategy); inferring or guessing (Compensation strategies); and various other strategies which may be employed (Oxford & Crookall, 1989). Language strategies are commonly used by individuals to help or assist in the understanding of the language they know or in the learning of a new language (Purdie & Oliver, 1999). Through the use of language strategies, individuals are able to store new information and retrieve that information for further use or accessing of information when needed. Research within the area of language strategies indicates that the use of either cognitive or metacognitive strategies, which may include the planning, monitoring, and analysis of written or spoken language, are the most frequently used strategies by individuals when either learning a new language or evaluating knowledge of an existing language (O'Malley et al., 1985). For example,

if an individual who is not familiar with a foreign language is introduced to that foreign language and begins to learn that language gradually, they will be more likely to monitor and analyze their performance in that language and try to plan or adjust their performance based on their analysis (i.e., Cognitive strategy), contrary to an individual who employs a Compensatory strategy which utilizes inferences and guessing as an approach to a foreign language.

Within this area of research, the use of discourse context information has not explicitly been examined as a variable which may be used as a strategy by non-foreign language speakers, but it may in fact be a very useful technique in the translation and comprehension of mixed-language discourse. Without the use of context information, speakers who are not familiar with the foreign language may be inclined to use Compensation strategies in which they would be prone to using guessing as a strategy for translation or comprehension. Through the use of strategies which do not require reasoning or analysis of discourse information, such as Compensation strategies, it may be evident through the use of language strategy inventories (e.g. Strategy Inventory for Language Learning) which specific language strategies Monolingual individuals are utilizing in comprehension and translation (Oxford, 1989). The key question based on language strategy usage is which language strategies are being employed by Bilinguals and/or Monolinguals and if these strategies themselves are differentially effective in assisting to translate and comprehend relatively familiar (i.e. Spanish) and non-familiar (i.e. Finnish) languages.

This study used Finnish as the non-familiar foreign language due to the high degree of dissimilarity between Spanish and English to Finnish. Although writing in the familiar Latin alphabet, Finnish is a non-Indo-European (Finno-Ugric) language which is unknown to most

individuals in the United States. It has very few cognates or common roots with English or Spanish. Overall, this study hoped to further the understanding of the various language strategies which may be utilized by Bilingual and Monolingual speakers in their ability to translate foreign language words embedded in text in a familiar language. Furthermore, this study attempted to increase the knowledge of understanding the limits of language comprehension by Monolingual individuals of mixed-language text in comparison to Bilinguals' comprehension of the same text. This study hoped to explore the use of language strategies as a means for language comprehension and foreign language translation for both Monolingual and Spanish-English Bilingual individuals for familiar and non-familiar languages which may be presented in everyday settings.

Purpose

The purpose of this study was to examine Monolingual and Bilingual individuals' ability to comprehend and translate foreign vocabulary words from mixed-language text. Furthermore, this study examined the usefulness of contextual information in translating critical content words in a familiar language within language-switched text, as well as the ability of Monolingual and Bilingual individuals to draw more global pragmatic inferences from mixed-language text. Additionally, examinations of language strategies utilized by Monolinguals and Bilinguals for translation and comprehension tasks were further examined. The following hypotheses predicted patterns, results, and rationales for predicting such outcomes for translation and comprehension.

Hypotheses – Translation Accuracy Difference Score

H_{1a}: Bilinguals' difference scores in translation of Spanish words will be low throughout all conditions (i.e., 0,1, 2, and 3) since pre-test and post-test translation accuracy scores will both be very high.

H_{1b}: Monolinguals' difference scores in translation of Spanish would moderately increase from the 0 foreign words per sentence condition to the 3 foreign words condition. The increase in performance would be due to the contextual information provided to Monolingual English readers, and this information would allow the reader to use English contextual information to infer the meaning of the Spanish words. The contextual information provided is the critical factor for the translation process.

H_2: Spanish-English Bilinguals' and Monolinguals' difference scores in translation of Finnish would moderately increase from the 0 foreign word condition to the 3 foreign words condition, but no significant difference would be found between the Bilinguals and Monolinguals. The moderate increase from the 0 foreign word condition to the 3 foreign word condition would be due to the amount of contextual information within the stories which would be available to help infer the meaning of Finnish words.

Hypotheses – Comprehension Accuracy

H_{3a}: Bilinguals' comprehension accuracy would be high in all Spanish conditions, while Monolinguals' comprehension accuracy would gradually decline as the number of Spanish words per sentence increases. The decrease in performance for Monolinguals would be due to the increase in the number of Spanish words per sentence (i.e., 0, 1, 2, or 3 words per sentence), which would create a decrease in contextual information for the Monolingual reader to utilize for

comprehension due to more content words being in a language which is unfamiliar to Monolinguals.

H_{3b}: Monolinguals' and Bilinguals' comprehension accuracy will gradually decline as the number of foreign words increases in the Finnish conditions. This decrease in performance would be due to the increase of Finnish words being introduced per sentence (i.e., 0, 1, 2, or 3 words per sentence), which would create less contextual information for Monolinguals' and Bilinguals' reader to utilize for comprehension.

Hypotheses – Language Learning Strategies

H_{4a}: Compensatory learning strategies would be a significant predictor of performance on: a) inference comprehension questions; and b) translation accuracy (i.e., translation difference scores) for Monolinguals and Bilinguals when tested over Finnish information. The use of guessing and inference strategies (i.e., Compensatory strategies) when encountering a foreign language would improve accuracy scores for translation and inference comprehension. The use of these strategies would be the most efficient and effective strategies for an individual with no knowledge of a new language, in this case Finnish.

H_{4b}: Compensatory learning strategies would be a significant predictor of performance on: a) inference comprehension questions; and b) translation accuracy (i.e., translation difference scores) for Monolinguals when tested on Spanish information. The use of guessing and inference strategies (i.e., Compensatory strategies) when encountering a foreign language would improve their accuracy scores for translation and inference comprehension. The use of these strategies would be the most efficient and effective strategies for an individual with no knowledge of a new language, in this case Spanish for Monolinguals.

H_{5a}: Cognitive learning strategies would be a significant predictor of performance on: a) fact comprehension questions; and b) translation accuracy (i.e., translation difference scores) for Monolinguals when tested on Spanish information. Their very minimal knowledge of Spanish may be a strong enough factor in assisting Monolinguals in understanding basic concepts/words for comprehension and translation.

H_{5b}: Cognitive learning strategies would be a significant predictor of performance on: a) fact comprehension questions; and b) translation accuracy (i.e., translation difference scores) for Monolinguals and Bilinguals when tested on Finnish information.

H_6: Bilinguals' self-ratings of their use of codeswitching would significantly predict translation accuracy difference scores when tested on Finnish word items. Bilinguals' experience with codeswitching between two languages may assist them in identifying foreign words due to their prior experiences in the simultaneous use of multiple languages.

Method

Participants

Three hundred and forty nine University of Texas at Brownsville (N = 181) and Kansas State University (N = 168) students were recruited from Behavioral Sciences courses. Participants from the University of Texas at Brownsville consisted of almost entirely highly fluent Spanish-English Bilinguals, while participants from Kansas State University consisted of primarily Monolingual individuals with minimal or no knowledge of Spanish. All participants were given course credit for their participation in the study. Participants were randomly assigned to one of eight conditions (i.e., Spanish or Finnish with 0, 1, 2, or 3 foreign words per sentence). Original sample size was calculated using *G-Power Version 2.0* from which a total of 360

participants were recommended for the completion of the study for a medium effect size with Power = .65 and α = .05 (Buchner, Erdfelder, & Faul, 1997). Three hundred and sixty four total participants were tested in this study, although 15 individuals were excluded from the analyses due to being bilingual in other languages other than English and Spanish, but only one knew any Finnish and he was randomly assigned to one of the Spanish conditions.

The mean age of participants from University of Texas at Brownsville was 25.09 years (range from 18 to 55 years). Thirty two males (17.7%) and 125 (69.1%) females, while 24 (13.3%) did not reported their gender, participated in the study. Additionally, 86.2% (*N* = 156) self-categorized themselves as Spanish – English Bilinguals, while 13.8% (*N* = 25) self-categorized themselves as English Monolinguals.

The mean age of participants from Kansas State University was 19.66 years (range from 18 to 34 years). Forty nine males (29.2%) and 104 (61.9%) females, while 15 (8.9%) did not report their gender, participated in the study. Additionally, 8.9% (*N* = 15) self-categorized themselves as Spanish – English Bilinguals, while 91.1% (*N* = 153) self-categorized themselves as English Monolinguals.

Both samples combined consisted of 23% (*N* = 87) males and 65% (*N* = 235) females while 12% (*N* = 42) of the sample did not provide their gender. 45.2% (*N* = 154) of participants self-categorized themselves as Bilingual, while 54.8% (*N* = 186) of participants self-categorized themselves as Monolingual. Additionally, 43% (*N* = 158) of the participants indicated they knew only English, while 44% (*N* = 182) of participants indicated knowing English and Spanish (see Item 8 in Appendix B). Those who designated themselves as Bilinguals had an overall mean Spanish self-proficiency rating (i.e., Spanish reading, writing, speaking, and overall

understanding) of 7.1 out of 9 and mean reading self-proficiency rating of 7.1 out of 9. Additionally, Bilinguals had an overall mean English self-proficiency rating (i.e., English reading, writing, speaking, and overall understanding) of 8.6 and mean reading self-proficiency rating of 8.6. Those who designated themselves as English Monolinguals had an overall mean Spanish self-proficiency rating (i.e., Spanish reading, writing, speaking, and overall understanding) of 2.6 and reading self-proficiency mean rating of 3.0. Additionally, Monolinguals had an overall mean English self-proficiency rating (i.e., English reading, writing, speaking, and overall understanding) of 8.8 and mean reading self-proficiency of 8.9.

Materials/Procedure/Design

Prior to the start of the experiment, participants were given both oral and written instructions, all in English, explaining the proper procedure of completing the given tasks but were not given enough information which would lead them to the true purpose of the study as this would allow participants to prepare specifically for the succeeding tasks. The informed consent form, which was the written portion of the instructions, provided some details of the nature of the study but certain information was excluded to reduce expectancy effects. Participants were told that this study would be examining the use of languages which they know or which they may have studied during high school or college and how their knowledge of these languages relates to language fluency. Through the informed consent, participants were informed of the length of the study, that no known risks were associated with the study, and contact information for the experimenter (see Appendix A). Participants from both samples were then randomly assigned to one of the eight experimental conditions. A language experience questionnaire (see Appendix B) was then given to all participants of the study. The language

experience questionnaire inquired about experiences that the participants had had with the languages and language styles under study. Additionally, the language experience questionnaire was used to collect demographic information such as gender, age, major in school, and other information that related to the participant's language experience/history.

The first task which was used consisted of a pre-test translation task in which participants translated either Spanish or Finnish vocabulary words prior to being provided with the original story (see Appendix C). The baseline translation task consisted of 21 items in either Spanish or Finnish, but the items were not given in the same order of presentation as they appeared later in the text. Once having completed the pre-translation task, participants were given a written story passage of about 137 words (seven sentences, 19.14 mean words per sentence and range of 8 to 28 words per sentence) in one of eight different experimental conditions. The first condition (i.e., all-English – 0 foreign words) consisted of a written passage entirely in English (see Appendix D). The second experimental condition consisted of all English information except for one content word within each sentence which was in either Spanish or Finnish (see Appendix D & I), for a total of seven Spanish or Finnish words. The third condition consisted of presenting the same material but with two content words in Spanish or Finnish within each sentence (see Appendix D & I), for a total of fourteen Spanish or Finnish words. The fourth condition which consisted of three content words in Spanish or Finnish in every sentence of the story (see Appendix D & I), for a total of twenty-one Spanish or Finnish words. None of the words in Spanish or Finnish were cognates or false cognates to the English equivalent word. In some instances it was impossible to have a direct one-to-one translation of a word due to the use of articles (e.g., el, la, or su) in Spanish and Finnish. In these instances articles were included to

maintain the structure of the sentence and to have the Spanish and Finnish content word make sense with the proper article. For a list of the Spanish and Finnish words which were used in this study refer to Appendix J.

The third task consisted of a translation post-test (see Appendix E) in which participants once again translated each of the 21 Spanish or Finnish vocabulary word items, in this case after having read the story passage with varying amount of language-mixed prose. Also printed at the top of this task was the story which they had just completed reading, in order to allow referring back to the original story for the purposes of translation. The foreign vocabulary words were presented in the order of presentation with in the story passage which corresponded with the condition which the participant was in. Each of the experimental conditions received all 21 Spanish or Finnish words, sometimes including words which were not presented within text, depending on the condition which they were randomly assigned to.

The fourth task, which was given between the translation post-test and the comprehension task, was a filler task in which participants completed 10 simple mathematical addition problems within one minute to eliminate working memory processing and rehearsal of the information which the participants had completed reading (see Appendix G). Once participants had completed the mathematical problems, a 12-item comprehension/memory task was administered to measure comprehensibility of the information in the story (see Appendix F). This task asked six specific questions regarding the content of the story passage, which tested their ability to comprehend the intended message of the story, as well their ability to recall specific information about the story. Furthermore, all comprehension questions specifically asked about content which had appeared in the Spanish or Finnish words in one or more of the

conditions. For example, “Where did Abel graduate from?”; the original text (1-Spanish word condition) states “Abel has just graduated from a very large preparatoria”, meaning that Abel has just graduated from a very large high school. All questions given in the comprehension task were in English across all conditions.

As an additional component to the comprehension task, six questions specifically examined the effects of language-mixed text on pragmatic inference drawing. These questions asked about intrinsic context which was not explicitly stated but would have needed to be inferred by the reader. To see the inference questions which were used, refer to Appendix F - Questions 7 to 12.

The final task was a modified version of the Strategy Inventory for Language Learning (SILL) which was originally created by Oxford (1989) (see Appendix H). This scale is divided into six subscales, Memory-related (Part A), Cognitive (Part B), Compensatory (Part C), Metacognitive (Part D), Affective (Part E), and Social (Part F). The primary modification to this SILL was the exclusion of the Affective and Social subscales of the original measure. For the purposes of this study the Cognitive, Metacognitive, Memory-related and Compensatory subscales were used in which the participants identified, on a 1 (Strongly Disagree) to 9 (Strongly Agree) scale, which language strategies they were likely to utilize when encountering a new foreign language. The final material included in this study was the Debriefing form (see Appendix K) which disclosed the true nature of the study and the experimenter answered questions regarding the study’s content and purpose. Once all questions and concerns were answered by the experimenter, the participants were thanked for their participation and dismissed. The total time to complete the study was about 30 minutes.

The design which was employed in this study was a 4 X 2 X 2 Between-subjects design in which participants from each sample were randomly assigned into one of the eight experimental conditions. There were four levels of the first independent variable, which was the number of content words in Spanish or Finnish (e.g., 0, 1, 2, or 3 words per sentence). The second independent variable was based on the participants' language skill (i.e., English Monolingual or Spanish-English Bilingual). Participants were categorized as either Monolingual or Bilingual based on their own perceptions of their own language skill. The third independent variable was the language in which participants were tested (i.e., Spanish or Finnish). Each participant completed all four measuring tasks (i.e., pre-test and post-test translation task, comprehension task, and the SILL) but only read one of the eight experimental story passages which varied only in the number of words in the foreign language of interest.

Results

Overview of Analyses

An overview of the categorization of the independent variables and the calculation of the dependent variables are further described. Primary analyses are presented in terms of the main effects, probing of the two-way interactions, and probing of the three-way interaction. Probing of the three-way interaction is most important since the translation and comprehension accuracy hypotheses are based off of this interaction. Also, hierarchical regression analyses were conducted to determine if various Language Learning Strategies (e.g., Cognitive and Compensatory strategies) were significant unique predictors of translation and comprehension performance.

Independent Variables

The primary independent variables which were used in the study included foreign language tested (i.e., Spanish or Finnish), number of foreign words per sentence (i.e., 0, 1, 2, or 3) in the story, and participants' language skill (i.e., Bilingual or Monolingual). Individuals were categorized as either Monolingual or Bilingual based on the participant's response on the Language Experience questionnaire when asked if they considered themselves to be Monolingual or Bilingual[1]. The use of the 0 word condition in both Spanish and Finnish word testing was used as a manipulation check to determine if the differences in translation accuracy were due to the manipulation of the number of foreign words per sentence or due to some individual difference or preexisting knowledge of the languages and/or task. Analyses examining if significant differences existed between the groups at pre-test and at post-test when tested at the zero foreign words per sentence condition indicated that no significant differences existed between the language groups when tested in Spanish or Finnish (see Figures 2, 3, 4 & 5). Monolinguals and Bilinguals' translation difference scores were close to zero when tested in Spanish and Finnish. Bilinguals' difference scores were close to zero when tested on Spanish vocabulary due to their high degree of translation accuracy at both pre-test and at post-test; when tested on Finnish vocabulary their pre-test and post-test translation accuracy was in essence close to zero. Monolinguals' translation difference scores on Spanish and Finnish vocabulary were essentially zero due to their low degree of knowledge of both languages on both pre-test and post-test and no contextual cues or foreign words in context to assist in the translation of the foreign language vocabulary.

Dependent Measures of Performance

The primary dependent variables used in the study were (a) a difference score in translation accuracy from pre-test to post-test, and (b) the number of correct comprehension items (i.e., Fact and Inference items combined). The method of calculation of the difference scores for translation accuracy was to subtract pre-test scores from post-test scores (i.e., Post-Test minus Pre-Test)[2]. Furthermore, pre-test and post-test scores were calculated by summing the number of correct verbatim and correct gist responses. Responses were coded as correct verbatim when the responses in the translation task (pre-test and post-test) were precisely as what appeared in the zero foreign word condition (see Appendix E & J). Responses were coded as correct gist when the responses in the translation task approximated the exact correct word but were not the precise words which were set in the experiment. For example, if a word on the translation task was "Estudiando", in Spanish, the verbatim response the participant needed to give would be "Studying", but a response such as "I Study" would be coded as a gist response. For the purposes of creating an overall correct response as the primary dependent variable for the translation task, verbatim and gist responses were combined to create a new overall correct response variable. The rationale for creating a new overall variable, which combined gist and verbatim responses, was that many possible variations may approximate verbatim responses but a more accurate measure of vocabulary learning should incorporate both gist and verbatim responses. Analyses more accurately reflected vocabulary learning with the incorporation of verbatim and gist responses combined as a dependent measure.

Inter-Rater Reliability

Due to the slightly subjective nature of the dependent measure of the number of correct translation responses (especially gist), inter-rater reliability was assessed to determine if two independent coders obtained highly reliable scores when examining verbatim and gist responses. Two independent Spanish-English Bilingual coders were used to assess correct (i.e., verbatim and gist) and error responses in pre-translation and post-translation tasks. The second Spanish-English Bilingual rater coded a subset of 37 translation tests, which included both Spanish and Finnish conditions. Bivariate correlations between pre-test and post-test responses indicated high positive correlations between both coders, indicating high inter-rater reliability. Furthermore, due to the nature of the reliability analysis with the use of two independent raters, an effective reliability score was calculated in which a composite reliability of both raters was determined (Rosenthal & Rosnow, 1991). From the effective reliability analysis it was concluded that both raters had a significantly high effective reliability indicating highly similar scoring based on the operation definitions used in the scoring procedure for both verbatim and gist responses. All effective reliabilities were $R = .993$ or greater. From this result it was concluded that the use of only one rater was necessary to accurately score each of the packets for both Spanish and Finnish translation tasks.

Scale Reliability Analysis

The two primary scales which were used for the current study included and 18-item "Language Experience and Proficiency Questionnaire", which was created for the purposes of this study by the experimenter, and the 36-item modified "Strategy Inventory for Language Learning" (Oxford, 1990). Reliability analysis for the "Language Experience and Proficiency

Questionnaire" demonstrated adequate scale reliability (Cronbach's alpha coefficient = .926), as did the "Strategy Inventory for Language Learning" (Cronbach's alpha coefficient = .951).

Primary Analyses

To test for main effects, two-way interactions, and a three-way interaction, a Multivariate Analysis of Variance (MANOVA) was employed. A 2 (Spanish or Finnish) X 2 (Bilingual or Monolingual) X 4 (0, 1, 2, or 3 foreign words per sentence) Between-Groups Factorial Design was used to test post-test minus pre-test translation accuracy difference scores and comprehension scores.[3] Results demonstrated three significant main effects, three significant two-way interactions, and one marginally-significant three-way interaction. The three-way interaction was of highest importance when testing for differences between Monolinguals and Bilinguals when tested on Spanish or Finnish words and based on the three conditions of the number of foreign words per sentence. The importance of the three-way interaction was based on the hypotheses proposed for the translation task and for the comprehension task, in that certain predictions examined the effects of independent variables on comprehension or translation ability at differing levels of the other independent variables.

The use of simple effects was employed to further probe the three significant two-way interactions and also a non-significant three-way interaction. According to Howell (2002), marginal or non-significant *F* values may be further probed (through the use of multiple comparisons or simple effects tests) to determine if significant differences do emerge between groups at different levels of multiple independent variables. Howell (2002) suggests that the Bonferroni *t* test can be calculated to determine if specific comparisons are significant following a non-significant *F* attained, based on 1) the use of MS error term from the omnibus ANOVA

analysis, which is the best estimate of the population variance, and 2) the correction of the alpha level, based on the number of comparisons to adjust for familywise error rate (Scheff, Saucier, & Cain, 2002).

In the case in which multiple comparisons with Bonferroni correction were utilized, a new adjusted *p*-value was calculated to determine if the differences between groups were statistically significant or not. The adjusted *p*-value by which all comparisons were compared to was $p = .0125$. This adjusted *p*-value was calculated by dividing the alpha level (i.e., .05) by the total number of group comparisons (i.e., 4) and produced the new adjusted *p*-value which was used in all multiple comparison analyses.

Main Effects – Translation Accuracy Difference Scores

A significant main effect was found for translation accuracy difference score based the number of foreign words per sentence (i.e., 0, 1, 2, or 3), $F(3, 333) = 62.96$, $p < .001$, $\eta^2 = .36$. Multiple comparisons using a Bonferroni correction indicated significant differences between the zero foreign word condition ($M = .46$, $SD = 1.06$) to the one foreign word condition ($M = 3.20$, $SD = 2.17$), to two foreign word condition ($M = 4.17$, $SD = 3.29$), and to the three foreign words condition ($M = 6.01$, $SD = 5.39$), (all *p*s < .001). Significant differences were also found between the one foreign word condition ($M = 3.20$, $SD = 2.17$) and the three foreign word condition ($M = 6.01$, $SD = 5.39$), $p < .001$. Significant differences were also found between the two foreign words condition ($M = 4.17$, $SD = 3.29$) and the three foreign words condition ($M = 6.01$, $SD = 5.39$), $p < .001$.The three foreign word condition ($M = 6.01$, $SD = 5.39$) was significantly different from the zero ($M = .46$, $SD = 1.06$), one ($M = 3.20$, $SD = 2.17$), and two ($M = 4.17$, $SD = 3.29$) foreign word conditions, (all *p*s < .001). Results from this analysis suggest that, as the

number of foreign words per sentence increases, individuals are increasingly able to use contextual information to aid in the translation of foreign words on the post-test, even though there is a substantial decrease in the amount of contextual information which is in the individual's primary language.

The second significant main effect found for translation accuracy difference scores was based on the language of the foreign words (i.e., Spanish or Finnish), F (1, 333) = 58.75, $p <$ .001, $\eta^2 = .15$. Results from this analysis indicated that individuals tested over the Finnish reading passage (M = 4.72, SD = 4.04) had greater translation difference scores, from pre-test to post-test, than individuals tested over the Spanish reading passages (M = 2.30, SD = 3.43). The findings from this analysis may be somewhat misleading in suggesting that individuals may be able to accurately translate Finnish words with greater ease than Spanish words, from pre-test to post-test, but the difference score (i.e., pre-test to post-test) in the Spanish condition was low due to the Bilinguals' difference scores being close to zero, suggesting no increase from pre-test to post-test due to their prior considerable knowledge of Spanish. A certain degree of caution needs to be taken when examining this finding and as well with the conclusions which may be drawn.

The final significant main effect found for translation accuracy difference score was based on the participants' self-reported language skill (i.e., Monolingual or Bilingual), F (1, 333) = 53.06, $p < .001$, $\eta^2 = .14$. Results indicated a significant difference between Monolinguals (M = 4.51, SD = 3.88) and Bilinguals (M = 2.42, SD = 3.70) suggesting that Monolinguals are able to have a greater usage of contextual information when translating a foreign language, whereas Bilinguals, while increasing their translation accuracy from pre-test to post-test, showed a smaller increase compared to Monolinguals. This result is almost surely due to the fact that,

when Monolinguals and Bilinguals' performance was tested on Spanish and Finnish material, Monolinguals' translation accuracy from pre-test to post-test in both Spanish and Finnish substantially increased, while Bilinguals' translation accuracy from pre-test to post-test in Spanish did not increase due to the high level of accuracy at both test times, although Bilinguals did substantially increase their translation performance over time when tested in Finnish. To better comprehend how important this finding truly is, the two-way interaction between the language the participants were tested on (i.e., Spanish or Finnish) and the participants' language skill (i.e., Monolingual or Bilingual) was further examined.

Two-way Interactions – Translation Accuracy Difference Scores

Three significant two-way interactions were found when examining the difference scores from pre-test to post-test for translation accuracy; each of these two-way interactions is discussed in further detail. The first significant two-way interaction was between the language which participants were tested on (i.e., Spanish or Finnish) by the participants' language skill (i.e., Bilingual or Monolingual), F (1, 333) = 16.03, p <.001, η^2 = .05. The use of simple effects analysis further probed this interaction and indicated several significant differences between Monolinguals and Bilinguals when tested over Spanish and Finnish words independent of the number of foreign words per sentence (all Fs > 3.94, p < .05) (see Figure 1). This result suggest Monolinguals (M = 3.92, SD = 3.48), when tested over Spanish words, showed greater increases in their translation accuracy from pre-test to post-test compared to Bilinguals (M = .76, SD = 2.58), but Bilinguals' low difference scores in Spanish reflect their high translation accuracy in both pre-test and post-test. Also, Monolinguals' (M = 5.07, SD = 4.17) translation difference scores were significantly greater than Bilinguals' (M = 4.31, SD = 3.88) when tested over

Finnish words, suggesting that Monolinguals were more accurate in translating Finnish words than Bilinguals were. Furthermore, this result suggests that a Bilingual's bilingual ability with Spanish did not transfer to the translation of an unfamiliar language, in this case Finnish.

The second significant two-way interaction is the interaction between the number of foreign words per sentence (i.e., 0, 1, 2, or 3 words) and the language which participants were tested on (i.e., Spanish or Finnish), F (3, 333) = 11.55, $p < .001$, $\eta^2 = .09$. With the use of simple effects, further probing indicated a significant differences between individuals when tested over Spanish and Finnish at one , two, and three foreign words per sentence (all Fs > 12.26, $p < .001$), but not at zero foreign words per sentence (see Figure 2). No significant difference was found between Spanish and Finnish at zero foreign words per sentence (Spanish Mean = .50, SD = 1.05; Finnish Mean = .42, SD = 1.10), F (1, 333) = .02, $p > .05$, $\eta^2 = .00$. Significant differences were found between Spanish and Finnish at one (Spanish Mean = 2.24, SD = 2.25; Finnish Mean = 4.26, SD = 1.52), two (Spanish Mean = 3.00, SD = 2.95; Finnish Mean = 5.44, SD = 3.18), and three (Spanish Mean = 3.54, SD = 5.34; Finnish Mean = 8.38, SD = 4.30) foreign words per sentence. These results suggest that, when individuals are tested over Finnish words, there is a greater increase in their pre-test to post-test translation accuracy scores when one, two, and three Finnish words are introduced compared to when individuals are tested over Spanish words.

The final significant two-way interaction which was found was between the number of foreign words per sentence (i.e., one, two, or three words) and an individual's language skill (i.e., Monolingual or Bilingual), F (3, 333) = 10.23, $p < .001$, $\eta^2 = .08$. With the use of simple effects analysis, further probing indicated significant differences between Monolinguals and Bilinguals at one, two, and three foreign words per sentence (all Fs > 9.74, $p <.01$), but no significant

difference was found between Monolinguals (M = .48, SD = 1.26) and Bilinguals (M = .44, SD = .79) at zero foreign words per sentence, F (1, 333) = .01, $p > .05$, $\eta^2 = .00$. Significant differences were found between Monolingual and Bilingual at one (Bilingual Mean = 2.26, SD = 2.17; Monolingual Mean = 4.07, SD = 1.82), two (Bilingual Mean = 3.02, SD = 3.36; Monolingual Mean = 5.43, SD = 2.73), and three (Bilingual Mean = 3.71, SD = 5.61; Monolingual Mean = 8.32, SD = 4.05) foreign words per sentence. The results suggest that Monolinguals have a greater ability to use contextual information to increase their translation accuracy scores from pre-test to post-test at all three foreign word introduction levels (see Figure 3).

An important factor which needs to be considered when examining differences between language skill groups and the languages in which they are tested, is that these results were heavily influenced by Bilinguals' translation difference score for Spanish words being significantly lower than Monolinguals due to their high translation accuracy for Spanish words creating an overall low difference score across all conditions and for the group overall. Further examination and caution needs to be considered when suggesting that there is a greater likelihood for Monolinguals to have greater accuracy differences from pre-test to post-test in translating Finnish and Spanish words, compared to Bilinguals, when only two-way interactions are being examined. To further explore if differences do exist between the two language groups when tested over different languages and at differing numbers of foreign words, the three-way interaction needs to be explored. This analysis also is the critical test if differences do truly exist between Monolinguals and Bilinguals when tested on Spanish and Finnish vocabulary words when 0, 1, 2, or 3 foreign words per sentence are introduced.

Hypothesis Testing – Translation Accuracy Difference Scores

The following analyses are based off of the findings of the three-way interaction between the variables of participant language skill (i.e., Monolingual or Bilingual) by language tested (i.e., Spanish or Finnish) by the number of foreign words per sentence (i.e., 0, 1, 2, or 3 words). The three-way interaction between these three variables was non-significant, F (3, 333) = 2.54, p =.06, η^2 = .02, but as previously mentioned, non-significant interactions may still be further examined to determine if significant difference are present between the multiple variables based on the dependent measure.

Hypothesis H_{1a} stated that Bilinguals' difference scores in translation of Spanish would be low throughout all conditions (i.e., 0, 1, 2, and 3 foreign words per sentence) since pre-test and post-test translation accuracy scores would both be very high. The results from the simple effects analysis indicated that, as predicted, no significant differences were found for Bilinguals when tested in Spanish in any of the three Spanish word conditions, F (3, 333) = .49, p >.05, η^2 = .02. Multiple comparisons using a Bonferroni correction further supported this finding in that all conditions for Bilinguals' had p-values greater than .0125. As predicted, no significant increase or decrease were found for Bilinguals' when tested in Spanish at zero (M = .57, SD = .81), one (M = .74, SD = 1.32), two (M = 1.28, SD = 2.15), or three (M = .36, SD = 4.50) Spanish words per sentence, suggesting that Bilinguals translation accuracy at pre-test and at post-test was substantially high in all conditions (see Figure 4). Thus hypothesis H_{1a} was supported.

Hypothesis H_{1b} stated that Monolinguals' difference scores in translation of Spanish would modestly increase from the zero foreign word per sentence condition to the three foreign words condition. Results from the simple effects analysis indicated that a significant difference

between the three conditions did arise, F (3, 333) = 22.15, p <.001, η^2 = .47. Multiple comparisons using a Bonferroni correction (p = .0125) indicated significant differences in the translation difference scores from pre-test to post-test from the zero Spanish word condition (M = .44, SD = 1.24) to the one (M = 3.74, SD = 1.98), two (M = 5.10, SD = 2.44), and three (M = 6.86, SD = 4.00) Spanish word conditions. Significant differences were found between the one Spanish word condition (M = 3.74, SD = 1.98) to the zero (M = .44, SD = 1.24) and three Spanish word condition (M = 6.86, SD = 4.00), ps < .001. Significant differences were found between the two Spanish word condition (M = 5.10, SD = 2.44) to the zero Spanish word condition (M = .44, SD = 1.24), p < .001. Additionally, the three foreign word condition (M = 6.86, SD = 4.00) was significantly different from the zero (M = .44, SD = 1.24) and one foreign word condition (M = 3.74, SD = 1.98) (see Figure 4), all ps < .001. Results from this analysis suggests that Monolinguals, when attempting to learn the meaning of Spanish words from language-mixed prose, are able to increase their translation accuracy from pre-test to post-test by making use of contextual information as the number of foreign words increases, even though there is a decrease in the amount of English contextual information provided to the Monolingual reader; however, enough information provided for the reader to accurately understand the foreign word and be able to accurately translate it into English.

Hypothesis H_2 for the translation accuracy difference scores predicted that Bilinguals' and Monolinguals' difference scores in translation of Finnish words would moderately increase from the zero Finnish word condition to the three Finnish words per sentence condition. Results from probing the three-way interaction using simple effects analysis, F (3, 333) = 21.43, p <.001, η^2 = .40, indicated that significant differences between the conditions did existed. Mulitple

comparisons using Bonferroni correction (p = .0125) indicated that no significant differences were found between the one (M = 4.11, SD = 1.41), two (M = 5.10, SD = 3.41), or three (M = 7.05, SD = 4.57), all ps > .05, Finnish word conditions for Bilinguals, but all conditions were significantly different from the zero Finnish word condition (M = .28, SD = .75), all ps < .001, (see Figure 5). Simple effects analysis did indicate a significant difference between the four Finnish word conditions for Monolinguals, F (3, 333) = 44.59, p < .001, η^2 = .63; through the use of multiple comparisons, using Bonferroni correction (p = .0125), it was found that significant differences existed between the one Finnish word per sentence condition (M = 4.39, SD = 1.62) to the three Finnish word per sentence condition (M = 9.65, SD = 3.69) and to the zero Finnish word condition (M = .52, SD = 1.31). Additionally, significant differences were found between the two Finnish words per sentence condition (M = 5.77, SD = 2.99) to the three Finnish words per sentence condition (M = 9.65, SD = 3.69) and to the zero Finnish word condition (M = .52, SD = 1.31). The zero Finnish word condition (M = .52, SD = 1.31) was significantly different from the one (M = 4.39, SD = 1.62), two (M = 5.77, SD = 2.99), and three (M = 9.65, SD = 3.69) Finnish word per sentence conditions, all ps < .001.

An additional analysis was conducted to examine if significant differences between Monolinguals' and Bilinguals' translation difference scores existed at zero, one, two, or three Finnish words per sentence. Simple effects analysis indicated that no significant differences truly existed between Monolinguals and Bilinguals based on their translation accuracy, from pre-test to post-test, at zero, one or two Finnish words per sentence (all Fs < .99, p > 05). However, a significant difference was found between Monolinguals (M = 9.65, SD = 3.69) and Bilinguals (M = 7.05, SD = 4.57) at three Finnish words per sentence, F (3, 333) = 10.43, p < .01, η^2 = .09. This

finding might reflect that Monolinguals, due to English being their L1, are better able to make use of English context information than Spanish-English Bilinguals who have Spanish as their L1, even though they also possess a high degree proficiency in English. The results from this analysis are of great importance in suggesting that both Monolinguals and Bilinguals, neither of whom knew any Finnish, were able to utilize context information when intending to disambiguate unfamiliar words from an obscure unfamiliar language such as Finnish (see Figure 5). The increase in translation accuracy from pre-test to post-test as the number of Finnish words increased demonstrates how much of a critical factor context information is for an individual who does not know any aspect of a language and is intending to better understand that language.

Main Effects – Total Comprehension, Inference, and Fact Comprehension Accuracy Scores

A significant main effect was found for total comprehension (i.e., fact and inference items) based on the language which participants were tested on (i.e., Spanish or Finnish), F (1, 333) = 9.09, $p < .01$, $\eta^2 = .04$. Results from the analysis indicated that there was a significant difference between individuals tested with Spanish (M = 10.88 out of 12, SD = 1.54) to those tested with Finnish words (M = 10.34 out of 12, SD = 1.80). This result suggests that individuals, independent of being Bilingual or Monolingual, were able to better overall comprehend information when presented with a familiar language (i.e., Spanish), compared to a non-familiar language (i.e., Finnish).

The second main effect which was found was for inference-only comprehension items based on the language which the participants were tested over (i.e., Spanish or Finnish), F (1, 262) = 5.72, $p < .05$, $\eta^2 = .02$. Results from this analysis indicated that there was a significant difference between individuals tested with Spanish words (M = 5.50 out of 6, SD = .88) and

those tested with Finnish words (M = 5.38 out of 6, SD = .93) based on their overall inference comprehension. This result suggests once again that individuals have a greater ability to draw inferences from a given story containing some words from a familiar language (i.e., Spanish), compared to when it contained words from a non-familiar language (i.e., Finnish).

The third main effect which was found was for fact-only comprehension items based on the number of foreign words per sentence, F (3, 333) = 3.62, $p < .05$, $\eta^2 = .03$. Results from this analysis indicated that there was a significant difference between the zero foreign word condition (M = 5.58 out of 6, SD = .78) to the two (M = 5.07 out of 6, SD = 1.01) and three foreign word per sentence conditions (M = 5.06 out of 6, SD = 1.14), ps < .0125. This result suggests that factual information for comprehension may be affected based on the amount context information which is presented in a foreign language, suggesting that as the number of foreign words per sentence increases there is a corresponding decrease in fact comprehension independent of an individuals language skill (i.e., Monolingual or Bilingual) and of the foreign language utilized (i.e., Spanish or Finnish).

The final main effect which was found was for fact-only comprehension items based on the language which the participants were tested over (i.e., Spanish or Finnish), F (1, 333) = 19.52, $p < .001$, $\eta^2 = .06$. The results from this analysis indicate that individuals who were tested on factual information from a given story with Spanish words (M = 5.44 out of 6, SD = .82) embedded within the text were able to better to remember factual information than when presented with a story passage with Finnish words (M = 4.99 out of 6, SD = 1.08) embedded within the text. The results from this analysis suggest that individuals have a greater ability to remember factual information which was presented to the reader, independent of their language

skill (i.e., Monolingual or Bilingual), when presented with words from a familiar language (i.e., Spanish) than when presented with words from an unfamiliar language (i.e., Finnish).

Two-way Interactions – Fact Comprehension Accuracy Scores

A significant two-way interaction was found between the variables of language on which the participants were tested (i.e., Spanish or Finnish) and the number of foreign words per sentence (i.e., 0, 1, 2, or 3), $p < .01$, on the number of fact comprehension items correct. A simple effects analysis indicated that no significant difference existed between Spanish (M = 5.45 out of 6, SD = .95) and Finnish (M = 5.71 out of 6, SD = .51) at zero foreign words per sentence, $p > .05$. Significant differences were found between Spanish and Finnish at one, two, and three foreign words per sentence (all Fs > 8.53, ps < .01). Refer to Table 2 for a complete list of means and standard deviations for Spanish and Finnish conditions at zero, one, two, and three foreign words per sentence for the number of correct fact comprehension items. Results from the simple effects analysis suggests that individuals recall more factual information when Spanish words are embedded in text than when Finnish words are embedded in English text as the number of foreign words per sentence increases.

The final significant two-way interaction was found between the variables of language in which the participants were tested on (i.e., Spanish or Finnish) and the participants' language skill (i.e., Bilingual or Monolingual), F (1, 333) = 4.01, $p < .05$, $\eta^2 = .02$. A simple effects analysis was utilized and indicated that no significant difference truly existed between Monolinguals and Bilinguals' when tested in Spanish or Finnish (all Fs < 2.12, $p > .05$)[4]. Although, the two-way interaction was significant, the probing of the interaction with simple effects analysis demonstrated that no significant difference was present between the groups. The

complete list of mean and standard deviations for each language group when tested in Spanish and Finnish appears in Table 1. The result from this simple effects analysis suggests that Monolinguals and Bilinguals have similar factual comprehension performance based on the use of Spanish or Finnish vocabulary words in language-mixed prose. The introduction of a foreign language does not significantly decrease or increase an individual's ability to comprehend factual information, based on the language skill (i.e., Monolingual or Bilingual), independent of the amount of words in the foreign language which is being presented to the reader. Furthermore, when considering the comprehension task which was administered, a ceiling effect may have been encountered possibly due to the overall low difficulty of the task which may have not provided the most sensitive test of the language-mixed prose on comprehension.

Two-way Interactions – Inference Comprehension Accuracy Scores

A significant two-way interaction was found between the variables of language in which the participants were tested (i.e., Spanish or Finnish) and the number of foreign words per sentence (i.e., 0, 1, 2, or 3), F (3, 333) = 3.29, $p < .05$, $\eta^2 = .03$, for the number of correct inference comprehension items. A simple effects analysis indicated that no significant difference existed between Spanish (M = 5.48 out of 6, SD = 1.13) and Finnish (M = 5.81 out of 6, SD = .40) at zero foreign words per sentence, between Spanish (M = 5.61 out of 6, SD = .65) and Finnish (M = 5.52 out of 6, SD = .77) at one foreign word per sentence, between Spanish (M = 5.36 out of 6, SD = .88) and Finnish (M = 5.48 out of 6, SD = .82) at two foreign words per sentence, (all Fs < 2.90, ps > .05). However, significant differences were found between Spanish (M = 5.56 out of 6, SD = .83) and Finnish (M = 5.07 out of 6, SD = 1.29) at three foreign words per sentence, F (1, 333) = 6.76, $p < .05$, $\eta^2 = .05$. Refer to Table 3 for a complete list of means

and standard deviations for Spanish and Finnish conditions at zero, one, two, and three foreign words per sentence for the number of correct inference comprehension items. Results from simple effects analysis suggests that inference drawing is greater when Spanish words are embedded in English text than when Finnish words are embedded in text, but only when three foreign words are embedded per sentence.

Two-way Interactions – Total Comprehension (Fact & Inference) Accuracy Scores

A significant two-way interaction was found between the variables of language participants were tested on (i.e., Spanish or Finnish) and the number of foreign words per sentence (i.e., 0, 1, 2, or 3), F (3, 333) = 7.13, $p < .001$, $\eta^2 = .06$, on the number of correct fact and inference comprehension items combined. Simple effects analysis indicated that significant differences existed between Spanish and Finnish at zero, two, and three foreign words per sentence (all Fs > 5.29, ps < .05). No significant difference was found between Spanish (M = 11.09 out of 12, SD = .1.07) and Finnish (M = 10.43 out of 12, SD = .1.30) at one foreign word per sentence, $p > .05$. Refer to Table 4 for a complete list of means and standard deviations for Spanish and Finnish conditions at zero, one, two, and three foreign words per sentence for the number of correct fact and inference comprehension items combined. Results from simple effects analysis suggests that total comprehension (i.e., Fact & Inference items) is greater for individuals when Spanish words are embedded in English text than when Finnish words are embedded in text when two and three foreign words are embedded per sentence.

Hypothesis Testing – Comprehension Accuracy Scores

The following analyses are based off the three-way interaction, which was non-significant for total comprehension (i.e., fact and inference comprehension items) F (3, 333) =

.94, $p > .05$, $\eta^2 = .01$, but the use of simple effects analysis was utilized to determine if significant differences did exist between the language groups (i.e., Monolingual or Bilingual) based on the language which they were tested on and by the number of foreign words per sentence (i.e., 0, 1, 2, or 3) introduced into the story passage.

Hypothesis H_{3a} for these data stated that Bilinguals' comprehension accuracy scores would be high in all Spanish conditions, while Monolinguals' comprehension accuracy scores would gradually decline as the number of Spanish words per sentenced increased. Results from the simple effects analysis indicated that no significant differences were found between the four Spanish word conditions for Bilinguals, F (3, 333) = 1.01, $p > .05$, $\eta^2 = .03$, but Monolinguals' comprehension accuracy did not significantly decrease, as predicted, as the number of Spanish words per sentence increased, F (3, 333) = .24, $p > .05$, $\eta^2 = .01$, (see Table 5). Further examination utilizing multiple comparisons with a Bonferroni correction ($p = .0125$) supported this non-significant finding (all ps > .0125). The results suggest that even though there was a substantial decrease in English contextual information, Monolinguals' comprehension accuracy was unaffected by the introduction of Spanish vocabulary words.

Hypothesis H_{3b} stated that Monolinguals' and Bilinguals' comprehension accuracy (i.e., fact and inference items) scores would gradually decline as the number of Finnish words per sentence increased. Simple effects analysis indicated that there were significant differences between the four word conditions for Bilinguals and Monolinguals (all Fs > 5.71, $p < .05$), therefore partially supporting the predicted hypothesis. Multiple comparisons using Bonferroni correction ($p = .0125$) supported this finding through the comparison of all foreign word conditions. Significant differences were found for Bilinguals from the zero Finnish word

condition (*M* = 11.56 out of 12, *SD* = .86) to the two (*M* = 9.76 out of 12, *SD* = 1.48) and three Finnish word condition (*M* = 9.64 out of 12, *SD* = 2.38). Results from the simple effects analysis suggests that a significant decrease existed in comprehension accuracy between the zero Finnish word per sentence condition to the two and three Finnish words per sentence conditions for Bilinguals, indicating that the incorporation of foreign language words in text decreases comprehension ability to a certain extent. The result from this analysis supported the prediction in suggesting that, as the number of Finnish words increases from zero, then there is a significant decrease in comprehension performance.

Significant differences were also found for Monolinguals from the zero Finnish word condition (*M* = 11.45 out of 12, *SD* = .51) to the three Finnish word condition (*M* = 9.78 out of 12, *SD* = 2.43). Results from the simple effects analysis indicated a significant decrease in comprehension accuracy for Monolinguals, when three Finnish words per sentence were embedded within text compared to when zero Finnish words per sentence were included. This result partially supports the prediction in suggesting that when Finnish words are included within text, then there is a corresponding decrease in comprehension accuracy. Although there was no significant difference between the one, two, and three Finnish word conditions for Bilinguals or Monolinguals, results were in the predicted direction (i.e., decreasing) across all Finnish conditions (see Table 6).

Hypothesis Testing – Language Learning Strategies

The following sets of hypotheses are based on the use of the Compensatory and Cognitive Language Learning Strategies as predictor variables in hierarchical regression analyses

(i.e., all predictors entered at once into regression model) to predict comprehension scores and translation accuracy difference scores.

Hypothesis H_{4a} predicted that Compensatory learning strategies would be a significant predictor of performance on: a) inference comprehension scores; and b) translation accuracy difference scores for Monolinguals and Bilinguals when tested on Finnish. a) Results from the hierarchical regression analysis when predicting performance on inference comprehension items indicated that Compensatory learning strategies were not a significant predictor of inference comprehension items for Monolinguals ($\beta = -.044$, $p = .750$), but were a significant predictor of inference accuracy for Bilinguals ($\beta = -.290$, $p = .006$) (see Table 7). The hypothesis was not supported in that Compensatory learning strategies was a significant negative predictor only for Bilinguals, suggesting that, when guessing or inferring the meaning of words in a foreign language, Bilinguals make less usage of guessing the meaning of words, which allows them to infer the underlying meaning of a story passage when Finnish words are presented in text. b) Results from the regression analysis when predicting performance on translation accuracy difference scores indicated that Compensatory learning strategies were not a significant predictor of translation accuracy for Monolinguals ($\beta = .164$, $p = .193$) or Bilinguals ($\beta = .077$, $p = .426$) when tested on Finnish words (see Table8). These results did not support the hypothesis but suggest rather that guessing or inferring the meaning of Finnish words does not assist Monolinguals or Bilinguals in accurately translating Finnish words.

Hypothesis H_{4b} stated that Compensatory learning strategies would be a significant predictor of performance for: a) inference comprehension items; and b) translation accuracy difference scores for Monolinguals when tested on Spanish words. a) Results from the regression

analysis indicated that Compensatory learning strategies was not a significant predictor of performance for inference comprehension items for Monolinguals ($\beta = .067$, $p = .580$) (see Table 9), thus not supporting the predicted hypothesis. Monolinguals may be relying on some other method of inferring information when Spanish words are presented within text and not solely relying on guessing the meaning of words, possibly due to their minimal familiarity with the language and a greater desire to rely on that sparse knowledge of Spanish. b) Results from the regression analysis indicated that Compensatory learning strategies were not a significant predictor of translation accuracy difference score performance for Monolinguals ($\beta = .071$, $p = .521$) when tested on Spanish words (see Table 10). This result did not support the predicted hypothesis. Thus, perhaps Monolinguals may be relying on their previous very limited knowledge of Spanish, or its relatedness to English, to translate the words, rather than only utilizing guessing or inference strategies.

Hypothesis H_{5a} predicted that Cognitive learning strategies would be a significant predictor of performance on: a) fact comprehension items; and b) translation accuracy difference scores for Monolinguals when tested on Spanish material. a) Results from the regression analysis indicated that Cognitive learning strategies were not a significant predictor of fact comprehension performance for Monolinguals ($\beta = -.052$, $p = .698$) on Spanish, not supporting the predicted hypothesis (see Table 11). Thus, there is no evidence that memory related strategies (i.e., Cognitive learning strategies) assist Monolinguals' in recalling factual information for comprehension when Spanish words are introduced into text. b) Results from the regression analysis also indicated that Cognitive learning strategies were not a significant predictor of translation accuracy difference score from pre-test to post-test for Monolinguals ($\beta = .211$, $p =$

.088) when tested over Spanish words, therefore not supporting the predicted hypothesis (see Table 12). The results from this analysis suggests that Monolinguals are not relying on the memory of Spanish words to assist in their translation of Spanish words, suggesting that other possible strategies may be utilized when presented with Spanish words.

Hypothesis H_{5b} predicted that Cognitive learning strategies would be a significant predictor of performance on: a) fact comprehension items; and b) translation accuracy difference scores for Monolinguals and Bilinguals when tested on Finnish words. Results from the regression analysis indicated that Cognitive learning strategies were not a significant predictor of either fact comprehension (see Table13) or translation accuracy difference score performance (see Table 14) for Monolinguals (β = -.200, p = .139, fact comprehension; β = .211, p = .090, difference score translation accuracy) or Bilinguals (β = .055, p = .607 fact comprehension; β = -.087, p = .379, difference score translation accuracy), although Cognitive learning strategies was marginally significant when predicting Monolinguals' translation accuracy difference scores (p = .090). The result from this analysis suggests that Monolinguals and Bilinguals are not relying on their previous exposure, knowledge, or similarities between the languages they do know and Finnish to assist in the recollection of factual information for comprehension or for assisting in translation.

Hypothesis Testing – Use of Codeswitching

Hypothesis H_6 predicted that Bilinguals' self-ratings of their use of codeswitching (sum of scores on items 9-17, see last part of Appendix B) would be a significant predictor of translation accuracy difference scores when tested on Finnish word items. Results from regression analysis indicated that use of codeswitching was not a significant predictor of

Bilinguals' (β = -.038, *p* = .697) translation accuracy difference score when tested on Finnish word items, therefore not supporting the predicted hypothesis (see Table 15). The result from this analysis suggests that, although Bilinguals reported a high degree of codeswitching (*M* = 5.14, *SD* = 1.88), this ability to codeswitch did not give Bilinguals a greater advantage in their translation from a non-familiar language (i.e., Finnish) compared to Monolinguals, indicating that having experience codeswitching is not a sufficient factor to predict success in translating words from a non-familiar foreign language.

Confidence Ratings – Regression Analysis

The following analyses were conducted to examine if the confidence ratings for correct responses on the pre- and post-translation task were significant predictors of translation difference score accuracy for Monolinguals and Bilinguals when translating Finnish and Spanish vocabulary words. Although no predictions were made regarding the confidence ratings of correct translations, this analysis was conducted on an exploratory basis to examine the usefulness of confidence ratings for translations tasks for future studies.

Results from the hierarchical regression analysis indicated that the confidence ratings provided by Bilinguals (*M* = 7.64 out of 9, *SD* = 2.45) (β = .055, *p* = .643), when translating Spanish vocabulary words, were not a significant predictor of performance. However, results indicated that confidence ratings provided by Bilinguals (*M* = 1.47 out of 9, *SD* = 1.43) (β = 1.304, *p* = .000) (see Table 16), when translating Finnish vocabulary words, were a significant predictor of translation accuracy, suggesting that as Bilinguals self-reported confidence rating of the translation increases, then there is also an increase in translation difference accuracy scores. Finding from both analyses indicate the usefulness of confidence ratings for Bilinguals when

translating Finnish vocabulary words though not for translating Spanish vocabulary words. This result needs to be interpreted with caution due to the high degree of translation accuracy for Bilinguals when translating Spanish words, Bilinguals' difference scores were close to zero in all conditions due to their high accuracy in translation and confidence ratings were high at both pre-test and post-test, indicating that this result may not be an accurate indication of the usefulness of translation confidence ratings for Bilinguals when translating Spanish words.

Results from the hierarchical regression analysis indicated that the confidence ratings provided by Monolinguals (M = 6.15 out of 9, SD = 1.91) (β = .137, p = .376), when translating Spanish vocabulary words, were not a significant predictor of performance. However, results indicated that confidence ratings provided by Monolinguals (M = 1.60 out of 9, SD = 1.33) (β = 1.276, p = .000) (see Table 17), when translating Finnish vocabulary words, were a significant predictor of translation accuracy, suggesting that, as Monolinguals' self-reported confidence ratings of the translation increases, then there is also an increase in translation difference accuracy scores. Findings from both analyses indicate the usefulness of translation confidence ratings for both Monolinguals and Bilinguals when translating Finnish vocabulary words though not when translating Spanish vocabulary words. The finding from the hierarchical regression analyses suggests that the use of self-reported confidence ratings of correct translations was a significant predictor and a useful technique when predicting translation difference score accuracy for Monolinguals and Bilinguals when translating Finnish and Spanish vocabulary words.

Discussion

Translation and Comprehension Effects

The results from this study have strong implications for second language acquisition and the use of context to infer meanings of unfamiliar foreign words. One of the main findings is that, through the use of linguistic contextual information, an individual is able to learn the meaning of unfamiliar words not previously known, as was shown by the translation difference score (i.e., pre-test to post-test) results. As had been previously found by Nagy et al. (1987) and Nagy et al. (1985) studying the learning of new vocabulary in one's own language, this study further supports the hypothesis that contextual information is a critical factor for foreign language learning as well. The present study not only extended this previous finding to multilingual text but also further explored the use of contextual information in foreign language learning of a completely unrelated language, in this case Finnish.

Beyond vocabulary learning, this study also explored the use of contextual information in comprehending factual and implied information in a foreign language and found that, due to the use of this contextual information, an individual's comprehension was at most minimally affected by increasing the number of foreign language words from 0 to 3 foreign words per sentence. A possible extension of these findings might be to test if contextual information may in some way suppress interference from a foreign language, thus allowing the individual to accurately comprehend the message of the story and possibly assist in the drawing of pragmatic inferences. Future studies may be able to address the issue of interference in language processing (e.g., translation and comprehension processing) and give further support to the findings of Lott (1983) and Ellis (1997), who suggested that the use of contextual information may be an important factor for the reduction of negative transfer (i.e., language processing interference)

across languages. Although interference was not directly tested in this study, it might be presumed that the results from the translation and comprehension tasks provide limited support for Lott's (1983) and Ellis' (1997) findings, suggesting that negative transfer (i.e., interference) may have been minimal due to the high degree of accuracy in translation and comprehension scores. Additionally, Proverbio, Roberta & Alberto (2007) suggested that negative transfer would occur from L1 to L2, thus creating disruptions in comprehension and production due to the L1 attempting to compensate for a deficiency in the L2 or a new foreign language. In applying the results from the present study to those found by Proverbio et al. (2007), the results would give further support to the notion that interference would have been reduced by the degree of intrinsic context information which Monolinguals and Bilinguals utilized. The contextual information which individuals were able to utilize for comprehension was the intrinsic context, which, as previously mentioned, is a necessary component for comprehension to occur and for pragmatic inferences to be drawn (Clark & Carlson, 1981).

In terms of the implications for the translation and bilingual lexical access literature, it had been previously postulated that an individual, whether Monolingual or Bilingual, associates links between their L1 and L2 (if any) to a semantic system (i.e., Hierarchical Model of Memory). The directional link from L1 to L2 is stronger than the corresponding link from L2 to L1. Additionally, the L1 link to the semantic system is stronger than the associated link between L2 to the semantic system (Kroll & de Groot, 1997). A possible framework to which these findings may be applied is the Hierarchical Model of Memory. Through the use of contextual information, the associated links between the L2 and the semantic system may be able to grow in strength due to the individuals' ability to incorporate and correctly extract the needed semantic

information from context to translate the foreign words and associate them with their L1 equivalents.

An important characteristic of this study was the systematic varying of amounts of mixed-language prose. Previous studies examining the use of language-mixed prose to test comprehension have not systematically language-switched only primary content words but rather have language-switched primary parts of a sentence (e.g., beginning, middle, or end) (Kolers, 1966). The present study not only maintained the basic syntactic structure and meaning of the language-mixed information, but also varied the number of foreign language content words in each sentence as a critical independent variable to test for translation and comprehension affects. Previous language-mixing research has largely assumed that codeswitching was a negative form of communication, reflecting a deficit in language fluency and creating interference between the multiple languages (Lott, 1983; Ellis, 1997; Proverbio et al. 2007). Grosjean (1998) argues that the use of codeswitching should not be assumed to reflect a lack of fluency in either the Bilinguals' L1 or L2, but rather suggests that codeswitching a normal behavior of Bilinguals when interacting with other Bilinguals or individuals who may have moderate knowledge of the Bilinguals' languages. The present study discovered an important benefit of such language-mixing, which individuals may be able to utilize as a means for acquiring a new language. With the use of language-mixing, individuals may now begin to develop strong associated links between their L1 and their intended L2 and as well create strong associated links between the L2 and the semantic system. The use of contextual information and language-mixing are thus key components for language learning and for comprehension. The findings from this study are consistent with Grosjean's (1998) view of Bilingual codeswitching, in suggesting that

codeswitching is not a deficit in language fluency but instead is a normal behavior dependent on various environmental factors which the Bilingual speaker assesses when utilizing codeswitched speech.

Additional findings from this study found that, although context information was critical for both Spanish-English Bilinguals and English Monolinguals, the Monolinguals benefited even-more from the use of English context information, especially in the three-word Finnish condition (see Figure 5). This finding suggests that the context information is particularly helpful if in one's native language. Spanish-English Bilinguals also had significant increases in translation accuracy due to the contextual information throughout all Finnish conditions, but if the context information had been provided in their L1 (i.e., Spanish), they may have shown an even greater increase in their translation accuracy. This result may also be reflecting a possible limit in the utility of linguistic context information for the translation of foreign words. Although there were substantial increases in translation accuracy for both Monolinguals and Bilinguals, it is possible that the limit of usefulness of context information may be being approached for the Bilinguals in the three Finnish word condition due to: 1) the substantial increase in foreign words per sentence and a corresponding decrease in English context information, and 2) the difference scores in translation accuracy for Bilinguals in the three Finnish words per sentence condition suggests that Bilinguals may be approaching the limit of ability to extrapolate the meaning of the foreign words from its context, due to the small increase in their difference scores relative to the two Finnish word condition. Although this result suggests that a limit to the usefulness of context information for Bilinguals may be being approached, it is not to say that Bilinguals do not

benefit from the utility of context information at all but instead this may indicate that the language of the context information is an important factor for foreign word translation.

Further support for the importance of contextual information for translation accuracy was found in the similarities between Monolinguals' pre-test translation accuracy when tested on Spanish vocabulary words and Monolinguals' and Bilinguals' pre-test translation accuracy when tested on Finnish vocabulary words (see Figure 4 & 5). Low scores on the pre-test indicated virtually no prior knowledge, but the substantial increase in post-test translation provides further support for the robust influence which contextual information provides for learning new vocabulary words. The fact that the Spanish results for Monolinguals was very similar to the Finnish results for Monolinguals and Bilinguals suggests that it is truly the linguistic context, rather than either minimal societal exposure to Spanish or etymological similarity of Spanish and English, which aids in translation of foreign vocabulary.

Language Learning Strategies & Translation Confidence Ratings

Language learning strategies come into play in acquiring a new foreign language. Various techniques may be utilized by individuals when encountering a foreign language, and people may employ various strategies, dependent on their proficiency of the language, in future encounters (Oxford & Crookall, 1989). This study examined the use of Compensatory (i.e., guessing and inference drawing) and Cognitive (i.e., reasoning and analysis) language learning strategies. The results from this study suggest that the use of language learning strategies (i.e., Compensatory or Cognitive strategies), as measured by the SILL, were not significant predictors of comprehension (i.e., fact, inference, or total comprehension) performance for Monolinguals. Neither were Cognitive language strategies significant predictors of translation performance for

Monolinguals, suggesting that when tested on either Finnish or Spanish vocabulary words, reasoning and analysis was not a strategy employed during translation. However, Compensatory strategies were a significant predictor of Bilinguals' inference comprehension performance when utilizing Finnish vocabulary words.

The findings from this study suggest that, although individuals may be utilizing Compensatory and/or Cognitive learning strategies, these strategies do not predict the ability to translate, except in the case of Bilinguals learning Finnish words. Although Compensatory and Cognitive learning strategies were most often not significant predictors of performance, it is not saying that these strategies are never utilized but instead that these strategies may not explicitly lead to better translation or comprehension scores. One possible explanation for these strategies not being significant predictors of translation and comprehension performance is that the SILL may not be an accurate measure of the strategies which it purports to evaluates. Possible modification of questions from the SILL could be utilized in future research to more accurately determine the utility of the specific language learning strategies for translation and comprehension.

Confidence ratings for correct translations may be a useful technique for the evaluation of translation accuracy. Although no significant predictions of translation performance were found for Monolinguals or Bilinguals based on their self-reported confidence of their translation of Spanish vocabulary words, significant translation performance predictions were found for Monolinguals and Bilinguals when examining their self-reported confidence ratings of Finnish vocabulary words. The findings indicate that self-reported confidence ratings for vocabulary translation are a useful technique for the prediction of translation accuracy performance when

encountering a non-familiar language (i.e., Finnish) but not a familiar language (i.e., Spanish). This finding may indicate that when encountering a non-familiar language, such as Finnish, it is useful to assess translation confidence for the prediction of translation performance by Monolinguals and Bilinguals.

Strengths and Limitations

Unlike previous research (Kolers, 1966), which only varied codeswitching at specific parts of a sentence (e.g., first part, middle part, and last part), the present study systematically language-switched 0, 1, 2, or 3 content words per sentence to determine the effects on translation and comprehension. Additionally, this study was able to utilize highly fluent Bilinguals who came from a bilingual environment (Brownsville, Texas on the US – Mexican border). They were not only exposed to Spanish and English on a daily basis, but also regularly used their knowledge of their two languages. Furthermore, the Bilingual sample had a high degree of self-reported codeswitching ability and fluency, which allowed for a more meaningful comparison with the Monolingual group testing the effects of the language-mixed text. An additional strength which this study provided was the low degree of knowledge of Spanish reported by Monolinguals, which allowed for critical comparisons of the two language groups faced with the Spanish vocabulary.

One of the primary limitations this study faced was in the testing of only the written modality of language-mixing. The most common form of language-mixing (i.e., codeswitching) is within the oral modality (i.e., speech). Although the present research examined the use of language-mixing in the written modality, this study did not compare the effects of oral language-mixing to identify if contextual information was also a critical factor in increasing translation and

comprehension accuracy. Furthermore, an additional limitation was the foreign words presented in Finnish. Although an English-to-Finnish dictionary and online resources (e.g., online translation websites) were utilized to create the appropriate Finnish measures, a native Finnish speaker was not consulted to cross-validate the Finnish words. However, this issue itself should not be considered a serious limitation due to a) the high degree of unfamiliarity of all participants for the Finnish words used, and b) the fact that this study did not utilize cognates when testing on Finnish vocabulary words (see Appendix J). Even if one or more critical Finnish words were not, in fact, the stylistically most appropriate lexical items in vernacular Finnish, it really would not matter as all the lexical items were unknown to participants.

An additional limitation of the study concerns the apparent ease of the comprehension measure. The mean score on fact items was 5.23 and inference test items was 5.43, each out of a possible 6 test items. The distribution of scores for both fact and inference test items was negatively skewed, suggesting the relative ease of the comprehension measure. This in turn may not have given an accurate representation of performance.

Additionally, one factor which needs to be addressed in future studies is the number of words per sentence in the given story. In this study the average number of words per sentence was 19.14 with a range of 8 to 28 words per sentence. Thus, the percentage of words in a foreign language per sentence for each condition was: 1 foreign word per sentence – 5%, 2 foreign words per sentence – 11%, and 3 foreign words per sentence – 16%. By systematically switching 1, 2, or 3 content words and varying the number of foreign words, the validity of the manipulation has greater internal validity than did the procedures taken in other studies (Kolers, 1966), because of the use of systematic switches rather than only at specific parts of sentences.

The purpose of this study was to examine if increasing the number of foreign words per sentence affected translation and comprehension performance, and to determine at what point there would be too much material in the foreign language without adequate contextual information in English to infer the meaning of the foreign words. Although this study did not increase the number of foreign words beyond three foreign words per sentence, future studies should address this issue to determine the upper limit of the number of the foreign words, after which comprehension and translation ability would begin to decrease.

Implications and Future Directions

Significant implications and applications emerge from the results from this study. A primary application for the results from this study is in the teaching of foreign languages to both Monolingual and Bilingual individuals. Based on the findings from this study, it can be suggested that the use of language-mixed (i.e., codeswitched) text may be very useful in the learning of a foreign language. Contrary to the prevailing negative misconception of language-mixing (i.e., an impoverished and deficient use of multiple languages), it is apparent from the results from this study is that some degree of language-mixing, at least up to point, may be a very useful component as it combines with contextual information to assist individuals in the translation and comprehension of a foreign language, much as one might encounter it in real life conversation with Bilinguals. Among Bilinguals, the use of codeswitching, which most often occurs with primary content words, is a common means of communication, and thus the codeswitching of primary content words in the story passages in this study provides not only external validity but as well ecological validity. Previous research has focused on the negative effects of language-switching and suggested that codeswitching may be utilized to compensate

for one's lack of knowledge in L2 (Grosjean, 1982; Heredia & Altarriba, 2001), but findings from this study may suggest that Bilingual codeswitchers may in reality be learning an L2 much faster by incorporating both languages and using the contextual cues from the L1 to drive the learning and understanding of the embedded foreign words. The current unprecedented increase in immigration worldwide greatly increases the number of individuals immersed in a new country with little or no knowledge of the language being spoken. Thus, language-mixing may be a critical factor in assisting individuals in beginning to learn the host language by incorporating the use of their first language (i.e., L1) and using that language's contextual cues to assist in the translation/learning and comprehension of the new language. Furthermore, educational programs whose focus is on the learning of foreign languages may be able to utilize language-learning materials that incorporate language-mixed text, which may in turn facilitate the process of learning foreign languages through the use of contextual cues.

Although some important findings have been found in this study, as with any study, new questions have arisen in regard to the use of contextual information with language-mixing and its effects on foreign language translation and comprehension. Some future directions worth pursuing involve examining how additional increases beyond three foreign words per sentence will assist and eventually hinder translation and comprehension accuracy, with a goal of identifying at what point the loss of important contextual cues in English stops being a benefit and begin becoming a hindrance to understanding the meaning of foreign language words. A further extension would investigate if similar findings would be obtained with the use of the oral modality and oral language-mixing. The overall results from this research offer a part of the

answer to the broader question of how translation/learning and comprehension of a foreign language can be improved for both Monolingual and Bilingual individuals.

Notes

[1] An additional categorical variable was created in which participants were considered Bilingual or Monolingual based on responses to the reading proficiency item included within the Language Experience Questionnaire. Individuals who considered themselves "Bilingual" were further separated based on their response to this item, resulting in individuals with high self-reported reading proficiency in Spanish (i.e., ratings of 6 to 9) were considered Bilingual, while individuals whose self-reported reading proficiency in Spanish was low (i.e., ratings of 1 to 4) were considered Monolingual. Individuals with self-reported proficiency rating of 5 were not included in either group. MANOVAs were conducted using this variable of categorization and provided similar results as when utilizing the self-categorization variable of language skill (i.e., "Do you consider yourself to be Bilingual?"). Grosjean (1998) suggested that individuals when using self-rating scales may overestimate or underestimate their true proficiency and not provide an accurate representation of their proficiency. Based on the results found in the MANOVAs and on the recommendation by Grosjean (1998), the use of self-categorization as Monolingual or Bilingual was preferred as the independent variable of language skill. This variable was chosen due to having provided an operational definition of a bilingual to participants and this definition may have assisted participants in differentiating if they truly were or were not bilingual.

[2] Proportion scores were also calculated and used as a dependent variable in all analyses to further refute the possibility of the effects obtained were not only due to a measurement calculation and not to the manipulation itself. Proportion scores were calculated by dividing the difference between post-test and pre-test (i.e., post-test minus pre-test) by the total post-test average. Results from the MANOVAs using the proportion dependent measure provided similar

results for the Spanish condition as the MANOVAs using difference scores, but provided uninterpretable results in the Finnish condition due to near 0% correct responses on pre-test for all participants.

[3] As an alternative analysis to that using the difference score as the dependent variable, a Repeated Measures ANOVA using an additional variable of pre- vs. post-translation tasks was conducted based on the nature of the translation task, pre-translation task followed by the manipulation subsequently followed by the second administration of the post-translation task. Results from the Repeated Measures ANOVA produced similar results as those produced by MANOVAs which were originally conducted on the difference score (i.e., change) dependent variable for translation accuracy. Tabachnick & Fidell (2007) recommend that if the research questions are phrased as "change" or "difference" score, then the use of ANOVA as a means for analysis is the best method for providing an answer. Based on the findings from the Repeated Measures ANOVA and the MANOVA analyses, the use of MANOVA was preferred due to subsequent analyses requiring the use of difference (i.e., change) score as the dependent measure (i.e., Hierarchical Regression Analysis) Also, for the sake of consistency the same dependent variable was utilized in all analyses so that appropriate comparisons and contrasts could be attained, and, based on the recommendation by Tabachnick & Fidell (2007), difference (i.e., change) scores were utilized as the primary DV in all analyses.

[4]The second set of simple effects was conducted to examine if significant differences existed between the testing of Spanish or Finnish vocabulary words for Monolinguals and Bilinguals. Simple effects analysis indicated that significant differences were found based on the number of correct fact comprehension questions for Bilinguals when tested on Spanish (M = 5.48 out of 6,

SD = .87) and Finnish (*M* = 4.86 out of 6, *SD* = 1.45), F (1, 333) = 16.55, $p < .01$, $\eta^2 = .08$, suggesting that Spanish-English Bilinguals are able to better comprehend factual information when Spanish vocabulary words are embedded within text than when Finnish vocabulary words are presented within text. Additionally, significant differences were also found between Spanish (M = 5.40 out of 6, *SD* = .77) and Finnish (*M* = 5.10 out of 6, *SD* = 1.02), F (1, 333) = 4.48, $p < .05$, $\eta^2 = .03$, for Monolinguals, suggesting that English Monolinguals are able to better comprehend factual information when language-mixed prose includes Spanish vocabulary words than when Finnish vocabulary words are included in language-mixed text.

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Table 1

Monolinguals' and Bilinguals' Comprehension (Factual Items) for Stories with Spanish and Finnish words

	Bilinguals		Monolinguals	
Language words	*M*	*SD*	*M*	*SD*
Spanish	5.48	.87	5.40	.76
Finnish	4.87	1.15	5.10	1.02

Note. No significant differences for Monolinguals and Bilinguals when tested over Spanish or Finnish vocabulary words.

Table 2

Two-way interaction between number of foreign words per sentence and language tested on independent of language skill between Spanish and Finnish for Fact Comprehension

	Spanish		Finnish	
Number of Foreign words	*M*	*SD*	*M*	*SD*
0	5.45	.95	5.71	.51
1	5.48	.84	4.91	.85
2	5.38	.78	4.74	1.14
3	5.47	.74	4.67	1.31

Note. Significant differences between Spanish and Finnish for conditions with one, two, and three foreign words per sentence.

Table 3

Two-way interaction between number of foreign words per sentence and language tested on independent of language skill between Spanish and Finnish for Inference Comprehension

	Spanish		Finnish	
Number of Foreign words	*M*	*SD*	*M*	*SD*
0	5.48	1.13	5.81	.40
1	5.61	.65	5.52	.77
2	5.36	.88	5.16	.82
3	5.56	.83	5.07	1.29

Note. Significant differences between Spanish and Finnish for condition with three foreign words per sentence.

Table 4

Two-way interaction between number of foreign words per sentence and language tested on independent of language skill between Spanish and Finnish for Total Comprehension

	Spanish		Finnish	
Number of Foreign words	*M*	*SD*	*M*	*SD*
0	10.71	2.34	11.51	.68
1	11.09	1.07	10.43	1.30
2	10.73	1.30	9.81	1.76
3	11.02	1.44	9.71	1.98

Note. Significant differences between Spanish and Finnish for condition with zero, two, and three foreign words per sentence.

Table 5

Monolinguals' and Bilinguals' Comprehension (Factual and Inference Items) based on the number of Spanish words per sentence

	Bilinguals		Monolinguals	
Number of Spanish words	*M*	*SD*	*M*	*SD*
0	10.38	2.52	11.00	2.17
1	11.17	1.23	11.00	.90
2	10.80	1.35	10.65	1.27
3	11.05	1.13	11.00	1.18

Note. No significant differences for Monolinguals and Bilinguals as the number of Spanish vocabulary words increased.

Table 6

Monolinguals' and Bilinguals' Comprehension (Factual and Inference Items) based on the number of Finnish words per sentence

	Bilinguals		Monolinguals	
Number of Finnish words	*M*	*SD*	*M*	*SD*
0	11.56	.86	11.45	.51
1	10.00	1.53	10.78	.95
2	9.76	1.48	9.86	2.03
3	9.64	2.38	9.78	2.43

Note. No significant differences for Monolinguals and Bilinguals as the number of Finnish vocabulary words increased.

Table 7

Compensatory Learning Strategy as predictor of Inference Comprehension Accuracy for Bilinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.01	
Language Skill - Bilingual	.17	.07	.08		
Step 2				.01	.01
Language Tested - Finnish	.15	.11	.08		
Step 3				.03	.01
Z-Compensatory	-.11	.05	-.12*		
Step 4				.05	.02*
Bilingual x Compensatory	.21	.11	.14		
Finnish x Compensatory	.13	.11	.09		
Finnish x Bilingual	.15	.22	.07		
Step 5				.05	.00
Finnish x Bilingual x Compensatory	-.04	.22	-.02		

Note. *$p < .05$

Compensatory Learning Strategy as predictor of Inference Comprehension Accuracy for Monolinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.01	
Language Skill - Monolingual	-.17	.11	-.10		
Step 2				.01	.01
Language Tested – Finnish	.15	.11	.10		
Step 3				.03	.01
Z-Compensatory	-.11	.05	-.12*		
Step 4				.05	.02*
Monolingual x Compensatory	-.21	.11	-.18		
Finnish x Compensatory	.13	.11	.01		
Finnish x Monolingual	-.15	.22	-.01		
Step 5				.05	.00
Finnish x Monolingual x Compensatory	.04	.22	.02		

Note. *$p < .05$

Table 8

Compensatory Learning Strategy as predictor of Translation Difference Accuracy for Bilinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.08	
Language Skill - Bilingual	2.21	.44	.28**		
Step 2				.17	.10**
Language Tested - Finnish	-2.51	.42	-.31**		
Step 3				.18	.00
Z-Compensatory	.27	.21	.07		
Step 4				.19	.02*
Bilingual x Compensatory	.29	.43	.05		
Finnish x Compensatory	-.31	.42	-.06		
Finnish x Bilingual	2.18	.85	.23*		
Step 5				.18	.00
Finnish x Bilingual x Compensatory	-.10	.86	-.01		

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

Compensatory Learning Strategy as predictor of Translation Difference Accuracy for Monolinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.08	.08
Language Skill - Monolingual	-2.21	.44	-.28**		
Step 2				.17	.10**
Language Tested – Finnish	-2.51	.42	-.31**		
Step 3				.18	.00
Z-Compensatory	.27	.21	.07		
Step 4				.20	.02*
Monolingual x Compensatory	-.30	.43	-.06		
Finnish x Compensatory	-.31	.42	-.06		
Finnish x Monolingual	-2.18	.85	-.25*		
Step 5				.20	.00
Finnish x Monolingual x Compensatory	.09	.86	.01		

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

Table 9

Compensatory Learning Strategy as predictor of Inference Comprehension Accuracy for Monolinguals when tested over Spanish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.01	
Language Skill - Monolingual	-.17	.11	-.01		
Step 2				.01	.01
Language Tested – Spanish	-.15	.11	-.01		
Step 3				.03	.01
Z-Compensatory	-.11	.05	-.12*		
Step 4				.05	.02*
Monolingual x Compensatory	-.21	.11	-.17		
Spanish x Compensatory	-.13	.11	-.10		
Spanish x Monolingual	.15	.22	.07		
Step 5				.05	.00
Spanish x Monolingual x Compensatory	-.04	.22	-.02		

Note. *$p < .05$

Table 10

Compensatory Learning Strategy as predictor of Translation Difference Accuracy for Monolinguals when tested over Spanish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.07	
Language Skill - Monolingual	-2.21	.44	-.28**		
Step 2				.17	.10**
Language Tested – Spanish	2.51	.41	.31**		
Step 3				.18	.00
Z-Compensatory	.27	.21	.07		
Step 4				.20	.02*
Monolingual x Compensatory	-.30	.43	.07		
Spanish x Compensatory	.31	.42	.18		
Spanish x Monolingual	2.18	.85	.23*		
Step 5				.20	.00
Spanish x Monolingual x Compensatory	-.10	.86	-.01		

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

Table 11

Cognitive Learning Strategy as predictor of Fact Comprehension Accuracy for Monolinguals when tested over Spanish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.01	
Language Skill - Monolingual	-.06	.11	-.03		
Step 2				.06	.06**
Language Tested – Spanish	-.47	.11	-.24**		
Step 3				.06	.00
Z-Cognitive	.02	.06	.02		
Step 4				.08	.02
Monolingual x Cognitive	.22	.12	.17		
Spanish x Cognitive	-.11	.12	-.08		
Spanish x Monolingual	-.18	.23	-.08		
Step 5				.08	.00
Spanish x Monolingual x Cognitive	.06	.24	.03		

Note. $^{**}p < .001$

Table 12

Cognitive Learning Strategy as predictor of Translation Difference Accuracy for Monolinguals when tested over Spanish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.07	
Language Skill - Monolingual	-2.22	.44	-.28**		
Step 2				.17	.10**
Language Tested – Spanish	2.48	.41	.31**		
Step 3				.17	.00
Z-Cognitive	.46	.22	.11		
Step 4				.22	.04**
Monolingual x Cognitive	-1.29	.44	-.25*		
Spanish x Cognitive	.11	.43	.02		
Spanish x Monolingual	1.89	.86	.21		
Step 5				.22	.00
Spanish x Monolingual x Cognitive	.18	.89	.02		

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

Table 13

Cognitive Learning Strategy as predictor of Fact Comprehension Accuracy for Bilinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.00	
Language Skill - Bilingual	.06	.11	.03		
Step 2				.06	.06**
Language Tested – Finnish	.47	.11	.24**		
Step 3				.06	.00
Z-Cognitive	.02	.06	.02		
Step 4				.08	.02
Bilingual x Cognitive	-.22	.12	-.14		
Finnish x Cognitive	.11	.12	.08		
Finnish x Bilingual	-.18	.23	-.08		
Step 5				.08	.00
Finnish x Bilingual x Cognitive	.06	.24	.03		

Note. $^{**}p < .001$

Cognitive Learning Strategy as predictor of Fact Comprehension Accuracy for Monolinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.00	
Language Skill – Monolingual	-.06	.11	-.03		
Step 2				.06	.06**
Language Tested – Finnish	.47	.11	.24**		
Step 3				.06	.00
Z-Cognitive	.02	.06	.02		
Step 4				.08	.02
Monolingual x Cognitive	.22	.12	.17		
Finnish x Cognitive	.11	.12	.08		
Finnish x Monolingual	.18	.23	.08		
Step 5				.08	.00
Finnish x Monolingual x Cognitive	-.06	.24	-.04		

Note. $^{**}p < .001$

Table 14

Cognitive Learning Strategy as predictor of Translation Difference Accuracy for Bilinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.08	.78
Language Skill - Bilingual	2.22	.44	.28**		
Step 2				.17	.10**
Language Tested – Finnish	-2.48	.41	-.31**		
Step 3				.17	.00
Z-Cognitive	.05	.22	.01		
Step 4				.22	.04**
Bilingual x Cognitive	1.29	.44	.20*		
Finnish x Cognitive	-.11	.43	-.02		
Finnish x Bilingual	1.89	.86	.20*		
Step 5				.22	.00
Finnish x Bilingual x Cognitive	.18	.89	.02		

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

Cognitive Learning Strategy as predictor of Translation Difference Accuracy for Monolinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.08	.08
Language Skill – Monolingual	-2.22	.44	-.28**		
Step 2				.17	.10**
Language Tested – Finnish	-2.48	.41	-.31**		
Step 3				.17	.00
Z-Cognitive	.05	.22	.01		
Step 4				.22	.04**
Monolingual x Cognitive	-1.28	.44	-.25**		
Finnish x Cognitive	-.11	.43	-.02		
Finnish x Monolingual	-1.89	.86	-.21*		
Step 5				.22	.00
Finnish x Monolingual x Cognitive	-.18	.89	-.03		

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

Table 15

Codeswitching as predictor of Translation Difference Accuracy for Bilinguals when Tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.25	
Language Skill - Finnish	-3.62	.51	-.50**		
Step 2				.26	.01
Z-Codeswitching	-.39	.32	-.09		
Step 3				.24	.00
Finnish x Codeswitching	-.44	.63	-.08		

Note. $^{**}p < .001$

Table 16

Confidence Ratings of Translations as predictor of Translation Difference Accuracy for Bilinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.07	
Language Skill - Bilingual	2.10	.41	.27**		
Step 2				.16	.09**
Language Tested – Finnish	-2.33	.39	-.30**		
Step 3				.20	.04**
Z- Confidence	1.32	.33	.33**		
Step 4				.33	.13**
Bilingual x Confidence	.20	.64	.03		
Finnish x Confidence	-4.68	.71	-.77**		
Finnish x Bilingual	2.45	1.24	.27*		
Step 5				.33	.00
Finnish x Bilingual x Confidence	.43	1.42	.04		

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

Confidence Ratings of Translations as predictor of Translation Difference Accuracy for Bilinguals when tested over Spanish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.07	
Language Skill - Bilingual	2.09	.41	.27**		
Step 2				.16	.09**
Language Tested – Spanish	2.33	.39	.30**		
Step 3				.20	.04**
Z- Confidence	1.32	.33	.34**		
Step 4				.33	.13**
Bilingual x Confidence	.20	.64	.03		
Spanish x Confidence	4.68	.71	.61**		
Spanish x Bilingual	-2.45	1.24	-.27*		
Step 5				.33	.00
Spanish x Bilingual x Confidence	-.43	1.42	-.05		

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

Table 17

Confidence Ratings of Translations as predictor of Translation Difference Accuracy for Monolinguals when tested over Finnish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.07	
Language Skill - Monolingual	-2.10	.41	-.27**		
Step 2				.16	.09**
Language Tested – Finnish	-2.33	.39	-.30**		
Step 3				.20	.04**
Z- Confidence	1.32	.33	.34**		
Step 4				.33	.13**
Monolingual x Confidence	-.20	.64	-.04		
Finnish x Confidence	-4.68	.71	-.77**		
Finnish x Monolingual	-2.45	1.24	-.27*		
Step 5				.33	.00
Finnish x Monolingual x Confidence	-.43	1.42	-.07		

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

Confidence Ratings of Translations as predictor of Translation Difference Accuracy for Monolinguals when tested over Spanish vocabulary words

Variable	*B*	*SEB*	*β*	R^2	ΔR^2
Step 1				.07	
Language Skill - Monolingual	-2.09	.41	-.27**		
Step 2				.16	.09**
Language Tested – Spanish	2.33	.39	.30**		
Step 3				.20	.04**
Z- Confidence	1.32	.33	.34**		
Step 4				.31	.13**
Monolingual x Confidence	-.20	.64	-.04		
Spanish x Confidence	4.68	.71	.61**		
Spanish x Monolingual	2.45	1.24	.26*		
Step 5				.31	.00
Spanish x Monolingual x Confidence	.43	1.42	.05		

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

Figure 1

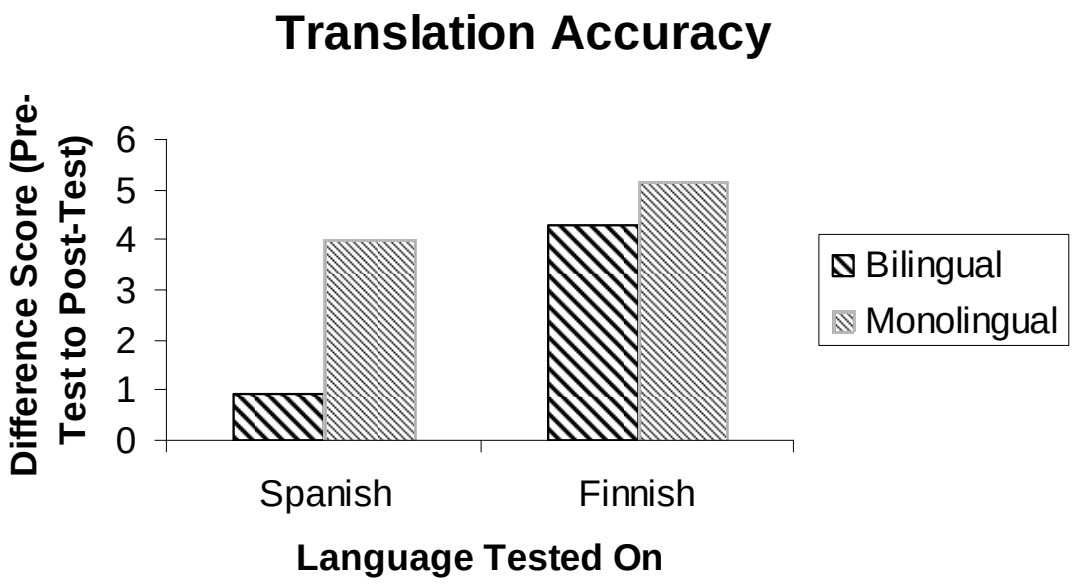

Translation Accuracy
Difference Score (Pre-Test to Post-Test)
6
5
4
3
2
1
0
Spanish
Finnish
Language Tested On
Bilingual
Monolingual

Figure 2

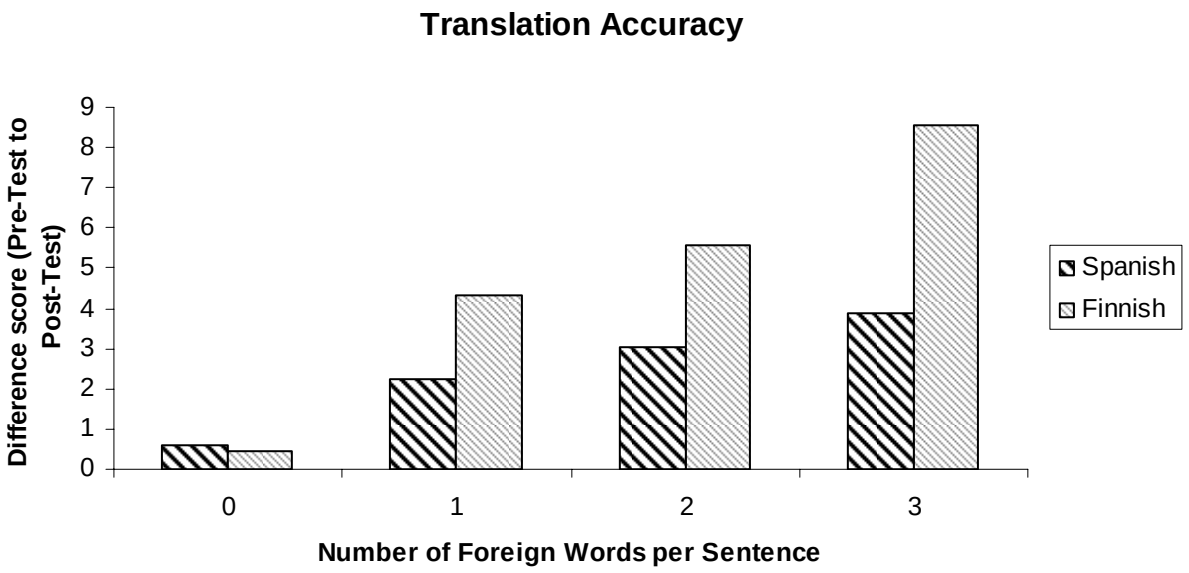

Translation Accuracy
Difference score (Pre-Test to Post-Test)
9
8
7
6
5
4
3
2
1
0
0
1
2
3
Number of Foreign Words per Sentence
Spanish
Finnish

Figure 3

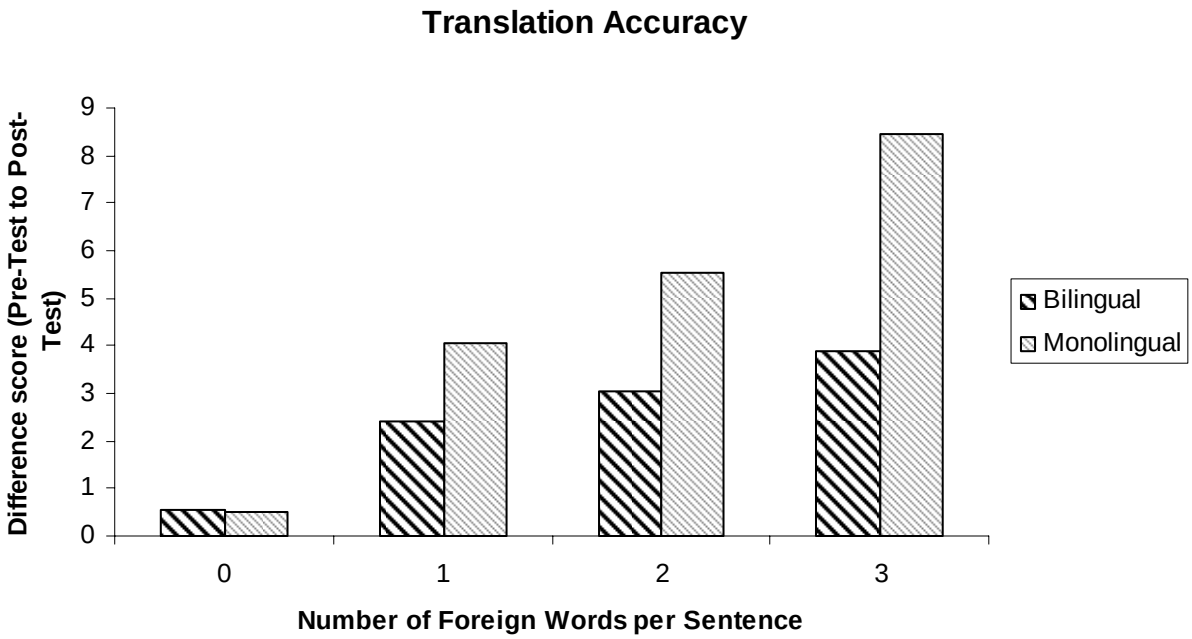

Translation Accuracy
Difference score (Pre-Test to Post-Test)
9
8
7
6
5
4
3
2
1
0
0
1
2
3
Number of Foreign Words per Sentence
Bilingual
Monolingual

Figure 4

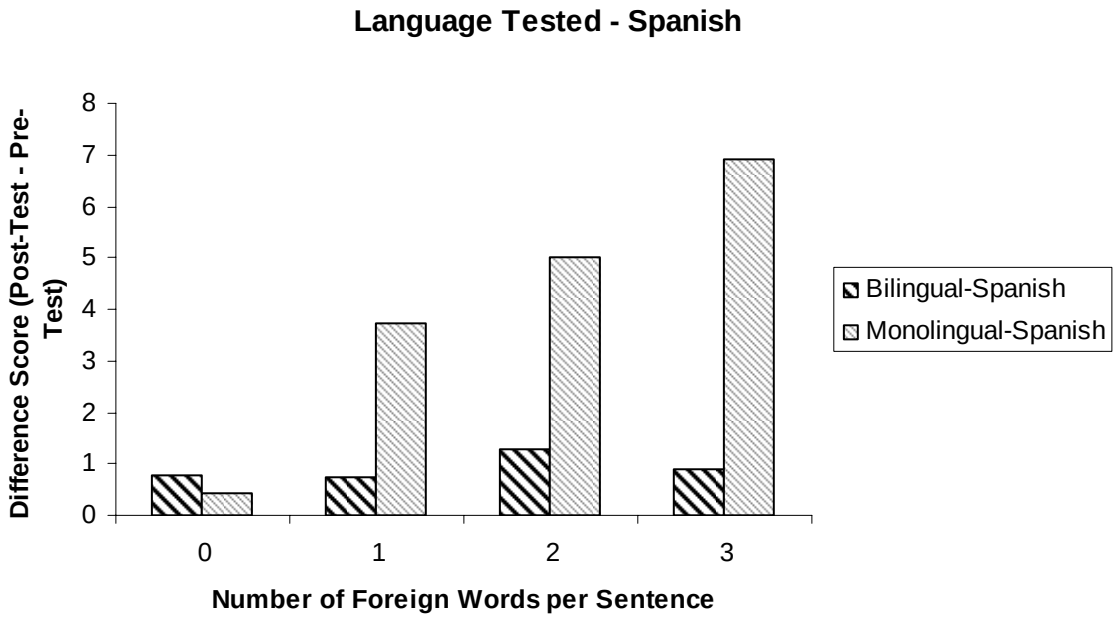
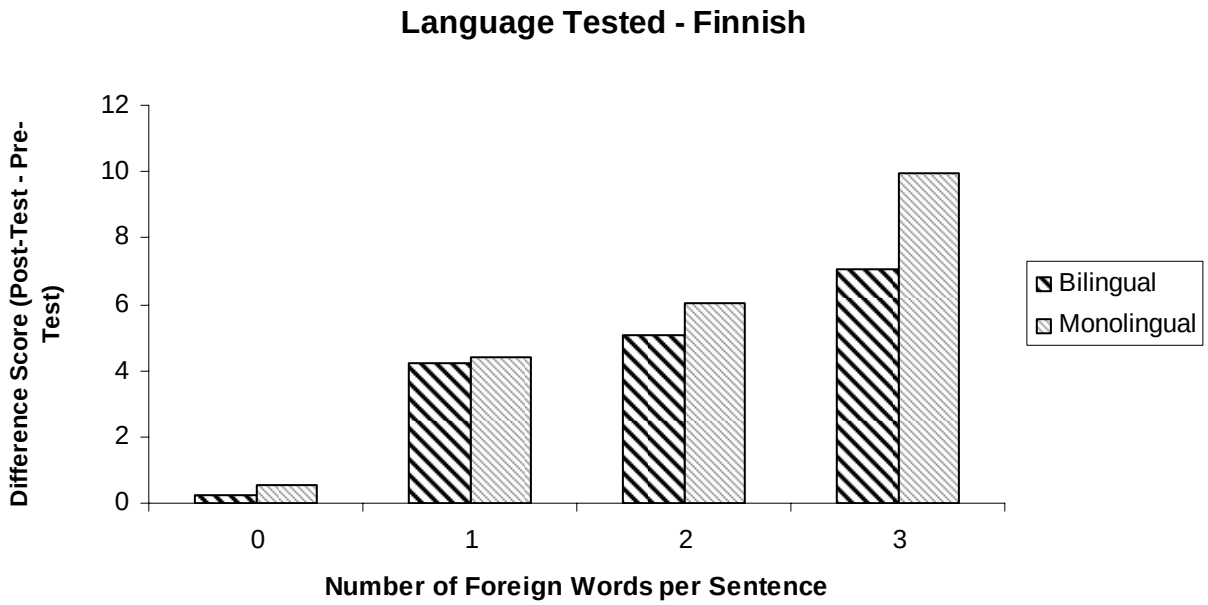

Language Tested - Spanish
Difference Score (Post-Test - Pre-Test)
8
7
6
5
4
3
2
1
0
0
1
2
3
Number of Foreign Words per Sentence
Bilingual-Spanish
Monolingual-Spanish

Figure 5


Language Tested - Finnish
Difference Score (Post-Test - Pre-Test)
12
10
8
6
4
2
0
0
1
2
3
Number of Foreign Words per Sentence
Bilingual
Monolingual

Appendix A

Informed Consent Form

Language Performance

You are invited to participate in a research study that will measure your ability on various activities based on your language fluency in English and/or Spanish.

Your selection to participate in this study is based on your ability to speak English and/or Spanish. Your participation in this study is important for the purposes that we are intending to better understand the limits in fluency of language use for bilingual English and Spanish speakers and monolingual English speakers.

You will not be required to give identifying information (e.g. Name or Social Security Number) for the study itself. You will be required to give your name and course instructor so that you may receive your appropriate credit(s) for your participation. No information that will be given during the course of the study will be able to be linked back to you or your name because all information that you will provide in the research packet will be anonymous. No potential risk(s) of any type are known or associated with this study. The total time that this study will take to be completed will be between 45 minutes to 1 hour.

Alternatives to the participation in this study will be given by your course instructor and if at any point you wish to withdraw your participation from the study you can do so with no penalty whatsoever. If you have any questions please feel free to ask the researcher at this time or at any time during the course of the study. If you have any questions after the completion of the study please feel free to contact me by email at bdelagar@ksu.edu or Dr. Rick Scheidt, IRB Chair, 203 Fairchild, KSU, Manhattan, KS 66506 785-532-3224. Once again thank you for your participation in this study.

Consent Statement:

You are voluntarily making a decision whether or not to participate. Your signature indicates that, having read and understood the information provided above, you have decided to participate.

Date: _____

Signature of Subject: _____

Signature of Investigator: _____

Appendix B

Please CIRCLE or FILL-IN your response to the following questions as best as possible. If you do not know please leave the question blank. If you have any questions please raise your hand so that the experimenter may assist you.

1) Circle your gender. Male Female

2) Provide your current age: _____

3) Circle your Ethnicity: **Circle only one** White/European American Black/African American Hispanic/Latino
Asian Other:_____

4) Circle your current year in school. **Circle only one**
1st year (Freshman) 2nd year (Sophomore) 3rd year (Junior) 4th year (Senior) 5th year (Other)

5) Provide your current educational major. (E.g. Psychology, Sociology etc.) _____

6) Provide your country of birth. (E.g. Mexico, United States etc.) _____

7) What languages have you studied by taking courses in them?
English Spanish French Greek Latin Greek Finnish Other: _____

8) What language do you know?
English Spanish French Greek Latin Greek Finnish Other: _____

9) How many Spanish courses have you taken in the Spanish department at the college level? (If you do not know the exact number please estimate.)
Number of Spanish courses: _____

10) How many Spanish courses have you taken at the high school level? Such as high school Spanish 1 or high school Spanish 2. (If you do not know the exact number please estimate.)
Number of Spanish courses: _____

11) Which language(s) do you use while you are at home? **Circle all that apply**
English Spanish Other: _____

12) Rank order the languages that you use at home as 1 being most frequent use, 2 less frequent and so on.
English_____ Spanish _____ Other: _____

13) Which language(s) do you use while you are at school? **Circle all that apply**
English Spanish Other: _____

14) Rank order the languages that you use at school as 1 being most frequent use, 2 less frequent and so on.
English_____ Spanish _____ Other: _____

15) Which language did you learn first? **Circle only one**
English Spanish Other: _____

16) Which language did you learn second? **Circle only one**

English Spanish Other: _____

17) At what age did you learn your second language? _____

18) Do you consider yourself to be bilingual (Having the ability to use two languages in your daily speech). **Circle only one**

a. Yes
b. No

19) Do you know any words in Finnish?
a. Yes → If yes which words do you know? _____
b. No

Please RATE the following items by responding 1 to respond "Strongly disagree" and 9 as "Strongly agree". If you have any questions please raise your hand so that the experimenter may assist you.

1 2 3 4 5 6 7 8 9

Strongly disagree ***Strongly agree***

1) I can **read** English well. **Rating: _____**
2) I can **write** English well. **Rating: _____**
3) I can **speak** English well. **Rating: _____**
4) I can **understand spoken** English well. **Rating: _____**
5) I can **read** Spanish well. **Rating: _____**
6) I can **write** Spanish well. **Rating: _____**
7) I can **speak** Spanish well. **Rating: _____**
8) I can **understand spoken** Spanish well. **Rating: _____**
9) I often **switch between languages** while conversing with people who also switch between languages. **Rating: _____**
10) I often switch between languages while conversing when I am at home. **Rating: _____**
11) I often switch between languages while conversing when I am at school. **Rating: _____**
12) I often switch between languages only around other bilinguals who know the same languages. **Rating: _____**
13) I often switch languages when conversing, but use one sentence in one language and another sentence in another.
(E.g. Hola. Me llamo Victor. What is your name?) **Rating: _____**
14) I often switch languages when conversing, often within the same sentence.
(E.g. Hola. My name es Victor. Que es your name?) **Rating: _____**
15) I prefer to switch between languages even when I am expected to only use one language. **Rating: _____**
16) I feel comfortable switching between languages in the same conversation. **Rating: _____**
17) I am able to switch between languages in the same conversation but I feel awkward doing so. **Rating: _____**
18) Other individuals that I know often switch between languages in the same conversation. **Rating: _____**

Appendix C

Instructions: Please translate the given Spanish words with the appropriate English words. If you do not know a word (s) please try to the best of your ability and be aware guessing will <u>NOT</u> be penalized. If you have any questions, please ask the experimenter now. In the provided column indicate on a scale of 1 to 9 how confident you are in that the translation which you have made is an accurate and correct translation of the foreign language words.

1 2 3 4 5 6 7 8 9

Not at all Confident **Very Confident**

Esperanzas = _____	Confidence Rating: _____
Dicho = _____	Confidence Rating: _____
Estudiante = _____	Confidence Rating: _____
Encontro = _____	Confidence Rating: _____
Pruebas = _____	Confidence Rating: _____
Pregunta = _____	Confidence Rating: _____
Vendiendo = _____	Confidence Rating: _____
Escuela = _____	Confidence Rating: _____
Grande = _____	Confidence Rating: _____
Preparatoria = _____	Confidence Rating: _____
Sobresalía = _____	Confidence Rating: _____
Ayer = _____	Confidence Rating: _____
Tema = _____	Confidence Rating: _____
Estudiando = _____	Confidence Rating: _____
Maestros = _____	Confidence Rating: _____
Resolucionar = _____	Confidence Rating: _____
El Director = _____	Confidence Rating: _____
Pasar = _____	Confidence Rating: _____
Alguién = _____	Confidence Rating: _____
Personas = _____	Confidence Rating: _____
Pensaban = _____	Confidence Rating: _____

Appendix D

Condition 1 (All English)
Yesterday Abel graduated from a very large high school. While in school everyone always thought of him as stellar student. Abel excelled in all of his classes, and all of his teachers had great hopes for him. Abel would always do the best on exams no matter what the topic was or how hard the questions were because he always spent so much time studying. One day while at school Abel found himself with an ethical question he couldn't resolve. He knew that some students were selling drugs but he didn't know if he should tell the principal or not because he wasn't sure of what would happen. From that day forward Abel knew he made a mistake, and that he should have said something to someone about what those individuals were doing.

Condition 2 (1 word in Spanish)
Yesterday Abel graduated from a very large preparatoria. While in la escuela everyone always thought of him as a stellar student. Abel sobresalía in all of his classes, and all of his teachers had great hopes for him. Abel would always do the best on pruebas no matter what the topic was or how hard the questions were because he always spent so much time studying. One day while at school Abel found himself with an ethical pregunta he couldn't resolve. He knew that some students were vendiendo drugs but he didn't know if he should tell the principal or not because he wasn't sure of what would happen. From that day forward Abel knew he made a mistake, and that he should have dicho something to someone about what those individuals were doing.

Condition 3 (2 words in Spanish)
Ayer Abel graduated from a very large preparatoria. While in escuela everyone always pensaban of him as a stellar student. Abel sobresalía in all of his classes, and all of his maestros had great hopes for him. Abel would always do the best on pruebas no matter what the tema was or how hard the questions were because he always spent so much time studying. One day while at school Abel se encontró with an ethical pregunta he couldn't resolve. He knew that some students were vendiendo drugs but he didn't know if he should tell el director or not because he wasn't sure of what would happen. From that day forward Abel knew he made a mistake, and that he should have dicho something to alguién about what those individuals were doing.

Condition 4 (3 words in Spanish)
Ayer Abel graduated from a very grande preparatoria. While in la escuela everyone always pensaban of him as a stellar estudiante. Abel sobresalía in all of his classes and all of his maestros had great esperanzas for him. Abel would always do the best on pruebas no matter what the tema was or how hard the questions were because he always spent so much time estudiando. One day while at school Abel se encontró with an ethical pregunta he couldn't resolucionar. He knew that some students were vendiendo drugs but he didn't know if he should tell el director or not because he wasn't sure of what would pasar. From that day forward Abel knew he made a mistake, and that he should have dicho something to alguién about what those personas were doing.

Appendix E

Condition 1 (1 word in Spanish)
Yesterday Abel graduated from a very large preparatoria. While in la escuela everyone always thought of him as a stellar student. Abel sobresalía in all of his classes, and all of his teachers had great hopes for him. Abel would always do the best on pruebas no matter what the topic was or how hard the questions were because he always spent so much time studying. One day while at school Abel found himself with an ethical pregunta he couldn't resolve. He knew that some students were vendiendo drugs but he didn't know if he should tell the principal or not because he wasn't sure of what would happen. From that day forward Abel knew he made a mistake, and that he should have dicho something to someone about what those individuals were doing.

Instructions: Please translate the given Spanish words with the appropriate English words. If you do not know a word (s) please try to the best of your ability and be aware guessing will <u>NOT</u> be penalized. If you have any questions, please ask the experimenter now. In the provided column indicate on a scale of 1 to 9 how confident you are in that the translation which you have made is an accurate and correct translation of the foreign language words.

1 2 3 4 5 6 7 8 9
Not at all Confident **Very Confident**

Preparatoria = _____	Confidence Rating: _____
Escuela = _____	Confidence Rating: _____
Sobresalía = _____	Confidence Rating: _____
Maestros = _____	Confidence Rating: _____
Pruebas = _____	Confidence Rating: _____
Pregunta = _____	Confidence Rating: _____
Vendiendo = _____	Confidence Rating: _____
Dicho = _____	Confidence Rating: _____
Grande = _____	Confidence Rating: _____
Ayer = _____	Confidence Rating: _____
Estudiante = _____	Confidence Rating: _____
Esperanzas = _____	Confidence Rating: _____
Tema = _____	Confidence Rating: _____
Estudiando = _____	Confidence Rating: _____
Encontró = _____	Confidence Rating: _____
Resolucionar = _____	Confidence Rating: _____
El Director = _____	Confidence Rating: _____
Pasar = _____	Confidence Rating: _____
Alguién = _____	Confidence Rating: _____
Personas = _____	Confidence Rating: _____
Pensaban = _____	Confidence Rating: _____

Appendix F

Instructions: Please answer the following questions regarding the story you just read. There is only one correct answer for each question. If you have any questions, please ask the experimenter now.

1. Where did Abel just graduate from?
a. Middle School
b. High School
c. College
d. Community College

2. How did most students in school think of Abel?
a. As an average student
b. As a drug addict
c. As a stellar student
d. As a nerd

3. Who had great hopes for Abel?
a. His friends
b. His teachers
c. His girlfriend
d. His wife

4. Why would Abel always do the best on exams?
a. Because he studied
b. Because he paid to get good grades
c. Because he cheated
d. Because he was a natural genius

5. What problem was Abel faced with?
a. He was selling drugs
b. He dropped out of school
c. He committed an ethical violation
d. He had an ethical question

6. What did Abel find out about some students?
a. They were selling drugs
b. They were buying drugs
c. They were confiscating drugs
d. They were making drugs

**7. What did Abel figure out later on?
a. No one believed him
b. He was wrong about his friends
c. He should have said something
d. He was right about the students

**8. How did Abel handle the issue about the students and the drugs?
a. He told the principal
b. He lied to the principal
c. He did not tell the principal
d. He forgot to tell the principal

**9. How did Abel handle studying for exams?
a. He only studied more for major exams
b. He always studied more than anyone else
c. He only studied on the weekends
d. He would tell people that he studied a lot

**10. How did Abel work to fix difficult problems and situations?
a. He did so only when they involved other people
b. He usually found a solution to problems
c. He was never able to solve a problem
d. He frequently ignored his own problems

**11. What did Abel wish he had done?
a. Said something to someone about the students
b. Told the students to stop what they were doing
c. Tell the principal that the students didn't study
d. Tell the principal about the students drug use

**12. What did Abel do after he graduated?
a. He got a job
b. He began to sell drugs
c. The story did not say
d. He went to college

**** Indicates inference questions which will require respondents to assume the next course of action taken by Abel.**

Appendix G

Please complete these math problems as to the best of your ability as possible and please show your work. When the experimenter gives the signal, you will have 1 minute to complete as many of these problems as possible.

1) 1569 + 2376 =

2) 6754 + 234 =

3) 432 + 129 =

4) 17653 + 1287 =

5) 234 + 123 =

6) 956 + 545 =

7) 210 + 785 =

8) 8688 + 3498 =

9) 1285 + 1286 =

10) 1289 + 3290 =

Appendix H

This questionnaire is designed to give us information about the way you tackle the tasks of learning a foreign language. This questionnaire can give us information about your learning techniques. Rate the following statements on the provided scale from 1 (Strongly Disagree) to 9 (Strongly Agree) regarding each of the statements below.

1 2 3 4 5 6 7 8 9

Strongly disagree **Strongly agree**

Part A **Rating**

1. I think of the relationships between what I already know and new things I learn in a foreign language. _____
2. I use new foreign language words in a sentence so I can remember them later. _____
3. I connect the sound of a foreign language word and picture of the world to help me remember the word. _____
4. I remember a new foreign language word by making a mental picture of a situation in which the word might be used. _____
5. I use rhymes to remember new foreign language words. _____
6. I review foreign language lessons often. _____
7. I remember new words or phrases by remembering their location on the page. _____

Part B

1. I say or write new foreign language words several times to try to learn them. _____
2. I try to talk like native foreign language speakers. _____
3. I practice the sounds of a foreign language. _____
4. I use the foreign language word I know in different ways. _____
5. I start conversations in a foreign language. _____
6. I watch TV shows spoken in foreign language or go to movies spoken in a foreign language. _____
7. I read for pleasure in foreign language. _____
8. I write notes, messages, letters, or reports in a foreign language. _____
9. I first skim a foreign language passage (read over the passage quickly) then go back and read carefully. _____
10. I look for words in my own language that are similar to new words in the foreign language. _____
11. I try to find patterns in a foreign language. _____
12. I find the meaning of a foreign language word by dividing it into parts that I understand. _____
13. I try not to translate a foreign language word-for-word. _____
14. I make summaries of information that I hear or read in a foreign language. _____

Part C

1. To understand unfamiliar foreign language words, I make guesses. _____
2. When I can't think of a word during a conversation in a foreign language, I use gestures. _____
3. I make up new words if I do not know the right ones in a foreign language. _____
4. I read a foreign language without looking up every new word. _____
5. I try to guess what the other person will say next in the foreign language. _____
6. If I can't think of a foreign language word, I use a word or phrase that means the same thing. _____

Part D

1. I try to find as many ways as I can to use my foreign language knowledge. _____
2. I notice my foreign language mistakes and use that information to help me do better. _____
3. I pay attention when someone is speaking in foreign language. _____
4. I try to find out how to be a better learner of a foreign language. _____
5. I plan my schedule so I have enough time to study a foreign language. _____
6. I look for people I can talk to in a foreign language. _____
7. I look for opportunities to read as much as possible in foreign language. _____
8. I have clear goals for improving my foreign language skills. _____
9. I think about my progress in learning a foreign language. ____

Appendix I

Condition 1 (All English)
Yesterday Abel graduated from a very large high school. While in school everyone always thought of him as stellar student. Abel excelled in all of his classes, and all of his teachers had great hopes for him. Abel would always do the best on exams no matter what the topic was or how hard the questions were because he always spent so much time studying. One day while at school Abel found himself with an ethical question he couldn't resolve. He knew that some students were selling drugs but he didn't know if he should tell the principal or not because he wasn't sure of what would happen. From that day forward Abel knew he made a mistake, and that he should have said something to someone about what those individuals were doing.

Condition 2 (1 word in Finnish)
Yesterday Abel graduated from a very large jalo koulia. While in school everyone always ajatus in him because he was a stellar student. Abel erionomaisuus in all of his classes and all of his teachers had great hopes for him. Abel would always do the best on tentti no matter what the topic was or how hard the questions were because he always spent so much time studying. One day while at school Abel found himself with an ethical kysmys he couldn't resolve. He knew that some students were myydä drugs but he didn't know if he should tell the principal or not because he wasn't sure of what would happen. From that day forward Abel knew he made a mistake, and that he should have mainittu something to someone about what those individuals were doing.

Condition 3 (2 words in Finnish)
Eilispäivä Abel graduated from a very large jalo koulia. While in school everyone always ajatus in him because he was a stellar opiskelija. Abel erionomaisuus in all of his classes and all of his opettaja had great hopes for him. Abel would always do the best on tentti no matter what the aihe was or how hard the questions were because he always spent so much time studying. One day while at school Abel perustaa himself with an ethical kysmys he couldn't resolve. He knew that some students were myydä drugs but he didn't know if he should tell the ensimmäinen or not because he wasn't sure of what would happen. From that day forward Abel knew he made a mistake, and that he should have mainittu something to joku about what those individuals were doing.

Condition 4 (3 words in Finnish)
Eilispäivä Abel graduated from a very surri jalo koulia. While in koulu everyone always ajatus in him because he was a stellar opiskelija. Abel erionomaisuus in all of his classes and all of his opettaja had great odattaa for him. Abel would always do the best on tentti no matter what the aihe was or how hard the questions were because he always spent so much time opiskella. One day while at school Abel perustaa himself with an ethical kysmys he couldn't hajota. He knew that some students were myydä drugs but he didn't know if he should tell the ensimmäinen or not because he wasn't sure of what would tapahtua. From that day forward Abel knew he made a mistake, and that he should have mainittu something to joku about what those inhmiset were doing.

Appendix J

Complete list of Spanish, Finnish, and English words

	Spanish Words	Finnish Words	English Words
1.	Ayer	Eilispäivä	Yesterday
2.	Grande	Surri	Large
3.	Preparatoria	Jalo koulia	High school
4.	Escuela	Koulu	School
5.	Pensaba	Ajatus	Thought
6.	Estudiante	Opiskelija	Student
7.	Sobresalía	Erionomaisuus	Excelled
8.	Maestros	Opettaja	Teachers
9.	Esperanzas	Odattaa	Hopes
10.	Pruebas	Tentti	Exams
11.	Tema	Aihe	Topic
12.	Estudiando	Opiskella	Studying
13.	Se encontro	Perustaa	Found
14.	Pregunta	Kysmys	Question
15.	Resolucionar	Hajota	Resolve
16.	Vendiendo	Myydä	Selling
17.	El Director	Ensimmäinen	Principal
18.	Pasar	Tapahtua	Happen
19.	Dicho	Mainittu	Said
20.	Alguién	Joku	Someone
21.	Personas	Inhmiset	Personas

Appendix K

Language Performance

Thank you for participating in this study. The full purpose of this study was to measure your ability to comprehend story passages and as well test your ability to translate a foreign language when embedded within English text. Many benefits may come from your participation in the study but the most important benefit that will come from this study will be to get a greater understanding of the limits and ability of English-Spanish Bilinguals and as well the limits in comprehensibility and translation ability for monolinguals. The purpose of having some stories being presented in a mixture of both English and Spanish is to test if there are any differences in comprehension and ability to translate foreign words based on the introduction of a foreign language within English text. Furthermore, it is hoped to gain a better understanding of the limits of comprehension and translation ability when varying amounts of words are introduced within English text.

If you would like to receive information as to the results of the study and if they will be presented at conferences or published I will be more than happy to provide you with that information. If you would like further information please feel free to email the experimenter at bdelagar@ksu.edu. Furthermore, please remember that all the information that you have provided will remain anonymous and no one will know any of the responses that you have provided that will lead to your identification.

Once again, thank you for participating in the study and if you have any questions please feel free to ask the experimenter now.

Glossary

Backward Translation – Translation of foreign language words from L2 to L1

Codeswitching – Use of two or more languages, dialects, or forms of speech during the same conversational discourse

Cognates – Words in one language which have similar orthographic and/or phonetic structures to words in another language and have equivalent meanings

Cognitive Strategy – Language strategy which utilizes reasoning and analysis when learning a foreign language

Compensation or Compensatory Strategy – Use of inferences or guessing when learning a foreign language

False Cognates – Words in two languages which may have similar orthographic and phonetic structures but have completely different meanings in different languages

Forward Translation – Translation of foreign language words from L1 to L2

Hierarchical Model of Memory – Model of organization which describes associated strength of links between L1 and L2 to the semantic system

Incidental Context – Additional information which is provided in text and is available to the individual, but is not primarily selected for the comprehension process

Inter-Sentential Codeswitching – Use of two different languages between sentences within the same conversation

Intra-Sentential Codeswitching – Use of two different languages within the same sentence within the same conversation

Glossary cont.

Intrinsic Context – information which does not appear directly in text or speech but rather is assumed (i.e., inferred) by the individual

L1 (Primary Language) – Language which was first acquired by Bilingual individual

L2 (Secondary Language) – Language which was acquired secondly by Bilingual individual

Language Interference – Errors or mistakes in the use of a second language in which the L1influences the learning or accessing of information which is integrated or learned in a L2

Language Strategies – Aids in the learning process by which individuals may utilize various techniques in the process of learning a foreign language

Language-Mixing – Use of two or more language systems during the same conversation discourse

Language-Switching – see *Language-Mixing*

Lexical Access – Process of activating lexical items from the semantic system/memory

Linguistic Context – Information which is explicitly provided and available for the listener/hearer in a situation in which the information is needed for comprehension

Memory Strategy – Storage of previously learned information when learning a foreign language

Negative Transfer – Errors due to information from the language not in use into the language which is currently being utilized

Positive Transfer – Transfer of information which allows an individual to correctly identify the meaning of a word based on the similarity of words orthographically and/or phonetically

Pragmatic Inference – Activation of information which is not explicitly stated within discourse, but which the reader/hearer concludes or deduces from the text.

Glossary cont.

Semantic System – Storage system which organizes knowledge of words, concepts, symbols, and objects