

INTRODUCTION

1.1 Overview

The study of cross-linguistic influence in the multilingual lexicon is still a new frontier in terms of research. While the bilingual and multilingual models that have thus far been expounded by researchers in the linguistic field have proven useful (Weinreich, 1953; Harley, 1995; Cenoz, Hufeisen, and Jessner, 2003; Murphy, 2003), more research regarding how the mental lexicon is structured will allow a clearer picture of the architecture of the multilingual mental lexicon. An increased complexity of the mental architecture has been found to correspond with the increased number of languages a speaker acquires. Advances in the area of cross-linguistic influence (Odlin, 1989; Murphy, 2003; Wei, 2003) may allow us to better understand the more intricate interactions that occur within the multilingual mind with the addition of a third language. Advances will also provide opportunities for insight into the nature and possible effects of psychotypology, which is the learner's perception of how languages are related or connected.

The effect of cross-linguistic influence on multilingual lexicon development is an area of study that merits increased research. The experiment reported in this thesis is a quantitative psycholinguistic study that investigated the cross-linguistic influence of L1 and L2 cognate forms on L3 frame acquisition (grammatical use of a word) in the multilingual lexicon. Cross-lexical influence is the phenomenon in which the knowledge of one set of words affects another being learned, comprehended, and produced. Within cross-lexical influence resides the so-called

“cognate effect”, which is the assumption of translation equivalence when words from different languages share form. A cognate is a word that is found in one language that is quite similar, through speaking or spelling, with a word from another language, as with *cocktail* in English and *coctel* in Spanish. In this experiment, cognate verbs in French (L3) with Spanish (L1) or English (L2) verbs were the focus.

Throughout this study, the Triad Model (Hall, 1993) is used to describe the connections between the mental representations of lexical entries. This model describes the nature of the relationship between three aspects of lexical knowledge: the *form*, which is the “physical” representation, the *frame*, which is the syntactic representation, and the *concept*, which is the meaning of the word (see Figure 1). The first two components are linguistic, while the third component is not (cf. Jackendoff, 1983). The frame contains the grammatical information of the word, such as its syntactic category, and other necessary information, such as categorial, subcategorization, and thematic features (Radford, 1988; Jackendoff, 1983).

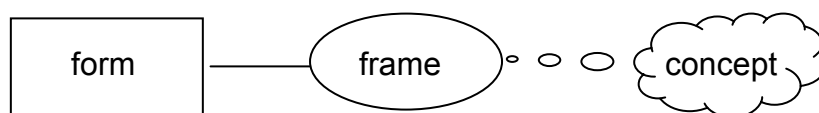


Figure 1: Hall's (1993) Triad Model

The prime motivation for this thesis is two-fold. Firstly, this is a conceptual replication study of an experiment reported in Hall, Ecke, Sperr, & Hayes (2004)¹ that studied learners for whom the L1 was Spanish, the L2 was English, and the L3 was German. The experiment tested one of the predictions of the “Parasitic Model” of multilingual vocabulary development, according to which a cognate in an L1 or L2 may serve as a “magnet” to a newly-learned L3 word. The experiment sought to verify whether the L3 German learners would adopt the frame of an L1 or L2 cognate. Although the hypothesis was confirmed, the effect appeared to be temporary. The connection between the new L3 word and the L1 or L2 cognate was tenuous after one presentation and dissolved quickly. In order to gain further insight, information was solicited regarding the learners’ perceptions of the typological relationship (psychotypology) that exist between Spanish, English, and German. English and German, historically, are typologically closer, while Spanish is considered more distant. The information solicited sought to draw out the learner’s views on the relationship of the three languages and the influence these views may have had on their frame selections. Secondly, a further motivation for this study is to add needed data to the area of cross-linguistic (specifically, cross-lexical) influence in the multilingual lexicon with regard to vocabulary development by testing the theory with different languages.

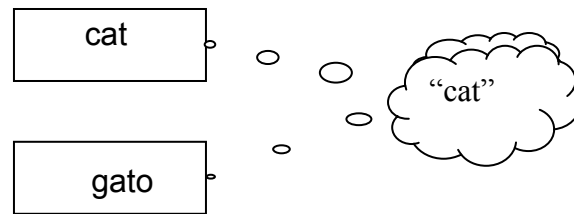
¹ Both the experiment using German as the L3 and the current project using French as the L3 are part of the FCT (Frame, Cognate, Typology) research project [CONACYT Grant number 39704-H awarded to Hall].

1.2 Multilingual lexicon

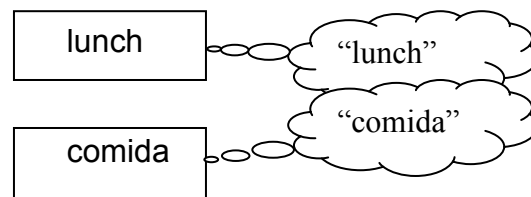
The study of the architecture of the mental lexicon has been an area of major interest for psycholinguistic researchers (Weinreich, 1953; Collins, 1975; Harley, 1995; Altarriba, 1997; Cenoz, 2001; Cenoz, Hufeisen, and Jessner, 2003; and Murphy, 2003, among others). This study focuses on the multilingual lexicon and the cross-linguistic influence that linguistic systems exert on each other.

The mental lexicon is the component of the mind where the phonological, morphological, and syntactic information about words is stored in lexical entries and connected to the semantic information of the lexical item. Study of the mental lexicon has provided information regarding the representation of lexical structure and its organization. The addition of a second (L2) language to a speaker's language repertoire increases the complexity of his/her mental lexicon. Weinreich's (1953) model of the bilingual lexicon postulates three possible mental representations of translation equivalents and was used to characterize different kinds of bilingual speakers (see Figure 2).

Compound representation:



Coordinate representation:



Subordinate representation:

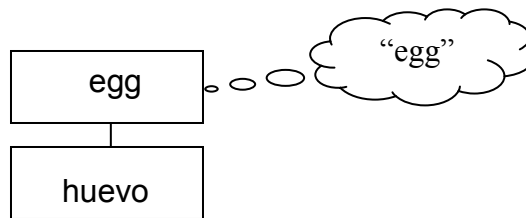


Figure 2: Weinreich's (1953) Model of the Bilingual Lexicon

In *compound representation* (later called *concept mediation* by Potter, So, Von Eckardt, and Feldman, 1984), the two word forms are individually connected to the same meaning (such as *cat* and *gato* both being connected to the concept of "cat"). In *coordinate representation*, the word forms are linked to two distinct but possibly overlapping concepts (such as *lunch* and *comida*). Both of these

representations are possible for bilinguals or advanced learners of a second language. The third possibility is *subordinate representation* (later called *word association* by Potter, et al., 1984) in which a word form in a second language is connected to the word in the native language, and is then connected to the concept. This is common in beginning learners of a second language. An example of this representation would be the form *huevo* in the target language, which would be connected to the lexical entry for *egg* in the native language, which would then be connected to the concept of “egg” in the learner’s conceptual system (cf. Figure 2). The word association model described by Potter et al. (1984) states that a second language learner uses translation equivalents from the first language to access concepts in the second language.

The Revised Hierarchical Model (Kroll & De Groot, 1997) elaborates on the concept mediation idea and describes a more direct access to the L2 concepts with a diminishing reliance on the learner’s native language, with stronger connections from the concept to the L1 than the concept to the L2. The model proposes that lexical-level links are stronger from L2 to L1, while conceptual-level links are stronger for L1 than for L2. Kroll & Stewart (1994) found in their experiment with Dutch-English bilinguals performing a translation task that L2 to L1 translation occurred more accurately and rapidly than L1 to L2 translation. Sholl, Sankaranarayanan, and Kroll’s (1995) work with bilinguals also revealed that words in the two languages are connected asymmetrically via lexical links and conceptual links.

Jiang (2002) bases his ideas on Levelt's (1989) model of lexical representation that describes the *lexeme* (which contains the form information of the lexical item) and the *lemma* (which contains the syntactical information and meaning of the lexical item). For a beginning second-language learner, Jiang contends that the information from the L1 is mapped directly onto the L2 lexeme, instead of the existence of L1 and L2 lexemes that are individually connected to the same lemma. As the learner becomes bilingual, the L2 lexeme detaches itself from the L1 lexeme and forges a direct link to the lemma.

Singleton (1999) notices in his survey of research on cross-linguistic influence that cross-linguistic influence is found in both the form and meaning aspects of the words involved. He states that cross-linguistic evidence "shows the interlingual facets of lexical operations to be semantic as well as formal and thus supports the view...that meaning is central to the functioning of the L2 lexicon" (p. 166).

One study on cross-linguistic influence involving the assumption of cognate form is Hall's (2002) study of pseudocognates of real Spanish words and English non-words. The results of this study found that intermediate EFL students (automatically) noticed the form overlap (potential cognates) and went on to assume a semantic overlap as well. Hall found that when learners were exposed to new vocabulary items, they utilized the form information of words that were known to them to theorize about the meaning of the new vocabulary item.

Within the multilingual lexicon, when an L3 word has phonological or orthographic level similarities with an L1 or L2 word, the new L3 form may be

subordinately connected to the similar L1 or L2 form. This means that the meaning of the L3 word may be tentatively connected to the L1 or L2 word as a result of the form being similar.

1.3 Cross-linguistic influence

The study of the multilingual lexicon has received more interest of late as researchers attempt to create a more thorough understanding of the “interconnections between the various lexicons in the multilingual’s mind” (Cenoz, Hufeisen, and Jessner, 2003, p. 3) as well as the organization and accessibility of the lexicons. In L3 acquisition, Wei (2003) has found that a learner’s prior knowledge of the L1 and L2 may influence the cognitive process and the alterations that are made in the mental lexicon while acquiring a third language. He uses the term *interlanguage transfer* to refer to the “competing language systems in multilinguals” (p.60). The study of multilingualism is proving to be more complicated than the study of bilingualism due to the cross-linguistic influence that occurs between the languages.

Weinreich (1953, p. 1) first coined the term *interference* for “instances of language deviation from the norms of either language which occur in the speech of bilinguals as a result of their familiarity with more than one language”. Because of the negative connotation that became associated with this word, *transfer* was then adopted. Odlin (1989, p. 27) encompasses both the positive and negative aspects of transfer and defines it as “the influence resulting from similarities and differences between the target language and any other language that has been

previously (and perhaps imperfectly) required”. Kellerman and Sharwood Smith chose to use the term *cross-linguistic influence* to describe “the interplay between earlier and later acquired languages” (Sharwood Smith & Kellerman, 1986, p. 1). This term is adopted here because of the behaviorist connotations of the term “transfer”.

Recent studies have looked at the role of cross-linguistic (including cross-lexical) influence during third language acquisition and the interaction that occurs among the three languages during acquisition of an L3. Because of the presence of a third language in the mental lexicon, it has been suggested that there is a different (and perhaps more complex) interaction than that of L1 influence on L2 learning (see Hall & Ecke, 2003, for factors contributing to the effects of cross-linguistic influence). Odlin (1989) found that “transfer occurs in ALL linguistic subsystems” (p. 152) and has also found that there is a greater possibility of cross-linguistic influence between languages that are structurally similar or typologically close.

Some of the factors that affect cross-linguistic influence in an L2 are also applicable for L3 acquisition. These factors include typological similarity between languages (see section 1.5) and the proficiency level and age of the speaker (Kellerman, 1983; Hall & Ecke, 2003). There are other factors that are particular to learners of L3 languages (or Ln, signifying any number of languages), such as the L2 recency effect (how recently the language has been accessed) or last language effect (Murphy, 2003). Another factor may be the concept that Grosjean (2001) developed called *language mode*, in which the L1 is continually in a state of

activation while the L2 and L3 languages are in varying states of activation during production. The L2 effect, in which the L2 seems to interfere with the production of the L3, leads researchers to believe the state of activation of the L2 may be high. The L2 effect is the phenomenon that occurs when the most recent language learned has a higher level of activation than the L1 (or any other previously-acquired language). Ecke (2001) found that “the degree of L1, L2, and L3 influence varies according to processing tasks and conditions” (p.106), which therefore influence language mode.

1.4 Parasitic Model

Largely through research on cross-linguistic influence, Hall (1993) developed the Parasitic Model, which is a theoretical framework that attempts to explain the default cognitive process of vocabulary development. Hall (2002) describes this process as “a series of automatic, unconscious cognitive stages that an emerging lexical entry is hypothesized to undergo after the learner first encounters an unknown word” (p. 72). New lexical items are added and mapped to the existing network.

According to the model, initial connections are established and a new L2 word is attached to the most highly-activated L1 word, which is normally the perceived translation equivalent. The translation equivalent chosen by the learner may be a clear translation (direct cognate) into the L1 (such as the English *telephone* and the Spanish *teléfono*), a false cognate (such as the English *actually* and the Spanish *actualmente*), an indirect cognate (such as the English *practice*

and the Spanish *practicar*), an L1 or L2 definition, or contextual cues (Hall, 2002). Connections are formed through *spreading* activation (Collins & Loftus, 1975). Generally, the form is the first characteristic that is acquired by second language learners, followed by the meaning (provided by the translation equivalent) and then the frame. This corresponds to Weinreich's (1953) subordinate representation mentioned previously. If the L2 word is a cognate of the L1, for example, then the direct connection to the conceptual structure will be easily established and reinforced (see Figure 3). If it is a false cognate, then the connections will need to be revised. Access routes are revised after receiving additional input.

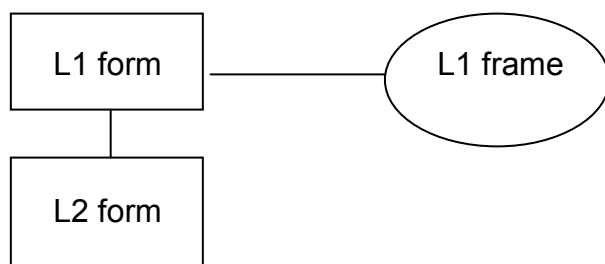


Figure 3: The closeness of form will allow the forms to connect

An example of this is found in Figure 4:

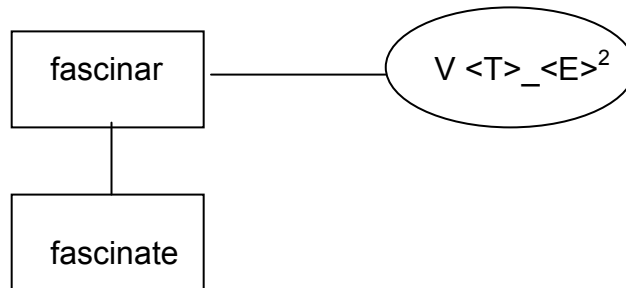


Figure 4: An example in L1 Spanish and L2 English

If the lexical item is not a cognate, then the L2 word will form a tentative connection with the frame of an alternate translation equivalent in the L1 (see Figure 5).

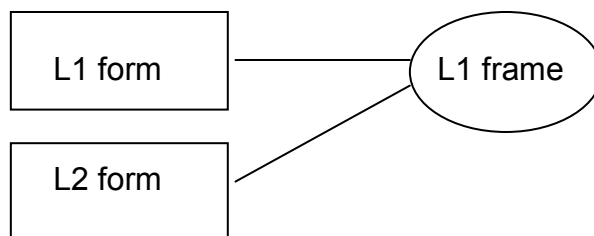


Figure 5: Tentative connection to the frame through translation equivalents

² This notation refers to the syntactic structure of the verb, such as thematic structure or sub-categorization frame.

An example of this is found in Figure 6:

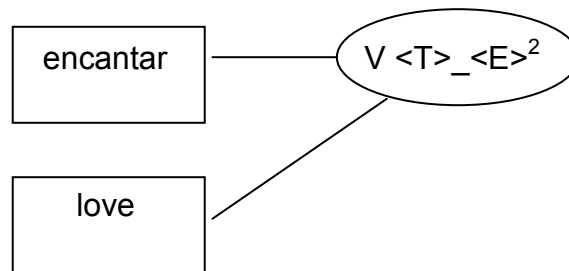


Figure 6: An example in L1 Spanish and L2 English

Hall, Ecke, Sperr, & Hayes (2004) note that the frame information provided in the lexical item may be most important for verbs due to the unpredictability of their syntactic features, including argument structure, valence, and complement types. Syntactic variation between languages has proven to present difficulties for second language learners (Adjemian, 1983) because of the tendency for the second language learner to assume the transfer of L1 verbs' syntactical properties. Even advanced L2 learners were subject to cross-linguistic effects from their L1 (Juffs, 1998).

In Hall & Ecke (2003), the Parasitic Model is extended to include the L3 mental lexicon. The idea of “total parasitism”, which is a cross-linguistic influence, is the occurrence of connections at any level of the triad (form, frame, or concept) with any of the languages in the trilingual lexicon. An analysis of the L3 speech

² This notation refers to the syntactic structure of the verb, such as thematic structure or sub-categorization frame.

data collected led the authors to find that cross-linguistic influence occurred at all levels of the triad. The languages involved were Spanish as the L1, English as the L2, and German as the L3. The most common occurrences of cross-linguistic influence at the form level of the triad were found to originate in the L3, while the most cross-linguistic influence at the frame level was from the L1, and the most cross-linguistic influence at the conceptual level was from the L2. Of the three languages, the L2 was found to be used most often as a source language, which may be due to the typology effect (see section 1.5). Other reasons for these results may include recency or proficiency effects (to account for the L3 influence), and the language effect of gender (to account for the L1 influence).

The methodological precedent for the current study, Hall, Ecke, Sperr, & Hayes (2004), consisted of three experimental conditions. Subjects were briefly exposed to new German verbs with their Spanish and English translation equivalents. Each German verb belonged to one of three conditions. The first condition was the Spanish Cognate condition in which German verbs were cognates with Spanish but not English. The second was the English Cognate condition in which German verbs were cognates with English but not Spanish. The third was the Non-Cognate condition in which German verbs were not cognates with Spanish or English. The verb stimuli were randomly mixed with noun distractors. The first two conditions were chosen to see if the L1 (Spanish) or L2 (English) cognate form of a new L3 (German) word would lead to the acquisition of the corresponding L1 or L2 frame. The third condition, in which no

cognate status existed among the three words, was designed to explore the subjects' selection when no cognate was present.

The subjects were university students taking a beginning German course at an elite private Mexican university after having achieved an equivalent of 500 on the TOEFL. The first part of the experiment consisted of a learning phase in which the German verbs in their infinitive form (with no frame information) were shown alone on a PowerPoint presentation slide for two seconds, then for an additional five seconds with the Spanish and English translation equivalents underneath, including their respective frame information. The second part of the experiment consisted of a testing phase (immediately after the learning phase) in which two sentences in French were shown to the students for 15 seconds. The subjects chose which sentence they thought was correct and marked it on their answer sheet. A delayed second testing phase was performed exactly one week later. The third part of the experiment consisted of a follow-up post-test questionnaire in which the subjects provided information regarding knowledge of German and English verbs, their previous level of study, a questionnaire regarding their psychotypological beliefs, and their personal strategies that were used during the learning and testing phases.

The results appeared to show the EFL learners transferred the Spanish L1 frames more often from L1 cognates, while the frequent use of the L2 English frames did not depend on similar forms. That is, Hall, et al. (2004) found that the subjects tended to adopt the frame of the Spanish verb when the German verb was a cognate with the Spanish verb. They found that this also to have been true

in the presence of English cognates. The results from the third condition (with no cognates present) showed a preference for the L2 or the typologically closer language (English).

These results were the impetus for the interest in replicating the study using French as the L3. The use of French, a language that is typologically closer to Spanish, allowed the exploration into whether, in the absence of cognates, learners will be influenced by the L2 effect or by psychotypical factors.

1.5 Typology

The typology effect, as mentioned in the previous section, has been argued to be another primary factor in cross-linguistic influence. Linguistic typology is the study of the similarities or common features that languages share. Typology involves some type of cross-linguistic comparison (Croft, 1990). Lehmann (1992) describes typological linguistics as trying to “assemble such knowledge, to formulate it, and to use it in providing explanations for patterns and processes of language” (p. 9). Finegan (1989) defines it as “a field of inquiry that focuses on classifying languages according to their structural characteristics” (p. 247). These characteristics could be lexical, phonological, morphological, or syntactic. They may develop based on inheritance through the historical closeness of the relationship on the “genealogical tree” of language evolution (English and German, Spanish and French, or Russian and Serbo-Croatian, for example) or through language borrowing (which may be due to trade, migration, science and technology, or the conquering of countries). In many cases, however, there may

not be any historical or contact reason, since all human languages are structured in a way that allows limited options of certain parameters, such as the order of subject, object, and verb, possessive marking, etc. (Chomsky, 1995).

Typology also aids in the discovery of language universals, which are principles that hold for all language types. There exist, for example, semantic universals within vocabulary, such as basic colors, animal names, body part names, and sensory verbs. To illustrate, all languages contain the two basic color types of black and white. The next level of classification includes red, the third level adds yellow or green/blue, and the next level consists of the five basic color terms of black, white, red, yellow, and green/blue. This progression continues and encompasses all color terms (Finegan, 1989).

Historical typology refers to languages that are “genetically” related to each other, while *formal typology* looks at the structure of the languages, independent of their “genetic” ties. By examining language structure, comparisons can be made regarding language distance. Odlin (1989) argued, for example, that Thai and English seem to be more structurally related than Thai and Arabic even though all three come from different families. Cenoz’s (2001) study of linguistic distance in L3 acquisition “confirms previous studies on typological distance in multilingual acquisition and proves that linguistic distance is a stronger predictor of cross-linguistic influence than L2 status” (p. 18) but emphasizes that it is not the only factor. In this study, she analyzed the influence of Basque (a non-IndoEuropean language) and Spanish on English. Basque and/or Spanish were the subjects’ first languages (44% had Basque as their L1, 23% had Spanish as their L1, 32%

had Basque and Spanish as their first languages) and English was the third language taught in school. Her data showed that typological distance was a salient factor, and she found that perception of typological distance could be more important than objective linguistic distance.

Kellerman (1983) was the first to use the term *psychotypology*, which he defined as a language learner's conscious or unconscious "perception of language distance" (p. 114). This refers to the perceived proximity or distance between the languages due to etymology, the "genealogical family tree" of human language, or mere coincidence. He proposed that cross-linguistic influence depends on whether the learner perceives that it is the L1 or L2 that is more closely related to the L3. The idea of psychotypology is based on the learner's *beliefs* on how the languages are related, and not necessarily the actual historical relationship between the languages. Murphy (2003) describes psychotypology as "the learner's perception of language typology, central to his perspective on transfer, whereby the learner's recognition of congruent forms between the native and target languages either facilitates or interferes with L2 acquisition" (p. 5). According to psychotypology, the *awareness* of the learner and his/her perceptions are more important than the actual language distance. This is because the personal perception that a learner has in his/her mind may be influential, while the actual fact of language distance may not be known and therefore not have any influence in the learner's mind. Kellerman (1978, 1986, 2001) found that a learner's perception of the distance affects his/her use (and

transferability) of metaphor, narrative, borrowing, etc. The perception of language distance and transferability may be more important than actual language distance.

In order to better examine the effects of linguistic typology or psychotypology on L3 development, Hall (2004) expands upon the concepts of the I-language (internal, individual) language system and the E-language (external, social) language system (Chomsky, 1986) by relating them to the concept of typology. In his current research proposal, Hall (2004, pp. 2-3) recognizes three forms of typology based on historical fact, actual learner knowledge, and learner perceptions:

- E-Typ: *The (study of) (proportion(s) of) shared linguistic features (indicators of language “type”) in the groups of E-language systems.*
- I-Typ: *The actual proportion(s) of shared linguistic features in the distinct I-language systems of individual multilingual learners/users at any given stage in their interlanguage competence.*
- P-Typ: *The perception of the proportion(s) of shared linguistic features in the E-languages and/or distinct I-language systems in multilingual learners/users.*

Since the language system of the learner of an L3 is a developing language system, the learner's expectation (psychotypology) may be different from the

actual typological facts of the L3 that is being acquired. Learners may, for example, expect that French and Spanish are typologically closer than French and English, though extensive borrowing from French by English may make French and English typologically closer. Learners may also hold an expectation that English and German are typologically closer to each other than to Spanish.

The theoretical framework related thus far underlies the purpose of this study. The purpose was to explore the cross-linguistic interactions that may occur in the multilingual mental lexicon with regard to syntactic frame selection during acquisition of L3 vocabulary with L1 and L2 cognates. The role of historical typology and psychotypology was probed to determine if cross-linguistic influence effects existed.

1.6 Research strategy

This experiment investigated the possible connections between L1 or L2 cognates and initial, unconscious frame assumptions in L3 vocabulary development. The first hypothesis was:

1. The similar form representation (cognate form) of a new L3 word and a previously-known L1 or L2 translation equivalent will lead to the initial adoption of the corresponding L1 or L2 frame, when the learner has had recent exposure to these translation equivalents.

A question this experiment seeks to answer is: When translation equivalents are provided, does form similarity affect frame use? From L3 error data (Hall & Ecke, 2003), it has been shown that there is frame influence from L1 to L3 and from L2 to L3 in natural data. Since lexical activation cannot be recreated naturally in this experiment, the lexical items will be artificially stimulated. In other words, there is induced priming to verify if by giving the L1 and L2 translation equivalents for new L3 words, similarity in form leads to frame inheritance.

By comparing and discussing the results from this study and the original study (Hall, Ecke, Sperr, & Hayes, in prep.), an additional hypothesis was explored when taking the two studies together:

2. Psychotypology will exert a cross-linguistic influence on the choice of frame when the translation equivalents are *not* cognate forms.

The major methodological precedent was the Hall, Ecke, Sperr, & Hayes (2004) experiment that was described in the literature review. A more in-depth description of the experimental study involving French as the L3 is presented in the Methodology section. Data from the experiment and the statistical analyses performed are presented in the Results section. The final section focuses on the interpretation and discussion of the results, along with comparisons to other studies and implications for the future.