

Typology Effects in Third Language Vocabulary Development

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Abstract

The terms typology and psychotypology are undifferentiated in studies of cross-linguistic influence (CLI) in additional language acquisition. This paper explores typological effects in L3 vocabulary acquisition by hypothesizing that three forms of typology, historical language typology (E-typ), the individual learner's language typology (I-typ), and psychotypology (P-typ), are important in the study of second language acquisition (SLA). This hypothesis was tested using Spanish, English and German as focus languages. Etymological sources of vocabulary for these languages (E-typ) are given before testing the hypothesis on 41 Spanish L1, English L2, and German L3 Mexican university students. Students in the study were given English and German vocabulary tests to determine I-typ and a psychotypological survey to establish P-typ. Results were compared for E-typ, I-typ, and P-typ to verify if correlations exist. Results show correlations between E-typ, I-typ, and P-typ, but not absolute correlations since the languages involved are considerably similar at the lexical level and there exists some disparity between subjects' I-typ and P-typ. The findings indicate that further research is necessary to differentiate the subconscious processes involved in word processing from more conscious, strategy-related processes involved in psychotypologically based lexical decision-making.

1. Typology effects in L3 vocabulary development

This chapter serves to introduce the reader to research developments in the area of the mental lexicon, the acquisition of additional language vocabulary, and crosslinguistic influence. Additionally, it defines the problem associated with claims that psychotypology plays an active role in crosslinguistic influence and presents examples of this problem. It concludes with a synopsis and explanation of the purpose of the present study.

1.1 Overview

The understanding of the organization of the mental lexicon has been a topic of study for psycholinguists for quite some time (Altarriba & Mathis, 1997; Cenoz, Hufeisen, & Jessner, 2001; Hall, 2000; Jiang, 2000; Levelt, 1999). The mental lexicon can be viewed as the mental version of a dictionary and its processes can be quite complex (Hall, 2000). Word recognition, that is accessing the lexical item in the mental lexicon, is a rapid, complex process that is little understood. Further, accessing words involves convergence, i.e. accessing the correct word for the context. Errors in lexical access are demonstrated by slips of the tongue, blends, exchanges and substitutions (Levelt, 1989).

When two languages are involved, the matter becomes further complicated. Researchers have an interest in determining if the acquisition of second languages (L2) is similar to or different from the acquisition of a first language (L1) and how the words in the L2 are accessed and stored (Harley, 1995). Consequently, numerous studies in L2 acquisition have been conducted attempting to determine the architecture of the bilingual mental lexicon (for a survey see Murphy 2003; Harley, 1995). Many of these studies indicate that when speakers of second languages produce in the L2, the native language plays an active role in production.

Similarly, third language (L3) acquisition has been of recent interest to psycholinguists. As with L2 acquisition, various studies have been conducted to define the architecture of the multilingual lexicon (see Cenoz, Hufeisen, and Jessner, 2003 for a survey of research in this area). Although there are some similarities to L2 acquisition, one must account for the presence and interactions of all languages in the learner's repertoire during the acquisition and production of the L3. The presence of three language systems in an individual leads to the possibility of

interaction between all three systems during production of the target forms. This interaction, cross-linguistic influence (CLI), is of interest to researchers since it can provide clues as to how a multilingual stores and accesses the languages in his or her repertoire.

CLI, also known as *transfer* or *interference*, has been a point of discussion in L2 learning for several decades (cf. Weinreich, 1974; Eubank, et. al., 1997). Some proposed factors that may contribute to CLI include learner proficiency, age of the learner, activation levels of known languages, and linguistic typology. These factors and others are being explored not only in the acquisition of second languages, but also in the acquisition of three or more languages. The focus here is limited to L3 acquisition, however.

Cross-linguistic influence in L3 acquisition contains many of the characteristics found in CLI in L2 acquisition (see Murphy, 2003); however, the presence of additional languages can affect the degree to which these factors interact. One salient difference is that in L3 acquisition, both previously known languages may play active roles in the acquisition of words. Thus, for example, it is possible that CLI will occur from the L2 of learners rather than the L1 during the acquisition of the L3 because it is the most recent language acquired and therefore more highly activated than the L1, a phenomenon known as the *L2 recency effect* or the *last language effect* (Cenoz, 2001; Murphy, 2003; Ecker 2001; Hammarberg, 2001).

Another consideration is typological distance. Typology is generally defined as the study of the shared linguistic features, or correlations, between languages (Comrie, 1981, 1988) and is often determined through identification of cross-linguistic patterns (Croft, 1990). These correlations can occur because of close language ties, as a result of languages borrowing from other languages, or may simply arise as a result of coincidence, although the latter is not very common and typology is not generally concerned with occurrences of coincidence.

Most studies of CLI, however, only consider the first factor mentioned, historical language ties, and do not consider the factors of borrowing and coincidence. These studies have suggested that the more typologically close languages are, the more likely they are to transfer in production (cf. Cenoz, 2001; Ringbom 2001). Hence, if the L1 is more typologically close to the L3 than the L2 (or vice versa) than transfer is more likely to occur from the typologically close language.

The idea of typological effects in language acquisition at the lexical level (i.e., at the level of morphological expression) was initially developed by Kellerman. In his 1983 study, Kellerman proposed that learners' knowledge of language proximity, conscious or not, has an effect on the acquisition of additional languages. He termed this phenomenon *psychotypology*. The area of psychotypology has since been investigated by researchers for its possible role in CLI (cf. Cenoz 2001, 2003; De Angelis & Selinker, 2001). However, the central problem in this area of research is that the relationship between linguistic typology and psychotypology has yet to be clearly delineated. Consequently, the need for further exploration into the ideas of typology and psychotypology and the role they play in the development of the L2 or L3 is evident.

Two important questions regarding the roles of typology and psychotypology are the following:

- 1) How are typology and psychotypology defined?
- 2) What is the role of typology and psychotypology in relation to the acquisition and production of additional languages?

The focus here, then, is to explore the roles of typology and psychotypology as they relate to cross-linguistic influence during L3 vocabulary development. This issue is addressed through a

study conducted on native Spanish speakers with advanced levels of English knowledge who were learning German as an L3. The following paper outlines this study and its findings in detail.

The discussion begins with an account of current research in the areas of the mental lexicon, in particular the L2 and L3 mental lexicons. Additionally, the topic of cross-linguistic influence in L2 and L3 acquisition and production is explored. Following the discussion of CLI is an overview of typology, including a survey of the research into typological and psychotypological effects in L3 acquisition. Particular attention is paid to methodology used in previous studies on typology, and definitions of both typology and psychotypology are presented as well as the researcher's assumptions concerning their roles in the area of CLI. The discussion will proceed with an outline of the study conducted and end with a discussion of the results and their implications.

1.2 Research on the Mental Lexicon

1.2.1 Native Language Acquisition

Before models of the multilingual lexicon can be approached, it is first necessary to understand the processing and accessing mechanisms of the L1 mental lexicon. Levelt (1989) offers a model of L1 lexical access and processing. He proposes that lexical entries contain two major components: the lemma (semantic-syntactic features) and the lexeme (phonological features). Moreover, Levelt argues that the lemma contains the conceptual representation associated with the word. In this model, the preverbal message activates a lexical item when it closely matches the conceptual representation of the lemma.

Hall & Schultz (1994) agree with the above outline but emphasize that the conceptual structure is not language specific. They describe the L1 mental lexicon as a massive connection

of triads consisting of two linguistic components and one non-linguistic component, which is the conceptual structure. The two linguistic components of this model, similar to the description given by Levelt above, consist of a form representation of the word (pronunciation/orthography) and a syntactic component that includes information such as syntactic category, subcategorical marking, theme, and idiosyncratic features.

Most notable about the L1 mental lexicon is the fact that every word has links, ranging from strong to weak, to other words that are related in form, meaning, or word class; thus, lexical networks are formed. Speakers of a language access all of these components during production and comprehension of language, and they do so with automaticity and great speed (Aitchison, 1994). It is this automaticity and speed that sets the native speaker of a language apart from the novice foreign language learner. Models of the multilingual lexicon strive to explain accessing and processing mechanisms in the learner and in the fluent bilingual or multilingual speaker (Cenoz et. al., 2001; Murphy, 2003) This is done in an attempt to explain the differences exhibited by native and non-native speakers and with the idea that an understanding of the underlying mechanisms of speech production and comprehension may facilitate language teaching and learning strategies.

1.2.2 Models of the Bilingual and Multilingual Lexicons

One of the earliest models of the bilingual lexicon was set forth by Weinreich. Weinreich (1953/1974) proposed that the bilingual mental lexicon comprises three possible organizations: *compound*, *coordinate*, and *subordinate* (see Figure 1). According to this model, coordinate bilinguals have a separate conceptual representation for words in the L1 and for words in the L2. Thus, as Weinreich notes, for a speaker of English and Russian, the word *kníga* would be linked to a particular concept, whereas the English translation equivalent, *book*, would be linked to a

separate conceptual form. In contrast, compound bilinguals have only one conceptual form for words and their translation equivalents. In this type of organization, to use the above example, the words *kníga* and *book* would be linked to the same conceptual form but would not be directly linked to one another.

Unlike the previous two, the third type of organization (subordinate) describes a situation where one language is clearly dominant over the other. This organization takes into account the proficiency level of the speaker since the level of language dominance minimizes as proficiency is achieved. Here the speaker accesses the conceptual representation of the L2 word through a direct link with the L1 translation equivalent. To access the meaning of *book*, then, the speaker would link the word directly to the L1 word *kníga* and then access the concept evoked by the L1 word.

types of bilingualism:

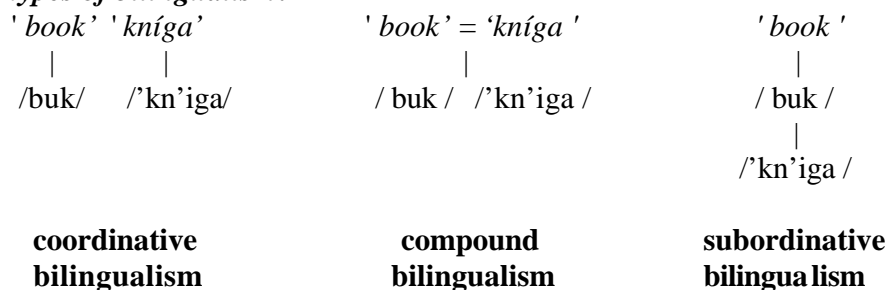


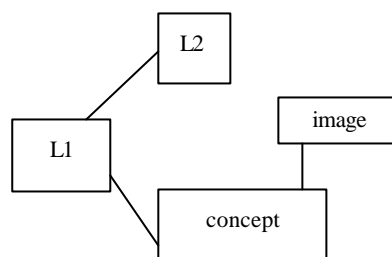
Figure 1. 1: Weinreich's organizations of the mental lexicon

Since research has not shown evidence for coordinate bilingualism, but has shown evidence for the compound and subordinates models (Altarriba & Mathis, 1997), current researchers generally take into account only the latter two of the three mental organizations proposed by Weinreich (the compound and subordinate models,) when developing models of the bilingual lexicon. Most recently, attention has focused on the compound and subordinate systems

and their possible variations and combinations (de Groot, 1993). Many of these models are very similar to the systems proposed by Weinreich but are known by different names. The *word association model* (subordinate organization) and the *concept mediation model* (compound organization) presented by Potter, So, von Eckhardt, and Feldman (1984) are examples of this type of variation (see Figure 1.2).

Like Weinreich's subordinate model, Potter et al.'s (1984) *word association model* proposes that the learner accesses the concepts of L2 words through the translation equivalents in the L1. Conversely, the *concept mediation model* proposes that L2 words are directly linked to the conceptual structure just as L1 words are linked to the conceptual structure. After experimental studies to test the two models, Potter et al. (1984) found support for the concept mediation model, and the researchers concluded that this model more closely represents the bilingual mental lexicon. The main difference between Weinreich's models and the word association and concept mediation models is that, like Jackendoff (1983), Potter, et al. (1984) assume that conceptual representations are not language specific, but are abstract and belong to a separate system.

Word Association Model



Concept Mediation Model

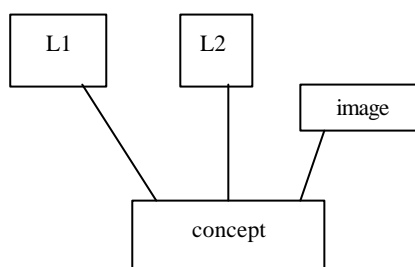


Figure 1. 2: The Word Association Model and the Concept Mediation Model (Potter, et al., 184)

Similarly, the *revised hierarchical model* adopts the ideas of word association and concept mediation but further asserts that there is a "developmental shift in second language learning from reliance on word-to-word connections to reliance on concepts" (Kroll & Stewart 1994, p. 151). This model presumes that the L1 will be substantially larger than the L2 for most bilinguals. Additionally, lexical connections from L2 to L1 are assumed to be stronger than those from the L1 to the L2. The researchers assume that this asymmetry is a result of the fact that L2 words are generally taught by directly associating them with L1 words, eg., explaining to Spanish-speaking learners of English *gato* means *cat*, as opposed to directly associating the L1 words to the newly presented L2 words, i.e. *cat* means *gato* (see Figure 1.3).

Furthermore, the model presupposes that translation from the L1 to the L2 is conceptually mediated while lexical translation from the L2 to the L1 is initially accomplished through direct mappings from the L2 word to the L1 word to attain access to the concept. Consequently, early learners of a language do not initially map L2 lexical entries to the conceptual structure. Eventually, as the learner achieves proficiency, a direct link from the L2 word to the conceptual system is established. Since meaning for the L2 word is initially accessed through the L1, the link from the conceptual system to the L2 will be weaker than the corresponding link in the L1 until proficiency develops (Kroll, 1993).

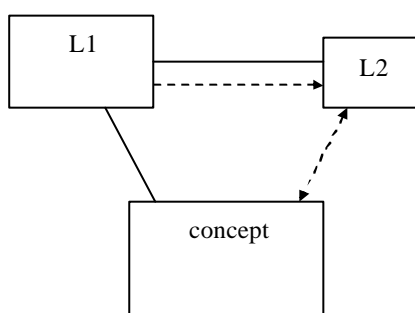


Figure 1. 3: Revised Hierarchical Model (Kroll & Stewart, 1994)

Altarriba and Mathis (1997) agree with Weinreich that combinations of these organizations may exist since experimental results indicate that beginning and advanced bilinguals access their two languages through different sets of mental links. Altarriba and Mathis also assert that the shift from word association to concept mediation occurs naturally as a function of language fluency. Additionally, they state that their experimental data do not fully support the Revised Hierarchical Model developed by Kroll and Stewart (1994). The authors

concede that the model is correct in its prediction that more fluent bilinguals rely on conceptual links when presented with words in the L2. Nonetheless, Altarriba and Mathis contend that it is not the proficiency level of learners that drive the links presented in the model. Rather, the authors argue that it is previous knowledge of the L2, for example the words that the learner already knows in the L2, which determines the shift from word association to conceptual representation.

Another model to consider is that presented by Jiang (2002). In contrast to the model proposed by Kroll and de Groot (1997), Jiang argues that rather than the L2 word being a separate entry that is linked to meaning through the L1, the L1 information is mapped directly onto the form of the L2. Jiang presents his ideas through an explanation of L1 lemma mediation based on Levelt's (1989) model of lexical representation. Levelt's model (1989, as cited in Jiang, 2000) assumes that each entry in the lexicon contains four types of information: meaning and syntax (the lemma), and morphology and form (the lexeme). Jiang extends this model to account for word acquisition in bilinguals.

According to Jiang, L2 words go through two stages of development. In the first stage, only formal specifications of the L2 word, such as the form, are contained in the entry and a link is developed to the translation in the L1. In other words, the L2 word is initially superimposed on the L1 lexical entry. As input increases, the L1 lexeme information is deactivated because it does not facilitate L2 word use. Thus, as the learner achieves proficiency, the L2 word moves from being mapped onto the L1 item to being directly linked to the meaning. Jiang contends that at this point the L1 lemma information is now copied directly onto the L2 lexical entry. As a result of this process, L2 word use is mediated by the L1 lemma information. Additionally, this mediation can both facilitate and interfere with lexical processing tasks.

Jiang concludes with a differentiation between those words learned through translation and those words that have no translation equivalent. He notes that without the benefit of lexical transfer, a word in the L2 must develop strong conceptual representation before it is acquired. Consequently, production of these items may take considerable time. As a result, once these words are acquired they may function more like L1 entries in ease and naturalness of use.

Hall (1993, 1996, 1997) and Hall and Schultz (1994) in their proposal of the Parasitic Model of lexical representation support the view that L2 words are initially accessed through the L1. The Parasitic Model describes words as being composed of three parts: the form, the frame, and the meaning (conceptual structure). Further, like Jackendoff (1983), Potter, et al. (1984), Kroll and Stewart (1994) and Altarriba and Mathis (1997), Hall and Schultz (1994) note that the conceptual structure is not a linguistic component and that it resides outside of the mental lexicon. This model assumes that the first stage of word learning is the establishment of the form of the L2 (i.e. the orthography and pronunciation). Once the form of the word is established, it is initially attached to the frame representation of the translation equivalent in the L1 and the learner applies the meaning and frame of the L1 to the L2. If no equivalent is found, then the learner must construct his or her own representation of the word in the L2, which will be directly linked to the conceptual structure. Eventually, through increased input, the learner revises connections and the configurations of the relevant representations so that, eventually, the semantic properties of the L2 are integrated.

In the event that the word encountered in the L2 is a cognate with a word in the L1, the Parasitic Model predicts that this word will have a direct connection to the cognate form in the L1 to ensure efficiency in processing. With true cognates, this connection will remain intact. However, with false cognates (those words that have the same form yet different meanings in the

two languages) the learner would need to reconfigure the connection once the error is discovered.

In a later study of L3 learners, Hall and Ecke (2003) extend the Parasitic Model to account for the architecture of the multilingual lexicon. The authors propose that when a learner encounters a word in the L3, the form activates the closest matches in the L1, L2, and L3 where available. The new word is then attached, parasitic style, to the most highly activated form. When differences are noted between the new word and its 'host' in one of the other languages, the representation is generally revised until the target form is reached (a continued lack of noticing results in fossilization). When the learner is unable to find a form match in the available languages, the new word is linked to the nearest translation equivalent. In the absence of translation equivalents, a provisional frame is developed and connected to the conceptual structure. Fluency develops as the connections between the new form and its host are revised, bypassed, or severed. Findings from this and other studies (Ecke, 2001; Hall & Ecke, 2003; Hall & Schultz, 1994; Hall, Ecke, Sperr & Hayes, 2004)) support the hypothesis set forth by the model that both the first and second languages contribute to cross-linguistical influence (CLI) in the acquisition of a L3.

According to Hall and Ecke (2003), CLI occurs as a result of the activation of form and/or meaning matches in the available languages. Consequently, the authors propose that understanding the architecture of the multilingual mental lexicon requires an understanding of the phenomenon of CLI. Additionally, although the authors agree that external factors (see below) contribute to the occurrence of CLI, they argue that these factors are exceedingly difficult to analyze because of their numerous interactions. Thus, they argue for further studies that concentrate on the internal factors since these factors are more easily controlled.

1.3 *Factors Contributing to CLI*

Due to the infancy of the area of study of cross-linguistic influence in L3 acquisition, much is still unknown about the interactions of the languages that a learner has at his/her disposal. Methodology and the scope of research are still being developed and there is a need to define terminology currently in use in this area (Cenoz, Hufeisen, & Jessner, 2001). Various factors have been offered to explain the occurrence of cross-linguistic influence in the production of additional languages.

Murphy (2003), for example, offers a comprehensive survey of proposed factors in CLI. Some items that may contribute to this phenomenon include lexical frequency, word class, the language context, educational background of learners, and the learner's linguistic awareness. Murphy concludes that the complex nature of L3 acquisition sets it apart from L2 acquisition and argues that many of the variables involved in CLI during L3 acquisition are currently underrepresented in the literature and are in need of further study.

An important consideration in the study of CLI is the idea of a learner's position on the language mode continuum proposed by Grosjean (2001). Grosjean defines *language mode* as "the state of activation of the bilingual's languages at a given point in time" (p. 2). Like Hall and Ecke in the previous section, Grosjean asserts that multilingual speakers' languages are all activated to varying degrees. This activation is contingent on the external factors surrounding production. An important factor to note is that the language mode continuum attempts to explain performance rather than competence in bilingual speakers. However, Grosjean posits that it is necessary to account for and control for the speaker's position on the language mode continuum

in studies of cross-linguistic influence. He contends that many studies confuse code switching, which is a production factor, with CLI, which is part of competence.

Like Grosjean, Cenoz (2001) believes the language mode of bilingual participants is a factor to consider in studies of cross-linguistic influence in L2 learners. Additionally, she proposes that linguistic typology and age contribute to this phenomenon and must be accounted for. Regarding CLI in L3 acquisition, Cenoz argues that one must not only account for the processes associated with L2 acquisition, but also for the more complex interactions between all of the languages a learner knows. In this respect she contends that L2 status is a factor that may contribute to the occurrence of CLI in production.

Hammarberg (2001) expands this idea that L2 status influences the production and acquisition of words in the L3. He contends that the level of L2 proficiency and the *recency* of the L2 (how recently the L2 has been used) affect the level of L2 influence on the L3. Thus, if the learner is highly proficient in the L2, it is more likely to influence the L3, just as if the L2 has been recently used it will be more highly activated. The final factor Hammarberg considers is the status of the L2, i.e. the fact that it is the most recently learned language. Research (see for example Gibson, Hufeisen, and Libben, 2001) indicates that there is a tendency to activate the most recently learned language during L3 performance.

Another factor that has been proposed to influence CLI is typology, and more specifically, psychotypology. Typology refers to the linguistic area of study that examines the 'correlations among different parts of a language's structure' (Comrie, 1988). Examples of typological factors to consider at the lexical level include word order, the incidence of cognates between languages; affixes attributable to a particular source language, such as the Latinate prefix *re-*; letter or sound combinations, e.g. the *sh/sch* common in Germanic forms; or the

presence of compounds such as those found commonly in English and German, e.g. hangnail, but infrequently in Spanish.

A more specific reference in the literature to typological effects in L2 and L3 acquisition is that which is termed *psychotypology*. Psychotypology was first proposed by Kellerman (1983) and refers to a language learner's "perception of language distance" (p. 114). Kellerman contends that transfer will occur more frequently when the learner perceives the target language as related to a previously known language rather than as unrelated.

Ringbom (2001) agrees with Kellerman's proposal that psychotypology plays a crucial role in additional language (L2, L3, L4, etc.) acquisition. He notes that in particular the effects of psychotypology can be seen in the acquisition and production of the lexis. As a basis for this argument he highlights the transfer of form seen with cognates and false cognates (words that have the same form in the two languages, but different meanings such as *red* in English, which refers to the color, and *red* in Spanish, which means *net* in English). He contends that the learners' transfer of form in the case of false cognates is a direct result of their psychotypological beliefs.

There are several problems with this account. First, a specific problem with the study by Ringbom is it does not consider the possibility that the transfer described can be attributed to L2 status. Rather, he claims that the tendency of learners to use the L2 as the basis for CLI in this and other studies is a result of psychotypology. Additionally, he does not consider the cognate effect. When a learner recognizes the form of a word, the frame and conceptual representation are automatically activated (cf. Hall, 2002; Hall & Ecke, 2003). In the case of false cognates, the correct form but incorrect conceptual representation is activated. Accordingly, transfer in the above example is better attributed to the typological facts of the languages (i.e., proximity at the

lexical level) than to the psychotypological beliefs of the learner. Finally, another more general criticism of studies that claim that psychotypology is a strong factor in the incidence of CLI in additional language acquisition is that psychotypology does not take into account if what the learner believes about a language is a result of what is represented in the individual's developing language system or what the learner knows about the historically typological facts about a language. Additionally, one must consider if psychotypology is a separate factor to be taken into consideration or if it is simply a state of what is referred to as I-language systems.

The idea of I-language and E-language systems was proposed by Chomsky (1986). Chomsky defines I-language systems as the internal language systems found within individual speakers. E-language systems are defined as external language systems and are a social construct. In reference to typology, one could view the individual's developing language system as part of the I-language system and linguistic typology as a subset of E-language.

The problem of non-differentiation between E-language and I-language systems is evident in several studies of CLI that conclude that language proximity and learners' perceptions have a strong influence on what items are transferred from each language (cf. Cenoz, 2001, 2003; Murphy, 2003; Hammarberg, 2001; De Angelis & Selinker, 2001; Ringbom 2001). In these studies it is not entirely clear that the roles of psychotypology (the learner's perception) and linguistic typology (at the level of E-languages) have been adequately differentiated since only those aspects of typology that result from historical ties are considered (Hall, 2004). This idea is explored in more detail in the following section.

1.4 The Present Study

As noted previously, there is a need to differentiate between psychotypology and typology in studies of cross-linguistic influence. Only by doing so can a correlation between

psychotypology and L3 vocabulary development be ascertained. To this end, for the purpose of this study three distinct forms of typology have been differentiated and are assumed to be of importance in studies of L2 and L3 acquisition (Hall, 2004, pp. 2-3). These forms of typology are based on the ideas presented in Chomsky's I-language and E-language systems and can be seen to represent a subset of these systems. Below are these forms as presented by Hall (2004) followed by a detailed explanation of each of these forms:

- 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[...]*
- 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[...]* (p. 3)

Hall's category of E-typ is based on descriptive linguistics and refers to the historical facts about a language as well as language borrowing and coincidental similarities between languages. These are the external facts that we know about a language's typology. For example, we know from comparative historical linguistics that German, English, French, and Spanish all derive from the (Proto) Indo-European language family (Lehmann, 1992). Both English and German also belong to the (Proto) Germanic subgroup within this family and consequently share many similar features, particularly at the syntactic level. In this respect, German and English are typologically closer to each other than to Spanish or French.

However, it is crucial to bear in mind that despite the seemingly obvious proximity between E-language systems such as German and English, the matter is complicated at the

lexical level by extensive lexical borrowing. Evidence for this can be found in the English language, which has a large number of Latinate words adopted during the Norman Conquest beginning in 1066 (Lehmann, 1992). Thus, one might argue that English is in fact closer to French than to German because of the relexification of English by the French.

An example of one possible version of E-typ vocabulary profiles can be seen in figure 1.4. This figure shows a hypothetical distribution of vocabulary source categories, Other, Germanic, and Latinate, in the three languages in proportions, represented in percentages, as they occur in each language. In this profile, we hypothesize that Spanish is comprised mainly of Latin origin words with some words from other source languages. Because of the heavy borrowing found in the English lexicon, we hypothesize that English also consists of principally Latinate vocabulary. The next largest category of words in English would be Germanic, with other source languages providing a smaller number of vocabulary items. Finally, we hypothesize that German includes primarily Germanic vocabulary, with less Latinate vocabulary and an even smaller quantity of other source language vocabulary.

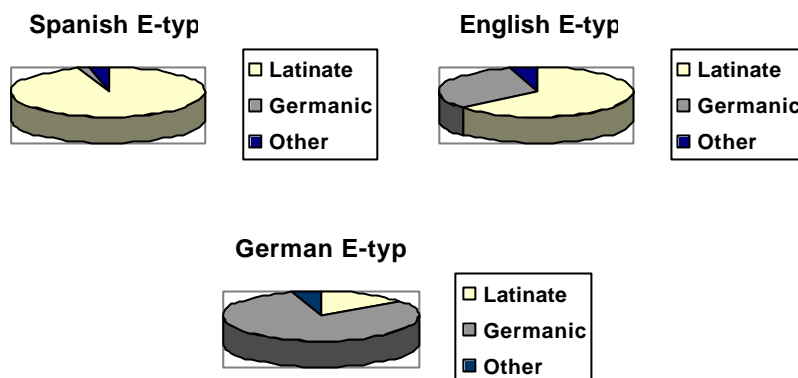


Figure 1. 4: Hypothesized E-Typ vocabulary profiles for Spanish, English, and German. Linate and Other vocabulary are of lower frequency in the English and German profiles. Other vocabulary is of lower frequency in Spanish.

Next, Hall's I-typ category refers to what is actually represented in the minds of the individual L3 learners (Hall, 2004). These are the internal facts about language and are dependent on the proficiency of the learner. At the lexical level, for example, this would be reflected by the proportions of cognates (form and frame) present in the minds of the individual learners (Hall, 2004). These proportions may not coincide with proportions of cognates represented in E-typ since the mental lexicons of individuals are reduced in size. Further, the proportions may vary from individual to individual due to such factors as vocabulary size and stability at the time of measurement (see Hall & Ecke, 2003, for a more extensive listing of factors).

A hypothesized I-typ profile for a native Spanish speaker, fluent in English, who is learning German is presented in figure 1.5. This graph illustrates the assumed proportions, represented in percentages, of the learner's knowledge of words from each language source category. For Spanish, since the speaker is native, we assume that the majority of words known

will be of Latinate origin, just as with the E-typ profile. As the speaker is proficient in English, we expect that the (s)he will have a smaller English vocabulary than Spanish vocabulary. This variation in vocabulary size is not reflected in figure 1.5 since this graph shows only the percent proportions of source vocabulary in the mental lexicon of the learner, not the size of the lexicon. Moreover, since we hypothesize that the learner knows more higher frequency words in English, and those words tend to be of Germanic origin, we expect that the majority of English words known will be of Germanic origin, with fewer Latinate and Other words. Finally, since the speaker is a beginning learner of German, we hypothesize that the vocabulary size of the L3 is substantially smaller (again, this is not reflected in Figure 1.5) and is comprised primarily, if not completely, of Germanic vocabulary since we hypothesize that the higher frequency words in German will be of Germanic origin and higher frequency words are generally taught before lower frequency words.

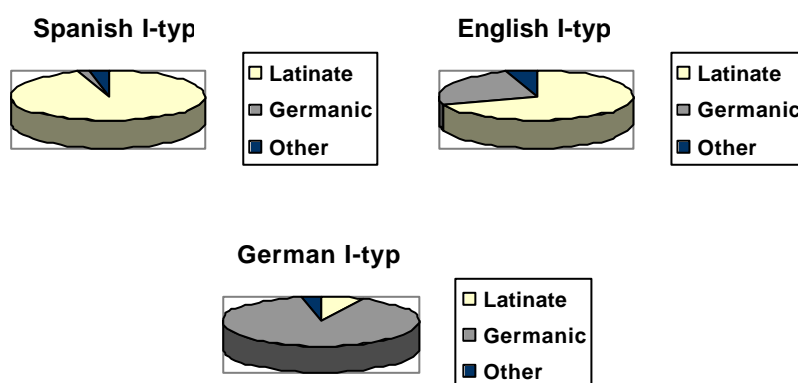


Figure 1.5: Hypothesized I-typ profiles of a native Spanish speaker who is proficient in English and a beginning learner of German. These figures present only known vocabulary and do not account for the vocabulary present in the E-typ profiles that are unknown by the learner.

Finally, Hall's category of P-typ refers to the perception (psychotypology) that a learner has regarding the proximity of the languages (s)he is acquiring (Hall, 2004). This perception may be conscious or unconscious. Conscious perception would be if the learner were aware of the E-typ facts regarding language proximity. Unconscious perception would be part of the I-typ category and would be when the learner detects similarities during the acquisition process.

Considering these three forms of typology, one can see that researchers of L2 and L3 acquisition need to be very careful in asserting that psychotypology is a factor in cross-linguistic influence. Very often learners may consider only one aspect of language, such as syntactic structure, for example, when determining proximity. Thus, a Spanish speaker who is proficient in English and is learning German may believe that German is typologically closer to English than Spanish is to English (psychotypology) since German and English are historically related and have more similar syntactic structures. However, historical typology refers to all aspects of language structure such as word order, phonology, vocabulary, etc. and not just to syntactic structure. Therefore, it is possible that the learner actually knows more typologically close structures between English and Spanish than between English and German (this is what is actually represented in the learner's developing language system). An instance of this would be if the learner knows more Spanish/English cognates, which are an example of typology as a result of borrowing from French, than English/German cognates. In this respect, then, the learner's psychotypology does not correlate with what is actually represented in the developing language system.

A further example of the confusion between typology and psychotypology represented in the current literature is found in an explanation of CLI effects between Basque, English and Spanish offered by Cenoz (2003):

Following De Bot (1992) and Paradis (1987) it could be hypothesized that the representation of the Basque linguistic system is more independent or distant from the representation of the Spanish and English linguistic systems, that is, Basque is represented relatively more separately because it is typologically distant and presents a different syntactic structure. Therefore our results indicate that when the languages involved are typologically distant and present important differences at the lexeme and lemma levels, the effect of typology would be stronger than the effect of L2 status. (p. 114)

The difficulty with this explanation is that it does not consider that what is represented in the linguistic system as a whole, and consequently all of the information on linguistic typology of the L3, is not present in the individual learner. Rather, what is represented within the individual is a developing language system. Thus the expectations of the learner (psychotypology) may not coincide with the typological facts of the language (s)he is acquiring.

According to Hall (1996), CLI effects are caused, at least in part, by the actual numbers of cognates within the mental lexicons of the learner, which again may or may not coincide with the expectations of the learners. Therefore, in the case outlined above, an alternative explanation could be that the subjects in the study knew more cognates between English and Spanish than between English and Basque. Consequently, although the above example is a case where the typological facts predict that transfer will occur more often between Spanish and English, it does not clearly demonstrate the role of psychotypology in the acquisition of an L3.

The main purpose of this study, therefore, was to develop profiles of E-typ, I-typ, and P-typ in an effort to determine if these three typologies are distinct. The profiles focused on Spanish as an L1, English as an L2, and German as an L3. Using this information, the correlation between L3 word development (represented by the learners' I-typ), typology (represented by E-typ), and psychotypology (represented by P-typ) were assessed to determine what effects, if any, psychotypology has on the development of L3 vocabulary. In the following chapter we discuss the methods used to collect the data for this study.

2. Methodology

This chapter provides a detailed explanation of the methods used to obtain the data for this study. It describes the process, including revisions, to data collection procedures during the course of the study and the reasons for these changes. This chapter begins with an overview of how the language source components of the three languages involved were determined, followed by a description of the subjects involved. It then moves into a comprehensive account of the instrument designs for both English and German vocabulary and continues with a brief description of the pilot study. This chapter concludes with a report of the actual collection process.

2.1 Preliminary stage

Before the empirical study could be conducted it was first necessary to obtain vocabulary source profiles (E-typ) of the three languages involved: Spanish, English, and German. For Spanish and English, this information was gathered from previous studies. Source languages for German vocabulary were calculated by the researcher and the details of this procedure are explained below in section 2.1.2.

2.1.1 Spanish and English Vocabulary Source Profiles

Figures for Spanish language sources were gathered from a previous study (Patterson, 1986) that classified Spanish words according to functional, physical, and chronological classes and their status as borrowed or inherited. In the above study, figures for the occurrences of borrowed and inherited words in Spanish were arrived at using *The Frequency Dictionary of Spanish Words* (Rodriguez & Rodriguez, 1964, as cited in Patterson, 1986) as a corpus. This dictionary covers the 5000 most frequent words in the Spanish language, which account for 90% coverage in any representative Spanish text (Patterson, 1986). As expected, Patterson (1986)

found that Spanish vocabulary derives primarily from Latinate sources with nearly 81% of all vocabulary sampled falling into this category. Germanic source words are counted as part of the 'Other' source language category and represent less than 1.7% of all words in the Spanish language (Patterson, 1986). Another 17% of vocabulary is not accounted for in the Patterson study and no explanation is given for this discrepancy by the researcher. Since the 'Germanic' source category in the Spanish language was not differentiated in the Patterson study, it was also not accounted for separately in this study. This was assumed to have no significant effect on the findings since the numbers of Germanic words are so minimal.

To acquire figures for the English vocabulary source profile, data from a study conducted by Finkenstaedt & Wolff (1973) were consulted. This study consisted of a computerized survey of the 80,000 entries in the *Shorter Oxford Dictionary* (3rd ed.) to profile source languages of English language vocabulary. Unlike the study above, frequency was not accounted for here. This survey revealed that English comprises 56.54% Latin origin vocabulary, 25% Germanic source vocabulary, and 13.63% other language source vocabulary (Other) (as cited in Ask Oxford, 2005). Vocabulary language sources for Spanish and English are summarized below in figure 2.1. Proportions of the distribution of vocabulary deriving from the three language sources are represented in percentages.

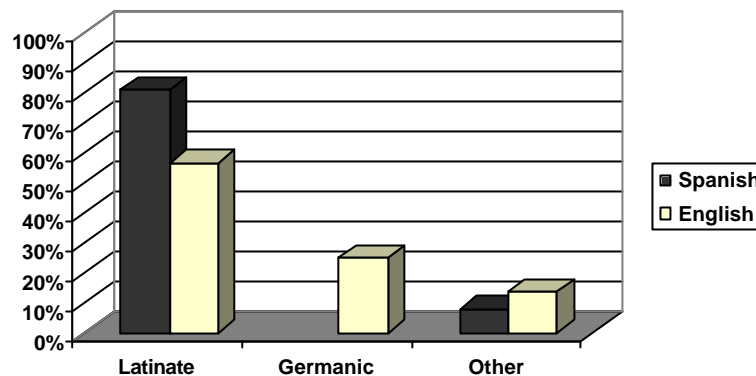


Figure 2. 1: Spanish and English vocabulary source profiles

2.1.2 German Vocabulary Source Profiles

Since no data was available regarding vocabulary profiles in German, figures were calculated for this study by randomly sampling 500 dictionary entries from the *Duden: Die deutsche Rechtschreibung* (Drosdowski, Müller, Scholze-Stubenrecht, & Wermke, 1996). Nation (2001) observes that one major problem with dictionary sampling is an overrepresentation of high frequency words. Generally, this occurs because higher frequency words have more entries in the dictionary than lower frequency words. Consequently, if a study uses a spaced sampling method to obtain vocabulary (e.g. selecting every 10th word in the dictionary), the incidence of high frequency words is higher resulting in an overestimation of the learner's vocabulary size. For this study, we were not interested in the learner's vocabulary size; rather we were interested in discovering the language sources of the German vocabulary known by the learners so that this could be compared to the profile developed here of the German language as a whole (E-type). Since the vocabulary found in the German is made of low- and high- frequency words to obtain

an accurate E-typ, it was important to obtain a representative sample of German vocabulary without an overrepresentation of high frequency words.

To remedy this problem, the following procedure was adhered to during the German vocabulary sampling process. First, the numbers of words under each letter of the German alphabet were estimated. This was done by taking the total number of words in the dictionary as a reference point and calculating the proportions of words under each letter. Next, using these proportions, the number of words needed from each letter category to meet the 500-word sample was determined. Once these numbers were obtained, the average number of entries on each page of the dictionary was estimated. Each page of the dictionary contains on average 45 entries; thus, the numbers 1 through 45 were randomized. Words in each letter category were selected according to the corresponding number entry on each page.

For example, words beginning with the letter *O* represent 1.6 % of words in the German language. For a sample of 500, 1.6 % would be 8 words. Thus, the numbers 1 to 45 were randomized and the first 8 numbers were chosen: 23, 2, 17, 3, 20, 8, 45, and 25. Page numbers under the *O* entries were then randomly selected and one word from each page was chosen to obtain the eight items. Thus, from the first page selected, the 23rd entry *Obliteration* was chosen and from the second page selected, the second entry, *Omelett* was selected. Once the German sample was acquired, the source language for each word was determined using etymological information provided by a German dictionary, *Duden: Die deutsche Rechtschreibung* (Drosdowski, et al., 1996) and a German etymological dictionary, *Kluge: Etymologisches Wörterbuch der deutschen Sprache* (Kluge, 2002).

When considering the etymology of the words, those words that the sources indicated were of English origin were then cross-checked with an English dictionary containing

etymological information to verify their language origins. This was done only in the case of English words because one cannot assume that English words are necessarily of Germanic origin due to extensive borrowing in English from other languages. When German words were found to be of French or Spanish origin, they were listed as Latinate since the greater majority of words in these languages derive from Latin.

Additionally, those words that were found to be compounds were analyzed according to their components. If the separate components of these words were of the same origin, they were listed under the source language of Latinate or Germanic. If the words comprised mixed components, i.e. a Germanic component and a Greek component, they were listed as Other. All other words that did not derive from Latinate or Germanic sources were listed under the 'Other' category (see Figure 3.1 for a comparison of German E-type to Spanish and English E-type profiles).

2.2 *Subjects*

Subjects for the two empirical studies, the P-type and the I-type profiles, initially consisted of 49 second semester German students at a private Mexican university. These students were enrolled in the second level of German in order to fulfill their foreign language requirement and had had 64 class contact hours of German study at the time of this study. According to the policy of the university, students must have completed at least university level intermediate English or have achieved at least a score of 500 on the TOEFL exam to enroll in German language classes. It was therefore assumed that the subjects had at least an intermediate level of English. Four intact German classes were tested during their regular class times to determine I-type and P-type profiles. Three classes were tested in one session each and one class was tested over a period of

two class sessions due to time constraints. Six subjects from the class that was tested over two sessions were eliminated from the original subject pool since they did not complete the second phase of the experiment, the vocabulary tests. Additionally, two subjects were eliminated because they did not respond to a minimum of two-thirds of the English vocabulary items presented. This brought the final number of subjects down to 41.

2.3 *Instruments*

Three instruments were employed in this study: an English vocabulary knowledge instrument, a German vocabulary knowledge instrument, and a psychotypological beliefs instrument. The first two instruments were designed to determine the typology of the L2 and L3 lexical items contained within the subjects' multilingual mental lexicons (I-typ). The purpose of the psychotypological profile instrument used in this study was to determine the subjects' beliefs regarding typological proximity or distance between the three languages (P-typ).

Vocabulary instruments for the study were created using the figures on the proportions of Latinate, Germanic, and Other source words obtained from the language word source profiles (see above). That is, the English and German vocabulary knowledge instruments were designed to reflect the proportions of words taken from Germanic sources and from Latinate sources. For English, the vocabulary instrument also includes the proportion of words obtained from Other sources. This latter category of vocabulary was eliminated from the German instrument because of insufficient numbers of words in this group within the pool of words from which the target vocabulary was selected (see below for further discussion on vocabulary selection).

Furthermore, word frequency was accounted for in both instruments. Previous studies indicate that knowledge of the first 10,000 most frequent words in the English is considered a very broad vocabulary base for L2 learners of English (Schmitt, Schmitt, and Clapham, 2001).

For an L2 learner to know a large number of words above the 10,000 frequency level would be quite exceptional and unlikely for the subject pool of the study and so the target vocabulary is restricted to words that fall within or below this frequency range. Likewise, since the study population comprises beginning learners of German, it is unreasonable to assume that they have knowledge of lower frequency vocabulary since their exposure to German has primarily been through school textbooks. As such, textbooks generally only introduce the higher frequency vocabulary of a language since this is most useful to the language learner.

With the above considerations, the study presented here adapts two versions of the vocabulary levels test of the English language (Schmitt, et al., 2001). Schmitt et al. created the original versions by randomly selecting vocabulary items from frequency counts in Thorndike and Lorge (1944), Kucera and Francis (1967), and the General Service List (West, 1953). Additionally, words for the vocabulary levels test were randomly selected from the University Word List compiled by Xue and Nation (1984) (Schmitt, et al., 2001). For German, since no appropriate instrument for this study could be located, words were randomly selected from the vocabulary index of the textbook used by the subject population, *Berliner Platz 1: Deutsch im Alltag für Erwachsene* (Lemke, Rohrman, & Scherling, 2002). The adaptation of the English instrument and the creation of the German instrument are explained in detail in the next two sections of this chapter.

2.3.1 *English Instrument*

As mentioned above, the English vocabulary instrument used in this study is adapted from two versions of the vocabulary levels test developed by Schmitt (2000) and Schmitt, et al. (2001). These tests attempt to measure the breadth of vocabulary knowledge at each of the frequency levels and at the academic word level. The original design of these tests divides

vocabulary according to frequency levels, i.e. according to how frequently these words appear in spoken and written text. These tests include words from the 1000 most frequent words, from the 2000, 3000, 5000, 10,000 frequency levels, and from the academic word level, the latter of which comprises vocabulary taken from the 3000 and 5000 frequency levels (see above for sources). Target words in each word group are ordered alphabetically and each word group contains only one word class.

Further, the vocabulary levels tests maintain the distribution of word classes (for every 3 nouns there are 2 verbs and 1 adjective) found within the stratified sample from which the researchers gathered vocabulary. The design of the tests include features to minimize guessing on the part of the test taker such as ensuring that none of the target items or distractors within each word group has overlap in meaning and by giving definitions that do not begin with the same letter as the target word. However, cognates were not accounted for in the original test design since these tests were developed to be used by learners of English with any native language background.

Because of the careful design and selection of vocabulary in the original versions of the test, word groups were left intact for the adapted instrument; however, since it is the purpose of this study to determine the types of words known by the subjects (I-typ) rather than the amount or the depth of knowledge of vocabulary, some changes were made to the design of the instrument. First, since it is only necessary to test passive knowledge of vocabulary to determine the typological profile of the subjects' L2 and L3 mental lexicons, Spanish synonyms, translation equivalents, or definitions were given in lieu of the English synonyms or definitions provided in the original instrument.

Likewise, cognate translation equivalents were avoided to minimize guessing. In lieu of cognates, brief descriptions or definitions of the target vocabulary were provided. The use of one- to several- word definitions is consistent with the format of the original vocabulary test, which also offers one- to several- word definitions. To ensure accuracy of the translations, a native Spanish speaker who was fluent in English checked all Spanish translations. To maintain the formatting of the original instruments, definitions were also ordered according to length with the shortest definition or translation equivalent appearing first.

Next, care was taken to ensure that the instrument contained the same proportions of Latinate, Germanic and Other vocabulary as found in the E-typ profile so as to be a more representative sample of English vocabulary in general (see table 2.1 below). Since the vocabulary levels tests closely represent the vocabulary language source proportions for English found in other studies, version 1 of the vocabulary levels test (Schmitt, 2000) was used as the basic instrument. However, the academic vocabulary in the original instrument was eliminated since it is not of interest to this study to measure academic word knowledge and since this category is comprised primarily of Latin-based vocabulary.

In place of the academic word level groups, intact word groups were chosen from the 3000, 5000, and 10,000 word frequency levels of version 2 of the vocabulary levels test (Schmitt, et al., 2001). These word groups were chosen according to word class and the number of Latinate, Germanic, and other source language target words they contained so that the final instrument would maintain, as closely as possible, the word class proportions (5 nouns for every 3 verbs for every 2 adjectives) of the original instruments. Thus, of the total number of 50 word groups in the final instrument, 25 were noun groups, 16 were verb groups, and 9 were adjective

groups. Finally, test instructions and examples were provided in Spanish so that the subjects would have a clear idea of what they were expected to do for the vocabulary tests.

Table 2.1: English vocabulary instrument language source distribution

Language Sources	Proportions	English language E-type profile proportions
Latinate	57% (86 words)	56.54%
Germanic	28% (42 words)	25%
Other languages	15% (22 words)	13.63%

2.3.2 German Instrument

The design of the German vocabulary instrument was modeled on the English vocabulary instrument since no appropriate instrument from other studies was located. For word selection, random sampling of the dictionary proved to be inadequate for the study since the majority of words tended to be of low frequency and the subjects, as new learners of German, would not have had exposure to these words previously. Using the German translations for the target words in the English instrument was likewise not feasible, again because of the level of German the learners had acquired. Based on these considerations and since it was expected that the majority of the subject pool had taken both levels of German within the university, the word lists at the end of the German textbook used in the first two levels of German at the institution were used for random sampling of vocabulary.

Initially, the plan was to use the same number of target words as in the English instrument. Thus, random selection consisted of assigning each word in the textbook word list a number and randomizing the list. Once this process was completed, the first 150 numbers

randomly selected, and their corresponding words, were chosen as target vocabulary. Target vocabulary word origins were then verified using a German dictionary (Drosdowski, et al., 1996) and a German etymological dictionary (Kluge, 2002). This check revealed that the majority of words selected from the word list (67%) have Germanic origins while Latinate sources account for 27% of all words and the remaining 6% fall into the Other category.

This textbook vocabulary survey contradicted the E-typ results from the dictionary survey. In the dictionary survey, of the 500-word sample, 51% derived from Latinate sources, 21.4% from Germanic sources, and 28% from Other sources (see Figure 3.1 in the next chapter). Consequently, the idea of using 150 target words was reconsidered since it was assumed that continued random sampling of the word list would provide the same ratios of language sources and it was pertinent that the proportions found in the E-typ profile be maintained. Moreover, since the subjects for the study had had only 64 contact hours of German language study, it is unreasonable to assume that the breadth of their vocabulary knowledge in German would equal that of their vocabulary knowledge in English.

The above considerations prompted a change in the number of target items from 150 to 60 in the German vocabulary instrument. The decision to use 60 was based on the idea that the amount of vocabulary acquired by the German learners would be less than half of the vocabulary attained in English. Also, previous studies indicate that providing a minimum of 30 target items in a vocabulary test is sufficient for assessing learners' word knowledge (Nation, 2001). However, to provide as much data as possible, and since the level of proficiency for the subjects was greater in English than in German, the original number of 150 target items was kept for the English instrument.

Consequently, 60 target items were selected from the pool of 150 words previously chosen. Selection decision was based on the source language of each word in an effort to match as closely as possible the word origin profiles found in the dictionary sample. Because the numbers of Other words was insignificant in the textbook random sample, this category was eliminated from the German instrument. However, this caused the textbook random sample to be incompatible with the E-typ profile. To correct this disparity, an adjustment in the calculation of the E-typ profile was needed.

To adjust the proportions in the E-typ profile, the Other category was eliminated from the 500-word dictionary sample. This change resulted in the total word count in the dictionary sample to be reduced from 500 to 362 words, all of Latinate or Germanic origin. Of these 362 words, 255 derived from Latin (66%) and from 107 German (33%). These figures became the proportions for the revised E-typ profile.

Once the E-typ profile was revised, vocabulary items were selected for the German instrument while maintaining the proportions in the adjusted E-typ profile as accurately as possible. Thus, since the majority of words needed to be from Latinate sources to fit the E-typ profile, all 40 of the Latin origin words from the original textbook random word list sample were kept for the final instrument and 20 Germanic words were randomly chosen (see table 2.2). As with the English instrument, care was taken to ensure that the German vocabulary instrument also contained the word class ratios reflected in the textbook vocabulary list (7 nouns: 1 verb: 4 adjectives). Therefore, the final instrument contained 13 word groups containing 6 nouns each, 3 word groups containing 6 verbs each, and 4 word groups containing 6 adjectives each (see Figure 2.3 for an example of a noun word group in the English and German instruments).

Table 2.2: German vocabulary instrument language source distribution

Language Sources	Vocabulary instrument proportions	Revised German language E-typ profile proportions
Latinate	66% (40 words)	66%
Germanic	33% (20 words)	33%

As with the English instrument, the German instrument is an attempt to test passive vocabulary knowledge. Hence, definitions of the target items were presented in Spanish. This was accomplished with the aid of a native German-speaking teacher of German who is fluent in Spanish. Additionally, a native Spanish speaker who was fluent in German checked all Spanish translations to ensure accuracy in the L1. Again, to minimize guessing, all cognate translation equivalents were avoided and definitions or descriptions were offered in their place. Definitions, as in the English instrument, were ordered by length and instructions and examples were also provided in Spanish in order to ensure that the subjects understand fully the nature of the task. (See Appendixes 1 and 2 for complete depictions of the English and German vocabulary instruments).

2.3.3 *Psychotypological Survey*

The psychotypological survey was taken from another previous study (Hall, et al., 2004) and was designed to reveal subjects' beliefs regarding the proximity of the three languages involved in the study. The survey consisted of five multiple-choice questions that asked subjects about their opinions regarding similarity between the three languages, the ease of learning of the languages involved for both native English and native Spanish speakers, and the historical relationship of the three languages. (See Appendix 3 for psychotypological instrument).

2.4 *Pilot Study*

The English and German vocabulary instruments were piloted prior to the experiment to assess the quantity of time subjects would need to complete the tasks and to determine if there were any errors in design. The psychotypological instrument was not piloted since it had been used in another, related study at the same institution the previous year.

Six volunteer subjects from level 3 German classes participated in the pilot. As an incentive, these students received one extra point on their participation grade for the class. One of these students was a native English speaker and was therefore given the German instrument to pilot. The fact that she was not a native Spanish speaker presented no problem for the pilot since the purpose here was to assess the feasibility of the study, rather than the I-type of each subject. Of the remaining five subjects, two more received the German instrument and three of the students were given the English instrument.

Subjects were instructed to complete the vocabulary tests as quickly as possible and to leave blank any item that they did not know the answer to. Those who were taking the English vocabulary test were told they had 30 minutes to complete the task. This corresponds with the amount of time given to subjects for the same task in the study conducted by Schmitt, Schmitt and Clapham (2001). Since the German vocabulary test was one-third the size of the English test, subjects were given 20 minutes to complete the task. Each subject was timed individually to assess the amount of time necessary to finish the tests.

All subjects completed the vocabulary tests much more quickly than expected. Average time for completion of the English test was 15.6 minutes, while the German instrument was completed on average in 7.3 minutes. The average number of correct answers for the English vocabulary test for the three subjects was 116 words (77%), while the average number of correct

responses for the German was 52 words (87%). Consequently, the decision was made to give subjects in the final experiment 20 minutes to complete the English instrument and 10 minutes to complete the German instrument, for a total of 30 minutes for both instruments.

For English, one problem in the test, a vocabulary translation, was identified. The English word *impudent* was translated as *barbaján* in the original test. Due to the difficulties this word presented, the meaning was checked, determined to be incorrect, and the translation was changed to *insolente* for the final instrument. The German instrument presented no identifiable problems and was therefore left intact for the final test instrument.

2.5 Procedure

Before beginning the experiment, subjects were told orally that this study was part of a larger study being conducted at the university to explore the acquisition of third language vocabulary. They were also told that their participation was anonymous and voluntary and that if they did not wish to participate, they were not required to. All students present in the class sessions participated in the experiment.

The experiment consisted of two phases: the psychotypological survey and the vocabulary exams. In all cases the psychotypological instrument was applied first to ensure that subjects were not influenced by the word familiarity task of the English and German vocabulary instruments. The psychotypological survey consisted of five multiple choice questions designed to assess the language beliefs of the subjects. The questions addressed subjects' beliefs regarding the proximity of Spanish, English, and German; which language, English or German, was easier for a native Spanish speaker to learn; which language, Spanish or German, was easier for a native English speaker to learn; and what historical relationship there was between the three languages. Students were given five minutes to complete the survey and surveys were collected

before the application of the vocabulary instruments (see Appendix 3 for the psychotypological survey).

For the second part of the experiment, six versions of the vocabulary tests were evenly distributed to the subject pool. Three began with the English vocabulary instrument and three began with the German vocabulary instrument. Within the English and German instruments, blocks of words were rotated so that the words that some subjects would see first were seen last by other subjects. The rotation of English and German instruments and the vocabulary was done with the consideration that some subjects may tire during the testing process and either not complete the tests or rush through the last part in order to finish. Rotation ensured that all words would get equal attention overall by the subjects.

For the vocabulary portion of the experiment, subjects were instructed to answer the vocabulary tests as quickly as possible and not to try to guess any of the answers. If there was a response that they did not know, they were to leave the answer space blank. They were also told that they had 30 minutes to finish the vocabulary tests. Questions regarding the meaning of words were not answered and subjects were told again that if they did not know the answer to leave the space blank.

The vocabulary tests consisted of groups of six words, three of which had translation equivalents in Spanish. Students were asked to write the number of the English or German word that corresponded to each of the translations next to the translation. They were also told in the instructions that not all six words had a translation in the test. An example was given at the beginning of both the English and the German tests that showed the initial block and the correct answer. Figure 2.3 gives an example of an English and a German vocabulary group as they appear on the vocabulary instruments.

1 arsenal	___ apuro	1Kasten	___ error
2 barracks	___ clérigo de iglesia	2Fehler	___ aceite
3 deacon	___ satisfacción, alegría	3Öl	___ parada de transporte público
4 felicity		4Aufgabe	
5 predicament		5Station	
6 spore		6Juli	

Figure 2. 2: English and German vocabulary translation tasks

One student in the first testing session noticed, and brought to the researcher's attention, a typographical error with a Spanish translation. The word *herbívoro* was written as *hebivero* and had escaped the notice of the researcher, pilot participants, and the native Spanish speakers consulted during the design phase of the instrument. Students in consequent testing sessions were informed of this error prior to the test. This error had no effect on the responses given, most likely because the two spellings were so close as to be easily overlooked. The item was therefore not eliminated from the data analysis.

3. Analysis and Results

We conducted this study with the premise that there is a need to differentiate between psychotypology and typology in studies of cross-linguistic influence. Consequently, for this study three forms of typology were differentiated: E-typ, which represents the historical typological facts of a language; I-typ, which represents the typological facts of the individual's mental lexicon; and P-typ, which is the learner's perception regarding typological proximity or distance of languages (Hall, 2004). Using the assumption that these three types are important in research that studies CLI, the purpose of this study has been to ascertain if a correlation exists between typology, psychotypology and L3 vocabulary acquisition. In this chapter, we look at each component and present the results and analyses of the study's findings in reference to the three forms of typology outlined in chapter one.

3.1 *Language Profiles*

As mentioned in section 2.1 above, previous research (Patterson, 1986) demonstrates that 81% of Spanish vocabulary derives from Latin sources while other language sources account for 1.7% of the vocabulary surveyed. For English, previous research (Finkenstaedt & Wolff, 1973) shows that the lexicon is composed of 56.54% Latinate vocabulary, 25% Germanic vocabulary, and 13.63% Other vocabulary. Our survey of the German lexicon indicates that out of a 500-word sample, Latinate sources account for 255 words (51%), Germanic sources contribute 107 words (21.4%), and Other languages, including Greek, supply the remaining 138 words (28%). However, note that in section 2.3.2, these proportions were adjusted during the instrument design phase of the study. Figure 3.1 shows the German vocabulary profile as compared to Spanish and English before these adjustments were made.

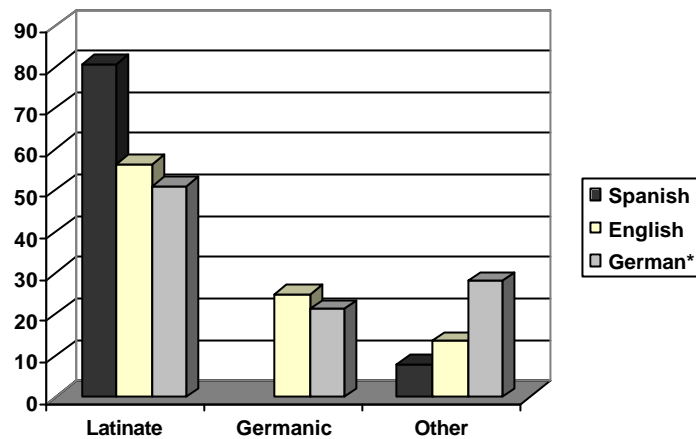


Figure 3.1: Unadjusted vocabulary source distributions

**Note:* But see section 2.3.2 for revised German vocabulary source proportions

3.2 Psychotypical Survey Results

Responses to the psychotypical survey were assessed to determine the subjects' beliefs regarding the three languages involved. The mean number of each type of response was calculated for each question presented. These results were then converted into mean proportions of responses to each question. Results obtained from this survey are similar to those found in Hall, et al. (2004) who used the same survey with first semester German students as opposed to second semester students.

An overwhelming percentage of subjects (95.4%) expressed the belief that English was most similar to German rather than Spanish, and 93.2% proposed that German and English were more similar to each other than German and Spanish and Spanish and English respectively. Most subjects (86%) also indicated that they believed that German would be easier for a native English speaker to learn than Spanish and 84.1% of the subjects surveyed believed that English would be

easier for a native Spanish speaker to learn. Additionally, 61.3% of subjects stipulated that German and English were more closely related historically (the correct answer). Table 3.1 summarizes these results.

Table 3. 1: Responses to psychotypological survey

Question	Options	% Response
Which language is more similar to German?	English	95.4
	Spanish	5
Which languages are more similar to each other?	German & English	93.2
	German & Spanish	6.8
	Spanish & English	0
Which language is easier to learn for a native Spanish speaker?	English	84.1
	German	15.9
Which language is easier to learn for a native English speaker?	Spanish	13.6
	German	86.4
Historically, in the language family tree, which is the correct relationship between the three languages?	[(Eng, Span) Ger]*	0.23
	[Ger, Eng, Span]*	34
	[(Ger, Span) Eng]*	0.23
	[(Ger, Eng.) Span]*	61.3

**Note the relationships of these language were presented in the form of a language tree in the original instrument.*

In the original English instrument design of Schmitt, Schmitt and Clapham (2001), the presence of cognates was not accounted for. There are at least two reasons for this. First, the test was designed to use with a variety of learners with different language and cultural backgrounds. This feature makes it impossible to factor in cognates since there is no standard L1 to use as a reference point. Additionally, the original purpose of this test was evaluative; it was meant to be used by teachers, administrators, or researchers to determine the vocabulary size of learners.

However, since the study presented here deals with lexical typology one must also account for the incidence of cognates between languages and across the three languages in order to fully analyze the data presented by the survey. A higher incidence of cognates between

languages indicates a higher level of proximity. For the purpose of this study, a cognate is defined as words with “at least 50% shared phonemes or regular variants (not counting inflections) in the same linear order” (Hall, et al., p. 23, 2004). Thus, the English vocabulary instrument was analyzed to assess the number of Spanish/English cognates present. Because this study focuses primarily on typology effects in L3 vocabulary acquisition, three types of cognates were identified in the German vocabulary instrument: English/German, Spanish/German, and English/Spanish/German. Since cognates across the three languages in the German instrument were found to be principally of Latinate origin (see below), it was deemed unnecessary to find cognates across the three languages in the English instrument since they would most probably be a subclass of the Spanish/English cognates and would offer no additional information for the study. Examples of each type of cognate identified in the German vocabulary instrument are given in table 3.2.

Table 3. 2: Cognate types- German vocabulary instrument

Cognate Type	Spanish	English	German
English/German		arm	Arm
Spanish/ German	taza		Tasse
English/Spanish/German	alcohol	alcohol	Alcohol

As such, the English instrument comprised 58 Spanish/English cognates and 92 noncognates out of 150 target items. Cognates account for 39% of all target words in the instrument. In the German vocabulary instrument, ten target words (17%) were English/German cognates. Only 2 target words out of 60 total (3%) were strictly Spanish/German cognates.

However, the majority of cognates in the German vocabulary instrument, 24 target words (40%), were cognates across the three languages and, of these, 96% (23 out of 24 words) were primarily of Latinate origin (see figure 3.2). The remaining 36 target items were noncognates with Spanish or English.

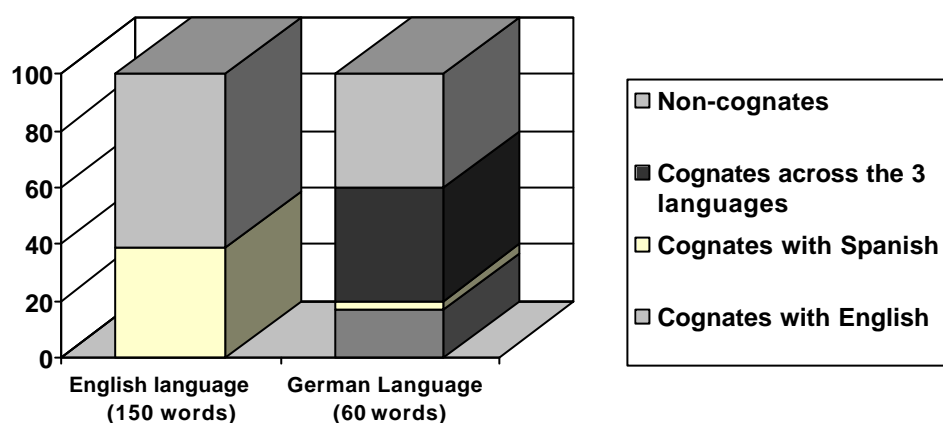


Figure 3.2: Cognate frequency in vocabulary instruments (in percentages)

3.3 Vocabulary Instrument Results

In order to determine the role typological and psychotypical effects have in learners' acquisition of languages, the data collected were analyzed to establish from what language sources the words subjects knew came from. First, means for the total number of correct responses for the English vocabulary test and the German vocabulary test were calculated. Next, to obtain an I-type profile of the subjects, means for the numbers of Latin-based words, Germanic words, and Other words were calculated for the English vocabulary test.

There were a total of 150 possible correct responses for the English vocabulary test. The mean proportion of correct answers provided by all subjects for the English vocabulary test was 64.03%. For the German vocabulary test, means for the numbers of Latinate words and

Germanic words were calculated. The total number of possible correct responses for the German vocabulary test was 60. The mean proportion of correct answers provided by all subjects for the German vocabulary test was 73%. These results are summarized below in table 3.1.

Table 3. 3: Means for correct responses and word type

Means	English vocabulary test n=150	German vocabulary test n=60
Mean number of correct answers	96.0 (64.03%)	43.8 (73%)
Mean number of Latinate words known out of the mean number of correct answers	60.7 (63.3%)	31.8 (72.6%)
Mean number of Germanic words known out of the mean number of correct answers	21.7 (22.6%)	12.0 (27.3%)
Mean number of Other words known out of the mean number of correct answers	13.6 (14.2%)	—

Using the data acquired from the vocabulary tests, the mean proportions for the types of words known were calculated in order to provide a comparison with the E-typ word profiles presented in section 2.1. Calculations show that for the English instrument, the mean proportion of Latinate words out of subjects' total number of correct responses was 63.3%. This was compared to the E-typ profile, which showed that English comprises 57% Latinate vocabulary. For Germanic words, the mean proportion of the subject correct responses in the English instrument was 22.6%, while the E-typ profile comprises 25% Germanic words. The proportion of Other words for both the subject responses to the English instrument and the E-typ profile were equal (14%). Figure 3.3 presents a comparison of the mean proportions of word sources for subject responses to the English vocabulary test and the E-type proportions of English word sources.

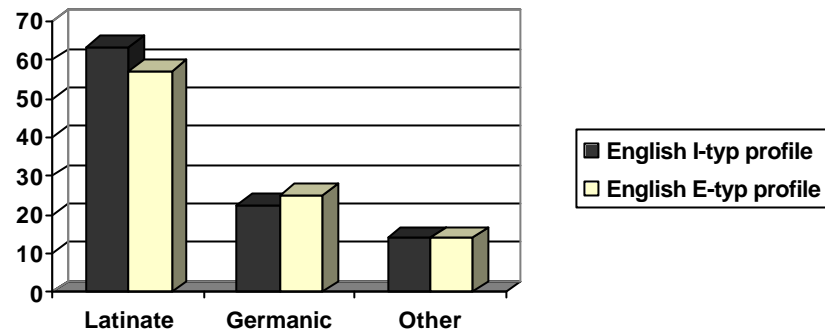


Figure 3.3: Comparison of distribution of language sources for vocabulary for subject responses to English vocabulary instrument to English E-typ vocabulary source profiles.

For German, the mean proportion of Latinate words from the total responses was 72.5% while the revised E-typ profile indicates that German comprises 66% Latinate words. The mean proportion of Germanic words in subject responses was 27% while the E-typ comprises 33% Germanic words. Figure 3.4 presents the mean proportions for subject responses to the German vocabulary test and the E-type proportions of German word sources.

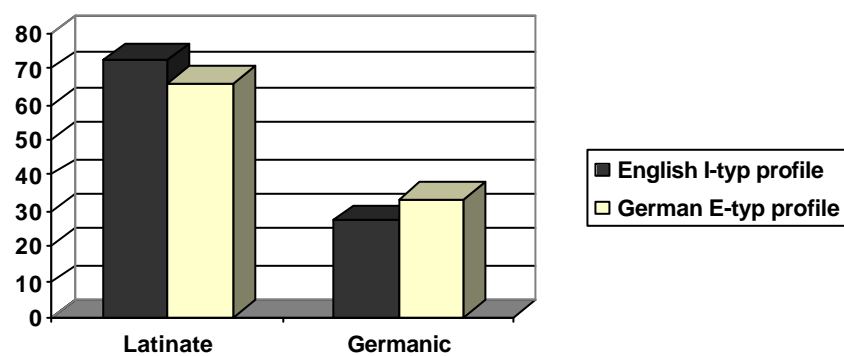


Figure 3.4: Comparison of distribution of language sources for vocabulary for subject responses to German vocabulary instrument to German E-typ vocabulary source profiles.

Finally, since the English and German vocabulary tests were designed to reflect the E-type profiles, and therefore contained more Latinate words than Germanic or Other category words, an argument could be made that subjects in the study were ‘directed’ to respond in a certain manner. That is, that by offering more Latinate words, the test offered subjects more opportunities to answer these items correctly thereby producing results that match the E-type profiles. To correct for this design feature, an additional calculation was made to determine the percentage of correct responses out of all Latinate words and out of all Germanic words in both the English and German instruments and the percentage of correct responses out of all Other words in the English instrument.

Results from this analysis show that out of a total of 86 Latinate words in the English vocabulary instrument, subjects knew on average 60.7 words (70.6%). Of the total number of Germanic vocabulary items (42) in the English instrument, subjects knew an average of 21.7 words (51.7%). For the Other category, subjects knew an average of 13.6 words out of 22 total words (61.8%) presented in the English instrument. For the German instrument, subjects knew an average 31.8 out of 42 Latinate words (75.7%) and 12 out of 18 Germanic words (66.5%) presented in the vocabulary instrument. These results are summarized below in table 3.4

Table 3. 4: Mean proportions of category words known.

Mean proportions of words in each category known by subjects	English Instrument	German Instrument
Mean proportion of Latinate words known	70.6% (n= 86)	75.7% (n= 42)
Mean proportion of Germanic words known	51.7% (n= 42)	66.5% (n= 18)
Mean proportion of Other words known	61.8% (n= 22)	_____

4. Discussion

This final chapter presents an interpretation and discussion of the results described in the previous chapter in reference to the hypotheses made at the onset of this study. The discussion proceeds by examining the three main aspects of this study, historical lexical typology (E-typ), the lexical typology found within the learners' repertoires (I-typ), and the learners' beliefs regarding proximity of the three languages (P-typ). The implications of the findings are then presented in a section that synthesizes the three aspects above. Finally, some methodological concerns and suggestions as to how these can be treated in future research are also presented.

4.1 *Lexical Typology*

The first phase of this study was to determine the E-typ profiles of the three languages involved. Data collected for this study did not support the initial hypothesis regarding the assumed language source profiles of German. That is, it was hypothesized that German comprises primarily Germanic words with fewer Latinate words and some Other words (see figure 1.2, repeated below in figure 4.1 for convenience). Rather, analysis of a random sample of vocabulary from a German dictionary revealed that the vast majority of German words (51%) are Latinate in origin, while 21.4% derive from Germanic sources, and 28% from Other sources. Based on these data, the hypothesized E-typ profile for German, shown in figure 1.2 of section 1.4, was revised to reflect the proportions outlined above. Additionally, figures for the proportions of source languages for Spanish and English vocabulary were adjusted for greater accuracy. Figure 4.1 presents the hypothesized E-typ profiles. Figure 4.2 presents the amended E-typ profiles for the three languages with adjustments to the German E-typ, Spanish, and English E-typ profiles based on the findings of this study.

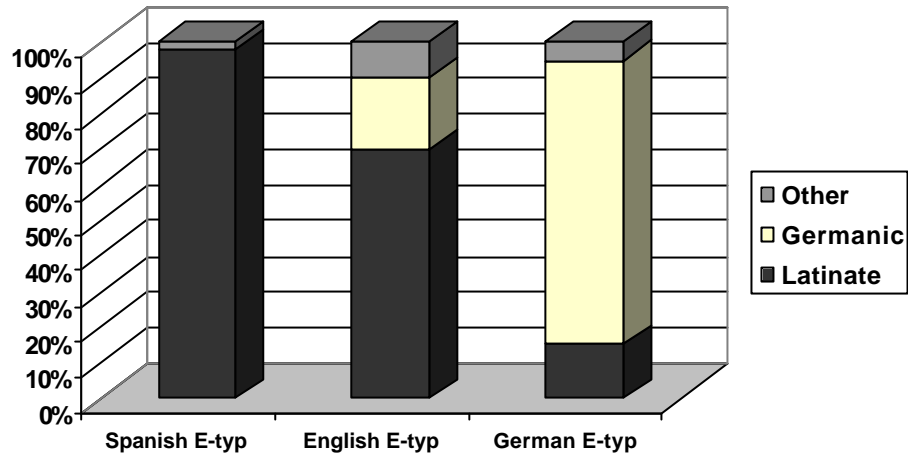


Figure 4.1: Hypothesized E-typ vocabulary profiles for Spanish, English, and German.

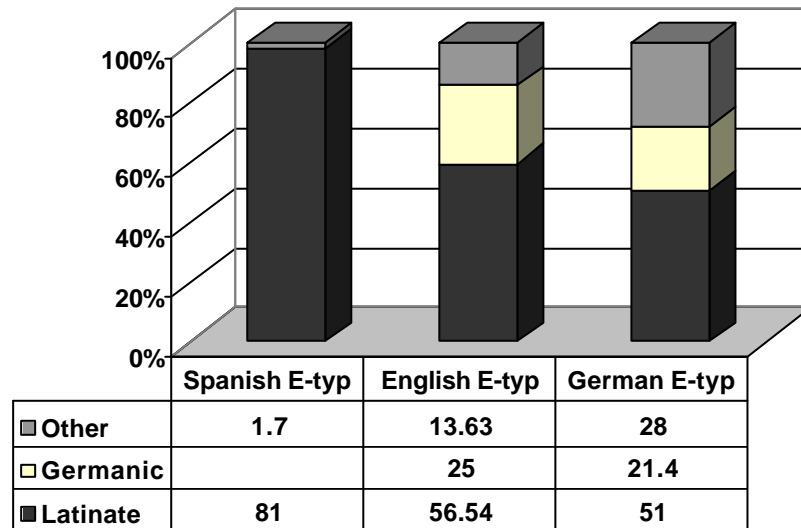


Figure 4.2: Revised E-typ profiles of Spanish, English, and German. Spanish and English word source proportions are adjusted based on the findings of this study. German profile is revised based on random sampling of a German dictionary.

Moreover, the data collected also demonstrate that the profiles of English and German, in respect to Latin- and German-based vocabulary, are the same. The E-typ profile for English reveals English comprises 56.54% Latinate vocabulary, 25% Germanic vocabulary, and 13.63% Other words profiles (see figure 2.1 in section 2.1.1). This is similar to the data presented above from the dictionary survey of German. Hence, the data presented above demonstrate that at the lexical level, English and German are typologically closer to each other than are Spanish and German.

This finding does not support the assumption set forth in section 1.4 that English and French (and therefore Spanish) are closer at the lexical level than English and German. Rather, the conclusion drawn from these data is that of the three languages, English and German are typologically closest at the lexical level. Nonetheless, to a great degree all three language lexicons are typologically similar since there is such a large presence of Latinate vocabulary in all three (see section 4.4 for further discussion on the implications of this finding). This is further supported by the large presence of cognates across the three language that were of primarily (96%) Latinate origin.

4.2 *Subject I-typ Profiles*

The second aspect we were concerned with in this study was to determine the language source distribution of word knowledge of third language learners. Although these data do give us some idea of the word source distribution within the mental lexicons of the subjects, they of course cannot determine the size of the mental lexicon. With this consideration, correct response rates for the English vocabulary test averaged 64.03% while correct response rates for the German vocabulary test averaged 73%. These figures should be considered in respect to the

instrument design when analyzing the data in that the German vocabulary instrument was designed using vocabulary from student textbooks, whereas the words for the English instrument were chosen randomly from frequency corpora. Consequently, the nature of the German instrument design results in slightly higher values for the proportions of words known in German as compared to those known in English since vocabulary was chosen from list of words already presented to the subjects during their course of study given their general level of proficiency in the two languages. We can therefore continue to assume that the subject's English mental lexicon is larger than the German mental lexicon.

Additionally, the data collected for this study demonstrate that when one considers the total words known by subjects, the subject I-typ profiles correspond with the E-typ profiles presented in chapter 2. The mean proportions for subject responses show little variation from the proportions found in the E-typ profiles. For English, there is a 6% difference between the proportion of Latinate words known by the subjects (64%) and the proportion of Latinate words found in the English vocabulary E-typ (56.54%). The proportion of Germanic words known by the subjects (27%) differs from the E-typ by 3%, while no difference can be found between the number of Other words subjects know (14%) and the number of Other words within the E-typ profile. Similarly, subject responses for the German vocabulary test show a difference of 6% from the E-typ profile in Latinate words (72%) and Germanic words (27%). Figure 4.3 reflects the revised I-typ profile and shows a comparison of revised E-typ and I-typ profiles.

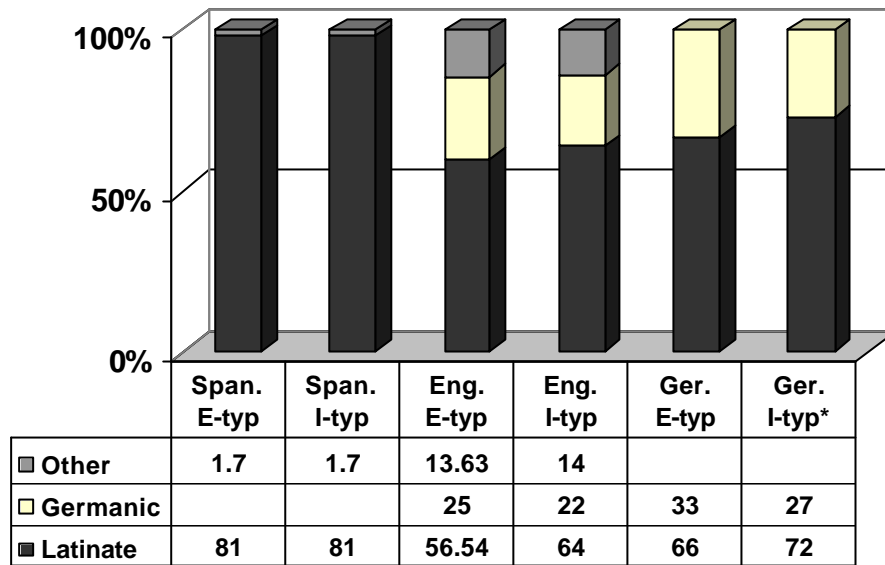


Figure 4. 3: Revised I-typ vocabulary profiles compared to E-typ profiles. Figures for I-typ present only known vocabulary and do not account for the vocabulary present in the E-typ profiles that are unknown by the learner. Spanish E-typ and I-typ are assumed to be the same for native speakers of Spanish.

**Note:* German E-typ omits ‘Other’ category and reflects adjusted profile used in instrument design (see section 2.3.2).

Another consideration here is the proportion of words known by subjects across the language source categories in each of the vocabulary instruments. This additional consideration is important because the design of the vocabulary instruments reflected the E-typ proportions of the English and German languages. Consequently, since a greater number of Latinate words were offered in the instruments, subjects had a greater chance to report Latinate vocabulary knowledge over Germanic vocabulary knowledge. Calculating the proportions of words known within each source language group corrects for this design feature.

As noted in section 3.2, out of the total number of Latinate words in the English vocabulary instrument, the subjects on average knew 70.6%; of the Germanic words, subjects correctly identified 51.7%; and of the Other category, subjects knew 61.8% of the words presented. In the German instrument, the proportion of Latinate words subjects identified

correctly out of a total of 42 averaged 75.7%; of the Germanic words presented subjects knew 66.5%. Figure 4.4 below summarizes these findings.

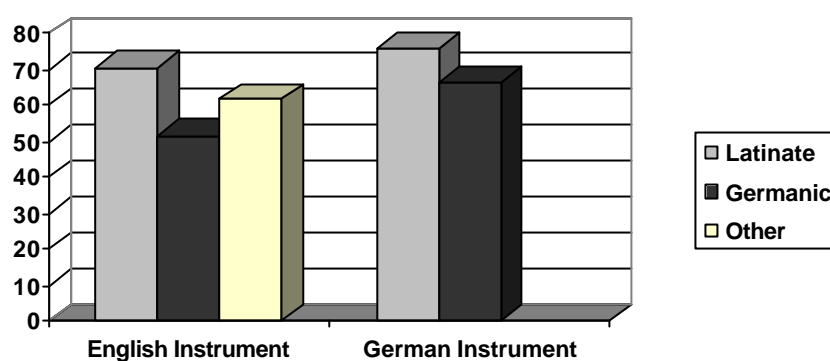


Figure 4.4: Proportion of subject responses across language source categories in the two vocabulary instruments.

Thus, our data have revealed two different measures of I-typ. The first measure shows a strong correlation between E-typ and I-typ. The second measure shows that the majority of subjects' vocabulary knowledge is of Latin origin. Based on the fact that both measurements indicate that Latinate words comprise the majority of vocabulary known by the subjects, the basis for subjects' beliefs that German and English are typologically closer is weak at best. This idea is discussed further in section 4.3 below.

4.3 *Psychotypological Beliefs*

The final aspect of the study concerns itself with learners' beliefs (P-typ) regarding proximity of the languages involved. As previously mentioned, an overwhelming majority of subjects (95.4%) expressed the belief that English was more similar to German than Spanish and 93.2% believed that of the three languages English and German were more similar than Spanish and English or Spanish and German. These answers correlate with the E-typ data presented

above, albeit weakly since those data suggest that English and German are only slightly more typologically proximal at the lexical level than Spanish and English or Spanish and German.

Interestingly, when the subjects were surveyed as to their historical knowledge of the three languages involved, only 61.3% of subjects stated that English and German were historically related. This figure is significantly smaller than the figures outlined above for psychotypological beliefs. The significance here is that on the basis of this figure it would appear that learners are not basing their beliefs regarding typological proximity or distance of Spanish, English, and German on the facts of historical linguistics. If learners are not basing their psychotypological beliefs on language facts, then one would conclude that they are basing their ideas on the experience that they have had with the three languages. In this case, this belief is unsupported by the I-typ data summarized above.

Further, although subjects expressed the belief that English and German are typologically closer, the I-typ data show that the majority of words subjects knew were of Latinate origin. Accordingly, the correlations shown in this study are not absolute correlations since the three languages have lexicons that are more similar than different and since learners' beliefs do not fully correspond with the facts of the languages and with the data regarding I-typ profiles. Thus, from the findings of this study, subjects appear to have only a weak basis for their beliefs regarding the proximity of English and German. This finding that subjects' beliefs regarding language proximity do not fully coincide with the facts of the languages involved is corroborated in parallel studies on the acquisition of second- and third- language vocabulary and is discussed in greater detail in section 4.4 below.

Notwithstanding the belief expressed by 84.1% of subjects that English and German were more similar than Spanish and English or Spanish and German, the majority of subjects believed

that English would be easier to learn than German for a native Spanish speaker. As Hall, et al. (2004) note, the perception that English is easier to learn than German for a native Spanish speaker may result from the high number of cognates shared by the two languages as a result of the influence of French on English vocabulary. Although a native Spanish-speaking learner of German may believe that German and English are more similar than English and Spanish, (s)he may subconsciously or consciously perceive that the incidence of Spanish/English cognates in the English language is higher than the incidence of strictly Spanish/German cognates (i.e. cognates that are not cognates across the three languages) in the German language

If in fact learners are basing their belief that English would be easier to learn than German for a native Spanish speaker on the numbers of cognates present between Spanish and English and Spanish and German, then this belief is unsupported when one considers the high number of cognates found across Spanish, English, and German. The data indicate that the number of Spanish/ English cognates (39%) present in the English vocabulary instrument is equivalent to the number of cognates across the three languages (40%) in the German instrument. Of the cognates across the three languages in the German instrument, 96% were of Latin origin. Consequently, the data here contradict claims by subjects that English and German are typologically closer. It is therefore important that future studies ascertain the source of learners' beliefs regarding the proximity of English and German. A summary of the numbers of cognates within the two vocabulary instruments is presented below in figure 4.5.

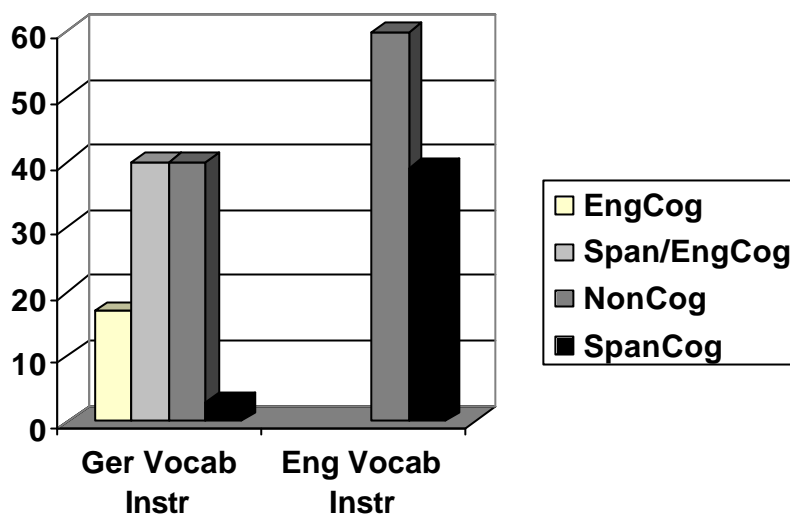


Figure 4. 5: Incidences of cognates in the German and English vocabulary instruments.

4.4 Conclusions

We have thus far considered each aspect of this study separately. In this section we return to the main purpose of this study, which is to explore the correlations between E-typ, I-typ, and P-typ. Accordingly, the data presented above show a strong correlation between E-typ, I-typ, and P-typ. Nonetheless, these correlations are not absolute since the three languages are more similar at the lexical level than they are different. The proportions of Latinate and Germanic (and in the case of English, Other words) in the three E-typ profiles are quite similar to each other and to the I-typ profiles. Still, the marked similarities between lexical items in Spanish, English, and German are not reflected in the typological beliefs expressed by the subjects regarding the proximity of the three languages. This lack of congruency between what learners' believe regarding language proximity and the facts of the languages involved has been demonstrated in

previous studies. Two such studies, based on the Parasitic Model of Vocabulary Development are discussed below.

The Parasitic Model (Hall, 2002; Hall & Ecke 2003) indicates that when learners encounter a new word in the target language, they will automatically and subconsciously identify the form of the novel word and attach it to the form and frame of the closest translation equivalent in the L1. The conceptual structure is then accessed for the target item via the L1 form and frame. In the case of cognates this happens much more quickly since the form is already represented in the L1 and this results in a direct connection of the target language word to the conceptual level. Support for this claim stems from subjects' tendency to attach false cognates onto the similar form in the L1 thereby accessing the wrong frame and concept.

Two related studies that explore the Parasitic Model of Vocabulary Learning in L3 acquisition support the findings above. In the first study (Hall, et al., 2004) native speakers of Spanish, with English as an L2, who were learning German as an L3 were presented with L3 verbs and asked to select the correct frame for the L3 words. For cognates between Spanish and German, the subjects selected the Spanish frame with more than chance frequency. For cognates between English and German, the subjects selected the English frame with more than chance frequency. For noncognate target items, subjects selected the English frame. When surveyed, subjects indicated that they believed that English and German were the typologically closest of the three languages. This belief corresponded to the fact that the English frame was chosen for noncognate status verbs.

The second study (Newbrand, 2005) replicated the first except that rather than using German as an L3, French was the L3 under study. The rationale behind this was to determine if the above findings with the noncognate verbs resulted from the typological proximity of English

and German. It was assumed that if the results of this second study showed that subjects selected the Spanish frame for noncognates in the French language, then the selection correlated with the typological facts of the language.

The results, though, revealed that when presented with the noncognate forms, subjects preferably chose the English frame just as they did in the first study. Again, for this study subjects were surveyed and indicated that they believed that Spanish and French were typologically closer than English and French. The relevance for selection of the English frame for noncognate verbs indicates that there is no correlation between the psychotypological beliefs of the subjects involved and the selection of the appropriate verb frame for the L3 vocabulary item. Rather, it may be that in the two cases discussed above subjects' selection of the English frame for noncognate forms in German and French is attributable to second or foreign language recency effects. That is, there is a greater tendency to transfer from the L2 than the L1 since it is the most recently activated language (cf. Hammarberg, 2001).

The present study is part of the same project as the two studies mentioned above and is motivated by the lack of differentiation between psychotypology and typology in studies of cross-linguistic influence. As discussed in section 1.4, the term *psychotypology* has been used frequently in the literature (cf. Kellerman, 1983; Cenoz, 2001; Ringbom, 2001) to account for transfer occurring from previous languages in the acquisition of an additional language. These claims do not consider that learners may not be fully aware of the linguistic facts of the languages involved and may therefore have beliefs that do not correspond with these facts.

The choice to use Spanish as an L1, English as an L2, and German as an L3 was based on several factors. First, by using languages present in the original Hall, et al. (2004) study, this study would offer more support or would refute the findings in that study. Second, there is a

widely held consensus that German and English are typologically closer to each other than to Spanish. This is supported in the literature from historical linguistics that shows that the two languages are historically related. Still, this belief does not consider the large number of French words adopted by English during the Norman Conquest or the great influence of Latin on German vocabulary (as found in this study) and the possibility that at the lexical level English and German may be more closely aligned with Latin based languages such as Spanish. Consequently, it was interesting to verify that learners assume that English and German are typologically proximal and to determine if this assumption was correct at the lexical level corresponded to the particulars of the languages involved.

At the inception of this study, it was assumed that the English E-typ would prove to be more closely aligned with Spanish E-typ than with German E-typ at the lexical level and that the German E-typ would be distinct from Spanish and English E-typs. This distinction would offer a basis for comparison between the responses given in the vocabulary tests and the facts of the languages. Also, because English and German would be second and third languages for the subjects involved, it was assumed that they would be more familiar with the more frequent words of the languages, i.e. the Germanic vocabulary items. In this case the I-typ profiles would probably not correspond with the E-typ profiles that show an alignment with Spanish and English at the lexical level.

Unexpectedly, the data collected for this study demonstrated that at the lexical level Spanish, English and German are extremely alike. Additionally, the E-typ profiles corresponded with the I-typ profiles. To reiterate, the conclusion we can draw from this is that a correlation does exist between E-typ, I-typ, and P-typ for the three languages involved in this study, but this

correlation is not absolute in view of the fact that subjects' P-typ does not correspond exactly with the E-typ and I-typ profiles.

The data discussed above accentuate the need for research that attempts to reveal the thinking processes involved in learners' development of psychotypological beliefs. At present, we still do not know on what information learners decide what languages are more similar than others. The E-typ facts illustrated above do not unequivocally provide a basis for subjects' beliefs that English and German are more proximal than Spanish and English or Spanish and German. Moreover, the low number of subjects who reported knowing that English and German are historically related indicates that learners are not necessarily basing their beliefs on language facts. At any rate, the data from the two related studies discussed above suggest psychotypological beliefs do not exert a strong influence in learners' acquisition of additional languages, at least in the case of Spanish, English, and German.

Nonetheless, when considering the findings presented here there are several problems that must be taken into account. The first difficulty lies in the assessment of vocabulary source languages for the German language. For this assessment the sample pool of vocabulary was quite small due to insufficient computational resources and time constraints of the study. Although great care was taken to ensure that the sample was random, and therefore more representative of the language as a whole, a sample of 500 items is insufficient to conclude with certainty that the results do in fact show an accurate profile of the language. In order to rectify this problem, further studies would need to be conducted to determine the language sources of a larger number of words.

A further difficulty is the fact that the majority of cognates in the German instrument were cognates across the three languages. Since this vocabulary was randomly chosen from the

word list in the students' textbook, and such a large number proved to be cognates, it appears that the majority of the words these learners are initially exposed to in the German language are cognates with English and Spanish. This is not surprising since textbook authors often seek ways in which to facilitate vocabulary learning and the inclusion of cognates may have been a conscious strategy. As such, future studies may find that the cognate status presented here is not representative of the language as a whole.

Moreover, because of the numbers of cognates present, it is uncertain to what degree the L1 or the L2 are involved in the subjects' guesses as to the meaning of L3 vocabulary. As discussed above with reference to studies on the Parasitic Model, it may be quite possible that both the L1 and the L2 are equally influential in these cases. This is particularly true when one considers the idea that word candidates from all known languages are activated during the selection process and multilinguals have no 'top-down control' over this activation process (Dijkstra, 2003). Consequently, because of this overlap with cognates we cannot generalize our findings and state that the psychotypical beliefs of learners will always correspond with the typological facts of the languages.

Finally, the tree graphs presented in the psychotypical instrument may have caused some confusion and added to the low correct response rate by the subjects. The graphs presented are simplistic in nature and do not reflect the complex relationships of the languages involved. It may be that this study underestimated the subjects' knowledge of these historical relationships and the low response rate was caused by unclear or unsatisfactory choices presented to the subjects. A revision of the presentation of these relationships would help to clarify if incorrect response rates were due to lack of knowledge or confusion.

To more clearly delineate the role of psychotypology in vocabulary acquisition, future studies would need to select languages that are not so similar at the lexical level so that there would be cognates between the L1 and L3 and the L2 and L3, but minimal or no overlap with cognates across the three languages. This would enable the researcher to determine more precisely what the correlation between the typology of the three languages is, and consequently to assess the psychotypology of the learners to determine if this corresponds with the facts of the languages involved.

An additional factor to consider is that this study only accounts for words subjects knew; it does not analyze the words subjects did not know. The primary reason for this was the lack of time needed to analyze the 210 individual target items present in the two vocabulary instruments. Future studies in this area would need to consider the unknown words and isolate typological patterns, such as if the unknown words were more of Latinate, Germanic, or Other origin. This would offer more support or refute the I-typ data and possibly determine more accurately the effects of typology on the development of additional language vocabulary.

Future studies would also need to account for the basis of learners' beliefs regarding languages. Although we surveyed psychotypological beliefs of the subjects' involved, we did not inquire as to the reasons learners had for these beliefs. Understanding of the source of learners' typological beliefs would provide support for findings in future studies. Thus for example, if it had been discovered in this study that learners' believed that German and English were typologically close simply on the basis of hearsay, this would have offered further support for the finding that the psychotypological beliefs did not correlate exactly with the E-typ and I-typ profiles.

With this study we have attempted to profile the lexical typologies of Spanish, English and German and determine if there is a correlation between these typologies and the typology of the lexical items present in the lexicons of the learners and to determine if these correlate with the psychotypological beliefs of the learners. We have shown through the data presented above that a correlation, though not absolute, does indeed exist between these three factors. While this study serves as a starting point for theory development, much more research is needed to differentiate the subconscious processes involved in word processing from the more conscious, strategy related processes involved in psychotypologically based lexical decision-making.

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Appendix 1: English Vocabulary Instrument

Últimos cuatro dígitos de tu número de estudiante: _____

Vocabulario de inglés A

En esta prueba de vocabulario, por favor identifica la palabra en la primera columna que mejor traduce la definición en español a la derecha, indicando tu elección con el número correspondiente. Si no sabes la respuesta, favor de no contestarla (es decir, no adivines). En cada grupo, hay 3 palabras que no tienen definiciones en español.

ejemplo:

1 clock ___ pared
 2 horse ___ lapiz
 3 business ___ caballo
 4 pencil
 5 wall
 6 shoe

respuesta correcta:

1 clock 5 pared
 2 horse 4 lapiz
 3 business 2 caballo
 4 pencil
 5 wall
 6 shoe

1 birth ___ deportiva
 2 dust ___ nacimiento
 3 operation ___ acción y resultado de triunfar
 4 row
 5 sport
 6 victory

1 adopt ___ subir
 2 climb ___ rodear
 3 examine ___ investigar minuciosamente
 4 pour
 5 satisfy
 6 surround

1 belt ___ idea
 2 climate ___ cinturón
 3 executive ___ parte interior de la mano
 4 notion
 5 palm
 6 victim

1 choice ___ calentura
 2 crop ___ carne
 3 flesh ___ el pago por un trabajo
 4 salary
 5 secret
 6 temperature

1 bake ___ unir
 2 connect ___ acortar, reducir
 3 inquire ___ caminar sin destino
 4 limit
 5 recognize
 6 wander

1 acid ___ buey
 2 bishop ___ baja temperatura
 3 chill ___ conjunto de partes que forman algo
 4 ox
 5 ridge
 6 structure

1 cap ___ enseñanza
 2 education ___ viaje
 3 journey ___ instruir niveles
 4 parent
 5 scale
 6 trick

1 burst ___ explotar
 2 concern ___ mejorar
 3 deliver ___ entregar
 4 fold
 5 improve
 6 urge

1 bench ___ un asiento
 2 charity ___ parte de un país
 3 jar ___ auxilio que se da a los necesitados
 4 mate
 5 mirror
 6 province

1 attack	___ encanto	1 original	___ completo	1 boot	___ oficial en el ejército
2 charm	___ falta	2 private	___ algo personal	2 device	___ un tipo de piedra
3 lack	___ valores u objetos preciosos	3 royal	___ algo novedoso	3 lieutenant	___ vasos por los que la sangre vuelve al corazón
4 pen		4 slow		4 marble	
5 shadow		5 sorry		5 phrase	
6 treasure		6 total		6 vein	
1 cream	___ mucho dinero	1 brave	___ habitual	1 apartment	___ perspectiva
2 factory	___ un estudiante	2 electric	___ valiente	2 candle	___ borrador
3 nail	___ leche agria y espesa	3 firm	___ tener hambre	3 draft	___ un lugar para vivir
4 pupil		4 hungry		4 horror	
5 sacrifice		5 local		5 prospect	
6 wealth		6 usual		6 timber	
1 blend	___ mezclar	1 alcohol	___ etapa	1 contaminate	___ garabato
2 devise	___ abrazar	2 apron	___ desorden	2 cringe	___ acobardar
3 hug	___ hacer planes	3 hip	___ delantal	3 immerse	___ sumerja
4 lease		4 lure		4 peek	
5 plague		5 mess		5 relay	
6 reject		6 phase		6 scrawl	
1 abolish	___ calmar	1 apparatus	___ ingresos	1 analysis	___ afán
2 drip	___ anular una ley	2 compliment	___ muestra de cortesía	2 curb	___ hipoteca
3 insert	___ anunciar de antemano algo que va a suceder	3 ledge	___ mecanismo que tiene una función determinado	3 gravel	___ pequeños pedazos de piedra
4 predict		4 revenue		4 mortgage	
5 soothe		5 scrap		5 scar	
6 thrive		6 tile		6 zeal	
1 bleed	___ anteceder	1 bulb	___ yegua	1 dissipate	___ robar
2 collapse	___ derrumbarse	2 document	___ un escrito	2 flaunt	___ evaporarse
3 precede	___ dar brincos o saltos	3 legion	___ un tipo de tropa	3 impede	___ retorcimiento
4 reject		4 mare		4 loot	
5 skip		5 pulse		5 squirm	
6 tease		6 tub		6 vie	

1 casual ___ olor agradable
2 desolate ___ extraordinario
3 fragrant ___ saludable
4 radical
5 unique
6 wholesome

1 gloomy ___ falto de contenido
2 gross ___ gris y deprimente
3 infinite ___ que no tiene fin ni término
4 limp
5 slim
6 vacant

1 acquiesce ___ asentir
2 bask ___ asolear
3 crease ___ pliegue
4 demolish
5 overhaul
6 rape

1 blaspheme ___ patinar
2 endorse ___ suministrar
3 nurture ___ maldecir
4 skid
5 squint
6 straggle

1 clinch ___ mover muy rápido
2 jot ___ quemar despacio sin flama
3 mutilate
4 smolder ___ cortar un miembro o parte del cuerpo
5 topple
6 whiz

1 concrete ___ forma circular
2 era ___ cumbre
3 fiber ___ periodo de tiempo
4 loop
5 plank
6 summit

1 balloon ___ cubeta
2 federation ___ un globo
3 novelty ___ algo raro o interesante
4 pail
5 veteran
6 ward

1 antics ___ mónton
2 batch ___ travesuras
3 connoisseur ___ experto en arte o música
4 foreboding
5 haunch
6 scaffold

1 auspices ___ desorden
2 dregs ___ la escoria
3 hostage ___ líquido bucal
4 jumble
5 saliva
6 truce

1 casualty ___ juerga
2 flurry ___ víctima
3 froth ___ aislamiento
4 revelry
5 rut
6 seclusion

1 alabaster ___ barril
2 tentacle ___ piedra blanca
3 dogma ___ escofina
4 keg
5 rasp
6 chandelier

1 blurt ___ caminar
2 dabble ___ orgullosamente
3 dent ___ dice algo sin pensar
4 pacify ___ ahogar a una persona oprimiéndole el cuello
5 strangle
6 swagger

1 brilliant ___ delgado
2 distinct ___ desnudo
3 magic ___ constante, firme, permanente
4 naked
5 slender
6 stable

1 drift ___ agarr a
2 endure ___ tejer
3 grasp ___ sufrir un dolor físico o moral
4 knit
5 register
6 tumble

1 betray ___ espantar
2 dispose ___ hacer público
3 embrace ___ hacer daño
4 injure
5 proclaim
6 scare

1 auxiliary ___ ayuda
2 candid ___ malhumorada
3 luscious ___ que tiene gran lujo o esplendor
4 morose
5 pallid
6 pompous

1 dubious ___ insolente
2 impudent ___ mezcolanza
3 languid ___ anticuado, viejo
4 motley
5 opaque
6 primeval

1 dim ___ raro
2 junior ___ excelente, admirable
3 magnificent ___ baja intensidad de luz
4 maternal
5 odd
6 weary

1 muscle ___ gallina
2 counsel ___ césped
3 factor ___ sugerencia
4 hen
5 lawn
6 atmosphere

1 apparition ___ charco
2 botany ___ fantasma
3 expulsion ___ el estudio de las plantas
4 insolence
5 leash
6 puddle

1 arsenal ___ apuro
2 barracks ___ clérigo de iglesia
3 deacon ___ satisfacción, alegría
4 felicity
5 predicament
6 spore

1 annual ___ incontrolado, violento
2 concealed ___ que dura un año
3 definite ___ firme, que decide y es inamovible
4 mental
5 previous
6 savage

1 pond ___ manada
2 angel ___ un ser divino
3 frost ___ manejar lo financiero
4 herd
5 fort
6 administration

1 encounter ___ reunión
2 illustrate ___ suplicar
3 inspire ___ cerrar algo herméticamente
4 plead
5 seal
6 shift

1 assist ___ ayuda
2 bother ___ despuntar
3 condemn ___ hacer girar
4 erect
5 trim
6 whirl

1 bull ___ excelencia, realce
2 champion ___ lugar donde se exhiben objetos
3 dignity ___ persona que destaca en una actividad
4 hell
5 museum
6 solution

Appendix 2: German Vocabulary Instrument

Vocabulario de alemán A

En esta prueba de vocabulario, por favor identifica la palabra en la primera columna que mejor traduce la definición en español a la derecha, indicando tu elección con el número correspondiente. Si no sabes la respuesta, favor de no contestarla (es decir, no adivines). En cada grupo, hay 3 palabras que no tienen definiciones en español.

Ejemplo:

- 1 Grossmutter ___ compra
 2 Buchhalter ___ abuela
 3 Zahn ___ guante
 4 Obergeschoss
 5 Handschuh
 6 Kauf

respuesta correcta:

- 1 Grossmutter 6 compra
 2 Buchhalter 1 abuela
 3 Zahn 5 guante
 4 Obergeschoss
 5 Handschuh
 6 Kauf

1 Birne	___ pera	1 Haar	___ brazo	1 Montag	___ area
2 Kassette	___ limón	2 Arm	___ la renta	2 Fisch	___ lunes
3 Diktat	___ estuche compacto de plástico donde se guarda una cinta magnética que graba y reproduce el sonido	3 Zutat	___ papel grueso de color café	3 Tasse	___ vasija en que se toman bebidas
4 Laden		4 Karton		4 Blut	
5 Zitrone		5 Miete		5 Konto	
6 Heft		6 Pils		6 Zone	
1 Joghurt	___ florero	1 Alkohol	___ moneda	1 rot	___ digno de atención
2 Kaution	___ depósito	2 Vermieter	___ departamento	2 erkältet	___ que facilita las cosas
3 Strasse	___ asunto de que trata una obra de arte, un escrito, etc.	3 Strumpf	___ líquido obtenido por la destilación	3 kompliziert	___ de difícil comprensión
4 Thema		4 Keller		4 interessant	
5 Vase		5 Wohnung		5 praktisch	
6 Lager		6 Münze		6 grau	
1 weiss	___ sencillo	1 Erde	___ flor	1 Familie	___ diversión
2 direkt	___ herbívoro	2 Blume	___ agua	2 Preis	___ valor atribuido a una cosa
3 einfach	___ anaranjado	3 Herz	___ cumpleaños	3 Spass	
4 vegetarisch		4 Geburtstag		4 Beruf	___ conjunto de personas que provienen de una misma sangre
5 separat		5 Wasser		5 Fleisch	
6 orange		6 Zehe		6 Dienstag	

1 fahren	___	conocer	1 Grippe	___	lugar	1 Kasten	___	error
2 kennen	___	conseguir	2 Universität	___	episodio	2 Fehler	___	aceite
3 belegen	___	manejar, conducir	3 Ort	___	institución donde se imparte la enseñanza superior	3 Öl	___	parada de transporte público
4 lieben			4 Szene			4 Aufgabe		
5 tauschen			5 Anorak			5 Station		
6 bekommen			6 Hälfte			6 Juli		
1 Appetit	___	camisa	1 Personalbüro	___	libra	1 Obstsorte	___	60 segundos
2 Ordner	___	lugar donde se exhiben objetos	2 Backofen	___	oficina de recursos humanos	2 Minute	___	ruta de camión
3 Museum			3 Mist			3 Linie	___	cuarto, habitación
4 Löffel	___	tendencia a satisfacer las necesidades orgánicas, esp. la de comer	4 Pfund	___	la hermana de su padre o madre	4 Möbel		
5 Hemd			5 Tante			5 Unterricht		
6 Garten			6 Schmerz			6 Zimmer		
1 Minister	___	padre	1 röntgen	___	hablar	1 sauber	___	limpio
2 Rock	___	secretario (de estado)	2 malen	___	vivir (de habitar)	2 kurz	___	simpatico
3 Plage	___	abundancia de algo perjudicial que afectan gravemente a la agricultura	3 wohnen	___	pedir (información)	3 richtig	___	que tiene serio, responsable
4 Knoblauch			4 sprechen			4 formell		
5 Arzt			5 erfragen			5 spät		
6 Vater			6 gewinnen			6 nett		
1 modern	___	importante	1 nehmen	___	ocurrir			
2 ganz	___	actual o de época reciente	2 halten	___	sostener			
3 wichtig	___	que pertenece al ámbito personal	3 verstehen	___	explicar			
4 einzeln			4 klären					
5 dünn			5 passieren					
6 privat			6 lesen					

Appendix 3: Psychotypological Survey

NOS INTERESA SABER TU PERCEPCIÓN ACERCA DE LA RELACIÓN ENTRE EL ESPAÑOL, EL INGLÉS Y EL ALEMÁN.

Por favor indique la respuesta que te parezca más adecuada con una cruz en el recuadro.

En tu opinión:

(a) *¿Cuál de los idiomas es más parecido al alemán?*

español inglés

(b) *¿Cuáles idiomas son los más parecidos (indica una opción):*

alemán/español alemán/inglés español/inglés

(c) *Para un hablante nativo de español, ¿cuál idioma es más fácil de aprender?*

alemán inglés

(d) *Para un hablante nativo de inglés, ¿cuál idioma es más fácil de aprender?*

español alemán

(e) *Históricamente, como en un árbol genealógico, ¿cuál es la relación correcta entre los tres idiomas?*

