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Variable Lexicalization of Dynamic Events in Language Production: A Comparison of Monolingual and Bilingual Speakers of French and English

by

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Dedication

This dissertation is dedicated to Bill Kazeil (1930-2007) who would have been so proud of me that I finally got it done.

Abstract

This study explores how bilingualism impacts lexical selection within spontaneous spoken language production. The particular analysis focuses on the choice between synonymous verbs in English. The main hypothesis predicts that, as a result of crosslinguistic influence, bilingual speakers of French and English will opt for the English synonym which has structural correspondence to the French translation equivalent more often than monolingual speakers, who do not experience an influence from French. Structural correspondence exists in two distinct ways: in the form of cognates (e.g., *applaudir/applaud* vs. *clap*) and in terms of the number of free morphemes used to convey the same semantic information (e.g., *lever/raise* vs. *put up*).

The language production data was generated by participants viewing video scenes and describing the action as it progressed. The frequency with which the different verbs were used was then compared across the different participant groups: monolingual English speakers and bilingual speakers of both French and English. The bilingual group was also subdivided based on language dominance. A range of different analyses were conducted.

A framework is established for interpreting the data. Bilingualism can have one of three main effects on the speech of bilinguals relative to monolinguals: (a) an *expanding effect*, in which bilinguals use a wider range of lexical forms than monolinguals, (b) a *limiting effect*, in which bilinguals use a more limited range of

lexical items than bilinguals, and (c) a *modifying effect*, in which the range of lexical items is basically the same between bilinguals and monolinguals but varies in terms of the frequency with which those lexical forms are used (a type of CLI labeled 'covert'). These effects interact with certain speaker variables such as which language is the speaker's dominant language.

The stage(s) within the language production process at which CLI impacts ultimate lexicalization is also explored. Current models of language production which focus on lexical selection are discussed. The results of this study are most compatible with specific notions such as lexical access being target-language non-specific (see Costa, 2004, for example) and the Weaker Links Hypothesis (e.g., Gollan and Silverberg, 2001; Gollan, Montoya, & Werner, 2002).

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1. Introduction

Speaking. It is something we typically do for all but the first year or so of our lives. It is something we typically do repeatedly and sometimes for long durations on a daily basis. It is something we typically do remarkably effortlessly and fluently. Yet, despite our relative ease, proficiency, and practice with this task, speaking requires much from the speaker – a speaker's mind is a busy thing.

During the speaking process, we do not simply have to concern ourselves with the content of our message (e.g., *what* we want to say), but, additionally, we need to choose the best linguistic form with which to express that message (e.g., *how* we want to say it). Whereas the formulation of the *content* of the message is a fairly deliberate, conscious process in which we are quite often aware of what we are thinking about, the decisions we make in terms of the ultimate *form* of the message are both very fast and largely unconscious. Most of the time, we do not have introspective awareness of how we established the ultimate selection of words and phrases that we articulate within an utterance.

But there is much to decide upon each and every time we speak. Speakers are constantly making syntactic, morphological, lexical, and phonetic choices during language production. The power and creativity in language is found in the fact that there is no one-to-one relationship between form and meaning. There are many ways to say basically the same thing – many forms to convey basically the same message – just as there are often multiple meanings which can be derived from a single language form-unit. Speakers must be able to navigate this variability with grace and dexterity. So, how do we do it? How do we ultimately choose one output string from the numerous potentials at our disposal?

To begin with, we must be expert data gatherers. We assess which entities or events within our intended message deserve greater emphasis and which entities or events are not worth mentioning, and we choose our lexical items and syntactic structures accordingly. We also assess the discourse context, including our audience, to determine such factors as the level of specificity and literalness of our vocabulary, the level of formality in our pronunciation and word choices,

and the degree of emotionally-charged language we use. In some instances, our choices are guided by data we have gathered in the past but which then influences us to choose lexical forms which are, for example, particularly frequent or which were only recently processed and therefore ripe for repetition.

1.1. Background Context for a Study in Bilingual Language Production

As introduced in the previous section, speaking is a very complicated process even when one knows only a single language (as evidenced by models put forth by Levelt (1989) and Dell (1986), for example). However, the majority of people worldwide use more than one language on a fairly regular basis (La Heij, 2005; Tucker, 1999); thus, bilingual language production is actually the global norm. Adding a second (or third, or fourth, etc.) language to the equation should contribute even more complexity to accounts of the language production process. In particular, models of bilingual language production need to account for the *control* of those two languages since bilinguals typically utter words in the language they intended to speak. Several different models of bilingual language production have been put forth which demonstrate an additional level of complexity over models of monolingual language production, for example, Green's (1998) Inhibitory Control (IC) model as well as adaptations of Levelt's (1989) model by de Bot (1992), de Bot and Schreuder (1993), and Poulisse and Bongaerts (1994).

One particular control issue is whether and how the bilingual is able to keep the two languages separated in cases in which only one of the bilingual's languages is required within that particular speech situation (called the monolingual mode by Grosjean (1998, 2001, for example) and explained in Chapter 2). Studies in crosslinguistic influence, or CLI, suggest that the nontarget language remains active even in monolingual mode situations (see Jarvis and Pavlenko, 2008, for a review). Michael and Gollan (2005) report that "considerable experimental evidence suggests that both a bilingual's languages are always active to some degree (e.g., Colomé, 2001; Hermans, Bongaerts, de Bot, & Schreuder, 1998; Van Hell & Dijkstra, 2002)" (p. 390).

The purpose of this dissertation is to investigate a type of CLI which has not, at present, been addressed to any significant degree in studies of language production, namely lexical choice. Most research into lexical choice has primarily fallen in the domain of sociolinguistics in which researchers of language variation account for specific lexical choices based on socio-economic factors such as geographic region, socio-economic status, and communicative context, for example. (A more complete list is presented in Chapter 2). This study, by contrast, looks at the issue from a psycholinguistic perspective, how lexical choice is determined during the process of language production and how a bilingual's knowledge of one language may influence which words are chosen while speaking in the other language.

The locus of CLI in the process of lexical choice could fall within any of several levels of representation. Most researchers in lexical access agree that there are three fundamental levels of representation involved in choosing words for articulation: the conceptual level, lexical level, and phonological level (e.g., Caramazza, 1997; Costa, 2005; Dell, 1986; Levelt, 1989; Levelt, Roelofs, Meyer, 1999). At the conceptual level, the speaker develops the content of the message, deciding on which conceptual information must be included. At the lexical level, lexical items and their grammatical properties are represented.[1] At the phonological level, the phonological code required for articulation is represented. As discussed in Chapter 2, languages have the potential to interact at each of these levels. Evidence from a naturalistic production experiment may shed some light on some of those potential interactions.

The specific type of CLI at the heart of this study is the influence of French on the lexical choices made in English by bilingual speakers of those two languages. The main experiment is designed to test whether the English lexical forms that exhibit a structural overlap with their French translation equivalents are chosen for articulation with higher rates by bilinguals than monolinguals (as compared to synonymous lexical forms in English which do not have a structural

[1] In keeping with Costa (2004, 2005) and La Heij (2005), I will refrain from using theory-specific terms like 'lemma' and 'lexeme' and instead refer to representations at this level of the system as 'lexical nodes' or 'lexical representations'

overlap with their French translation equivalents). There are two types of crosslinguistic structural overlap under scrutiny: French and English lexical items which share (a) graphemic/phonemic form (i.e., cognates), and (b) lexicalization configuration (i.e., the conflation of conceptual information in the same number of free morphemes). In other words, the experiment tests whether bilinguals of French and English choose cognates (e.g., *applaud*, which is a cognate with French *applaudir*) over their non-cognate synonyms (e.g., *clap*) and whether they choose single-word encodings (e.g., *raise* [one's hand], akin to the French single-word encoding *lever*) over multi-word encodings (e.g., *put up* [one's hand]) more often than monolingual speakers of English.

CLI between cognates has been identified in a small number of previous studies, as outlined in section 2.2, although not within such a large-scale investigation of lexical choices in a naturalistic context by highly proficient bilinguals. CLI of language-specific lexicalization patterns has also been observed in at least one study (Navarro, 2007) which investigated the gradual acquisition of the target language patterns in second language learners. Perhaps the scarcity of research on the CLI of lexicalization patterns is in part due to the subtlety of the phenomenon which makes it a very challenging interaction to investigate. The study presented in this dissertation is designed to test whether CLI in the domain of both cognates and lexicalization patterns is observable in the verbal output of bilinguals so as to augment the scarce evidence currently available on this topic.

The fact that lexical choice (from amongst a set of grammatical and synonymous lexical options) has been an understudied domain of CLI research may be, in part, due to the obscurity of identifying CLI in such cases. Instances of CLI that are not realized in the form of ungrammatical outputs or measurable delays in processing are not easily identified; this type of transfer is 'covert' (as explained in Chapter 2). It can only be recognized once the relative frequencies of use of the different options are established and compared to those of monolingual speakers, as is done in this study.

With the sizeable quantity of data generated by the main experiment (reported in Chapter 5 & 6), it is also possible to touch upon other characteristics of bilingual speech which are not strictly cases of CLI. For example, bilinguals who are speaking in their non-dominant language may vary from monolingual speakers by using certain strategies which lighten the cognitive demands of speaking in the language in which they are less proficient. Along these lines, the data generated by the main experiment will also be analyzed from the perspective of the implementation of certain simplification strategies by bilinguals.

1.2. Framework for Interpreting the Production Data

Considering the effects of both CLI and the use of simplification strategies, being bilingual could have one (or more) of the following effects on lexical choice:

(a) *no effect* – lexical choices made by monolinguals and bilinguals are largely the same

(b) *limiting effect* – bilinguals use a smaller range of words than monolinguals

(c) *expanding effect* – bilinguals use a wider range of words than monolinguals

(d) *modifying effect* – bilinguals and monolinguals use the same range of words but vary in terms of how frequently different words are chosen.

Option (a), that there are no differences in the lexical choices made by bilinguals compared to monolinguals, is highly unlikely due to the widely held position that a bilingual is not simply two monolinguals within one person, a viewpoint initially put forth by Grosjean (1989). As outlined in Chapter 2, researchers have documented many ways in which bilinguals and monolinguals process language differently; one of these ways is lexical choice.

Option (b), that bilinguals use a smaller range of lexical choices than monolinguals, could be a product of bilinguals receiving less exposure to each of their languages as compared to monolingual speakers. Reduced exposure could lead to reduced sensitivity to the fine-grained nuances conveyed by near

synonyms, for example. If what is a near synonym to a monolingual is actually an absolute synonym to a bilingual, some kind of constraint against redundancy may cause bilinguals to restrict their output to only one of those forms. Some evidence for bilingualism as a limiting factor is found in this study.

Option (c), that bilinguals use a wider range of words than monolinguals, could exist if longitudinal exposure to the language being spoken was sufficient to have given the bilingual an appreciation for those subtle semantic distinctions between near synonyms, just as for monolinguals. The expanded scope of the bilingual's vocabulary may come about as a function of having more experience with the overt word-selection process required to choose a lexical item in language A versus language B each and every time the bilingual speaks. In code-switching situations,[2] for example, bilinguals can be even more expressive than monolinguals as they have a repertoire of words in more than one language from which to choose. Some evidence for expanded vocabularies of bilinguals, who are processing in their dominant language, is found in this study.

Option (d), that bilinguals and monolinguals use the same range of lexical items but with different frequencies, can be accounted for if the bilinguals develop preferences for certain terms based on different criteria than monolinguals. Two factors that drive lexical preferences for bilinguals but not monolinguals are (a) crosslinguistic influence from the other language, and (b) employment of simplification strategies to lighten the processing load.

One obvious type of crosslinguistic influence could be the cognate status of words within the bilinguals' two languages. For example, if the bilingual needs to choose between the English synonyms of *absorb* versus *soak up*, the French cognate *absorber* may contribute to the bilinguals' preference for choosing *absorb* in English. Looking beyond strict lexical form correspondence, as is the case for cognates, another source of potential crosslinguistic influence relates to how languages distribute information across the necessary lexical units.

[2] I use code-switching to refer to both language-mixing situations of (a) grammatically-constrained intra-sentential mixing of more than one language and (b) pragmatically-driven inter-sentential mixing of more than one language, despite the distinction in terminology advocated by Ritchie and Bhatia (2004) but not adopted by all researchers in the field (see, for example, Myers-Scotton, 2005). Ritchie and Bhatia call (a) code-mixing and (b) code-switching.

If a bilingual, for example, needs to choose between the English synonymous expressions *leave* versus *go out of*, the way French tends to lexicalize this motion event may influence the bilingual's choice in English. In the lexicalization of French motion verbs, the path of motion is indicated within the verb root (e.g., *sortir*), as is the case for the English word *leave*. Thus, the bilingual may be more inclined to package motion information in English in the manner compatible with French. The preference, therefore, would be to choose the word *leave* as opposed to the expression *go out of* which articulates path information in separate lexical units and, as such, does not follow the French pattern. CLI in the form of changes in the frequency with which different forms surface in the language is called 'covert transfer'. This study presents evidence of such covert transfer both in terms of the cognate relationship and lexicalization patterns.

An example of a simplification strategy which could result in modification of lexical preferences would be when speakers opt for words which can be applied to a host of different referents as opposed to words with very restricted sets of referents. Highly polysemous words plus words higher on the semantic hierarchy both have greater applicability – they can be used to label more referents than words with few meanings and words lower on the semantic hierarchy. For example, a bilingual may choose the multipurpose verb *put* instead of verbs that are more fully specified, such as *place*, since *put* is more reliable; it can be used to cover more types of placement activities than *place* (e.g., *I put/placed the note on the table, I put/?placed the photo on the front of the fridge, I put/*placed the number in my Blackberry*). Evidence of bilinguals employing the simplification strategy of preferring more multifunctional verbs also emerges in this study.

All the options save Option (a) are evidenced in the data generated by this study. But how can that be? How can bilinguals have both a limited range of lexical choices and an expanded range of lexical choices as compared to monolinguals? The answer was alluded to in the discussion above. It all depends on the type of bilingual in question. Specifically, it depends on whether the bilingual is processing in his or her *dominant* language. In relation to monolinguals, bilinguals processing in the non-dominant language may have (a) a

reduced lexical range, and (b) lexical preferences guided by both crosslinguistic influence and simplification strategies. In contrast, bilinguals processing in the dominant language may have (a) an expanded lexical range, and (b) lexical preferences guided by crosslinguistic influence only.

A = monolingual preference, **B** = hypernym for A, more general term, **C** = has structural equivalent in bilingual's other language, **D** & **E** = low frequency terms

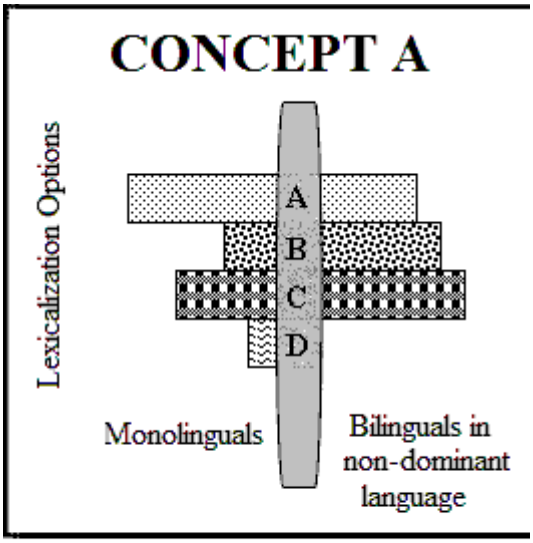

Figure 1.1 Lexical choices of bilinguals in their non-dominant language as compared to monolinguals

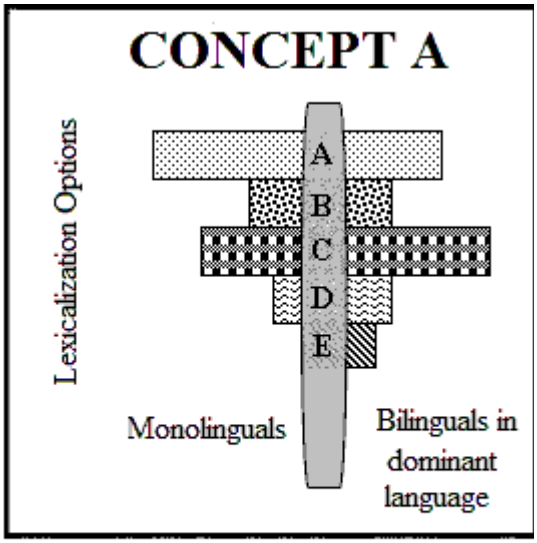

Figure 1.2 Lexical choices of bilinguals in their dominant language as compared to monolinguals

Figures 1.1 and 1.2 offer a possible rendering of the distinct lexical choice patterns exhibited by bilinguals in relation to monolinguals. Figure 1.1 compares monolinguals to bilinguals processing in their non-dominant language and Figure 1.2 compares monolinguals to bilinguals processing in their dominant language. The diagrams work in this way. Each horizontal bar is one lexicalization option for encoding the same basic conceptual information. The length of the bar to the left of the vertical band reflects the frequency with which monolinguals choose that option, whereas the length of the bar on the right of the vertical band reflects the frequency with which bilinguals choose that same option. Option A is used by monolinguals more often than any other options. It is the monolingual preference but not necessarily the bilingual preference. Option B is a more

general and productive term, for example a superordinate term or hypernym, which is used as a simplification strategy. C is the option which shares structural overlap in the bilinguals' other language thus crosslinguistic influence boosts its selection for bilinguals. Options D and E are very low-frequency terms which convey subtle nuances or connotations that distinguish them from Options A to C.

The difference between Figures 1.1 and 1.2 is in the language dominance of the bilingual speaker who is represented by the bars extending to the right of the vertical band. In Figure 1.1, the bilingual is speaking in his or her non-dominant language and, as such, may have a reduced lexical range in comparison to the monolingual native speaker (with certain options, like D, not surfacing in the lexical output). In Figure 1.2, on the other hand, the bilingual is speaking in his or her dominant language and may actually have a larger range of lexical items to choose from to express the same basic meaning (with the addition of option E). Both types of bilinguals are affected by CLI in terms of the increased frequency of the lexical item C over that of the monolingual speaker. It is the non-dominant bilingual who is more likely to employ certain simplification strategies, such as choosing more general, productive terms, resulting in the increased usage of option B. My investigation into the realization of these different outcomes is provided in the following pages, beginning with an overview of the structure thesis.

1.3. Thesis Overview

This thesis is structured in the following way. Chapter 2 sets the stage by outlining the process of language production with particular emphasis on the component of lexical selection. The state of bilingualism is defined and its implications on language production are discussed. A global view of the differences between bilingual and monolingual processing is presented including a discussion of crosslinguistic influence (CLI). A description of the particular subtype of CLI labeled 'covert' is offered, along with examples of covert transfer from language domains other than lexical choice. The chapter goes on to outline some additional variables which may contribute to differential lexical choice.

Speaker-specific factors such as language dominance and context of acquisition are addressed. Language-specific factors (e.g., cognate status) may also play a role. Additionally, the situation-specific factor of a language mode is discussed. All of these factors are potential variables in the main experiment. Chapter 2 concludes with a discussion of the various considerations that impact lexical choice and how the state of bilingualism may contribute to a speaker's ultimate selection of words.

Chapter 3 details the semantics of the main linguistic unit under investigation: the verb. Since lexical choice is driven primarily by the meaning one wishes to convey, it is important to outline relevant semantic features including relationships like polysemy, synonymy, and hyponymy. Verbs can also be classified into basic types which have their own semantic specifications. For motion verbs, in particular, additional information can be included in the root along with the fact of motion resulting in a conflation of features like MOTION plus MANNER or MOTION plus PATH. The chapter also explores the English verb-particle construction, over-viewing both syntactic and semantic considerations. Chapter 3 concludes with a contrastive analysis with French which will inform the later discussion of potential crosslinguistic influence on language production.

Chapter 4 begins with an introduction to the empirical study, indicating the motivation for the main experiment, which is detailed in Chapter 5. Before the main experiment was conducted, several preliminary experiments were carried out with the goal of learning more about the key linguistic items under analysis. The first preliminary experiment required native French speakers who were bilingual in English to translate one of each synonym pair into French to see if the English synonyms shared a common French translation. The remaining preliminary experiments all involved monolingual English speakers who offered ratings on the both the synonym pairs and the individual words. Features like level of formality, level of specificity, and degree of similarity were tested. The methodology and results of these experiments are detailed in this chapter.

Chapter 5 outlines the methodology of the main production experiment. It delves into who the participant speakers were and how the visual stimuli were

created. A brief summary of the thirty-five monolingual English speakers is provided. The forty bilinguals had a much more detailed Language Background Questionnaire to complete in the middle of the main experiment. The structure and results of this questionnaire are detailed in this chapter along with further details about the procedure of the main experiment and how the language production data were processed.

Chapter 6 presents the results of the main experiment considering calculations such as general verb counts, verb-choice variability, rates of single- versus multi-unit verb forms, copula and VPC frequency, particle use and placement, effects of cognation, and motion verb conflation preferences. Comparisons are drawn between the two main participant groups (monolinguals versus bilinguals) and also between different subgroups of bilinguals, in particular based on language dominance.

Chapter 7 concludes the dissertation with a discussion of the results and suggestions for follow-up studies. The main hypothesis that the state of bilingualism adds extra complexity to the process of establishing individual speakers' lexical choices is supported by the results. The impacts of both CLI and the use of simplification strategies are summarized. The discussion also attempts to tease apart the relative importance of the different speaker, lexical, and situational variables for establishing an influence on word choice in English. Is there an effect of just being a bilingual or is it the result of specific crosslinguistic transfer between French and English? How much influence does French have if French is the speaker's first versus second language, dominant versus non-dominant language? What is the role of cognates and lexicalization pattern overlap between the two languages? What impact does the linguistic context have in terms of activating potential transferring structures or verbal units? In this chapter, the results are discussed with reference to how they contribute to our understanding of the process of bilingual language production.

2. Language Production

2.1. Monolingual Language Production

Despite bilingualism being the rule rather than the exception in the world today (La Heij, 2005, p. 289), most research and modelling of language production has thus far focused on monolingual speakers. Costa (2005) laments that even these monolingual models are lacking sophistication in that most of them concentrate on single-word production (p. 308). An aim of this thesis is to broaden the scope somewhat by investigating bilingual speakers and their lexicalization habits extending, potentially, beyond single-word units. To set the stage, however, I begin with an overview of monolingual language production models.

2.1.1. Monolingual Lexicalization

The locus within the language production process which is of interest to this study is that of lexicalization (as opposed to syntactic or phonological encoding). At the most basic level, lexicalization means encoding meaning into the words of a language and it is most often used to refer to the diachronic process that creates the vocabulary of a language in the first place. I am using the term in a slightly different way, to refer to the process by which speakers routinely encode meaning into the words of a language each and every time they formulate an utterance. Kempen and Huijbers (1983) used this synchronic interpretation in their definition: "retrieving from the mental lexicon word material for the sentence under construction" (p. 186). Other researchers like de Bot & Schreuder (1993) and La Heij (2005), for example, also use the term lexicalization to refer to this online process of lexical encoding.

This type of lexicalization transpires in the following way. Speakers start by developing thoughts regarding something they want to say – a non-linguistic preverbal message, to use Levelt's (1989) terminology. The preverbal message is composed of conceptual information which needs to be packaged into specific chunks of meaning so that it can then be mapped onto existing linguistic units in

the language. For example, if an English speaker wanted to talk about how a person on top of a bridge got from one side to the other, the concept of motion as well as the basic path of that motion can be packaged together and lexicalized as *cross*, as in s*he crossed the bridge* (i.e., *cross* = MOTION + ACROSS[3]). However, if that same speaker wanted to describe the motion of a person passing beneath the bridge, the path of that motion could not be lexicalized into the same unit as the fact of motion but rather would require its own lexical unit, as in *she went under the bridge* (i.e., *go* = MOTION, *under* = UNDER). The chunking of conceptual information must be different for the lexicalization of these two different events. How the speaker knows which conceptual information to package together has been called the 'Chunking Problem' (see Beirwisch & Schreuder, 1992, and Poulisse, 1995).[4]

Once the conceptual information has been chunked appropriately, it must be mapped onto the semantic specifications of a lexical unit. This mapping stage of the process is termed lexical access (in that the relevant lexical item is now accessed). Multiple lexical items may be accessed if a portion of their semantic composition matches the conceptual criteria of the preverbal message. The next stage of lexicalization, therefore, needs to select the most appropriate lexical item for the given situation. Once a lexical item has been selected, it is available for articulation. In sum, the process of lexicalization proceeds through four distinct stages: conceptual chunking, lexical access, lexical selection, and articulation. The processes of lexical access and selection[5] are explored in greater detail below.

[3] In this thesis, I follow the convention of using small caps to indicate a conceptual unit.
[4] Beirwisch & Schreuder (1992) call it a 'problem' as a criticism of Levelt's (1989) speaking model. Levelt's model posits several distinct stages in the production process starting with the Conceptualizer which prepares the preverbal message and feeds information into the Formulator where the language encoding takes place. Crucially, these components are modular and therefore do not interact. The 'Chunking Problem' derives from this modularity in that the Conceptualizer does not necessarily know how to chunk the conceptual information appropriately for efficient use by the Formulator because it cannot see what units exist in the Formulator. Levelt's solution is to suggest that experience with the language over time teaches the speaker the best way to package the information. See also Bierwisch & Schreuder (1992) and Roelofs (1992) for alternative models of the encoding of semantic units into lexical units of a language.
[5] The stage of articulation of lexical items is beyond the scope of this study.

2.1.1.1. Monolingual Lexical Access and Lexical Selection

Once the initial phase of lexicalization has been achieved (i.e., the conceptual information has been packaged into chunks appropriate for mapping onto lexical units), the final stage requires the system to choose one set of lexical items that best represents the conceptual content. This process is described as unfolding in two steps, the first of which is called lexical access, whereby relevant lexical items are identified, and the second of which is called lexical selection, whereby only one of the identified lexical items is chosen for articulation.

The conceptual-to-semantic overlap that takes place when the conceptual input from the preverbal message is being mapped onto the semantic specifications of individual lexical items may result in more than one lexical item being accessed. As stated by La Heij (2005), the "preverbal message activates, in addition to the sought-for-word, a cohort of semantically related words (as originally proposed in Morton's 1969 and in Levelt's 1989 models of speech production)" (p. 295). When a lexical item is accessed it becomes activated and is, therefore, a potential candidate for selection. How, then, does the system select the appropriate (or 'sought-for') word from the available candidates? This is the job of the lexical selection mechanism.

Most current models of lexical selection are based on Morton's (1969) logogen model in which each word is represented by a logogen (or node) which becomes activated by conceptual-to-semantic overlap. Selection takes place once one of the logogens reaches a certain threshold level of activation (e.g., Caramazza, 1997; Dell, 1986; Levelt, 1989; Roelofs, 1992). More recent models have incorporated the idea that the level of activation of other lexical items (i.e., competitors) also plays a role in selection (e.g., Cohen et al., 1990; Phaf et al., 1999; Roelofs, 1992; Starreveld & La Heij, 1996). If competitor nodes have high levels of activation, the more difficult it is for a single candidate to reach threshold which, as a consequence, delays selection.

Activation may also occur indirectly from other nodes (i.e., spreading of activation) which are connected within the network either semantically (e.g., Collins & Loftus, 1975) or phonologically (e.g., Dell, 1986). Not only does

activation spread between semantically related words (like *doctor* and *nurse*) but between words that co-occur quite frequently even though their meanings are quite different in isolation (i.e., collocations, like *commit* and *crime*, for instance).[6] Additionally, Morton built into his model the characteristic that the frequency with which words are used or encountered by a speaker alters the speed with which the logogen for that word reaches the threshold. One can think of it either that the threshold level for very frequent words is lower than for infrequent words or that the resting level of activation for very frequent words is higher than for infrequent words. Regardless, much research has shown that words with high frequency reach the threshold faster than words with low frequency (see Monsell, 1991). How recently a word has been encountered has also been shown to influence how quickly that word reaches threshold (e.g., Griffin, 1992; Wheeldon & Monsell, 1992; Vitkovitch & Humphreys, 1991). Lexical nodes stay in a heightened state of activation for a certain period of time after they have been accessed before returning to their resting level of activation. If that node is reactivated by the conceptual system while still experiencing residual activation, it will reach its threshold faster than if it had not been recently accessed.

In sum, the successful selection of a lexical candidate is simply an empirical eventuality of a single lexical node reaching a threshold level of activation before any other node. Many factors influence the rate with which the threshold level is attained, some of which are (a) the degree of conceptual-to-semantic overlap, (b) the level of activation of competitors, and (c) factors relating to the speaker's experience with that lexical item such as how frequently or recently it has been accessed.[7] Once a lexical candidate has been selected, it is made available for phonological encoding prior to articulation.

A debate exists in the language production literature regarding whether phonological encoding only takes place once a single candidate has been selected

[6] See Smadja (2004) or Hoey (2005) for a fuller description of the concept of collocation and McKoon and Ratcliff (1992) and Durrant (2008) for experimental evidence of priming within collocations (at least ones which have been independently rated as being highly associated).

[7] Many other factors have been noted to influence the speed of retrieval of lexical items (such as lexical class, length and/or number of syllables, phonological and/or orthographic neighbourhood density, age of acquisition of that item, etc.). How these factors relate to the model of language production presented here is beyond the scope of this study.

(i.e., 'discrete' or 'serial' models, per Levelt, 1989, for example) or whether, in fact, all accessed/activated nodes send activation to their corresponding phonological nodes (i.e., 'cascaded' models, per Peterson and Savoy, 1998, for example). If phonological encoding does commence prior to final selection, then a distinction must be made between the cascaded models in which phonological encoding has no effect on the selection of the lexical candidate (also called 'feed-forward' models, per Humphreys et al., 1988) versus the 'interactive' models (as per Dell, 1986, for example) in which the lexical candidates receive feedback from the phonological level which may have an impact on which candidate is ultimately selected. Regardless of the exact time-course of phonological encoding, once it is complete, the word is ready for articulation.

2.1.1.2. The Convergence Problem

Synonyms (as outlined in section 3.1.2) pose a particular problem for models of lexical access and selection. Since synonyms are, by definition, words which share the same basic meaning, the conceptual input that activates one member of a synonym set should also activate the other members of the synonym set, resulting in multiple highly activated lexical competitors. Levelt (1989) called this the 'convergence problem' (p. 200). How does lexical selection distinguish between nodes that share most of their semantic criteria in order to choose only one lexical item for articulation? Most of the time, a single selection is ultimately achieved; speech errors in the form of lexical blends (such as *stummy* for *stomach* and *tummy*) are quite rare. (See Fromkin, 1973, for a description of different speech errors and their occurrence). However, studies in the time course of lexical selection (Jescheniak & Schriefers, 1998; Peterson & Savoy, 1998) have shown that synonyms remain activated quite late in the process (late enough that each one receives some phonological activation). English poses a particular challenge in that it has fairly extensive synonymy (Anttila, 1989).

Levelt's (1989) solution to the convergence problem, at least in terms of synonyms,[8] was to posit the 'uniqueness principle' which states that "no two lexical items have the same core meaning" (p. 213). By 'core meaning', Levelt is referring to what he calls the "most salient" (p. 212) meaning component of the lexical item. In other words, synonyms are not, in fact, synonyms at all because their core meanings diverge to a critical degree. Levelt acknowledges that the lexical representation probably contains more information than simply the basic semantic features of a word although he opts not to explicate them further as he feels those additional factors are not necessary to distinguish between synonyms.

> There are, probably, additional properties stored with an item. It may have particular pragmatic, stylistic, and affective features that make it fit one context of discourse better than another. The item *policeman* fits better in formal discourse than *cop*, which is otherwise very similar in meaning. Certain so-called registers (talk to babies, talk between lovers, etc.) seem to select for lexical items with particular connotational properties. Whether such features should be considered as conceptual conditions on the item's use is a matter of much dispute; we will not go into it. (p. 183)

La Heij (2005) also expresses the view that the convergence problem is not really a problem, but for a slightly different reason. He does not adhere to the uniqueness principle but feels that discourse and usage factors play an important role in the selection between synonyms. His 'complex access, simple selection' model presupposes that all the information needed to make one lexical representation stand alone as the most appropriate is specified in the conceptual input of the preverbal message. Even though distinct words may share the same dictionary definition (i.e., they are synonyms), La Heij feels that they still have different meanings because they have different functions and are used to different effect in terms of the speaker's communicative goal.[9]

[8] Levelt (1989) did, however, feel the model had a problem in choosing a word versus its hyponym (e.g., *animal/dog*) since the concept DOG would map onto the information stored in the lexical representation for both *dog* and *animal*. He also found this convergence problem in distinguishing between a word and a phrasal equivalent like *mother* versus *female parent*.

[9] Levelt (1989) put forward this idea of a 'communicative goal' being a key variable in determining a verbal utterance. We talk for a reason, and the *way* we talk (e.g., the subtle word choices we make) impacts whether or not we achieve that intended goal.

> There is little we can say with certainty about what comprises the meaning of a word. Clearly, dictionary definitions and simple feature lists do not do any justice to its complexity, fuzziness, and context dependency. Therefore, the only information we can rely on is the speaker's and the addressee's behaviour. If an addressee reacts differently to *mother* than to *female parent*, this defines a difference in meaning. (p. 293)

In order for the system to select the appropriate word out of those with very subtle semantic and functional differences, the preverbal message must be intricately detailed and the lexical representations to be mapped onto must be highly specified, much more so than is typically put forth in current models of language production. This is the 'complex access' part of the procedure. Here La Heij summarizes some of the many factors which influence word choice and therefore must be specified in the preverbal message.

> Because speakers want to achieve a communicative goal, it is evident that in preparing an utterance, they have to anticipate as much as possible how a particular addressee in a particular situation will react. To that end, the speaker should take many aspects into account: the addressee's age, likes and dislikes, intelligence, language skills, sense of humor, social position, occupation, and so on. In addition, the speaker should adjust the utterance to the specific social context. Within sociolinguistics, some of these factors are discussed under the headings of *style* and *register*, which refer respectively to the language required in a specific situation and to the language used within specific socioeconomic groups (e.g., occupational groups and teenagers; see also Levelt, 1989). (p.291)

La Heij gives the following example of some of the complex affective and pragmatic cues (which I've capitalized to identify them as cues) that might be specified in the preverbal message (p. 294):

(1) SLANG WORD APPROPRIATE
EUPHEMISM PREFERABLE
FIRST NAME ALLOWED

In turn, each lexical node would be specified or tagged with whether or not it was a slang word, or a euphemism, or a first name, for example. The cues in the preverbal message would then be mapped against the tags attached to each lexical

node and, in cases in which an overlap existed, activation would be increased. Thus if the preverbal message included the SLANG cue and the representation for the word *chuck* included a SLANG tag, activation of the node for *chuck* would be increased in relation to the activation of the node for the synonym *throw* which does not include the SLANG tag.

The final stage of the complex access, simple selection process is the simple selection component. The idea here is that because the conceptual input is so detailed, the selection of the appropriate lexical item is very simple. As La Heij explains, "given the complexity of the preverbal message, it seems unlikely that situations will arise in which this message specifies more than one lexical item. As a consequence, there is no convergence problem to be solved." (p. 296).

Schriefers (2005) supports La Heij's view that models of lexicalization need to describe the preverbal message in more detail. He states that we have a "problem of adequate characterization of the conceptual input…to the language production system. At least a large part of monolingual language production research, particularly the experimentally oriented tradition, has tried to bypass this problem" (p. 285). He goes on to say that "most of the experimental research that tries to uncover the details of the linguistic encoding processes tends to avoid the complexities of the conceptual input" (p. 286). The most common experimental paradigms that have been used (i.e., implicit priming, picture word interference, sentence completion) are not designed to account for the complexities of the thought-to-language mapping process that is involved in natural language production. He suggests that by using methodologies which provide a more complex and contextualized linguistic environment, an exploration of these characteristics is inevitable.

To summarize, the lexicalization process involves several distinct stages from conceptual chunking, to lexical access and selection, to phonological encoding (prior to articulation). Selection of a candidate is achieved automatically once its node reaches a threshold level of activation. Therefore, to resolve the convergence problem that is inherent in the selection amongst

synonyms, a highly detailed preverbal message is posited in which pragmatic, affective, and stylistic information is also included in the conceptual input that is mapped onto the information bundles attached to each lexical representation.

2.2. Bilingual Language Production

When viewing the process of language production, as outlined above, from the perspective of a bilingual speaker (defined below), additional factors need to be taken into consideration, mostly with regard to whether or not the bilingual has control of the two languages at each stage of the process.

2.2.1. Defining Bilingualism

Before any full-fledged discussion of bilingualism begins, we must make sure we have a common understanding of the terms 'bilingualism' and 'bilingual'. As is common practice in the field, I use the term bilingualism to cover instances of multilingualism as well as strict bilingualism. As such, the term bilingual may also be used to refer to a speaker who knows and uses more than just two languages. Bilinguals are formed over time, not created instantaneously. Thus, there must be some point during the acquisition of an additional language whereby a speaker becomes a bilingual. Measuring and specifying this point would be virtually impossible; thus, I adopt a functional application of the term following the lead of Grosjean and Soares (1986), who define bilinguals as people who regularly use two or more languages to function in their everyday lives. Somewhat equal proficiency in both languages or native-like competence in the L2 are not prerequisites for bilingualism, since those situations are very atypical. As Grosjean (1996) explains, "bilinguals acquire their languages for different purposes, in different domains of life, with different people. It is precisely because the needs and usage of the languages are usually quite different that bilinguals rarely develop equal fluency in their languages. The level of fluency attained in a language (more precisely, in a language skill) will depend on the need for that language and will be domain-specific" (p. 21-22). With this concept

of 'bilingual', and the linguistic state of being bilingual, called 'bilingualism', in mind, let us now return to the discussion of bilingual language production.

2.2.2. Bilingual Lexicalization

As mentioned above, the first stage of lexicalization requires the speaker to chunk conceptual information into relevant packages such that each package can be mapped onto an existing lexical unit in that language. Part of learning a language involves learning how to chunk the conceptual information appropriately for that language. As Levelt (1989) explains:

> conceptualizing and grammatical encoding are interacting for the language-acquiring child [to the end that] the mature speaker has learned what to encode when preparing a message for expression…The language-specific requirements on semantic structure have become represented in the Conceptualizer's[10] procedural knowledge base. (p. 105)

Thus, when bilinguals learn two languages, they are learning two systems for organizing conceptual information for linguistic realization. De Bot & Schreuder (1993) point out that there is a lack of experimental research addressing how bilinguals deal with the different lexicalization patterns for each language (i.e., the Chunking Problem extended beyond a single language).

Slobin's Thinking for Speaking proposal (1987, 1996) removes the chunking problem from the domain of linguistic encoding (of which the Conceptualizer is one component) and instead locates the packaging together of certain conceptual features within the nonlinguistic conceptual system. We are born into a language and, through exposure, we learn to think for the purposes of speaking that language. Because the locus of the conceptual packaging is outside the linguistic system, it has potential ramifications in terms of the speakers' nonlinguistic behaviour as well. As such, Thinking for Speaking is considered to be a manifestation of the linguistic relativity hypothesis which proposes that the language we speak influences how we perceive and think about the world around us. For example, McNeill and Duncan (2000) demonstrated that gesture habits

[10] See footnote 8 for a description of a portion of the architecture of Levelt's (1989) Speaking model.

were different for speakers of languages which contrast in terms of specific lexicalization patterns. Boroditsky, Schmidt, and Phillips (2003) showed that the grammatical gender assigned to nouns in German and Spanish is a salient characteristic in terms of (a) how those objects are remembered, (b) how those objects are described, and (c) how similar pictures of those objects were rated, even when each task was conducted in English, a language in which grammatical gender does not exist. In both of these cases, the language that participants learned as a child seemed to influence certain aspects of their non-linguistic behaviour. Regardless of whether the conceptual packaging takes place inside or outside the bounds of linguistic processing, the fact remains that languages differ in terms of how conceptual features are bundled together for the purposes of lexicalization.

Motion events are a fruitful domain for exploring the Chunking Problem further. Talmy (1985, 2000) lists six distinct components that have the potential to be involved in a motion event: (1) the fact of motion itself, (2) the FIGURE (the object undergoing motion), (3) the GROUND (another object the FIGURE moves relative to), (4) the PATH of motion, (5) the MANNER of motion, and (6) the CAUSE of motion. Languages vary in terms of which components can be packaged along with the fact of motion into a verb root. For example, an English speaker has the option of encoding MANNER along with the fact of motion in the verb root when the PATH information is being expressed in a following preposition phrase, as in (2). By contrast, a French speaker must encode the PATH information inside the verb root (along with the fact of motion), leaving MANNER information to be expressed in a following adverbial phrase, as in (3).

(2) *I* ***scampered*** [MOTION/MANNER] *across the street* [PATH]

(3) *J'ai* ***traversé la rue***[MOTION/PATH] *allégrement* [MANNER]

The concept of SCAMPERING can be encoded in a single word in English, *scamper*, whereas in French the same idea must be expressed with a more generic motion verb, e.g., *courir* (to run), plus an adverbial describing the manner of running, e.g., *allégrement* (playfully/briskly) or *d'une manière folâtre* (in a playful/lively manner). Green (1993) asserts that a complete model of language

production needs to account for how bilinguals deal with such crosslinguistic variable lexicalizations.

It is feasible to think that the language production system of a bilingual will encounter situations in which the lexicalization patterns of the two languages intermingle, especially if a speaker has more experience in one of the languages and is therefore more practiced in that system of packaging conceptual information. As a consequence, the speaker may chunk information in one language in the manner that is required for the other language, resulting in one of a number of possible outcomes. The most obvious outcome is for the speaker to generate an ungrammatical utterance in the output language. For example, if a French/English bilingual packaged the MOTION, PATH, and MANNER information in the English way when speaking French, he/she would formulate an utterance deemed ungrammatical by French native speakers.

(4) **J'ai **marché*** [MOTION/MANNER] *dans*[11] *la chambre* [PATH]
I walked into the room

A second possible outcome is for the speaker to produce utterances which, although technically grammatical, sound stilted or unnatural. For example, if a bilingual French/English speaker packaged the same information as in (4) above but using the French configuration when formulating an utterance in English, an English native speaker may judge the expression (as in 5) to be slightly odd and may therefore conclude that English is not the first language of the speaker even though he/she did not actually violate the grammar of English.

(5) *I **entered the room*** [MOTION/PATH] *walking.* [MANNER]

Another possible outcome is that the cross-over in lexicalization patterns may sound perfectly natural in both languages. In those cases, casual observation would probably not be enough to notice an effect of one language on the other and a more detailed analysis of the language output is required. The effect may become apparent once the frequency of the respective lexicalization patterns is assessed. For example, if a preverbal message does not include specification of

[11] This expression would be grammatical if the speaker was trying to convey the message that he/she walked *within* the room (as opposed to *into*) because in that case 'the room' is a location, or ground entity, and not an expression of path.

MANNER and only involves MOTION and PATH, speakers of English have the option of conflating MOTION and PATH into the verb stem, as in (6a), or lexicalizing them separately in the verb stem plus the following preposition, as in (6b).

(6) a. *I **left**[MOTION/PATH] the room.*

b. *I **came**[MOTION] <u>out of</u>[PATH] the room.*

(7) a. *Je **suis sorti(e)**[MOTION/PATH] de la chambre.*

b. **Je **suis allé(e)**[MOTION] **hors de**[PATH] la chambre.*

The only grammatical lexicalization in French is the conflation of MOTION and PATH in the verb stem, as in (7a). Since the lexicalization pattern shown in English in (6b) is ungrammatical in French (7b), bilinguals may find it simpler to avoid that pattern when speaking English as well and opt more often for the lexicalization pattern that works in both languages. Such a preference would only become apparent once the relative frequency of the two lexicalization options was compared to English monolingual speakers who do not have the same crosslinguistic influence from French.

2.2.2.1.Bilingual Lexical Access and Selection

The main debate regarding lexical access and selection for bilingual speakers is whether the bilingual has control over the activation of lexical representations belonging to each language – are the mechanisms 'target-language specific' or 'target-language non-specific'? There seems to be a general consensus that lexical access is target-language non-specific (see Costa, 2004, for example), which means that the conceptual input activates lexical representations in both of the bilingual's languages, even when the bilingual only intends to speak one of them. However, there is not agreement in the literature about whether lexical *selection* is target-language specific or not and how, therefore, the system selects words from the intended language.

One proposal (e.g., Colomé, 2001; Costa and Caramazza, 1999; Roelofs, 1998) advocates that lexical selection is target-language specific - that the selection mechanism actually only considers candidates in the intended language. The implication of this view is that although nodes in

the non-target language may be activated, they do not act as competitors to the nodes in the target language. By contrast, the target-language non-specific view of lexical selection supports the idea that all activated nodes are potential candidates/competitors, regardless of which language they belong to. Proponents of this position, therefore, need to posit a mechanism that ensures selection within the target language. Two alternative suggestions have been put forth: (a) that lexical representations in the non-target language are collectively inhibited resulting in lower activation levels and less chance of selection (e.g., Green, 1998; Hermans et al., 1998), or (b) that the language cue that is part of the preverbal message is sufficient enough to collectively raise the activation levels of the lexical nodes belonging to that language (Poulisse and Bongaerts, 1994). La Heij (2005) advocates this last viewpoint as an extension of his complex access, simple selection model. In this view, the language to be spoken will be one of the cues included in the complex preverbal message which will be mapped onto the lexical nodes that have been tagged for that language. In a sense, speaking one language versus another, from a lexical-selection point of view, is the same as speaking in one style or register versus another, a view supported by Paradis (1987), de Bot & Schreuder (1993), and La Heij (2005). So, LANGUAGE is just like any other cue in the complex preverbal message that allows the speaker to converge, without problem (or with only occasional problem)[12] on the single lexical item which best represents all that conceptual information.

The target-language specific/non-specific question can be extended to the level of phonological encoding as well – do word *forms* in the non-response language receive activation (target-language non-specific view) or is activation reserved for the word forms in the response language (target-language specific view). Costa (2004) concludes that "there appears to be enough experimental evidence to suggest that the activation

[12] Just like traditional monolingual speech errors (i.e., semantic substitutions, blends, etc.), the same kinds of bilingual speech errors have been documented. See, for example, Poulisse and Bongaerts (1994).

of linguistic representations belonging to the non-response language reaches even the phonological level" (p. 216). This conclusion precludes the claims of the discrete models of lexical selection mentioned in section 2.1.1. Instead, evidence gathered from studies in bilingual language production (as summarized in Costa, 2004) is consistent with models in which phonological encoding begins for all accessed lexical items prior to actual selection (i.e., cascaded and interactive models).

Whether or not activation of representations from the non-response language takes place is largely independent of whether or not the knowledge of one language influences the way in which a bilingual processes the other. This latter question is the topic of the following section.

2.2.3. Crosslinguistic Influence (CLI) or Transfer

The extent to which bilinguals have control of their languages and can store and use their two language systems separately, keeping each intact and independent, has been a long-standing question in the study of bilingualism. As early as 1969, Haugen was reflecting on whether bilinguals could "keep the patterns of two (or more) languages absolutely pure" (p. 8). This question can be interpreted in two different ways, depending on whether one focuses on the storage or the usage aspect of language processing. From a storage perspective, the question seems to ask what kind of control speakers have in establishing discrete and distinct language stores as the individual languages are being acquired. From a usage perspective, on the other hand, this question asks how much control speakers have in keeping those language stores discrete and distinct each and every time they are being used. In essence, both interpretations address the issue of control.

What Haugen was referring to is the phenomenon of crosslinguistic influence (CLI, for short) or transfer. Jarvis and Pavlenko (2008) defined crosslinguistic influence as "the influence of a person's knowledge of one language on that person's knowledge or use of another" (p. 1). Weinreich (1953)

first talked about this phenomenon using the term 'interference'. Although some linguists still use the term 'interference' (e.g., Edwards, 2004), the term 'transfer' is often preferred since 'interference' seems to imply a negative outcome to the transfer from one language to the other, which is not always the case. The term 'transfer' has also been criticized as being associated with the behaviourist notion of transferring skills or habits which is one of the reasons why Kellerman and Smith (1986) introduced the theory-neutral term 'crosslinguistic influence'. An additional benefit of 'crosslinguistic influence' is that it encompasses any phenomenon in which one language influences the other, regardless of whether the result is a direct transfer of forms. For example, the phenomenon of avoiding a feature entirely which is common in the speaker's L1, but which the speaker knows is quite rare in the L2, would fall into the category of crosslinguistic influence. In keeping with Jarvis and Pavlenko (2008), I shall use the terms 'crosslinguistic influence' and 'transfer' synonymously in this dissertation.

It is obvious from the extensive literature on CLI (see Odlin, 1989 and Jarvis and Pavlenko, 2008 for reviews) that it is a very common-place occurrence for at least one of a bilingual's languages (typically the L2) to not be 'pure' (to use Haugen's term which I understand to mean matching that of a typical monolingual speaker), especially in stages of acquisition. But what about once the bilingual has reached a high level of competence in his/her L2? Will traces of interaction always exist? Has the bilingual gained enough control to eliminate such transfer, if in fact it is undesirable? And how does the situational context (i.e., language mode) contribute to crosslinguistic interactions? It would be reasonable to expect intrusions of one language on the other in bilingual-mode situations in which both languages are being used in the same conversation and are thus both activated in the speaker's mind. But what about monolingual-mode situations in which the non-active language (or the 'language-not-in-use' to use the terminology adopted by Costa, 2004) is not required? Can the speaker simply turn that language off such that it has no further influence? Perhaps the interaction between the two languages intensifies as competence increases to the point that features of the L2 actually begin to surface in the L1 output (a phenomenon called

'reverse transfer', documented as early as 1937 by Mencken and identified as a type of transfer by Jakobovits in 1970). Is it possible for either language to remain pure, in any given situation, or is that outcome beyond the control of the speaker? Obviously many bilinguals have the ability to produce fluent, grammatical utterances in both of their two languages, but does that mean that some not-readily-observable intermingling of languages is not taking place?

Haugen's response to his own question casts some doubt on whether it is possible for bilinguals to keep their languages totally separate and intact. He states that "in some degree one or both languages will be bound to receive some transfer of patterns from the other" (p.8). He even goes as far as to claim that "bilingualism leads inevitably to a certain confusion of patterns" (p. 10). His choice of the word "confusion" could be interpreted to indicate that both languages are potentially affected by the interaction of the other, regardless of which was acquired first or which is the dominant language. Mack (1984, 1986) draws a similar conclusion and claims that her experiments (see section 2.2.4 below) provide evidence for the interdependence of languages in the bilingual's mind. "One (or both) of the languages has been internalized differently by bilinguals than by monolinguals" (1984, p. 172). Becoming a bilingual results in language restructuring, she suggests, and once speakers have started acquiring a second language, they are no longer like monolinguals, even in their first language. Grosjean (1996) encapsulates the essence of these ideas in his assertion that it is now a fairly well-accepted fact that a bilingual is not simply two monolinguals in one person.

2.2.4. Processing Differences – Summary of Experimental Results

So how exactly are bilinguals and monolinguals different? It is not unreasonable to expect that bilinguals in the bilingual mode (see section 2.2.6.2 for a definition) function very differently than monolinguals, but what about in the monolingual mode? In the words of Grosjean and Soares (1986) "the question of interest is how the language processing of bilinguals in the monolingual speech mode differs from that of monolinguals given this residual activation of the other

language" (p. 146-147). They imply that bilinguals must process differently than monolinguals because of the existence and potential influence of the other language.

It is also realistic to expect bilinguals to show different behavior than monolinguals when they are processing in their non-dominant language since habits and structures from the dominant language may be transferred over to the non-dominant language, especially if the non-dominant language is the second language. More interesting are situations in which bilinguals are found to be different from monolinguals even when functioning in their dominant and/or first language. Some of those findings are outlined below.

2.2.4.1.Bilinguals in L1 Compared to Monolinguals of that Language

One unsurprising difference that many researchers have found in the linguistic processing of monolinguals compared to bilinguals who are tested in their L1 is in the speed of processing. The existence of a second language seems to cause a delay in response in the first or dominant language. Specifically related to language production, having two different lexical stores seems to slow down the speaker's ability to name objects and numbers in their L1 (Magiste, 1979; Gollan, Montoya, Fennema-Notestine, & Morris, 2005; Ivanova & Costa, 2008), or to name objects in the presence of interfering words from the non-response language (Hermans, Bongaerts, de Bot, & Schreuder, 1998). In a lexical decision task, De Groot, Delmaar, & Lupker (2000) found that Dutch/English bilinguals had longer decision latencies than Dutch monolinguals when presented with Dutch words which were interlingual homophones (meaning that they also functioned as English words but with distinct meanings). Other production measures have shown more Tip-of-the-Tongue (TOT) states in the L1 of bilinguals compared to monolinguals (Gollan, Bananni, & Montoya, 2005) and decreased 'verbal fluency' as measured by counting the number of words participants can generate adhering to certain criteria in a limited amount of time (Gollan, Montoya, & Werner, 2002). In more general terms, Magiste (1986)

found that bilinguals' speed of processing in their L1 became slightly slower as their proficiency in the L2 increased.

In terms of comprehension, Mack (1984) found bilinguals slower than monolinguals at grammaticality judgment tasks, even in their L1. She concluded that it must be due to the state of bilingualism itself as she could find no specific crosslinguistic features that would account for the delay. She did find some crosslinguistic effects in her 1986 study in which bilinguals were slower than monolinguals at a semantically primed lexical decision task until the targets were primed in both languages, at which point response times sped up. Altenberg and Cairns (1983) found that, in an English lexical decision task, bilinguals took longer than monolinguals to discard nonsense words which violated English phonotactic constraints but agreed with the phonotactics of the participants' non-dominant language, German.

Occasionally, it seems that knowledge of two languages offers a processing advantage, at least when patterns (i.e., linguistic structures) in both languages are the same. Van Hell and de Groot (1998) found that bilinguals more easily generated an associated word when the initial word given was a cognate with a word in the bilingual's other language, even when the participants did not realize the experiment was addressing their bilingualism. Cognate status (explained in more detail in section 2.2.6.3) also seems to help bilinguals process more quickly in their L1 in the following ways. In a lexical decision task, Van Hell and Dijkstra (2002) found that Dutch/English bilinguals responded faster to Dutch words which were cognates with English words than to noncognate control words. Similarly, in a picture naming task, Costa, Caramazza, and Sebastián-Gallés (2000) found that Spanish-Catalan bilinguals could name pictures in both L1 and L2 more quickly when the word was a cognate between those languages (although the effect was larger when naming in L2) .

By contrast, Mack's (1986) grammaticality judgment task involved non-equivalent structures and she found that bilinguals made more errors than monolinguals for those sentences which mimicked structures which were allowed in the other language (thus confounding the bilingual). In this situation, the effect

of bilingualism was not speed of processing but rather a reduction in syntactic accuracy in the L1 of the participants. Major (1992) also demonstrated a deviation from the monolingual norm in the L1 of his bilingual participants. His population under study was a group of adult Americans with English as their L1 who were living in Brazil. He found that the greater the participants' proficiency in their L2 (Brazilian Portuguese), the more their voiceless stops diverged from the monolingual English pattern when they were speaking English.

All in all, there seems to be ample evidence that some bilinguals are not able to keep their two languages, first or second, independent and intact. Some kind of crosslinguistic influence or processing-load influence has been demonstrated in several different domains, sometimes to the advantage of the bilingual and sometimes to his or her detriment. In this experiment, I hope to add to this body of evidence on the production side of the communication system. The type of effect I hope to demonstrate is not one of speed or accuracy, but rather of lexical choice. Bilinguals will vary from monolinguals in terms of the frequency with which they choose certain lexical forms such that they opt more often for the forms that structurally match the translation equivalents in their other language.

2.2.5. Covert Transfer

Speed and accuracy (including grammaticality) constitute measures which are easily observable, given the right experimental paradigm. Therefore, the influence of one language on the other which results in speed and accuracy differences in the bilingual as compared to the monolingual has been termed 'overt interference' (Mougeon & Beniak, 1991, p. 181). By contrast, some types of crosslinguistic influence may not be so easy to detect, such as when the output does not violate the grammaticality rules of the language, but does vary from monolinguals in terms of the frequency with which certain forms are uttered. In the words of Klein-Andreu (1980), "such interference may well elude impressionistic observation, to the extent that it does not give rise to utterances that, considered individually, are ungrammatical in the recipient language (p.

69).” The complementary label ‘covert interference’ (Mougeon & Beniak, 1991, p. 160) has been offered to identify cases in which crosslinguistic influence is not so obvious.

Ringbom (1987, p. 50) uses the expressions ‘overt’ and ‘covert’ slightly differently, based more on a comparison of structures between the L1 and L2. For him, overt transfer occurs when learners of a second language see similarities between the L1 and L2 whereas as covert transfer occurs when the relevant L2 structures have not been acquired so the learner transfers the L1 structures to compensate or avoids certain structures entirely. Unlike Mougeon & Beniak, Ringbom uses the term ‘covert’ to cover instances of ungrammatical outputs in L2. Like Mougeon & Beniak, however, the outcome of covert transfer may be a difference between monolinguals and bilinguals in terms of the frequency with which certain forms and structures are used if certain structures are avoided. Thus, in Ringbom’s view, covert transfer often leads to omissions or avoidance in the language production of learners. Appel and Muysken (1987, p. 86) call the Ringbom-style covert transfer ‘indirect L1 influence’. Silva-Corvalan (1994) reserves the term ‘indirect transfer’ for cases in which the transfer does not result in ungrammatical outputs but simply changes the frequency with which bilinguals use certain forms (i.e., higher frequency usage when a parallel structure exists in the other language and lower frequency usage when a parallel structure does not exist in the other language). Thus, Silva-Corvalan’s use of the term ‘indirect transfer’ matches that of Mougeon & Beniak’s (1991) use of the term ‘covert interference’.

For the purposes of this study, I would like to integrate these terms and instead refer to the phenomenon as ‘covert transfer’ (or occasionally as ‘covert crosslinguistic influence’). I want to avoid the term ‘interference’ as it implies a negative consequence to the crosslinguistic influence (as mentioned above), which is not the case in this study which analyzes the frequency of use of perfectly grammatical utterances and very precise lexical choices. The terms ‘transfer’ and ‘crosslinguistic influence’ do not have the same negative connotation as ‘interference’. I also prefer the term ‘covert’ over ‘indirect’ since

the crosslinguistic influence that results in a change in frequency with which speakers use particular forms is no less direct than the crosslinguistic influence that may result in a grammatical error. It is just less directly noticeable; it is covert. Thus, any differences that emerge in this study between monolinguals and bilinguals, in terms of the frequency of certain lexical items, that can be attributed to the existence or absence of an equivalent form in the bilinguals' other language, will be identified as cases of 'covert transfer'.

In reference to this phenomenon, Silva-Corvalan (1983) suggested that "the influence of one language on another may be evident only through differences in the frequency of use of a certain structure, rather than in the development of ungrammatical constructions" (p. 8). Mougeon and Beniak (1991) explain further that this type of influence is "manifested by the decline of a form which has no counterpart in the superordinate language" (p. 160), [13] thus it is a process of reduction or leveling of structural dissimilarities between languages in contact. They describe this interlingual influence as not being a qualitative difference (from the monolingual norm) but as a statistical or quantitative difference and, as such, it is one of the least well-documented effects of language contact.

It seems reasonable that bilinguals, when given the choice, would opt for structures which exist in both of their languages thereby avoiding structures which are particular to only one language. Weinreich (1953) called this "a reduction of his [sic] linguistic burden" (p. 8). Silva-Corvalan (1994) explains it this way: "bilinguals develop strategies aimed at lightening the cognitive load of having to remember and use two different linguistic systems" (p. 6).

Some evidence for covert transfer has been shown in a few different linguistic domains. At the level of syntax, Schachter (1974) and Hakuta (1976) demonstrated how learners of English as a second language who have a structure similar to a relative clause in their L1 (e.g., Persian and Arabic in Schachter's study and Spanish in Hakuta's study) use relative clauses in English more often

[13] The language contact situations they study typically involve a superordinate language, which is the language of the dominant society, versus a subordinate language which is the home language of the bilinguals being studied.

than learners who do not have an equivalent structure in their L1 (e.g., Chinese and Japanese, respectively). At a morpho-syntactic level, Klein-Andreu (1980) demonstrated that the Spanish spoken by a group of Spanish-English bilinguals in the United States differed from monolingual Spanish speakers in that the choice of the simple present tense versus the present progressive more closely resembled the English usage of those forms. At a lexical level, Nadasdi, Mougeon, and Rehner (2004), found that, when choosing amongst synonym sets, certain populations of French/English bilinguals opted more often for the word which shared form overlap with the English translation equivalent (e.g., *char* for 'car', as opposed to *voiture* or *auto*, etc.). Silva-Corvalan's research looks at pragmatic effects relating to subject inclusion and word order. As Spanish is a pro-drop language, speakers have the option of including or omitting the subject pronoun in their sentences, although it is often governed by pragmatic constraints. In her experiment, Silva-Corvalan (1994) found that bilingual speakers had a more restricted use of subject inclusion and a more fixed SVX word order than monolingual Spanish speakers, both following the English pattern.

Researchers in second language acquisition have also noted this kind of covert transfer in a preference for L1 structures resulting in L2 production which is grammatical yet somehow non-native-like. Ringbom (1998) has proposed that second language acquisition researchers should pay more attention to examples of covert transfer. L1 transfer may exist in more subtle ways, he suggests. "Transfer research so far has focused too much on errors, and it is time to approach transfer problems from other angles as well. Clearly documented overuse and underuse of constructions and lexical items provid[es] one such approach" (p. 196). Granger and Tyson (1996), for example, observed that French learners of English overused common connectors such as *or*, *but*, and *so*, which have close equivalents in French.

In my research, I have designed an experiment that may reveal additional evidence of covert transfer, but at the level of verb lexicalization. When confronted with a choice between verb synonyms (i.e., distinct lexical forms which convey the same basic meaning), will a bilingual be influenced by a

structural equivalence between one member of the synonym set and the way verbs are lexicalized in the other language? By 'structural equivalence', I do not simply mean cognate forms, although that may well play a role,[14] Rather, I want to investigate a more subtle structural equivalence: that of verbal information being encoded in one form-unit (e.g., single-word verbs like *remove*) versus across more than one form unit (e.g., multi-word verbs like *take off*), as was introduced in section 2.2 2.

In summary, let us revisit Haugen's query about whether bilinguals have the ability to keep the 'purity' of the patterns of each of his/her two languages; can bilinguals control the intrusion one language onto another? In this study, my focus is on whether languages can remain discrete and independent each and every time they are being used (as opposed to the question of language purity in acquisition leading to storage distinctions), and during the process of language production. The particular linguistic patterns that I am investigating are at the level of lexicalization, and in particular, the process of encoding action information into verb forms. The type of CLI that I have designed the main experiment to find are instances of covert transfer in which the frequency of certain lexical choices is different between the bilingual and monolingual populations. I will also consider the effects of speaker (e.g., age of acquisition, language dominance, etc.), situational (e.g., language mode), and linguistic (e.g., cognate-status) variables which may contribute to this intermingling of languages, as outlined below.

2.2.6. Other Variables that Impact Bilingualism

In addition to the basic distinction of monolingual versus bilingual speaker, the results of this study may well be influenced by a variety of additional variables, whether they are inherent to the speaker, controlled within the experiment, or related to the linguistic units themselves. Bilinguals are considered to be a group because they all have the characteristic of storing and

[14] The verbal fluency experiment of Gollan et al. (2002) demonstrated how cognate status can impact lexical access in that bilinguals generated a higher proportion of words which had cognates in their other language as compared to monolinguals for whom cognate-status was irrelevant.

using more than one language in their minds. Bilinguals of French and English, specifically, are a group because they share (more-or-less) the grammars and lexicons of the same two languages in their minds. However, there are many factors which distinguish one bilingual from the next and which may influence the way each processes the two languages. First and foremost is which language is their first language and which was learned subsequently. The age at which the second language was acquired and the learning context (e.g., naturalistic versus scholastic) may also be important. For a study in language production such as this, the current usage rates of each language and the degree to which the speaker uses both within the same communicative situation may also be crucial determinants of current behaviour. All of these factors, among others, may contribute to the bilingual's overall relative proficiency in each language which could well impact the direction and degree of crosslinguistic influence. In terms of situational determinants, whether or not both languages are required in the speech situation and, therefore, are active in the speaker's mind may also influence the output forms. From the perspective of the linguistic units under scrutiny, the type of form/meaning relationship which exists crosslinguistically may also play a role. In particular, whether or not words in French and English are cognates, in that they share form overlap in addition to meaning overlap, could be an important consideration.

2.2.6.1. Speaker Variables

Each bilingual is a unique speaker with a distinct acquisition history and individual current linguistic practices. Such variables will be tracked for each participant so that they can be pooled into appropriate subgroups allowing for these speaker-inherent characteristics to be treated as independent variables. The main characteristics that contribute to the uniqueness of each bilingual speaker are outlined below.

First Language

For many bilinguals, it is easy to determine one's first language (L1). It is the language spoken in the home which the infant is exposed to from birth. It is also, therefore, the first language that the individual produces once he/she begins talking. Lenneberg (1967) characterized the process of acquiring that first language as "automatic acquisition from mere exposure" (p. 176) and it is therefore a case of implicit learning. As a product of this intense exposure and naturalistic acquisition environment, we become native speakers of our first language and, as such, gain a linguistic competence that allows us to produce and understand the language fluently, with accurate and precise lexical selection and usage appropriate to contextual considerations. This competence also endows us with intuitions about what are grammatical versus ungrammatical forms in that language. By contrast, a second language (and third, fourth, fifth, etc., all of which I will call L2) is a language to which the individual is exposed only after a sizable portion of the first language grammar and lexicon are already in place.

For other bilinguals, it is not so easy to label a language as being the first as opposed to the second. Many children around the world are exposed to more than one language from birth, in the case in which one parent routinely addresses the child in one language and the other parent uses the other language or where the home language is different from the predominant community language. Additionally, in the Canadian context, there are many immigrant children who have one language in the home but become immersed in English or French for large portions of their daily existence once they enter the daycare or education system. For many of these children, English or French becomes their dominant language instead of the heritage language spoken at home. Ivanova & Costa (2008) refer to bilinguals such as these as "switched-dominance bilinguals" (p. 278). In these situations, it may not be valid to call the home language the child's L1. If the child was still very young when he or she started having intense exposure to the other language at which point competence and fluency in the first language started to plateau, perhaps that secondarily acquired language, in effect,

would become the L1. The L1 of a bilingual is often more difficult to determine than might otherwise be expected.

When reporting on the status of bilinguals in this experiment, I will indicate, where relevant, which is the first language by listing that language first. For example, any bilinguals who have English as their first language, I will refer to them as English/French, or E/F bilinguals, for short. By contrast, F/E bilinguals have French as their first language.

Age of Acquisition

The term 'simultaneous' bilingual was introduced to account for the situation in which children were exposed, to a similar degree, to two different languages from a very young age. Meisel (2004) suggests that acquisition can be considered to be simultaneous if the children are immersed in more than one language by the time they are three or four years old. Such a situation would qualify as "multiple first language acquisition" (p. 95). If the children are older by the time they get that intense exposure to a second language, then it is no longer considered simultaneous acquisition, but rather 'child second language acquisition'. By contrast, 'adult second language acquisition' takes place if a speaker is only exposed to a second language after childhood. The cognitive and contextual factors that distinguish these three types of acquisitional histories is beyond the scope of this dissertation due to the fact that, in the main experiment reported in Chapter 5 and 6, there were not enough participants within each group[15] to draw any meaningful conclusions on the impact of age of acquisition on the lexical choices made by bilinguals. However, since age of acquisition was documented for each participant as part of the Bilingual Language Background Questionnaire (see section 5.2), a discussion on determining age of L2 acquisition is provided below.

[15] The participants in this experiment would fall into one of five groups: simultaneous bilinguals of French and English, L1 French speakers who acquired English in childhood, L1 French speakers who acquired English after childhood, L1 English speakers who acquired French in childhood, and L1 English speakers who acquired French after childhood.

Determining Age of Acquisition

When establishing the age of acquisition of a second language learner, the age at the *onset* of learning is usually taken as the determining factor. In fact, some researchers (see Kovelman, Shalinsky, Berens, & Petitto, 2008, for example) highlight the importance of establishing categories based on the age at the onset of acquisition with their preference of the label 'early exposed bilinguals'. However, some learners may have only periodic and inconsistent exposure to the L2 during the initial stages of acquisition resulting in the bulk of learning taking place at a point in time beyond what the researcher has classified as the critical period. In such situations, it is debatable whether the critical period would still offer them the advantage it would to those who attained a higher level of competence during that time.

Meisel (2004) takes the stand that if a child has not started learning a second language by the time he/she is ten years old, any subsequent acquisition of a language cannot be classified as child second language acquisition (corresponding to an 'early bilingual'), but instead falls into the category of adult second language acquisition (corresponding to a 'late bilingual'). I would venture to qualify this claim a little further and suggest that not only does the onset of acquisition have to fall within the first ten years of life, but that the exposure to L2 during that time must be both consistent and sustained in order for significant changes in L2 competence to be realized.

In terms of participant classification in my experiment, the Language Background Questionnaire asked the bilinguals three questions relating to age of L2 acquisition: (1) when did they first have sustained and consistent exposure to the L2, (2) when did they start using the L2 regularly themselves, and (3) when did they feel they acquired a point of comfortable proficiency in the L2? From these three measures, I could confidently surmise the point at which the onset of acquisition started (by the first two questions), and the point at which a good portion of that new grammar/lexicon was in place (by the final question). I then followed Meisel's classification and reserved the category of early bilingualism for those who answered '10' or younger for all three questions and the category of

late bilingualism for those who answered more than 10 for all three questions. There were a handful of bilinguals who answered questions (1) and (2) as 10 or younger but question (3) as older than 10. For a discussion on how I classified those participants, see section 5.2 and Appendix E

Context of Acquisition

The lexical choices made by bilinguals may be influenced by the context of acquisition of their second language, in particular whether the language was learned in a classroom environment or in a more context-rich, naturalistic environment. Joos (1967) noted that the register (see section 2.3) found within a classroom was more formal than the register found in peer interactions outside the classroom. It could be that second-language classrooms, in particular, exhibit this more formal register quite consistently, at least in terms of the vocabulary introduced in course material and used by the instructor. Overly informal or slang terms will be avoided in favour of more neutral terms which have a higher level of formality. Therefore, the lexical preferences acquired in a classroom setting may be different (i.e., more formal) than those acquired in more naturalistic contexts in which less formal language is common. If these tendencies of lexical storage and retrieval are preserved beyond acquisition and into the phase of functional bilingualism, context of acquisition could easily affect lexical choices made by bilinguals.

Language Dominance

The variables discussed above (L1, age of L2 acquisition, context of acquisition) plus variables like current usage rates may all play a role in establishing a bilingual's current level of proficiency in each language and, hence, which of the languages is the bilingual's dominant one. Bilinguals who show no discernable difference in their proficiency in both languages are labelled 'balanced bilinguals'. If crosslinguistic influence exists at the level of lexical encoding, it is reasonable to predict that the dominant language would intrude upon the non-dominant language more than vice versa. In fact, this is exactly

what Appel & Muysken (1987) state is the case, within their discussion of simultaneous bilinguals. "When one language becomes dominant it will interfere more frequently in the less-known language" (p. 98). Lui, Bates, and Li (1992) also argue that the degree of proficiency in L2 will impact both the degree and direction of the transfer (with more transfer occurring for bilinguals with lower proficiency in the L2 and potentially even reverse transfer occurring for bilinguals with very high proficiency in their L2).[16] Thus, in an experiment in English language production, one would expect to find more crosslinguistic influence from French for the French-dominant bilinguals than for the balanced and English-dominant bilinguals. That is not to say, however, that the English-dominant bilinguals will not show instances of transfer from French. Costa (2004) remarks that future research in bilingualism needs to focus on whether "competition across languages is restricted to L2 speech production for non-proficient bilinguals" (p. 217) or if, in fact, it is evident in the production of proficient L2 speakers or even when bilinguals are speaking in L1.

2.2.6.2. Situational Variable – Language Mode

There is one main independent variable that is not an inherent characteristic of each bilingual, but is relative to the current discourse context or situation – Language Mode. Green (1986) suggests a bilingual's two languages could be in one of the following states: *selected* (currently being used), *active* (ready for use), and *dormant* (not being used at all). Even in situations in which a language is considered to be dormant, it may influence the production of the selected language (in the form of what he calls interference errors). Grosjean (1998) views the level of activation of the bilingual's languages in terms of a continuum that is divided into different language modes. He explains that "a mode is a state of activation of the bilingual's languages and language-processing mechanisms… [which] is controlled by such variables as who the bilingual is speaking or listening to, the situation, the topic, the purpose of the interaction, and so on" (p. 136). At the bilingual end of the mode continuum, both of the

[16] See also, Ellis (1994, p. 330-332) for a discussion on the not-so-straightforward relationship of relative proficiency and degree of transfer.

bilingual's languages are selected and being used (e.g., most commonly realized in situations of code-switching). At the monolingual end, the bilingual only has one language activated because the communicative context only requires/allows for that one language (e.g., in conversation with a monolingual). Thus, for the purposes of this study, 'mode' refers to the external linguistic context as it influences the degree of activation of the bilingual's two languages. Mode can be described along a continuum of contexts. At the monolingual end of the continuum, the bilingual is interacting with speakers who only know one of the bilingual's languages. At the bilingual end of the continuum, the bilingual is interacting with other bilinguals who share the same languages and they are using both languages in that situation. (For an in-depth look at modes of language, see Grosjean, 2001).

Grosjean (1998) explains that interference (a term which he uses as a subtype of crosslinguistic influence that results in ungrammatical forms in the output language) is much more obvious at the monolingual end of the mode continuum because it would hardly be noticed in a bilingual mode when speakers are often switching back and forth between languages. However, a bilingual mode context is exactly when greater crosslinguistic influence would be expected.[17] One way to test this hypothesis is to look at how frequently bilinguals choose certain linguistic units which have some kind of form correspondence to the equivalent units in the other language. If the frequency increases when the speaker is functioning in a bilingual mode as opposed to a monolingual mode, then that is evidence of crosslinguistic influence.

2.2.6.3. Linguistic Variable – Cognate Status

Another key variable deals with the types of lexical items uttered by the participants and for which the representations may be quite different between bilingual and monolingual speakers – whether or not the English word chosen is actually a cognate with a corresponding French word. Since monolingual English

[17] For example, Jared and Kroll (2001) found an influence of French on naming in English for E/F bilinguals only after they had been exposed to a block of trials in which they named words in French and were, therefore, in more of a bilingual mode of functioning at that stage of the experiment.

speakers have no knowledge of which lexical items have French cognates, this variable should not be present for monolinguals. However, due to the high degree of both form and meaning overlap between cognates in the two languages, this factor may well play a role in the lexical processing of bilinguals.

Cognates are words in two languages which display some sort of meaning and form correspondence. They typically share enough of the same meaning that they are considered to be translation equivalents, at least in certain contexts. The picture is a little bit murkier when determining form correspondence. For starters, words in literate languages have two different types of form: phonemic and graphemic form. If the two languages in question share the same alphabet and the potential cognates are pronounced in similar ways (i.e., have very similar phonemic form), then they are also likely to be written in similar ways (i.e., to have very similar graphemic form). The reverse relationship, however, is not guaranteed. Just because words share the same basic graphemic form does not mean that they will be pronounced the same across the two languages. French and English demonstrate this phonological divergence quite well. The cognate *table*, for example is pronounced quite differently in French (i.e., /tablə/) versus English (i.e., /tebəl/). In addition to the stressed vowel being different, the ordering of the vowel and /l/ in the second syllable varies. This divergent language-specific pronunciation could account for why, as noted by Grosjean (1998), discussions of cognates do not address phonemic overlap nearly as much as they address graphemic overlap. What happens when cognates exist in languages which do not share the same orthographic system? In this case, the form equivalence can only be measured phonemically.[18]

For the purposes of this experiment, I classified words as cognates if they shared a certain degree of both graphemic and phonemic overlap. Some cognates were almost identical in form (e.g., *to absorb/absorber*, *to post/poster*) whereas others showed greater contrast (e.g., *correct/corriger*, *explode/éclater*). See

[18] The overall complexity of cognate classification is highlighted by Votaw (1992) who uses a six-cell system showing three degrees of both form and meaning overlap.

section 6.11 for a listing of all the English words categorized as having a French cognate.

Cognates have been shown to influence language processing in bilinguals in several ways. They function as successful primes in different types of lexical decision tasks (see Sánchez-Casas & García-Albea, 2005, for a summary). They can help speed up picture naming in both L2 and L1 (Costa, Caramazza, & Sebastián-Gallés, 2000), they can enhance word generation in verbal fluency tasks (Gollan, Montoya, & Werner, 2002), and they enhance prevention of TOT states (Gollan & Acenas, 2004). Therefore, it would not be surprising to find that they also influence word choice in naturalistic language production, which is what this experiment is designed to test.

In summary, several different categories of variables may impact the process of language production in bilinguals: (a) variables directly associated with the speakers themselves (e.g., L1 vs. L2, context of acquisition, language dominance), (b) variables relating to the speech situation (i.e., language mode), and (c) variables relating to the lexical units being considered for production (i.e., cognate status of verbs).

2.3. Factors Influencing Lexical Choice – Monolingual Perspective

Following the line of thought articulated by La Heij (2005) and Schriefers (2005) which I outlined in section 2.1.1, I think that an investigation of speakers' lexical choices between synonyms requires a very detailed account of the possible distinctions that exist between words that share the same basic semantic content. As mentioned earlier, these types of additional distinctions can be pragmatic, affective, and stylistic in nature. Speakers must also take into consideration the geographic region in which the speech situation is taking place and the socioeconomic status of the interlocutors. All of these factors must have the potential to be accommodated in the preverbal message created by the speaker in order for the appropriate synonym to receive enough activation to be selected. Knowledge of these subtle distinctions between words would therefore be part of a speaker's semantic and pragmatic competence. A summary of a wide range of

these distinctions are presented in Table 2.1 using verb examples to demonstrate each distinction. See section 3.1.2 on the lexical relationship of synonymy for a more detailed explanation of some of these factors.

Table 2.1
Factors Affecting Lexical Choice

Factor	Description	Examples	
Regional Dialect	Forms within one language vary depending on region	Canadian British	***Signal*** *before you turn* ***Indicate*** *before you turn*
Social Dialect	Forms within one language vary depending on social factors	Low SES High SES	*We'll* ***dig in*** *at 8* *We'll* ***dine*** *at 8*
Style[19]	Forms vary according to the level of formality of a situation	Casual Neutral Formal	*Don't* ***piss me off*** *Don't* ***make me mad*** *Don't* ***infuriate me***
Register	Forms vary according to the linguistic conventions of a specific social group or occupation	Neutral Business Familial	*They* ***fired*** *her* *They* ***terminated*** *her* ***employment*** *They* ***sacked*** *her*
Affective Impact	Use of euphemism or dysphemism to either avoid or emphasize sensitive topics	Euphemism Neutral Dysphemism	*He* ***passed away*** *last year* *He* ***died*** *last year* *He* ***croaked*** *last year*
Semantic Transparency	Use of literal versus figurative speech for a certain effect	Literal Metaphorical Idiomatic	*I* ***don't know*** *I'****m stumped***[20] *I* ***haven't the foggiest***
Aesthetic Quality	Preference for a certain rhythm, symmetry, alliteration, or avoidance of repetition	Repetition Non-repetition	*I* ***opted for*** *the first option* *I* ***chose*** *the first option*
Level of Specificity	Choosing terms from level of semantic hierarchy that suits the situation and audience	Hypernym Basic Level Hyponym	***Move*** *back a bit* ***Step*** *back a bit* ***Shuffle*** *back a bit*
Collocation (Frequency)	Certain combinations occur together by convention	Conventional Non-conv.	*The story* ***ended*** *well* *The story* ***finished*** *well*
Lexical Frequency	Forms encountered more frequently are available for selection more readily	High Frequency Low Frequency	***Do*** *that stunt* ***Perform*** *that stunt*
	Low frequency forms are either freely used or avoided depending on the audience	Using Low Fr. Avoidance	*I* ***contemplated*** *the offer* *I* ***thought about*** *the offer*
Recency of Usage[21]	Forms encountered more recently are available for selection more readily	Recent Usage Versus	*My IPod* ***performs*** *well* *My IPod* ***works*** *well*

[19] Definitions for linguistic style and register vary in the literature. Here I am following the distinction outlined by Wardhaugh (1992).

[20] Purportedly (OED), this usage comes from the puzzlement brought on when pioneers could not remove a stump when clearing the land ("stump, v.1", 1989). Interestingly, Anttila (1989) says that metaphor is "one of the most important phenomena in human linguistic communication" (p. 141) and that it is "common to all mankind" (p. 147).

[21] Speakers may also make the semi-conscious decision not to repeat a word recently used in the speech situation. For example, Lyons (1968) remarked that "many people deliberately refrain from using the same word more than once in the same utterance, if they can avoid it" (p. 450).

Whereas most of the factors listed in Table 2.1 influence the complex-access stage of lexical choice, the last three items listed in Table 2.1 (i.e., collocational frequency, lexical frequency, and recency effects) exert an influence in the simple-selection stage instead. They are not cues established in the preverbal message but are rather empirical features of lexical representations established via each speaker's individual experience with the language. These features influence lexical selection automatically by contributing to activation levels of each lexical node irrespective of the conceptual input to the system.

The list in Table 2.1 summarizes factors that would be expected to influence lexical choice from the perspective of monolingual speakers. The picture may be somewhat different if a bilingual speaker is our point of reference. In the following section I outline how bilingualism may contribute to the factors that affect lexical choice during spontaneous language production.

2.4. Factors Influencing Lexical Choice – Bilingual Perspective

Bilingualism may affect lexical choice in two distinct ways: (a) the fundamental state of being a bilingual may impact lexicalization, regardless of which languages the bilingual knows, and (b) the interaction of the two specific languages (i.e., CLI) may impact lexicalization. Each of these factors is discussed below.

2.4.1. The Influence of the State of Bilingualism

One of the biggest functional distinctions between a bilingual and a monolingual relates to the fact that when bilinguals are confined to using only one of their two languages in the different situational contexts of daily life, they are not getting exposure to the other language in those same contexts. By contrast, monolinguals typically function in only one language in all daily contexts thus they get more general exposure to, and practice in, that language. Sensitivity to features like style and register is presumably acquired through experience in a language in many, many different situational contexts; since monolinguals would have more varied experiences, it seems reasonable to expect that they would have

more acute sensitivities to style and register distinctions. Several researchers have observed that, in fact, some bilinguals do exhibit a smaller stylistic range when speaking as compared to their monolingual counterparts (Gal, 1984; King, 1985; and Appel & Muysken, 1987). This stylistic restriction in a second language may vary according to how the bilinguals acquired that second language. For example, if they learned the language primarily in the classroom, they may have been introduced to more formal language and thus they would be accustomed to using those types of words in their conversations. By contrast, if their second language was primarily acquired via day-to-day interactions with native speakers, bilinguals may have a more casual lexicon of words to draw from. Thus, the academic L2 acquirer may describe an event as *She inflated the balloon* and the non-academic acquirer may describe the same scene as *She blew the balloon up*.

Similarly, since collocational patterns are basically a convention of the language, sensitivity to them is presumably acquired through repeated exposure within the language. Thus, if bilinguals have not been exposed enough to those patterns in one of their languages, they may not be influenced by that convention when it comes to their own speech. At an even more fundamental level, reduced exposure to a language in certain contexts may lead to less extensive vocabularies for bilinguals. They simply may not have the same store of synonyms that monolinguals might have. Thus, they may use more basic level words (e.g., *laugh*) as opposed to hyponyms (e.g., *chuckle*); they may use more literal language (e.g., *get angry*) as opposed to metaphorical language (e.g., *see red*) or idiomatic language (e.g., *fly off the handle*); they may use more neutral language, or orthophemism,[22] (e.g., *take a pee*) as opposed to euphemism (e.g., *go to the bathroom*). Conversely, they may use dysphemism (e.g., *take a piss*) in inappropriate situations.

Differences in speaking behaviour between bilingual and monolingual speakers which is due to the bilingual receiving less exposure to each of his/her

[22] Kate Burridge and Keith Allan (2006) introduce this term to complement the terms euphemism and dysphemism already current in the literature. They explain the distinction between these three terms by calling euphemism 'sweet talking', dysphemism 'talking offensively', and orthophemism 'straight talking'.

two languages in comparison to a monolingual speaker is the thrust of the idea behind Gollan's Weak Link Hypothesis (Gollan & Silverberg, 2001; Gollan & Acenas, 2004; Gollan, Montoya, Fennema-Notestine, & Morris, 2005; Gollan, Montoya, Cera, & Sandoval, 2008). The hypothesis suggests that bilinguals are lexically disadvantaged in relation to monolinguals since, by definition, a bilingual divides his/her time between two languages. Thus, the amount of exposure to each language experienced by bilinguals will necessarily be less than that of monolinguals (in cases where they have similar ranges of linguistic interactions on a day-to-day basis.) As a consequence, the links between the phonological and semantic representations in the bilingual's mind will be weaker than those within the monolingual's mind due to those connections in the bilingual's mind being utilized less frequently. In support of this hypothesis, Gollan has shown that bilinguals experience more tip-of-the-tongue states (Gollan & Silverberg, 2001; Gollan & Acenas, 2004), are slower at picture naming (Gollan & Silverberg, 2001; Gollan et al., 2005; Gollan et al., 2008), and exhibit less verbal fluency (as measured by the number of a specific type of lexical items a participant can generate in fixed amount of time) (Gollan & Silverberg, 2001) than monolinguals. I suggest that having less exposure to each of the two languages may also result in sparser semantic and pragmatic specifications for certain words. Therefore, when selecting words, bilinguals may not have the same capacity to express subtle semantic and pragmatic distinctions as the monolingual leaving other factors, such as word frequency, to play a more significant role in the overall process of lexical selection.

If reduced exposure to the language does not allow bilinguals to acquire some of the fine-grained semantic or pragmatic distinctions between synonyms, they may condition themselves to formulate a simpler preverbal message without some of the cues that the speaker knows will not find any matches when accessing lexical representations. For example, if bilingual speakers know their repertoire of slang terms is very limited, they will not formulate preverbal messages containing the SLANG WORD APPROPRIATE cue. The main consequence of creating preverbal messages that are less elaborated is less lexical diversity when speaking.

Bilinguals may use a smaller set of words and use them more often than monolinguals.

2.4.2. Crosslinguistic Influence

The other set of effects of bilingualism on language variation are due to the direct influence of one language on the other, or crosslinguistic influences. One logical interaction could be that, when multiple forms (which correspond to the same basic meaning) exist in one language, the form that has structural correspondence in both languages is chosen more often than the form that is only present in the language being spoken. In terms of lexical choice, the result would be a preference for words that have a cognate in the other language (e.g., English *applaud*, which has the French cognate *applaudir*) as opposed to words that do not share cognate status (e.g., *clap*). The main inter-language effect due to form overlap that this study looks at is found at a pre-lexical stage, when the language processor is deciding how to package the relevant conceptual information into lexical units of the language. If the language to be spoken includes some forms that follow the same lexicalization patterns found in the other language and some forms that are unique to the output language, perhaps the bilingual will more frequently opt for the forms shared by both languages. For example, in the process of encoding English motion verbs, speakers can often choose between synonyms in which one option has both MOTION and PATH information conflated into one unit (e.g., *cross*) and another option whereby the same information is distributed across two units (e.g., *go across*). This same concept is encoded in French in a one-word conflation (*traverser*), thus the French/English bilingual may be influenced by that pattern and choose the single-word option in English more often than a monolingual who does not have the same influence.[23]

One final way in which crosslinguistic interactions may influence word choice is in establishing levels of activation of certain words. Both frequency and recency have been shown to have positive effects on the speed of lexical processing (see Monsell, 1991, for a discussion of the frequency effect and

[23] See section 3.2 for a more detailed discussion of motion verb characteristics and crosslinguistic differences in lexicalization of those characteristics.

Griffin, 2002 on the recency effect). Because cognates share a large portion of both their semantic and phonological characteristics, accessing a form in one language may also extend the frequency and recency benefit to the cognate form in the other language. Despite the absence of psycholinguistic studies that explicitly test the hypothesis that cognates have highly connected lexical nodes (if not the same one), this idea is supported by Gollan and Acenas' (2004) experiment on TOT states. In keeping with the Weaker Links hypothesis, they found that bilinguals experience more TOT states than monolinguals (since they have had less exposure to words in that language than monolinguals). However, there was no difference between bilinguals and monolinguals in TOT rates for cognates. It appears as though the cognate in one language receives a frequency benefit (i.e., a degree of activation) when the cognate in the other language is being accessed.

In summary, one way of thinking about the distinct factors of bilingualism and crosslinguistic influence is that the general state of bilingualism is a homogenizing factor (i.e., making language less variable or diverse than that of a monolingual) whereas crosslinguistic influence is a diversifying factor (i.e., augmenting the variables for a bilingual versus a monolingual speaker). Bilingualism may make speakers less able to adapt linguistically to the different situational contexts that call for specific linguistic accommodations. Crosslinguistic influences, on the other hand, can be grouped as one of the factors affecting the potential for lexical items to be selected. It is a psycholinguistic factor like frequency and recency which is independent of the particular communicative situation. However, just to complicate matters, it may be situationally relevant as well in that the degree of influence may vary depending on whether the speaker is in a monolingual or bilingual mode situation. A revised table is presented below with the inclusion of the two additional factors that may play a role for bilingual language production.

Table 2.2
Potential Factors Influencing Lexical Choices in Bilingual Language Production.

	Factor	Type	Stage
1	Regional Dialect	**SITUATIONAL***	**LEXICAL ACCESS**
2	Social Dialect		
3	Style		
4	Register		
5	Affective Impact		
6	Semantic Transparency		
7	Aesthetic Quality		
8	Level of Specificity		
9	Lexical Frequency – deliberate usage of low frequency terms for a certain effect		
10	Lexical Recency – deliberate avoidance of recently used terms		
11	Crosslinguistic Influence on lexicalization patterns	**PSYCHO LINGUISTIC**	**SELECTION**
12	Collocational Patterns		
13	Lexical Frequency – may be impacted by frequency of cognates		
14	Recency of Usage – may be impacted by recently used cognates		

*Greater sensitivity to situational factors is typically acquired through greater exposure to the language in question; thus, bilinguals may have lower sensitivities than monolinguals, who, by the very nature of only ever using one language, have greater exposure to that language than bilinguals.

All in all there are numerous ways in which being a bilingual may subconsciously influence lexical choices in the language production process, either in the form of CLI or as a consequence of knowing and using more than one language on a regular basis. Before proceeding to the description and results of the main production experiment in which these influences are tested, an overview of the semantics of the verb (as the main linguistic unit being analyzed) as well as a crosslinguistic comparison (i.e., English and French) is provided in the following chapter.

3. Verb Semantics

The starting point in the process of language production is having something to say. Therefore, it is meaning which provides the impetus to speak and which directs the speaker to choose the particular phonetic, lexical, and morpho-syntactic form which will best express his/her intended message. In order to understand what type of meaning is conveyed by English verbs and to get a better sense of how and why certain form choices are made during language production, it is necessary to explore some of the different factors which affect the lexical semantics of a verb.

3.1. General Lexical Form-to-Meaning/Meaning-to-Form Relationship

The relationship between linguistic form and meaning is a very intricate one. If language were an ideal symbolic system, there would be a one-to-one mapping of (linguistic) form and meaning so as to avoid phenomena like ambiguity, in which a single form represents multiple meanings or concepts, and redundancy, in which multiple forms represent a single meaning or concept. However, natural languages do not adhere to this ideal in that they exhibit both polysemy (one form corresponding to more than one related meaning) and synonymy (one meaning corresponding to more than one form).[24] Since the starting point of speaking is meaning (i.e., having something to say), synonymy is much more relevant than polysemy to language production studies. Synonymy means that speakers may have multiple lexical options which viably encode the meaning they wish to convey. Polysemy, on the other hand, is more pertinent in the process of language comprehension for which the form of language is the starting point. In the latter case, the hearer of language must be able to resolve the ambiguity presented by a polysemous word in order to accurately comprehend the

[24] Nevertheless, historical linguists suggest that one of the reasons for linguistic change is that the language is trying to adhere more closely to this ideal. For example, Anttila (1989) claims that one motivation for words being borrowed from another language is to take over particular meanings of polysemous words (p. 182) which cuts down on the degree of polysemy. He also points out that language change reduces synonymy in that words which invoke the same referent typically become differentiated over time (p. 143).

intended message. However, polysemy does play a role in language production as well, as is explored below.

3.1.1. Polysemy

Polysemy refers to the fact that many words in a language have multiple but related meanings. Dictionaries represent polysemy by numbering and listing the different meanings but including them all under the same entry to indicate they are multiple meanings of the same word. Words vary significantly in terms of the number of meanings that they represent. For example, the basic motion verb *go* has 29 different senses listed in the Merriam-Webster Online Dictionary (2009), whereas the more specific action verb *goad* has only two. In order to convey the intended meaning of a highly polysemous word, a speaker must rely on the situational context and/or the linguistic context to disambiguate the word. For example, if one shouts *Go!* to a fellow driver who is stopped at a green light or, conversely, to a hockey player rushing down the ice with the puck, two different meanings are intended and obvious due to the situational context (i.e., for the driver, *go* involves changing from a static position to a dynamic change of location and for the hockey player, *go* involves maintaining or increasing a certain pace of motion). Alternatively, it may be the linguistic context that disambiguates a polysemous word. It is the preposition phrases following *go* which render two different interpretations of the verb in 8).

(8) a. *I go <u>by train</u>, not by car, when possible.*

b. I go <u>by Janice</u>, not by Dr. Smith, when possible.

This semantic dependency between the verb and other syntactic components highlights how words which are highly polysemous are somehow less semantically specified than words which have only one or two meanings and are therefore not so dependent on situational or linguistic context to be understood. Highly polysemous words are less semantically dense – lighter, if you will. Jespersen (2007) first used the term "light verb" (p. 117) in his exhaustive study on modern English grammar (Part VI first published in 1954) to describe some of these polysemous verbs when they are used in a very precise

way, as in expressions like *take a bath*, *have a smoke*, and *give a shout*. In these examples, the description of the actual event is conveyed by the following noun phrase and not so much by the verb itself. (Notice how each of these expressions has a 'heavy verb' synonym using the same lexical unit as the following noun: *bathe, smoke, shout*). Although not all highly polysemous words are 'light' in Jespersen's sense, they do seem to lack some semantic density and specificity which is, instead, contributed by other components, either lexically or contextually.[25]

In addition to *go*, some of the more highly polysemous verbs in English are very basic words, fundamental to our existence, such as *make* (32[26]), *do* (31), *run* (30), *take* (28), *give* (21), *get* (19), *work* (17), *cut* (15), *have* (13), *see* (13), *write* (13), *put* (10), etc. Speakers are engaging in these activities repeatedly in their everyday existence. Because speakers often talk about their daily lives, these lexical items have the potential to be heard and produced very frequently[27] and, therefore, learned at a very young age. The lack of inherent specificity of these verbs entails that many of them have hyponyms, more precise encodings of the basic action. For example, there are many ways in which one may *make* something: *create, shape, craft, construct, build, compose, bake*, etc. Both the hyponym (i.e., the more specific term) and the basic-level term (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976; Rosch, 1978) describe the scene in question, the hyponym simply offers more detail. (See section 3.1.3 for a fuller account of hyponymy).

During language production, if the lexicalization process is being hampered in some way, a speaker may resort to choosing highly polysemous verbs higher on the semantic hierarchy in order to preserve fluency. For example, if the speaker is experiencing a time pressure or is engaged in some other

[25] In fact, Slobin (2004) refers to *go* and *get* as 'light verbs' (p. 239), meaning they are not specified for the manner of motion and, as such, do not convey much information beyond the fact that something is moving or being moved.
[26] This indicates the number of different senses of a word listed in the Merriam-Webster online dictionary.
[27] For example, the average frequency for this set of verbs from Brown's (1984) corpus of spoken frequency is 390, which is more than one standard deviation greater than the mean of all the words in the corpus.

cognitively demanding task while speaking, the use of the more general and frequent term may save the cognitive resources that would be required to find the more precise, less polysemous, and lower frequency term. A similar type of cognitive constraint on lexicalization may be the act of speaking in one's second language, or at least in one's non-dominant language, which could result in bilinguals using more highly polysemous words than monolinguals in that same situation.

3.1.2. Synonymy

Synonymy plays a more obvious role than polysemy in the process of language production because it gives the speaker options, wanted or not. At the most basic level, synonymy exists when a speaker wants to lexicalize a certain concept and several different words seem to adequately convey the intended meaning. Cruse (1986) more precisely classifies synonyms as sets of words which have a (a) high degree of semantic overlap and (b) low degree of contrast. Point (a) is not specific enough on its own to define synonymy since other types of semantic relationships also have a high degree of semantic overlap (e.g., hyponymy, metonymy, and even antonymy). Point (b) is important for two reasons. First, it eliminates the other types of lexico-semantic relationships that involve semantic overlap such as hyponymy and antonymy. Second, it implies that synonyms can actually have some semantic contrasts, albeit to a low degree.

Along those lines, many linguists argue that complete synonymy does not exist. Clark (1987), for instance, argues for the Principle of Contrast which states that no two forms in a language can have exactly the same meaning. Keeping in mind the extent of polysemy that exists in language, we can see the unlikelihood of one word sharing all its polysemous senses with one other word. As Palmer (1976) explains "where a word is polysemic [sic], it will, naturally, have a variety of synonyms each corresponding to one of its meanings" (p. 70). For example, one sense of the word *couch* makes it synonymous with *sofa* but you could not replace *couch* with *sofa* in the following sentence since *couch* can also be used as a verb whereas *sofa* cannot.

(9) a. *Your comments are couched in strong terms.*

b. *Your comments are sofa'd in strong terms.*

Most definitions of synonymy will qualify the relationship by stating that the synonymous words will mean either exactly or (crucially) *nearly* the same thing as each other. This distinction has been labeled in the literature as 'absolute' or 'true' synonymy versus 'near' synonymy. By absolute or true synonymy, semanticists mean that all of the different senses of the two words are exactly the same and that they are perfectly interchangeable in all contexts. Such duplication does seem rather pointless and most semanticists would argue that absolute synonymy does not exist, or if it does, it is extremely rare. Cruse (1986) explains:

> One thing becomes clear once we begin a serious quest for absolute synonyms, and that is that if they exist at all, they are extremely uncommon. Furthermore, it would seem reasonable to predict that if the relationship were to occur, it would be unstable. There is no obvious motivation for the existence of absolute synonyms in a language, and one would expect either that one of the items would fall into obsolescence, or that a difference in semantic function would develop. (p. 269)

Anttila (1989) makes the same claim about two words which emerge as absolute synonyms; in such a case, only one can survive. "Either one form is lost…or differentiation takes place" (p. 143). Following this line of reasoning, I will assume that any synonyms that exist in English are, in fact, near synonyms, but I will use the term 'synonym' to refer to these near synonyms.

3.1.2.1.Role of Context in Establishing Meaning

Context plays a significant role in determining the semantic relationship of words. Words which are synonyms in one situation may not be if the context is changed (10).

(10) a. *I saw/observed an accident this morning.*

b. *I saw/*observed her image in my mind.*

Conversely, context can establish a semantic congruence between words which are not considered synonyms in isolation. Palmer (1976, p. 64) calls this "context-dependent synonymy", the state in which two words are used

interchangeably within a specific context, but which are not normally considered to be synonyms. With the additional world knowledge that the context provides, the two words can be used synonymously. Lyons (1968) makes the same general point when explaining how context can make sense differences irrelevant, thus rendering two related but normally non-synonymous words synonymous once they are embedded within the context-providing sentence or situation (p. 452). For example, the word *get* does not necessarily imply that something is paid for in the same way that the word *buy* makes that implication. However, when used in a commercial context, *get* is understood to mean 'obtain through purchase', thus the words *get* and *buy* are synonymous in a sentence like (11).

(11) *I'll stop by the store to buy/get some bread.*

Thus, it seems, context is the key. It differentiates words in some cases (e.g., *saw* vs. *observe*) and draws them together in others (e.g., *buy* vs. *get*). In both situations we have words which share a great deal of semantic overlap, but which have some minor though significant meaning differences that precludes them from being classified as absolute synonyms. Accordingly, a breakdown of how synonyms can be differentiated would be useful.

3.1.2.2.Factors Differentiating Synonyms

To elaborate on the topic of synonym differentiation introduced in Chapter 2, a more detailed discussion of some of the individual factors which render synonyms distinct from one another is presented below. Palmer (1981) suggests that all synonyms will vary in their distributions due to the following factors: (a) dialectal, (b) stylistic or register based, (c) connotational, and (d) collocational. Different dialects of the same language may have unique words which share a referent. For example, in Canada, a driver *signals* to turn right in a motor vehicle whereas a British driver *indicates* to turn right. For speakers who have acquaintance with both dialects, these words become synonyms; however, the speaker would probably use them discriminately depending on the dialect group of the listener.

Style and register are inter-related concepts in that they are situationally determined. Actually, Cruse (1986) argues that style is, in fact, one of the three factors which determine a specific register. He defines register as the varieties used by a single speaker based on a given occasion or situation. The register one adopts is determined by the interacting forces of (a) the field of discourse (i.e., topic, such as legal vs. scientific vs. sports, etc.), (b) the mode (i.e., manner of transmission such as spoken vs. written. vs. emailed, etc.), and (c) the style (which is roughly the level of formality adopted based on factors such as interlocutors' roles, familiarity, social position, attitudes, etc.). A collective influence of all these factors will result in the speaker using certain linguistic variable forms (i.e., a certain register) in certain situations.

I am going to treat style as a distinct category despite its interdependence with register. For the purposes of this study, style refers to the level of formality used in the language. Speakers will adopt a more casual, informal style with their close friends as opposed to the more formal style they typically apply when speaking to superiors or strangers. One intuitive way to operationalize the category 'style' (as described by Anttila, 1989) is to think about three distinct levels whereby the middle level corresponds to the degree of formality that one normally uses in regular day-to-day conversations with acquaintances. Using more formal expressions would move the level up and using more nonstandard or slang expressions would move the level down. The following is a breakdown of style and register for some synonymous terms.

(12) a. *offspring* - formal style, bureaucratic register
b. *child* - neutral style, generic register
c. *kid* - informal style, private register

The next factor Palmer suggested as influencing the different distribution of synonyms is connotation. Connotation is a term used to describe the affective associations that accompany words. Words can share the same basic meanings, but still differ with regard to the positive, negative, or neutral attitudes or associations evoked. For example, the words *shy*, *introverted*, and *withdrawn* have the same basic meaning, but may convey different speaker attitudes: *shy* being more positive, *introverted* being fairly neutral, and *withdrawn* being a bit

negative. Lyons (1968) made the observation that synonym choice may be influenced by connotative effect. "It is undoubtedly true that one word may be preferred to another because of its different emotive or evocative associations. But the extent to which this is of importance varies considerably from one style or situation to another" (p. 449). Therefore, to understand how important connotational factors are in word choice, one has to know the situational context of the utterance.

Use of euphemism has the goal of somehow alleviating the negative connotations associated with a concept, which is why we find euphemism common in reference to sensitive topics like death, bodily functions, and warfare. (See, for example, Burridge and Allan, 2006). So, instead of saying someone *died*, we can say they *passed on* which somehow sounds less harsh and less final because it evokes the sense of a transition to another place. In certain situations speakers may want to shock their listeners by evoking harsh connotations with the use of dysphemous expressions. Saying that someone is *worm food* evokes the idea of finality and insignificance, a concept which most of us do not want to entertain.

The last factor Palmer suggested that has an impact on the use of synonyms is collocational distribution, which refers to the tendency of certain words to co-occur. Words which are synonyms do not surface in close proximity to the same set of words with the same frequency. We classified *sofa* and *couch* as synonyms earlier yet they are involved in quite different collocational combinations. For example, we can talk about a *sofa bed* and a *couch potato* but not a **couch bed* or a **sofa potato* even though these expressions compositionally make sense based on the primary semantic composition of the words *couch* and *sofa*. In these instances, the collocational combinations of *sofa bed* and *couch potato* are fixed expressions which take on meaning beyond the literal interpretation of the individual units (e.g., a *couch potato* is not really a *potato*, and a *sofa bed* is a *sofa* that turns into a *bed*, not a *sofa* that can simultaneously be a *bed*). Not all collocational tendencies are due to such fixed expressions. For instance, both the expressions *close the door* and *shut the door* are grammatical in

English. However, the likelihood of encountering *the door* after *shut* is much higher than the likelihood of encountering *the door* after *close.*[28] *Close* and *shut* have different collocational tendencies.

Speakers must be cognizant of all these variables (i.e., dialect, style, connotation, collocation) when making word choices. Anttila (1989) remarks on the abundance of synonyms in English and summarizes some of the ways in which they contrast. "English is rather rich in synonyms, and, nearly always there is some differentiation in that one term is stylistically marked as more abstract, emotive, emphatic, technical, or colloquial" (p. 143). Considerations of dialect, style, and register (which would include Anttila's factors of colloquial and technical language) are determined by the situational context of the speech act. Connotation (subsuming Antilla's abstract, emotive, and emphatic factors) is primarily driven by the attitudes of the speaker or the attitudes a speaker wishes to generate in the listener. Collocational constraints are governed by the linguistic context. Therefore, the speaker must consider the general situation, the potential emotional impact, and the greater linguistic context each and every time he or she selects a synonym. (See section 2.1 for a description of how these different factors contribute to the ultimate selection of a specific lexical item during speech production).

3.1.2.3.English Synonymy

Why should English be particularly rich in synonymy, as remarked by Anttila (1989)? One reason suggested for the abundance of synonym in English is as a result of the various influences exerted on the language by other languages over the course of its history. A basic Anglo-Saxon wordstock has been enriched by borrowing from, in particular, French (in the Middle English period) and then

[28] A Google search (April, 2009) for the expressions *shut the door* versus *shuts* and for *close the door* versus *closes* revealed a much higher ratio (reported as a percent) for *shut* being followed by *the door* (17%) than for *close* being followed by *the door* (4%). I chose the 3rd person singular non-past inflected form of the verb as the denominator to eliminate including pages in which *shut* and *close* were not being used as verbs and to limit the size of the denominator. (This decision was based on the logic that the same ratio of websites would have *shuts* versus *closes* as would have *shut* (V) versus *close* (V).)

from Latin and Greek (during the Renaissance and beyond), not to mention all of the other languages English speakers have come into contact with during the years of invasion of Great Britain (e.g. up to Norman period) and the subsequent periods of colonization and the more recent global linguistic domination.[29] As a result, English now has synonyms which vary only slightly with regard to meaning but have different linguistic sources. Palmer (1976, p. 59) uses the following triad of synonyms as an example of the contribution of those major sources:

(13) a. *kingly* → Anglo-Saxon source
b. *royal* → French source
c. *regal* → Latin source

Although these terms share the same basic meaning, they differ along some of the dimensions mentioned earlier like level of formality (i.e., style), usage within particular domains (i.e., register), affective associations (i.e., connotation), and co-occurrence with other words (i.e., collocation). Brinton & Arnovick (2006) offer this same example, among others, and argue that the Anglo-Saxon source words tend to be colloquial, or characteristic of spoken languages (think of *feel (sorry) for*, for example), the French source words tend to be literary (think of *console*), and the Latin source words tend to be scholarly expressions (think of *commiserate*).

One common distinction between synonyms within the English verb system is that certain Anglo-Saxon or Germanic source verbs are composed of more than one lexical unit whereas the Romance counterpart conveys the same information within a single lexical unit. Multi-part verbs themselves have different structural compositions. For instance, 'prepositional verbs' are constituted by a verb followed by an immovable preposition. Thus, even though they are composed by two distinct units, they act as one. An example of a

[29] Over 15 years ago, McCrum, Cran, and MacNeil (1992) offered statistics to back up this claim of global linguistic domination, citing figures like 750 million speakers, (only half for whom it is their L1), the language of three quarters of the world's mail, over half of the world's technical and scientific periodicals, 80% of the information stored on the world's computers, and over half of the business deals in Europe.

prepositional verb is given in (14a) with (14b) showing a Romance-based one-word synonym.

(14) a. *look at* *I'm looking at the picture*

b. *examine* *I'm examining the picture*

Another type of multi-part verb is the 'verb-particle construction', or VPC, (see section 3.3 for a fuller description of VPCs) in which the final element is actually a movable particle which can surface either in front of the direct object or after it (for transitive verbs) as in (15a) and (15b). Like prepositional verbs, VPCs often have a Romance-derived one-word synonym as well (15c).

(15) a. *put out* *Please put out [the candle] before you leave.*

b. *put out* *Please put [the candle] out before you leave.*

c. *extinguish* *Please extinguish [the candle] before you leave*

Even the sequence of a motion verb followed by a directional preposition (16a) can have a one-word Romance-based equivalent (16b) despite not forming a syntactic unit together (since the preposition is actually the head of the following prepositional phrase).

(16) a. *go across* *I'm going across the gym to open the door*

b. *cross* *I'm crossing the gym to open the door*

It was noted earlier that the etymology of synonymous words (i.e., Anglo-Saxon/Germanic versus Romance/Latin in origin) may contribute to the frequency with which those synonyms are used in particular registers (i.e., colloquial spoken discourse versus literary and scholarly discourse). Distinctions of style, as one component of register, have also been noted for the multi-word synonyms (often Germanic in origin) versus single-word synonyms (often Romance in origin). DeCarrico (2000) explains that "the use of certain phrasal verbs often lends a more informal tone to discourse than would their one-word counterparts. Phrasal verbs such as *figure out* and *give in* contribute a more informal flavour to the…dialogue than would their formal synonyms *fathom* and *succumb*, respectively. Other phrasal verbs, though, are considered fairly standard by many speakers and writers and do not necessarily signal informality" (p. 80).

In summary, although true synonymy is rare (or non-existent), English does have a robust store of near synonyms for a language production study examining factors which contribute to the selection amongst synonyms. Apart from the characteristics previously mentioned that distinguish synonyms, (i.e., regional dialect, style, connotation, and collocation), the actual lexical structure (i.e., one-word encoding versus multi-word encoding) may additionally play a role in the ultimate choice of synonym.

3.1.3. Hyponymy

Hyponymy is a relationship between words based on their level of semantic specificity. Objects and events can be described in varying degrees of preciseness. For example, a pet dog could be accurately called an *animal* if specificity was not required or a *poodle* if a higher degree of specificity was desired. Terms can be slotted into a semantic hierarchy in which the broader terms (like *animal*) are placed higher in the hierarchy (and are therefore referred to as superordinate terms), and the more specific terms (like *poodle*) are represented lower down (and are therefore referred to as subordinate terms). At some level of the hierarchy, in between superordinate and subordinate terms, will be a basic level word (like *dog*). (See Rosch, 1978, and Rosch, Mervis, Gray, Johnson, and Boyes-Braem, 1976.) Rosch et al. (1976) provided evidence that basic level categories have some sort of priority within perceptual, linguistic, and developmental domains. Basic level words are maximally functional for the day-to-day interactions of the speaker. For a myriad of reasons, lexicalizing the concept DOG is useful in our society thus the word *dog* is very common. It captures enough specificity to distinguish dogs from other domesticated animals, which is important for when we want to talk about dog-specific concepts such as *walking the dog* and *dog parks*, without over-specifying such that different breeds are set apart. While one could say *I have to walk my poodle before supper* (although the listener might wonder why the breed was specified), it would not be accurate to talk about the *poodle park* when referring to the off-leash area for all dogs.

Within the semantic network, or semantic hierarchy, hyponymy is the relationship of an item lower (hypo-) on the hierarchy to an item above it. Since categories higher on the hierarchy are more general, a term lower on the hierarchy (i.e., a hyponym, like *poodle*) will be more specific than the term directly above it (i.e., its hypernym, in this case *dog*). Hyponyms inherit the characteristics of their hypernyms. For example, the criteria used to distinguish the concept DOG from all other concepts is also part of the concept POODLE. But since POODLE is lower on the hierarchy, it includes characteristics that are not necessary in the specification of DOG.

From a psycholinguistic perspective, during language production, some indication of specificity must be made when retrieving the appropriate lexical item in order to differentiate between retrieving a word like *laugh* versus its hyponym *chuckle*. All of the conceptual conditions which would make *chuckle* a suitable choice would also map onto the lexical representation for *laugh*, so a theory of language production must include an explanation for how the speaker converges onto only one item. Levelt (1989) suggest the solution to this hyponym problem is explained by his Principle of Specificity which claims that if core conditions are satisfied by more than one lexical representation which are at different levels of the hierarchy, the most specific one (lowest one) will be retrieved. Therefore, if you are thinking about CHUCKLING you will retrieve *chuckle* whereas if you were only thinking about LAUGHING (an activity which could happen in a variety of different manners), you will retrieve *laugh*. But, if you are thinking about CHUCKLING you will never retrieve *laugh* because that term is higher in the hierarchy (and therefore less specific). The Principle of Specificity predicts that basic level terms cannot win out over hyponyms regardless of their relative frequencies in cases where all the conditions of the hyponym have been met.

Since bilingual speakers require more lexical storage than monolinguals in order to accommodate two languages, it may be that they confine their lexical choices to these functional, basic level words in more situations in which monolinguals might migrate down the hierarchy to choose more specific,

subordinate terms.[30] This hypothesis will be tested in the main experiment of this study. As mentioned in section 3.1.1 on polysemy, words at the basic level are often more frequent than their hyponyms as well, which may predispose the bilingual to choose from the basic level more often. In this way, bilinguals would be able to cut down on the search options within their productive lexicon[31] which could enhance fluency, especially in cases of speaking in the non-dominant language when other types of challenges to fluency may be present (e.g., syntactic, articulatory, etc.).

3.2. Verb Typology

Since the linguistic units under scrutiny in my study are verbs, it is important to introduce some basic concepts of verb typology. Verbs can be classified into many different basic types based on semantic criteria, syntactic criteria, or a combination of the two. Numerous typologies have been put forth. (See, for example, Vendler 1967, Comrie 1976, Moens & Steedman 1988, Dixon 1991, Levin 1993). For the purposes of this study, a fairly general description of verb types is suitable.

3.2.1. Active (Dynamic) Events

At the most fundamental level, verbs are the linguistic category used to denote events, as opposed to nouns which typically denote entities (Frawley, 1992). Frawley explains an event as "a cover term for states or conditions of existence (e.g., *be sad*), processes or unfoldings (e.g., *get sad*), and actions or

[30] Kilborn (1994) argues that speaking in L1 and L2 are often guided by different motivations. In L1, the focus is on the optimality of the message, of ensuring a complete mapping of concept to lexical unit to maximize understanding (and thus, to fulfill this goal, hyponyms would be chosen when relevant). By contrast, the guiding principle when speaking in L2 is economy, not optimality – being able to achieve as much clarity in the message as possible with the minimum of cognitive energy (and thus the superordinate term will be chosen when sufficient, if in fact more cognitive energy is required to find the appropriate hyponym).

[31] That is not to say that a bilingual speaker will not *understand* certain hyponyms even if they do not use them productively. It is generally understood that speakers have a bigger receptive than productive vocabulary (see Waring, 1997 for exploration of the not-so-straight-forward relationship between receptive and productive vocabulary). Production is a speaker-determined process so the speaker can opt for the increased efficiency of using a smaller set of words whereas comprehension is a reactive process in which the input is established externally thus the listener must be ready for anything and can infer the meaning of unfamiliar or rarely encountered words through the linguistic and situational context of the utterance.

executed processes (e.g., *sadden*)" (p. 141). What all of these concepts have in common is that they all have a temporal characteristic in relation to the entity involved in the event (Langacker, 1987): the entity exists in a certain state unchanging through time (e.g., *be sad*), the entity changes in its state through time (e.g., *get sad*), or the entity exerts a change on another entity through time (e.g., *sadden*). Thus, time seems to be an important factor in both the description and classification of verbs. From the purposes of the following classification, I will use the term 'event' with the understanding that the primary linguistic category used to denote an event is a verb.

A useful two-way distinction in event types, introduced by Lakoff (1965), is that of a 'stative' versus 'non-stative' event. Stative events (also called 'static' events), like *be sad* presented above, tend to have internal uniformity whereby the state of existence does not change through time. By contrast, non-stative events (also referred to as 'dynamic' or 'active' events, as I will do here), like *sadden,* do not have internal uniformity but instead exhibit a series of internal sub-processes that result in the event taking place. In essence, a change of some sort occurs. (17) offers examples of some stative and active events (by way of the English verb employed to denote it).

(17) a. Stative Events: *be, think, love, weigh, remain, seem, cost,* etc.

b. Active/Dynamic Events: *run, hit, eat, travel, jump, study,* etc.

The verbs at the heart of my study all denote active events, thus a closer look at this particular category is warranted. Active or dynamic events can be described as being "controlled, executed, or carried out, with a distinct effect on the participants" (Frawley, 1992, p. 146) which makes them suitable for being used in constructions like the imperative (18a), the pseudo-cleft (18b), a response to "What happened?" (18c), and in conjunction with adverbs like *carefully* and *deliberately* (18d).

(18) a. *Run home!*

b. *What she did was run home.*

c. *What happened? She ran home.*

d. *She ran home carefully*

Unlike, statives, actives do not necessarily persist through time. A dynamic event like *hit* takes only a few seconds to complete and the extension through time of an dynamic verb like *run* is indeterminable without more information. For this reason, dynamic events in English have the capacity to be used in the progressive construction if one needs to deliberately extend their occurrence through time (19a). By contrast, statives are already extended through time and as such disallow progressive encoding (19b).

(19) a. *She was running home.*
He was hitting the tennis ball against the wall.

b. **I was being sad all day.*

The differential temporal unfolding of active events (e.g., the fact that *run* and *hit* take different amounts of time to complete) is another conceptual characteristic that has been recognized in verbal classifications.[32] Dynamic events can be described as being 'punctual', in which case they happen instantaneously (20a), or 'durative', in which case the event lasts through time to a certain degree (20b).

(20) a. Punctual Dynamic Verbs: *hit, blink, cough, jump,* etc.

b. Durative Dynamic Verbs: *run, talk, eat, study, drive*, etc.

Durative active verbs can also be classified based on whether or not they involve a natural endpoint to the event. For this type of classification, it is not just the verb itself which determines the category, but the verb plus its primary arguments. Garey (1957) introduced the terms 'atelic' to describe events which do not have a natural endpoint (21a), as opposed to 'telic' events which do have a natural endpoint (21b).

(21) a. Atelic Durative Dynamic Events: *run, talk, eat, drive,* etc.

b. Telic Durative Dynamic Events: *run home, eat lunch,* etc.

In (21a), the event as represented by the verb in isolation is atelic in that there is no inherent indication of when and how the event concludes. Once a direct object

[32] Classifications based on how the event denoted by the verb relates to time have been variously termed Aktionsart, lexical aspect, inherent aspect, Aristotelian aspect, and situation type. This latter term, in some ways, seems the most apt, as the classifications are not wholly determined by the verbs themselves but often by the combination of the verb plus its primary arguments – the whole situation – an observation made by both Comrie (1976) and Jackendoff (1997).

has been included, the temporal scope of the event is limited and a sense of when and how the event concludes is made apparent.

3.2.2. Motion Events

Active or dynamic events in which the primary change is in the location or position of the main entity can be subcategorized as 'motion' events. Displacement of an entity is, therefore, the key component of an active motion event. Some examples are given below (22).

(22) Motion Events: *move, go, come, run, crawl, roll,* etc.

The semantics of motion events has been the topic of extensive analysis led primarily by Talmy (1985, 2000). Talmy posits seven distinct meaning components which have the potential to be part of a motion event: (a) FIGURE – the main entity being displaced, (b) GROUND – the entity which the FIGURE is moved in relation to, (c) PATH – the path of motion, (d) MANNER – the manner of motion, (e) CAUSE – the cause of motion, (f) ENABLEMENT – the reason for motion, and (g) PURPOSE – the purpose of motion. The subject of the sentence in (23) marks the FIGURE entity. Each of the other components is included in a phrase after the main motion verb.

(23) *I*[FIGURE] *went* *home*[GROUND] *along the west road*[PATH], *erratically*[MANNER], *by car*[ENABLEMENT], *because work was over*[CAUSE], *to see my family*[PURPOSE].

English has the capacity to conflate some of these different components along with the fact of motion into the verb stem, as in (24).

(24)	a. FIGURE	*It is* ***raining***	(rain is being displaced)
	b. GROUND	*I* ***boxed*** *the books*	(the motion is into the boxes)
	c. PATH	*We* ***descended***	(motion is downward)
	d. MANNER	*I* ***skipped*** *along*	(motion in a skipping manner)
	e. CAUSE	*I* ***pushed*** *the cart*	(the cart moved due to pushing)

There is only so much room in a single verb stem for the conflation of these conceptual components, along with the fact of motion. Talmy (2000) suggests that the conflation of (a) path and motion, and (b) manner and motion are

the two most common patterns found in languages around the world. As in (23) above, if speakers want to encode additional components, they may need lexical units and syntactic structures beyond the verb stem on its own. Talmy (2000) calls these other structures 'satellites' (and they come in a variety of morpho-syntactic configurations, for example, Slavic verbal prefixes, German separable/inseparable verb prefixes, etc.). In English, the prototypical satellite constituent is the verb particle (see section 3.3 for further discussion on the verb-particle construction in English).

PATH seems to be privileged in that it is the component most likely to be overtly expressed in some capacity within a clause when a motion event is described (Talmy, 1985). PATH is conceptually important because it provides a spatial framework for the FIGURE and GROUND entities and, as such, is called the 'framing event' (Talmy, 1985). Typological distinctions between languages can be made based on where the encoding of PATH information typically takes place, in the verb stem or in some satellite constituent. Languages which typically conflate PATH information in the motion verb stem, Talmy (1985) calls 'verb-framed languages' (or V-languages, for short). By contrast, languages which typically express PATH information in the satellite constituents are called 'satellite-framed languages' (or, S-languages). Talmy (1985) points out a distinction in this regard between Germanic and Romance languages. Germanic languages tend to be satellite-framed whereas Romance languages tend to be verb-framed.

English as fundamentally a Germanic language typically encodes path information in a satellite like a particle (25a) or a PP (25b).

(25) a. *He <u>came</u>* [MOTION] *<u>back</u>*[PATH]

b. *She <u>came</u>*[MOTION] *<u>down</u>*[PATH] *the hill*[GROUND]

The absence of PATH information as part of the verb stem in English leaves room for the conflation of MANNER information instead, as in (26).

(26) a. *He <u>rushed</u>* [MOTION/MANNER] *<u>back</u>*[PATH]

b. *She <u>skidded</u>*[MOTION/MANNER] *<u>down</u>*[PATH] *the hill*[GROUND]

Slobin (2000, 2006) talks about the verb stem having a 'slot' into which either PATH or MANNER information can be included. Since S-languages typically encode PATH information in satellite constituents and not the main verb, the slot is available for the inclusion of MANNER information in the verb stem. In Slobin's (2000) words, "in S-languages, direction is almost always encoded outside the main verb, leaving that slot open for an array of manner verbs. As a consequence, these languages have elaborated the domain of manner of movement" (p. 110). This ready slot for conflation of MANNER has resulted in S-languages developing a much more extensive lexicon of MANNER verbs than V-languages. For example, he estimated that the S-languages of English, German, Dutch, Russian, and Hungarian "each have several hundred manner verbs" (2006, p. 71). By contrast, the V-languages he examined, Spanish, French, Turkish and Hebrew, "have less than 100, and probably less than 60 in everyday use" (ibid).

As suggested above, the reason S-languages have such a large stock of MANNER verbs is based on the concept of "ease of processing" (Slobin, 2004, p. 223), which refers to how accessible certain means of expression are in a language.[33] MANNER, Slobin explains, is "highly codable in S-languages not only because it tends to be expressed by single lexemes rather than phrases…but also because the free expression of manner as a main verb in all types of directional clauses greatly increases its frequency of use" (p. 111). Thus, the ease of processing of MANNER information encourages S-language speakers to include manner which then makes MANNER even easier to process since speakers encounter it so often in the language around them. As a consequence, "a language with a rich manner lexicon tends to get richer over time. That is, learning and using the languages engenders habitual attention to detailed analysis of a domain, leading to further lexical innovation, and increasing attention to the domain over time" (Slobin, 2006, p. 72).

[33] The relative degree of ease of processing of manner information between S-languages and V-languages has lead to crosslinguistic differences observed in many different domains. Slobin (2003, 2006) has catalogued many of these differences in areas such as (a) ease of lexical access, (b) imagery and understandability of manner verbs, (c) use in conversation, (d) acquisition of manner verbs, (e) use in elicited oral narratives, (f) use in creative fiction, (g) translation of creative fiction, and (f) metaphoric extensions of manner verbs.

Although English is primarily an S-language, with a very large store of easily accessed MANNER verbs, English actually does include some verb-framed alternatives due to a rich history of lexical borrowings from the V-language French. For example, (27) is a verb-framed paraphrase of (25b).

(27) *She descended*[MOTION/PATH] *the hill*

As mentioned previously, verbs that have different etymologies are not always used with the same frequency within the same types of registers. In particular, Romance-source words are typically used in more formal or literary registers with Germanic-source words more common in colloquial, spoken language. Talmy (1985) also acknowledges this distinction in the usage of satellite-framed verbs in English, such as those in (28), versus their Romance-source, verb-framed synonyms, in (29).

(28) *go in(to), go out of, go back, go across, put up*

(29) *enter, exit, return, cross, raise*

Speakers of English have much to decide on when encoding MOTION events. Motions along certain paths can either have PATH conflated into the verb stem (29) or encoded within a satellite constituent (28). If PATH is expressed in the satellite, the speaker can also choose to conflate manner into the verb stem, if MANNER is a salient concept that the speaker wishes to convey. For example, rather than simply using the bare motion verbs *go* and *come* (which vary only in the perspective of the motion in relation to the speaker), speakers have the option of being more descriptive, of choosing a hyponym of *go* or *come* such as those in (30).

(30) *scurry in, saunter in, dart in, crawl in, swoop in, motor in,* etc.

The difference in the placement of PATH information has a consequence in terms of the number of lexical units required to encode the fact of motion along with the PATH of motion. In the verb-framed configuration, only one lexical unit, the verb root, is required (31a). By contrast, in the satellite-framed configuration, two lexical units are required to convey the same information (31b), with the option of conflating MANNER into the verb stem (31c).

(31) a. *I entered the room.*

b. *I came into the room.*

c. *I waltzed/stumbled/hurried/burst/tip-toed into the room*

3.2.3. Additional Classifications

Like active verbs, stative verbs can also be sub-classified based on certain semantic criteria. For the purposes of this study, a detailed listing of verb types (as in Levin (1993) or Dixon (1991), for example) was not essential, but, in the main production experiment, I did code stative verbs into one of the three broad categories of 'copula', 'possessive', and 'psychological'. I treated copula verbs (32a) as those which link together the subject with a subject complement, some kind of phrase that is equated with or describes the subject. I classified verbs as possessive (32b) if they indicated a relationship of possession between the subject and direct object (whereby the object is owned or possessed by the subject). Psychological verbs (32c) were classified as such if they refered to some psychological or cognitive state or process being experienced by the subject.

(32) a. Copula Verbs: *be, remain, weigh, sound, feel, grow,* etc.

b. Possessive Verbs: *have, own,* etc.

c. Psychological Verbs: *learn, see, want, decide, imagine,* etc.

3.3. Verb-Particle Constructions (VPCs)

Another distinction found in English between the number of lexical units required to convey the same information can be found in the domain of verb-particle constructions (or VPCs for short).[34] English has an abundance of VPCs[35]

[34] A note on terminology is constructive at this point. Although some scholars have used the term 'verb-particle construction' and 'phrasal verb' synonymously (e.g., Hampe, 2002; Gorlach, 2004; O'Dowd, 1998, Neagu, 2007) and other scholars have used the term 'phrasal verb' preferentially (e.g., Bolinger, 1971; Declerck (1976); Side, 1990, Brinton & Akimoto, 1999), I have chosen to use the label 'verb-particle construction' exclusively (along the lines of Fraser, 1976; Lipka, 1972; Lindner, 1981; Cappelle, 2005; Gries, 2003; and den Dikken, 1995). My goal is to avoid the confusion which surrounds the term 'phrasal verb' which has also been used more restrictively to refer to the subcategory of idiomatic VPCs only (e.g., Quirk et al., 1985) and more generally to refer to the supercategory of prepositional verbs in addition to VPCs (as noted by Cappelle, 2005). More recently, VPCs have also been referred to as 'particle verbs' (e.g., Dehé, 2002).

in which the verb root is followed by a unit called a particle, as in (33a). Often, English has a one-word synonym as well (33b).

(33) a. *blow up, put out, pump up, take off, put back*, etc.
b. *explode, extinguish, inflate, remove, return*, etc.

Similar verb and particle combinations are found in other Germanic languages (see Dehé 2002, for example) thus the VPC is considered to be a Germanic trait. Although not all the one-word synonyms of VPCs have a Romance etymology, a majority of the ones tested in this study are Romance-based (including all of the examples in (33b) which either came directly from Latin or via French). Thus, like the synonyms compared in the motion event section (3.2.2), the multi-word encodings follow a Germanic pattern and the one-word encodings follow a Romance pattern.

3.3.1. Syntactic Considerations of VPCs

Of the two constituents that constitute a VPC, the verb root comes first followed by the particle, which would be classified as a preposition (e.g., *up, out*, etc.) or adverb (e.g., *back*) if treated in isolation. Hampe (2002) notes that the standard view regards a VPC as "a discontinuous lexical item consisting of a transitive or intransitive verb and an adverbial particle, e.g., *break down* or *make up*" (p. 1). The discontinuous nature of the two constituents is only observable in transitive verb situations as the particle then has the potential to surface in either pre-object or post-object position, as in (34).[36]

(34) a. *We <u>blew</u> <u>up</u> [the device] before it caused any damage.*
b. *We <u>blew</u> [the device] <u>up</u> before it caused any damage.*

[35] For example, Neagu (2007) asserts that there are around 1000 different senses for V+*up* sequences and around 600 for V+*out* sequences alone.
[36] The design of the main experiment in this study is not geared toward investigating the factors that influence a speaker to produce the particle in either pre- or post-object position. For an exhaustive exploration of those factors, see Gries (2003). However, there may be crosslinguistic factors or factors related to the state of bilingualism contributing to that placement, as discussed in section 6.8.2; thus, a comparison between monolinguals and bilinguals will be made in terms of the position of the particle.

Despite the fact that the particle is separable from the verb root, together they form a semantic unit (as implied by the one-word synonyms given in (33b) above).

Before exploring the semantic contribution of the particle (see section 3.3.2), we must first elaborate on the syntactic classification and behavior of particles. These guidelines were instrumental in assisting me to identify particles as such during the analysis of the text generated in the main experiment of this study. Following Cappelle (2005), I treated the words in (35) below as particles if, within the sentential contexts uttered by the speakers, they could surface grammatically in both pre-object and post-object position, or if they were used with no object at all (and thus were used within an intransitive verb structure). The most prototypical particles are the ones which also function as prepositions which can head PPs (35a). The non-prepositional units in (35b), traditionally thought of as adverbs, can also function as particles in situations where they can surface both before and after the DO.

(35) a. *about, across, along, around, by, down, in, off, on, out, over, round, through, up*
b. *ahead, apart, aside, away, back, home, together*

Particles can actually co-occur with PPs within the same argument slot in a verb phrase. The examples in (36) are taken from den Dikken (1995:55f).

(36) a. *They put the books [<u>down</u> <u>on the shelf]</u>.*
b. *They sent a schedule [<u>out</u> <u>to the stockholders]</u>.*

In these examples, each particle + PP constituent collectively indicates the end location of the direct object.

Both the particle and the PP would legitimately fill that position independently (e.g., *put the books down* or *put the books on the shelf*) which makes this structure distinct from a PP headed by a complex preposition, as in (37)

(37) a. *I took the books [<u>out of the bag</u>]*.
b. *I took the books out/*I took the books of the bag.*

Regardless of whether one treats the particle as a specifier to the head preposition within the PP, or one treats the PP as a complement to the particle

head within some kind of Particle Phrase (see Cappelle 2005 for discussion), the particle plus PP do form a semantic unit in that, together, they denote the resulting location of the DO. They also form a syntactic unit in that they can be preposed together in a locative inversion construction (38).

(38) *[Down on the shelf] they put the books.*

Instances of these complex VPCs (which include both a Prt and PP) will be treated, and therefore counted, as regular VPCs.

Two of the most common particles actually have a variable function. In addition to fulfilling the traditional particle role (as in 39), *back* and *on* are also sometimes used in a supporting role in which they give more precise understanding to another following particle (as in 40).

(39) a. *I need to take {back} this movie {back}.*

b. *Can you turn {on} the light {on}?*

(40) a. *Plug the fan {back in}.*

b. *When you get a chance, you should come {on by}*

Cappelle (2005) calls these particles 'specifying particles' because they fill the specifier slot in the generative-grammar phrase-structure model.

It is apparent that the specifying particles are not the main particles in these examples because they do not convey the primary spatial relationship being expressed and they are ungrammatical, or change in their interpretation, if the head particle is omitted (41).

(41) a. **Plug the fan back.*

b. *?You should come on.*

Another consideration when studying VPCs which include specifying particles is the naturalness of the placement of the particle bundle in relation to the direct object. Native English speakers who I queried found the placement of the specifying particle plus the main particle constituent (i.e., *back in*) stilted and unnatural in pre-object position, as in (42).[37]

(42) *?Plug {back in} the fan.*

[37] A Google search (July, 2009) bears out these native speaker intuitions. The string *plug the fan back in* surfaced in over 300 webpages whereas *plug back in the fan* surfaced in only one.

In sum, for the purposes of the data analysis of this study, lexical items are classified as being part of a VPC if they consist of (a) an intransitive verb followed by a particle (e.g., *come in*), or (b) a transitive verb followed (either immediately or after the direct object) by either a single particle (e.g., *put it down*) or a particle plus PP constituent (e.g., *put it down on the ground*). Additionally, there may be constraints on the placement of the particle if it is preposed by a specifying particle (e.g., *back in*) which will be taken into consideration in the analysis of particle placement within the data generated by the main experiment.

3.3.2. Semantic Considerations of VPCs

The semantic contribution of the particle is much debated in the literature.[38] At a basic level, VPCs can be sub-classified into one of three groups based on semantic considerations. These groups have been labeled (e.g., Dehé 2002) as (a) semantically compositional or transparent, (b) idiomatic, and (c) aspectual. In category (a), the literal meanings of the verb root and the preposition-cum-particle are combined to create a compositional meaning typically based on a directional understanding of the particle (43).

(43) Compositional VPCs

a. *They put {**down**} their weapons {**down**}*

b. *They picked {**up**} the pieces {**up**}*

c. *They threw {**out**} the garbage {**out**}*

Idiomatic VPCs are quite the opposite in that they are non-compositional: the meaning of the overall construction does not correspond to the compositional meaning of the two different parts (44). Or, to use Dehé's words, 'Idiomatic PVs [Particle Verbs] form a semantic unit whose meaning is not fully predictable from the meaning of its constituents' (p. 5). So, for example, *running off the reports* really does not have much to do with either the action of running or with the discontinuation of contact implied by the spatial interpretation of the preposition *off*.

[38] See, for example, Bolinger (1971), Lipka (1972), Lindner (1981), Brinton (1985), Dehé (2002), Jackendoff (2002).

(44) Idiomatic VPCs

a. *She turned {**down**} that job in Toronto {**down**}*

b. *They ran {**up**} a huge bill {**up**} over the weekend*

c. *They roughed {**out**} a plan {**out**} for the party*

The third and final grouping that Dehé outlines is the Aspectual VPCs in which the particle gives a different aspectual interpretation to a situation than would exist without the particle (45). Aspect, here, refers to the lexical aspect or Aktionsart (i.e., how an event inherently relates to time, as outlined in section 3.2.1).

(45) Aspectual VPCs[39]

a. *He sang on after we left.*

b. *She drank up the wine*.

In these examples, as observed by Jackendoff (1997), the inclusion of the particle prolongs the duration of the event in (45a) (focusing on the atelic nature of the event) and implies a terminus to the event in (45b) (focusing on the telic nature of the event).

Brinton (1985) also remarked on the aspectual nature of particles, in particular of the telic interpretation certain particles contribute to the conceptualization of an event. Particles, she says, "may add the concept of a goal or an endpoint to durative situations which otherwise have no necessary terminus. That is, the particle may affect the intrinsic temporal nature of a situation and hence alter its Aktionsart from atelic to telic" (p. 160). In support, she offered the examples in (46).

(46) a. Atelic Event: *The house burned*.

b. Telic Event: *The house burned down*.

Up seems to be the most productive telic-marking particle in English, really focusing attention on the terminus of the event (47) (Lindner, 1981).

[39] O'Dowd (1998:63) notes that the subcategory of Aspectual VPCs are sometimes referred to as 'phrasal verbs' (whereas other scholars use the term 'phrasal verb' synonymously with the general category of the verb-particle construction regardless of subtype, as indicated in footnote 33).

(47) a. *He ate {**up**} his meal {**up**}.*

b. *It's time to gas {**up**} the car {**up**}.*

c. *I need to sponge {**up**} all the water {**up**}.*

I would like to suggest that, regardless of whether they are used within a compositional, idiomatic, or aspectual VPC, particles play an aspectual role, in most cases having a telic-marking or resultative function.[40] The verb roots on their own denote atelic events but once the particle is added, these new situations have a natural endpoint which results in a new state (48).

(48) a. Compositional: *throw out the garbage* (now it is out)

b. Idiomatic: *turn down the job* (now it is off the table)

c. Aspectual: *eat up the pie* (now it is gone)

In effect, then, all VPCs could be classified as aspectual. A closer look at Dehé's Aspectual VPCs category seems to reveal a pattern in which the meaning of the root is transparent (and not idiomatic) but the meaning of the particle is non-spatial, as opposed to the spatial interpretation of the particles found in the Compositional VPC category. Thus, these constructions are not truly compositional or idiomatic so they need their own category, which Dehé calls Aspectual since the primary function of the particle is to indicate whether or not the situation is telic.

The synonymy that exists in English between VPCs and one-word alternatives seems to pervade each of the different VPC classifications, as in (49).

(49) a. Compositional: ***throw out/discard** the paper*

b. Idiomatic: ***turn down/reject** the job offer*

c. Aspectual: ***eat up/consume** the pie*

In these single-word equivalents, the telic or resultative nature is encoded directly in the verb stem. English speakers, therefore, have the option of choosing

[40] Although most particles contribute a telic interpretation to an event, the particles *on* (e.g., *he sang on*) and *away* (e.g., *she slept the day away*) function as atelic markers (as described by Jackendoff, 1997) or continuative aspect markers (as described by Brinton, 1988). Rice (1999) and Rice & Newman (2004) make a distinction between the two, identifying *on* as marking resumptive aspect and *away* as marking continuous aspect. Regardless of the analysis or terminology used, *on* and *away* (as well as *on and on*, *again and again*, and *over and over*, as per Rice, 1999) add emphasis to the atelic nature of the event.

between structures that encode the resultative nature of the event in the verb stem versus those in which the resultative quality is encoded by the particle.

Which class each VPC falls within governs the type of relationship that exists between the verb on its own in relation to the verb plus the particle. Within compositional VPCs, the particle is providing a primarily spatial contribution which is either required to make the verb grammatical (50a) or changes the sense implied by the verb (50b and 50c).

(50) a. **They put their weapons.*

b. *They picked the tiles they wanted.* (*pick = choose*)

c. *They picked up the tiles they wanted.* (*pick up = collect*)

Within idiomatic VPCs, the particle is an integral component in establishing the meaning of the overall VPC and without it the verb root would be interpreted literally instead of figuratively. Compare the sentences in (51).

(51) a. *She turned. / She turned down the offer.*

b. *They ran. / They ran up a huge bill.*

On the other hand, in aspectual VPCs, the primary contribution of the particle is to emphasize the aspect of the event thus the meaning of the verb root does not typically change with the inclusion of the particle nor is the particle necessary to make the expression grammatical, as in (52).

(52) a. *He sang. / He sang on after we left.*

b. *She drank. / She drank up the wine.*

Because the particle is not required to make the sentence grammatical or to ensure the correct interpretation of the verb, I call the particles in these cases 'non-required' particles.

3.4. Crosslinguistic Lexico-Semantics Distinctions

The primary hypothesis in this study is that crosslinguistic transfer is one of the many factors that contributes to a speaker's ultimate lexicalization of the pre-verbal message. In particular, lexicalization habits from French will transfer into the lexical choices made in English by bilinguals of French and English. Additionally, a contrastive analysis of the two languages may point out areas in

which a bilingual for whom English is the second language may avoid structures which do not have equivalent forms in French, the L1. To that end, it is necessary to have a basic understanding of the semantics of French verbs.

3.4.1. Motion Event Comparison

As mentioned in section 3.2.2, Romance languages are verb-framed languages (or V-languages, for short) in terms of the encoding of PATH information within motion events. French, as one of the Romance languages, follows this pattern in that PATH information, if overtly expressed, is encoded in the verb stem,[41] as in (53).

(53) *Elle descend*$_{[\text{MOTION/PATH}]}$ *la colline*
(She is descending/coming down the hill)

That is not to say that MANNER information is not allowed to be conflated into the verb stem (54); however, if both PATH and MANNER are expressed, PATH takes precedence and is conflated into the verb stem with MANNER information being relegated to a satellite constituent (55).

(54) *Elle court.*
(She is running.)

(55) *Elle descend*$_{[\text{MOTION/PATH}]}$ *la colline, en courant*$_{[\text{MANNER}]}$
(She is descending/coming down the hill, running.)

In French, therefore, manner is not 'highly codable', as it is in English. The encoding of manner information in motion events that also include an indication of path comes at a processing 'cost' to the speaker. Slobin (2006) explains,

> In verb-framed languages, manner must be expressed in some kind of subordinate element, such as a gerund or other adverbial expression ('exit flying'), whereas in satellite-framed languages the main verb of a clause is

[41] Kopecka (2006) argues that French is actually a hybrid between a V-language and a S-language in that it contains certain prefixed verbs in which the path is expressed by the prefix (classified as a satellite) leaving a slot for manner expression within the verb stem, like in the verb *envoler* 'away-fly'. However, these structures are a remnant of the Old French system and, in contemporary French, such prefixation is not very regular (e.g., one does not *revoler* 'back-fly' or *transvoler* 'across-fly' in French) or productive (i.e., very few additions to French in the last few centuries). Additionally, some of the prefixes have lost their spatial interpretation (e.g., *prendre* 'to take' versus *surprendre* 'to surprise'). For these reasons, I will treat French as a strictly V-language for the purposes of this study.

> available for the expression of manner ('fly out' in Germanic, 'out-fly' in Slavic, etc.), providing a "low cost" alternative to adjunct expressions of manner such as 'exit flying' or 'exit with a flap of the wings'. I will suggest that this apparently trivial processing factor of relative "cost" of encoding manner has widespread consequences for both the lexicon and discourse patterns of a language, with probable effects on cognition (p. 62).

The evidence Slobin presents to support this conclusions comes from a variety of different sources: from oral narratives, comparisons of written texts, ease of lexical access, acquisition of manner verbs, and basic number of manner verbs that exist in each language. I will touch upon each of these briefly below.

One of the main processing consequences Slobin was referring to is that English and French speakers tend to encode MANNER in motion-event descriptions with a different degree of frequency. Because of the processing costs associated with encoding MANNER in French, it makes sense that French speakers typically do not include an account of MANNER in their descriptions of motion events which involve PATH specification. Batchelor & Offord (1982) make just such an observation. "Often where the manner of movement is specified in English, it is left vague or ignored completely in French: a general verb is used in French where English uses an explicit verb" (p. 244). By the examples they give, 'general' refers to a verb which encodes both MOTION and PATH such as *cross* (e.g., *She crossed the road*), whereas 'explicit' refers to a verb which encodes MOTION and MANNER such as *walk* (e.g., *She walked across the road*), which is a more explicit indication of the event than simply a bare motion verb stem like *go*. In terms of empirical evidence for this claim, Slobin (2000) compared the oral narratives of French and English speakers who were describing the event of an owl emerging from a tree and flying away. None of the 21 French speakers in his sample conflated MANNER with MOTION in their descriptions of the motion event; they all conflated PATH with MOTION. By contrast, 32% (16) of the English speakers conflated MANNER with MOTION using expressions like *fly (out)*, and none of the English speakers conflated PATH with MOTION using a verb like *exit*. The remaining 68% of English speakers used the bare MOTION root *come* followed by a PATH-indicating particle. The verb root does have some spatial information

as it gives the perspective of the motion in relation to the speaker but there is no true indication of the PATH with which that motion follows. For example, one can *come up* or *come out* or *come in* or *come back*, in which case the PATH is expressed by a satellite constituent.

Further evidence that speakers of French, as a V-language, conflate MANNER and MOTION less often than speakers of English comes in written forms of the language, in both newspaper stories and creative fiction. Slobin (2003) gives an account of how the two languages are used differently in newspaper reports of the same incident. In the English newspaper, the story includes more MANNER verbs to describe the same scene than are found in the French story. Similarly, in a comparison of one chapter of Tolkien's *The Hobbit* with a French translation of the text, Slobin (2005) found that Tolkien used 26 different instances of 14 different MANNER verbs whereas only 17 instances of 8 different MANNER verbs were used in the French translation.

In terms of lexical access and acquisition, again, it seems as though MANNER is a more salient component for both adult speakers and child learners of English in comparison to French speakers. Slobin (2003) reported that a group of adult English speakers were able to generate a much larger number of MANNER verbs in one minute than adult French speakers. This distinction in the size of vocabulary of MANNER verbs is shown from a very young age. Comparisons (from the CHILDES database, http://childes.psy.cmu.edu) of the verbs used by English versus French children reveal that English-speaking pre-schoolers use a much wider range of MANNER verbs than French-speaking pre-schoolers (Slobin, 2003). Hickmann (2003) made a similar observation from the analysis of a corpus of language elicited from two picture books, *Horse story*, and *Cat story* (Hickmann, 1982). She found that English-speaking children as young as 3 years old were routinely encoding both PATH and MANNER within a single clause (using a MANNER verb plus a PATH satellite). By contrast, young French-speaking children rarely encoded MANNER in their description. By about 6 years, French children started, occasionally, to include a description of MANNER, but it was typically in a separate clause from the PATH/MOTION conflated main verb. It was

not until adulthood that French speakers included a description of MANNER within the same clause (in an adverbial), but, even then, MANNER was articulated much less often than it was for English speaking adults.

As argued previously, because MANNER is highly codable in English, it surfaces very frequently and the language has accumulated a large number of MANNER verbs to accommodate speakers' desire to fill the slot available for MANNER specification. French, on the other hand, typically fills the slot with PATH information, thus, in order to encode MANNER information, a secondary constituent of some sort is required, which entails processing costs for the speaker. Since the slot is not available for MANNER specification very often, the language has not developed such an extensive store of MANNER verbs. For example, Slobin (2003) reports that Jovanović and Kentfield (1998) conducted an analysis of 115 MANNER verbs in English and found that there were only 79 counterparts for those verbs in French, many of which were very low frequency words.

Slobin (2003) summarizes the contrast between French and English in their encoding of motion events in the following way.

> Manner is highly codable in English, because it is carried by the main verb. Every clause requires a verb, and it is just as easy to say *go in* as *run in*. I…argue that English-speakers get manner "for free," and make widespread communicative and cognitive use of this dimension. In French, by contrast, manner is an adjunct—an optional addition to a clause that is already complete. French-speakers indicate manner when it is at issue, but otherwise do not mention it (p. 4).

This typological distinction between French and English relates to the study reported in this dissertation in the following way. If bilinguals transfer the French lexicalization patterns from French to English, one would expect to find bilinguals conflating MOTION and PATH (since these verbs also exist in English, albeit in a small number) more often than English monolinguals who do not have the additional influence of transfer from French. Alternatively, bilinguals may be sensitive to the typological distinction and avoid conflation of PATH and MOTION when speaking in English. In either case, the evidence will surface in the relative

frequencies with which the different conflation patterns are used by bilinguals and monolinguals. Both situations would be classified as instances of covert transfer.

One other related area in which S-languages and V-languages tend to show discrepancies is in how the scene is set during narrative accounts. Berman and Slobin (1994) showed that narratives by speakers of Spanish, also a V-language, often set up the scene of a motion event by expressing the ground information prior to articulation of the main motion verb. Such foregrounding would often involve the use of copula verbs, as in the English example in (56).

(56) *There IS a path that starts by the boulder. There IS a dip in the path before a sharp rise. At the end of the path, there IS a forest. A young boy follows the path to the forest.*

Slobin (1996, 2000) suggests that this pattern is typical of V-languages (such as French) and it allows listeners to infer the path of motion by having previously established the setting. By contrast, S-languages (like English) encode path within the main motion event clause, for example, as a series of PPs (57).

(57) *The boy hiked <u>from the boulder</u>, <u>down the dip</u>, <u>up the rise</u>, <u>to the forest</u>.*

"These differences are typical", Slobin suggests, "with a great deal of static scene setting in V-languages, contrasted with very rare use of such descriptions in S-languages" (2000, p. 131). Thus, not only do French and English vary in how frequently and diversely manner is included in motion event descriptions, it follows that they would also vary in terms of the frequency with which copula verbs versus active verbs are used within descriptions of motion events.

3.4.2. Lexical Aspect

French, being a non-Germanic language, does not have a structural equivalent to the movable particle found in English. Therefore, the information that is encoded in English particles must be conveyed in a different manner in French. As discussed previously, one of the functions of the particle in English is to encode a resulting state of an action – to mark an event as being telic. Vinay

and Darbelnet (1960: 80-81) argue that where English typically uses a particle, French simply uses implication based on the meaning combinations of the verb and the following direct object. An example they offer is French verb *déchirer* which means 'to tear'. The type of direct object which co-occurs with this verb will change the interpretation of the event and will therefore be translated in different ways in English since English has a specific form unit to convey those subtle meaning distinctions.

(58) a. *déchirer sa robe* (tear her dress)
b. *déchirer la lettre* (tear up the letter)
c. *déchirer une page de son carnet* (tear out a page from a book)

In terms of the non-required particles mentioned in section 3.3, it would be reasonable to expect that the F/E bilinguals (at least those who are not English dominant) would include the non-required particle less often than English monolinguals since French does not have an equivalent aspectual marking unit like a particle. Since these French L1 speakers are accustomed to relying on the sentential context (i.e., the combination of verb plus its arguments) to convey aspectual information, they may well be content to use the same strategy when speaking in English. The risk of having the listener misconstrue the temporal nature of the event may be worth the savings in processing load for the bilingual. This strategy may be particularly attractive when one considers the intricacies of VPCs in English. For example, an array of particle options are sometimes available, to different semantic effect (59).

(59) a. *wipe the car down/off*
b. *fill the form in/out*

In (59b), it seems that two antonymous particles are used without changing the basic meaning of the VPC. The abundance of ESL resource material on the topic of VPCs points to the difficulty that ESL learners of English have with this structure, in particular with the idiomatic VPCs (as they must be lexicalized and memorized as a unit) and with the aspectual VPCs (as the particle

is often not required to make the structure grammatical). Neagu (2007)[42] observed that Romanian and Spanish speaking learners of English "tend to use fewer phrasal verbs and more single word verbs than native speakers performing similar tasks" (p. 122). Since Romanian and Spanish are both Romance languages and, like French, neither language has an equivalent lexical unit to the particle in English, it would be reasonable to expect the same type of avoidance strategies used by French-speaking learners of English.

3.4.3. Adverb Placement

As noted by Walter (1989), French typically encodes adverbs between the verb and the direct object, (e.g., *J'aime*$_{V}$ ***beaucoup***$_{Adv}$ *tes chaussures*$_{NP}$) whereas in English, the same adverb typically surfaces elsewhere (e.g., preverbally as in *I* ***really***$_{Adv}$ *like*$_{V}$ *your shoes*$_{NP}$ or after the DO as in *I like*$_{V}$ *your shoes*$_{NP}$ ***very much***$_{Adv}$). Since both adverbs and particles play a similar function in that they modify the interpretation of the verb and since a subset of English particles are, in fact, adverbs (see section 3.3), it may be the case that the French/English bilinguals transfer this French pattern into English and show a preference for the inter-argument position (e.g., between the verb and the DO) for particle articulation in English, a potentiality that is assessed in the analysis of the data generated by the main experiment of this study.

All in all, there are many factors at play when it comes to encoding meaning in a verb unit. The fact that English and French have fundamentally different ways of packaging information such as telicity and expressions of PATH and MANNER, and that constituent placement is not always identical (e.g., adverb placement) makes these two languages prime candidates for a study in

[42] Neagu (2007) offers a useful account of how idiomatic particles can be interpreted systematically as an extension of the literal meanings of those particles. Her inclusive account of the semantic contribution of particles has the goal of improving acquisition of VPCs by second language learners of English. In her discussion she gives an account of the semantic difference between *fill in* and *fill out* (see example _), in which *in* simply implies the addition of further information whereas *out* implies the expansion of information to the point of reaching a canonical state, in this case of a completed form. Other '*out* VPCs' are similarly thought of as expansions but within other domains (e.g., *wait out* is a temporal expansion and *puff out* is an expansion of volume).

crosslinguistic influence. The fact that English has borrowed a large part of its vocabulary from French over the years and thus has traces of the French patterns, makes it a prime language to test if any crosslinguistic influence is manifest in the lexical choices made by bilinguals in that they opt for the English forms that follow the French patterns more often than their monolingual English counterparts.

As outlined in the next chapter, the main linguistic items under analysis are English synonyms which vary in terms of the number of free morphemes involved in the expression of the same meaning. Single-word verbs follow the French pattern of encoding features like telicity (e.g., *extinguish*) or PATH of motion (e.g., *enter*) in the verb stem. Multi-word verbs, by contrast, follow the Germanic pattern in which telicity or PATH of motion information is indicated in a separate particle unit (e.g., *put out*, *go into*). Before describing the main production experiment (in Chapter 5), I first outline a series of preliminary experiments designed to gather data on the individual synonym pairs at the heart of this study. Those experiments are described below.

4. Pre-Testing the Key Linguistic Items

4.1. Background Information

In order to determine whether bilinguals' lexical choices in English are influenced by their knowledge of French, I developed a language production experiment (described in detail in Chapters 5 and 6) which was designed to elicit certain key linguistic items in the speech of the participants. Video scenes served as the visual stimuli with the resulting data taking the form of the participants' descriptions of those scenes. In order to guide the development of the videos, I first constructed a set of these key linguistic items (see section 4.1.2 below). Because the principal variable in the main experiment was lexical choice, the key linguistic items were all sets of synonyms. Before running the main experiment, I conducted several preliminary experiments to gather information about these synonym sets.

4.1.1. Rationale for the Preliminary Experiments

With the view of keeping the main experiment (Chapter 5) as naturalistic as possible, I decided to place very few formal constraints on the participants. They were given the task of simply describing the video scenes as each one progressed. There were no sentence onsets to be completed and there were no interrupting questions from the experimenter. The result of such a participant-determined, unconstrained experiment is that the exact nature of the resulting data is somewhat unpredictable. I knew I would collect large amounts of data beyond the key linguistic items I was focusing on. In order to make the best use of the crucial data points, I decided to learn more about the nature of these key linguistic items prior to conducting the main experiment.

Pre-testing these items served several functions. First, it allowed me to gather relative ratings in which one member of a synonym pair was compared directly to the other member. Second, the gathered data allowed me to learn more about the nature of the words comprising each synonym pair. This information would potentially reveal any large discrepancies between the members of each

pair. Such non-homogeneity can be controlled for or avoided entirely by omitting those items from the analysis. A third function of these preliminary experiments was to establish item ratings and item groupings which could be used as variables in the analysis of the main experiment. This information could then be used to answer other questions about bilinguals and bilingualism such as whether bilinguals, when speaking in their second language, tend to choose more formal or less specific expressions than other speakers.

Two different preliminary experiments were conducted. One experiment tested French native speakers (who were bilingual in English), who produced French translations to each of the English synonymous words. The second experiment tested monolingual English native speakers and gathered ratings on the key linguistic items regarding features like relative formality, relative specificity, and degree of meaning similarity between the two lexical items.

4.1.2. Key Linguistic Items[43]

Unlike most linguistic experiments in which linguistic stimuli are presented and the nonlinguistic behaviour of the participants is measured, studies in language production typically work in reverse; non-linguistic stimuli are presented to participants and the subsequent linguistic behavior is recorded and analysed. This language production experiment follows the same tradition. The input is visual (video scenes) and the output is linguistic (oral descriptions of the action in those scenes). Therefore, in order to generate the type of linguistic behaviour that is relevant and informative despite being relatively unconstrained, the visual input must be both planned and precise.

The type of behaviour that I am investigating is verb choice when participants are given the task of describing particular actions. My target variables were verb synonym pairs in which one member of the synonym set is a single-word encoding of the action and another member is a multi-word encoding of that same action (what I call the XY Target Pairs). Thus, the starting point in

[43] I chose to call these synonym sets the 'key linguistic items' rather than the 'target items' since only half of them are the target items and the other half are the control items. I saved the term 'target' for the critical pairs as outlined below.

my experimental design was to find a set of synonyms that followed this pattern. Potential candidate synonym sets were evaluated based on how portrayable they were – how easily an actor could perform the event in a manner that would prompt the participants to choose from among the relevant synonyms upon viewing the scene. For example, synonym pairs like *contemplate*/*think about* which denote psychological events were deemed unsuitable for enactment. Additionally, I wanted to find fairly basic, everyday activities as I did not want participants to be lacking the vocabulary to describe the scenes. Therefore, I was looking for common, concrete, active verbs as the target structures.

In order to find such pairs, I searched through some different linguistic references[44] including a French/English dictionary (*Harrap's*, 1991) which I used to confirm that the English pairs were synonymous enough to have the same potential translation into French. I established a list of 30 synonym pairs consisting of one single-word option and multi-word option.

I also needed an additional set of verb synonym pairs which share the same number of lexical units (e.g., either two single-word encodings or two multi-word encodings of the same event, what I call XX Control Pairs) in order to control for other variables which might be at play. If bilinguals differ from monolinguals in the target set, but not the control set, it is likely that the variable encoding (single- vs. multi-word), or features inherent to those variable encodings, are differentially influencing the distinct participant groups. Inclusion of the control set would also help to tease apart the influence of any of these other features (e.g., frequency, formality, etc.). The target and control verb synonym pairs are listed in Table 4.1.

[44] Some of the resources I consulted were dictionaries of phrasal verbs such as the *Longman Dictionary of Phrasal Verbs* (Courtney, 1989) and the *Cambridge International Dictionary of Phrasal Verbs* (Hughes, 1997), the *Oxford Thesaurus* (Urdang, 1991), and an online synonym lists (Learn-English-Options.com, 2005).

Table 4.1

XY Target and XX Control Synonym Pairs Following the Shared French Translation – Listed Alphabetically According to the Shared French Translation.

	Target Synonym Pairs (XY)				Control Synonym Pairs (XX)		
1	*absorber*	**absorb**	**soak up**	1	*acheter*	**buy**	**purchase**
2	*acheter*	**get/buy**	**pick up**	2	*appeler*	**call**	**phone**
3	*assembler*	**assemble**	**put together**	3	*applaudir*	**clap**	**applaud**
4	*attraper*	**grasp**	**grab hold of**	4	*bloquer*	**block**	**obstruct**
5	*baisser*	**lower/drop**	**go down**	5	*briser*	**break**	**snap**
6	*cacher*	**hide**	**cover up**	6	*caresser*	**stroke**	**caress**
7	*déborder*	**overflow**	**spill over**	7	*corriger*	**mark**	**correct**
8	*enlever*	**remove**	**take off**	8	*échanger*	**exchange**	**trade**
9	*entrer*	**enter**	**come into**	9	*fermer*	**shut**	**close**
10	*entrer*	**enter**	**type in**	10	*frapper*	**hit**	**strike**
11	*éteindre*	**extinguish**	**put out**	11	*lancer*	**throw**	**toss**
12	*exploser*	**explode**	**blow up**	12	*mettre*	**put**	**place**
13	*gonfler*	**inflate**	**pump up**	13	*montrer*	**show**	**present**
14	*illuminer*	**illuminate**	**light up**	14	*parler*	**speak**	**talk**
15	*inspirer*	**inhale**	**breathe in**	15	*pleurer*	**cry**	**weep**
16	*lâcher*	**release**	**let go of**	16	*pointer*	**point**	**aim**
17	*lever*	**raise**	**put up**	17	*poster*	**mail**	**post**
18	*mouillir*	**dampen**	**get wet**	18	*recevoir*	**get**	**receive**
19	*poser*	**place**	**set down**	19	*reparer*	**repair**	**fix**
20	*ramasser*	**gather**	**pick up**	20	*sauter*	**jump**	**leap**
21	*rebondir*	**rebound**	**bounce back**	21	*tirer*	**fire**	**shoot**
22	*remettre*	**return**	**hand back**	22	*toucher*	**touch**	**feel**
23	*retirer*	**withdraw**	**take out**	23	*transpirer*	**sweat**	**perspire**
24	*retourner*	**return**	**take back**	24	*allumer*	**switch on**	**turn on**
25	*réveiller (se)*	**awaken**	**wake up**	25	*déchirer*	**tear up**	**rip up**
26	*revenir*	**return**	**come back**	26	*déplacer*	**move aside**	**push aside**
27	*sauver (se)*	**flee**	**run away**	27	*écrire*	**write down**	**note down**
28	*sortir*	**leave**	**go out of**	28	*reculer*	**move back**	**step back**
29	*sortir*	**remove**	**take out**	29	*remettre*	**hand in**	**turn in**
30	*traverser*	**cross**	**go across**	30	*rendre*	**hand back**	**give back**

4.1.3. Sentential Frames

Many of the verb units in the stimulus set are polysemous and often the meaning which makes a lexical unit synonymous with another is not actually the dominant or most frequent meaning for that lexical form. For example, a word like *drop* has many different meanings and usages. It can be a noun or a verb (60); it can be transitive or intransitive (61); even within the same syntactic category, meanings can vary significantly as in (62) which is a listing of the first two intransitive senses of the verb *drop* in the on-line Merriam-Webster dictionary.

(60) a. *The **drop*** (N) *in the employment rate was of great concern.*
b. *The employment rate may **drop*** (V) *unexpectedly.*

(61) a. *Can you **drop*** (V_{trans}) *what you're doing and help over here*
b. *The employment rate may **drop*** ($V_{intrans}$) *unexpectedly.*

(62) ***1 :** to fall in drops*
***2 a** (1) **:** to fall unexpectedly or suddenly (2) **:** to descend from one line or level to another **b :** to fall in a state of collapse or death **c** of a card **:** to become played by reason of the obligation to follow suit **d** of a ball **:** to fall or roll into a hole or basket*

Drop is paired as a synonym with *go down* for the purposes of this study. Notice how *go down* cannot be substituted for *drop* in most of the meanings listed above. Meaning 2a(2) is the only one which makes *drop* synonymous with *go down*. For two of the tasks in these preliminary experiments, it was important to ensure that the participants were processing the specific meanings which would make the pairs of words synonyms. Therefore, these verb units were embedded inside a sentential frame which served to narrow down the potential meaning of the verb to the target meaning which was shared by its synonym. A list of these sentential frames is provided in Appendix A.

4.2. Translation Experiment

The purpose of the Translation Experiment was to verify that the purported English synonyms were, in fact, similar enough such that each member of a synonym pair had the potential to be translated into the same lexical item in French. If a common translation equivalent in French exists for both of the English synonyms, an interaction between all three lexical items would be expected. By contrast, if the translations of the English synonyms are never the same, that result would suggest that the two English words may *not* in fact be synonyms for the bilingual.

As mentioned earlier, the initial set of key linguistic items was developed with the assistance of a French-English dictionary which indicated that both expressions within each English synonym pair had the potential to be translated into the same French word. However, I felt it was important to verify that these

relationships existed in the minds of actual bilinguals of French and English. Dictionaries represent a standard view of both languages and do not offer an indication of word frequency or preference. By conducting this preliminary experiment using bilinguals from the same basic population as the main experiment (i.e., living in Canada), and by tapping into native speaker word-choice preferences, I gained some confidence in the validity of the set of key linguistic items. In fact, I did adjust some of the original French translations to those listed in Table 4.1 based on the results of this experiment. For example, whereas the dictionary indicated *souffler* as being a common translation for both *extinguish* and *put out*, most of the bilinguals preferred the translation *éteindre*. I wanted the list in Table 4.1 to reflect how these words are viewed collectively by this set of French/English bilinguals.

4.2.1. Method

4.2.1.1. Participants

Since the task in this experiment was to provide a French translation for verbs in English, the 28 participants in this experiment were all French/English bilinguals who spoke French as their first language. They were of mixed ages and regions (although most were from the provinces of Ontario and Quebec in Canada) and they demonstrated a range of proficiency levels in English. However, they all reported that they had either been using English for many years or had recently been heavily immersed in an English-speaking environment. The key criterion for this task was that the bilinguals were native speakers in French with a comfortable proficiency in English since French was the language into which the words would be translated and I was looking for native speaker translations and not second language translations. I did not consider it to be problematic that the participants had varying degrees of proficiency in English since the task was to translate into their first language. If they provided a translation at all, that was an indication that they understood the word in English. Most of the verbs for translation were very common everyday words which did not seem to pose a problem for most of the bilinguals. Some participants left

occasional translations blank which indicates they were not familiar with the word (e.g., *weep*) in English to begin with.

4.2.1.2. Procedure

Participants were contacted via email and asked to send a reply and to include in their reply a French translation for each of the 60 English verbs which were presented within a sentential frame. Each participant was presented with one of the synonyms from each of the 60 synonym pairs. Therefore, two lists were created, and each participant was only given one of the lists. The lists were also balanced for the number of single-word versus multi-word test items.

The words for translation were presented within a sentential frame in order to provide the necessary context to narrow down the meaning of that word. The sentence contexts were the same for the words within each synonym pair in order to fully direct the participant to the synonymous meanings of the two words. (See Appendix A).

4.2.2. Results and Discussion

The translations were pooled and tallied and then compared to the translations of their synonyms. A table of results is presented in Appendix B. Due to the fact that synonymy also exists in French, I did not expect to find that all the participants would translate all the words in the same way. However, I was hoping to find that all of the English synonyms from one list would be translated into the same French form as the English synonym from the other list at least once. An even better result would have been if the French translation which was given the most often was the same for both English synonyms. Most of the English synonym pairs showed exactly that overlap in translation. All but seven XY Target Pairs (*enter/come into, enter/type in, flee/run away, inhale/breathe in, remove/take out*) and three XX Control Pairs (*aim/point, show/present, push aside/move aside*) shared the single most frequent translation into French. For example, for the vast majority of all the synonym pairs, the most frequent translation that Group A gave for one member of the synonym pair was the same

translation as Group B gave most often for the other member of the synonym pair. I calculated a degree of overlap by simply averaging together the percentages with which synonym A and synonym B were translated into the same French word. Here are some examples showing a range of overlap. For the synonym pair *applaud* and *clap*, all the participants gave the translation *applaudir*; therefore, there was 100% overlap in translation. For the synonym pair *explode* and *blow up*, 75% of the time *explode* was translated as *exploser*, and 69% of the time *blow up* was translated as *exploser* for an average overlap of 72%. For the synonym pair *leave* and *go out of*, *leave* was only translated as *sortir* 25% of the time (which, in fact, was not the most frequent translation – *quitter* was given 42% of the time) whereas *go out of* was translated as *sortir* 71% of the time for an average overlap of 48%.

Almost all of the XX Control Pairs and over half of the XY Target pairs showed an overlap rate of greater than 50%. In other words, for each of those pairs, more than half of the participants offered the same translation for the different members of the synonym pair. The overall overlap rates for the two different stimulus sets were 79% for the XX Control Pairs and 63% for the XY Target Pairs. The difference in translation overlap rate between the two groups of stimuli was significant ($t(29) = 10.11$, $p<0.001$), with the XY Target pairs having a lower overlap rate, which may suggest that the inclusion of a secondary lexical unit (e.g., the particle or preposition) in one member of each XY pairs introduces an additional semantic component which leads to more divergent translations between the XY than XX pairs. In other words, when the members of a synonym pair do not share the same number of lexical constituents, an additional element of divergence comes into play which sometimes influences non-equivalent translations.

As mentioned previously, in only 10 of the 60 pairs was the single most frequent translation for each member of the pair not the same. Table 4.2 lists each of these pairs along with its most frequent translation (with the frequency indicated). However, if the calculation is modified to include all of the common translations that were given for the two members of each synonym pair (and not

just the single most frequent translation), the overlap rates (shown in the last column of Table 4.2) are over 60% for all but one pair (discussed below). The fact that there is a high rate of *common* translations for these pairs suggests that there are also synonymous words in French for these concepts (e.g., *sortir* and *quitter* for both *go out of* and *leave*) or that participants chose translations from different levels of the semantic hierarchy. For example, one can *enter* a PIN number or *type in* a PIN number. One could argue that *enter* is a more generic expression with *type in* specifying the exact nature of the *entering* (and is, thus, a hyponym for *enter*). Unsurprisingly, for this pair, bilinguals chose a translation at the same level of the hierarchy, with *taper* being the most frequent translation of *type in* and *entrer* being the most frequent translation of *enter*.

Table 4.2

Synonym Pairs which did not Share the Same Most Frequent Translation Along With the Percentage Overlap of All Common Translations.

Synonym A (plus most frequent translation)	Synonym B (plus most frequent translation)	% Overlap of **All** Translations
move aside (*tasser*, 50%)	*push aside* (*déplacer*, 38%)	93%
breathe in (*respirer*, 63%)	*inhale* (*inhaler*, 58%)	89%
run away (*s'en fuir*, 42%)	*flee* (*se sauver*, 47%)	78%
go out of (*sortir*, 71%)	*leave* (*quitter*, 42%)	77%
present (*donner*, 35%)	*show* (*montrer*, 50%)	72%
come into (*rentrer*, 40%)	*enter* (*entrer*, 67%)	67%
aim at (*viser*, 93%)	*point at* (*pointer*, 50%)	67%
type in (*taper*, 31%)	*enter* (*entrer*, 31%)	62%
take back (*reprendre*, 27%)	*return* (*retourner*, 54%)	61%
take out (*sortir*, 81%)	*remove* (*enlever*, 75%)	11%

When semantically close alternatives (e.g., synonyms, hyponyms) exist in French, it appears as though one of the factors contributing to the final translation choice is whether one of the French options is a cognate with the English verb (as would be the case for both *taper* and *entrer* above). The most frequent translation

for many of the pairs in Table 4.2 was the cognate in French (e.g., *point/pointer, inhale/inhaler, enter/entrer, return/retourner, type in/taper, push aside/pousser*). This same pattern was evident within some of the 50 synonym pairs which did share the single most frequent translation, with the translation rate being higher for the English synonym which was a cognate than for the English synonym which was not a cognate (see Table 4.3). For example, *réparer* was the translation offered 100% of the time for bilinguals who were given the word *repair* but only 75% of the time for bilinguals who were given the word *fix*.

Table 4.3
Cognate Effect in French Translation Rates

French Translation	English Stimulus - Cognate	English Stimulus - Non-Cognate
réparer	*repair* (100%)	*fix* (75%)
recevoir	*receive* (100%)	*get* (73%)
corriger	*correct* (100%)	*mark* (73%)
assembler	*assemble* (100%)	*put together* (64%)
telephone	*phone* (40%)	*call* (17%)
illumine	*illuminate* (50%)	*light up* (47%)
caresser	*caress* (67%)	*stroke* (50%)
bloquer	*block* (81%)	*obstruct* (73%)
exploser	*explode* (75%)	*blow up* (69%)

Cognation seems to be an important factor in establishing a translation. Because this off-line task allowed participants the time to deliberately weigh their options before deciding on one translation equivalent, perhaps cognation has a greater chance at exerting an influence in this task than in an on-line task such as was conducted in the main experiment. In addition, this task required deliberate consideration and comparison of words in both languages, which is not a requirement of the main experiment. Thus, just because cognates seem to play a strong role in this off-line translation task, it does not necessarily follow that cognates will also influence word choice in spontaneous speech. Of course that

argument does not preclude the possibility of a cognate influence in both types of tasks either.

Recall from Table 4.2 that there was only one synonym pair which did not show at least a 60% translation overlap rate once all common translations were considered: *take out/remove*. The translation variability of this pair, along with the pair *go out of/leave* cannot be explained as a cognate effect. Instead, it seems as though the word *out* is particularly salient, often prompting the choice of *sortir* as the translation (for *go out of*, 71% and for *take out*, 81%). Motion *out* of something implies a container-like source entity. Similarly, the French verb *sortir* is used primarily when the point of departure is some sort of enclosed space.[45] By contrast, the French verbs *quitter* and *enlever* imply a more general motion-away-from-a-point without that point necessarily being some sort of container-like location. Thus, even though the accompanying sentential contexts established a container-like source (e.g., a room for *go out of/leave* and a mailbox for *take out/remove*), the more general departure-point verbs were chosen as the translations for the English verbs which did not include the word *out* (i.e., *remove* and *leave*).

All in all, the results of this small-scale translation experiment give me the confidence that the target synonym set I established for the main experiment was valid in terms of the verbs' classification as synonyms based on common translations into French. To further inform the design and interpretation of the main experiment, I also gathered English native-speaker intuition data on the synonym pairs, as outlined below.

4.3. Synonym Rating Experiment

In order to gather additional information about the key linguistic items, I recruited native monolingual English speakers who performed a series of rating tasks. Participants were asked to rate each of the verbs in relation to the other member of the synonym pair in terms of their level of formality, specificity, and similarity.

[45] In these cases, a boundary is crossed which Aske (1989) and Slobin and Hoiting (1994) noted is a relevant notion within V-languages.

4.3.1. Method

4.3.1.1. Participants

Twenty English native speakers were recruited for this experiment. No one reported having a comfortable command of any other language; thus, they were classified as monolingual English speakers. Participants were of a wide range in terms of ages and included members of both sexes.[46] Most were speakers of standard western Canadian English, thus they were similar dialectally to the pool of participants used in the main experiment.

4.3.1.2. Procedure

Participants were asked to judge (a) the relative formality of the two items, (b) the relative specificity of the two items, (c) the similarity of meaning between the two items, and (d) the similarity of meaning between the two items when embedded within the same sentential frame. Ratings on Formality and Specificity were collected in the first part of the experiment and ratings on Similarity and Similarity-In-Context were collected in the second part of the experiment.

In part one, individually tested participants were presented with a pair of synonyms on a computer screen (presented via Psyscope software) and then asked first to rate them for relative formality and second to rate them for relative specificity. Once one pair had been rated on both criteria, a new pair of synonyms would be presented. The instructions for this part of the experiment first described the nature of near-synonymy and then explained what the participant's task was with regard to the pair of words. Near-synonymy was explained as a situation in which two different words could both be used to describe the same scenario, thus they are different words that mean more-or-less the same thing. The participants were told that these words, however, may vary in terms of how formal/casual they are and how specific they are. Instructions on the Formality Rating task offered the example of the synonym pair *relax* versus *chill out*, which vary on formality, whereas the instructions for the Specificity Rating task offered

[46] 15 females, ranging in ages from 16 to 63 and 5 males, ranging in ages from 30 to 64, participated in this experiment.

the examples of *walk* versus *strut* which vary on specificity. The display screen for each experimental trial was set up as shown in Figure 4.1.

Brightly coloured stickers had been placed on five keys on the computer keyboard directly underneath each star and the participants simply pressed the key which corresponded to the point on the scale that they chose. I decided to use a 5-point scale so that, in addition to absolute measures of SAME versus DIFFERENT, I could also establish the relative degree of formality or specificity difference between items within each pair. The experiment was run using the Psyscope application which enabled me to randomize the order of presentation of the pairs. Before the critical pairs were shown, participants were given two practice trials to get acquainted with the procedure.

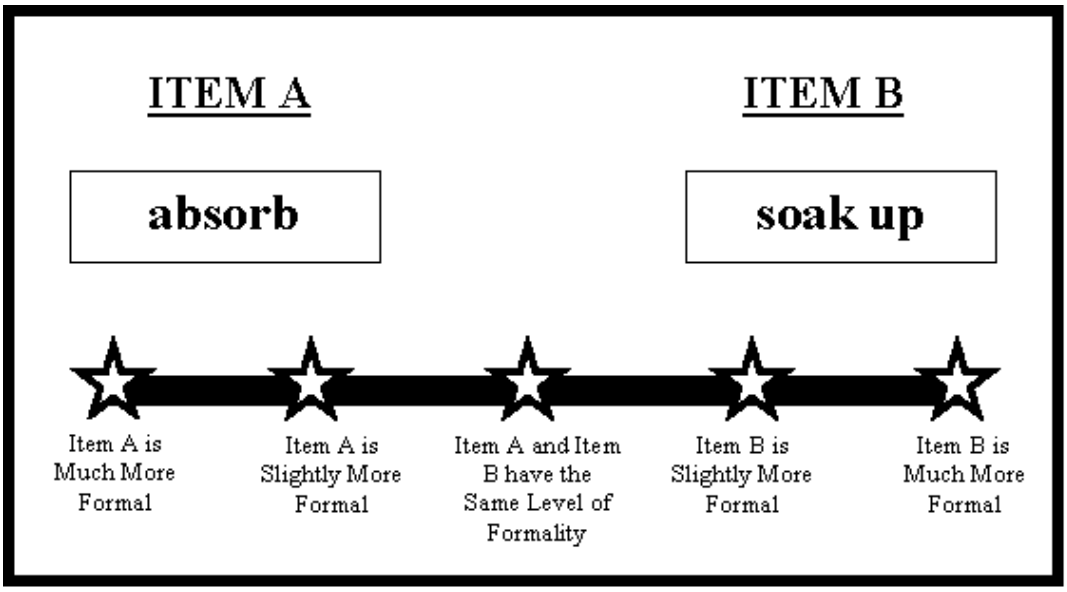

Figure 4.1. The basic screen configuration used in the Formality Rating and Specificity Rating Task.[47]

Upon completion of the Formality and Specificity Rating tasks, the participants were presented with a new set of instructions for the two subsequent Similarity Rating tasks. Since many of the verbs that constitute the key synonym pairs were polysemous, when they were presented as a pair in isolation, the dominant meaning of one of the verbs might not be the meaning which makes that

[47] For the Specificity Rating task, the word Formal was replaced with the word Specific.

word a synonym for the other member of the pair. Therefore, native speakers may have felt that the meanings were not actually very similar. Providing a sentential frame should have narrowed down the intended meaning of the target words, resulting in higher (or at least no lower) similarity ratings. Again a 5-point scale was used. This time, however, the scale was strictly ordinal.[48] The instructions presented to the participants explained that on the far left of the scale was the option "They mean ABSOLUTELY the same" whereas on the far right of the scale was the option "They DON'T REALLY have the same meaning". They were also told that they could choose any of the middle options along the scale as well. The example of *think about* and *contemplate* was given. The screen's configuration for each of the main trials is shown in Figure 4.2.

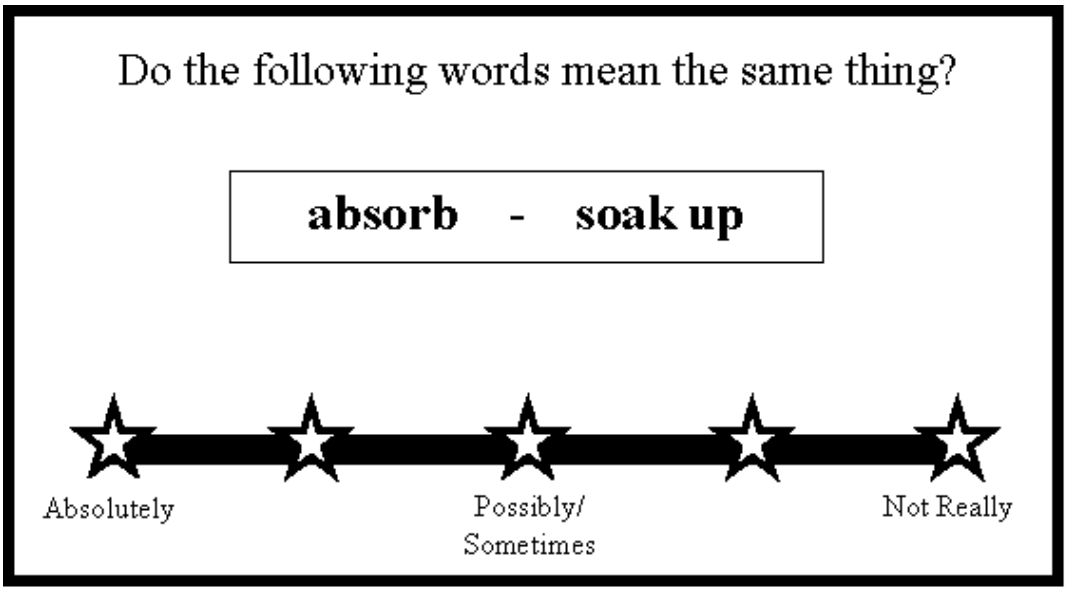

Figure 4.2. The basic screen configuration used in the Similarity Rating Task.

In terms of the labels corresponding to the points along the scale, I chose "Not really" as opposed to a stronger statement like "Absolutely Not" because all of the trials involved pairs of words that I considered to be near-synonyms. Thus, if I chose the label "Absolutely Not", at least based on my judgment of word similarity, no one would have chosen the negative extreme in the rating task. I

[48] 5-point scales of this nature, also called 'Likert' scales (after Likert 1932) are commonly used in non-chronometric linguistic tasks (i.e., tasks in which time is not a variable). See Derwing and de Almeida (2004) for discussion.

wanted participants to utilize the whole of the scale so I chose a label which would reflect a higher degree of meaning contrast without automatically excluding that point as a rating for potential near-synonym pairs.

Once participants had rated one pair on similarity, in isolation, the pair of words would remain but the instructions above changed slightly to ask them if the following words meant the same thing within the sentential context provided, as shown in Figure 4.3. Directly beneath the pair of words, a sentence containing a blank line in which the synonymous words fit would appear. The scale and labeled points remained the same between the Similarity Rating task and the Similarity-In-Context Rating task.

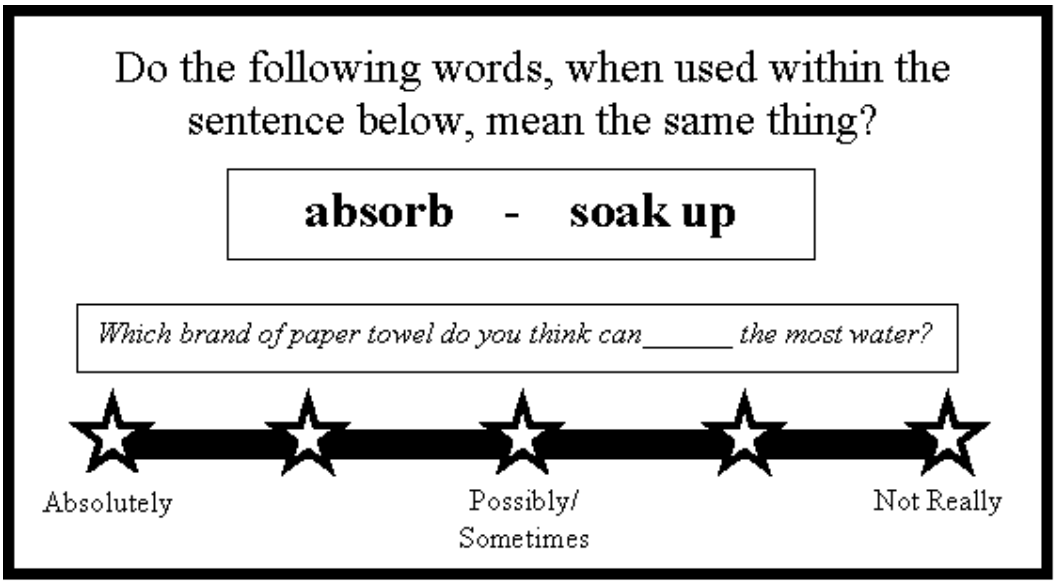

Figure 4.3. The basic screen configuration used in the Similarity-In-Context Rating Task.

4.3.2. Results and Discussion

4.3.2.1. Formality and Specificity Rating Tasks

For the Formality and Specificity Rating tasks, I conducted two main comparisons. First, I wanted to see if the XY Target pairs (i.e., one single-word verb and one multi-word verb) varied from the XX Control pairs (i.e., two single-word verbs or two multi-word verbs) with respect to formality and specificity.

The second comparison focused on just the target pairs to see if the ratings for the single-word verbs varied from the multi-word verbs.

The scale that was used during these rating tasks was a two-tailed scale of five points with the midpoint marking no difference in formality/specificity, the next two points outwards marking the points of slightly more formality/specificity for the word represented at that end of the scale and the two end-points marking the point of much more formal/specific for the word represented at that end of the scale. Thus, in absolute terms, the range of individual ratings would be from 0 (no difference) to 2 (much difference).

All of the ratings were relative to the other member of the pair such that a negative value represented a higher formality or specificity rating for the left-hand member of the pair and a positive value represented a higher formality or specificity rating for the right-hand member of the pair. When running the analysis of variance to compare relative formality differences and relative specificity differences of the XX and XY pairs, I only performed a subjects analysis for cases in which the polar value of each rating was irrelevant. I wanted to see if each participant rated the pairs as different, regardless of which member was rated as more or less formal or specific. Therefore, in the subjects analysis I converted all the ratings to absolute values before establishing averages over the two synonym pair types for each participant.[49]

[49] Within an items analysis, the polar value would need to be maintained to properly capture an average formality and specificity rating for each pair. The real values and not the absolute values would need to be averaged for each item. For example, if Participant A rated *absorb* in the pair *absorb-soak up* as being slightly more formal (-1) and Participant B rated *soak up* as being slightly more formal (+1), the average formality difference would be 0. Since the subjects versus items analysis would involve different steps and since the ordering for the XY but not the XX pairs was deliberate and consistent, I chose not to include the items analysis.

Table 4.4

Formality and Specificity Rating Task Results

	Difference in Formality	Difference in Specificity
XX	1.15	0.75
XY	1.36	0.76
All Synonym Pairs	1.25	0.75

Note. Numbers are out of 2.

The first relevant finding presented in Table 4.4 is the overall high ratings of formality difference that participants assigned for members of each synonym pair (1.25/2). By contrast, the specificity difference rating is much lower (0.75/2). The ratings for Difference in Formality are significantly higher than the ratings for Difference in Specificity ($F(1,19)=83.52$, $p<0.0001$) Since these pairs of words were chosen as synonyms, one would not expect them to vary a great deal in terms of specificity; however, formality is associated more with pragmatics than semantics allowing it to vary to a greater degree without affecting the word pair's status as synonyms. Thus, synonyms seem to have the potential to differ more in terms of formality than they do in specificity and still be considered synonyms.

The next relevant result shown in Table 4.4 is that the two different Synonym Pair Types (XX versus XY) varied from one another in the Difference in Formality ratings ($F(1,19)=26.45$, $p<0.001$) but not in the Difference in Specificity ratings ($F(1,19)=0.05$, $p=0.82$). The fact that both sets of synonym pairs showed the same degree of difference in terms of specificity confirmed their suitability as target versus control sets. On the other hand, the difference between the XX and XY pairs in terms of formality difference required further exploration in case that distinction had relevance for the main experiment.

An analysis of the XY Target pairs independently reveals that the single-word verbs are quite different with respect to formality and specificity than their multi-word synonym counterparts. Single-word verbs were collectively rated as more formal ($t(19)=-4.02$, $p<0.001$) but less specific ($t(19)=2.16$, $p=0.04$) than

their multi-word synonym counterparts. Figure 4.4 shows a histogram of the responses given for all the trials in the experiment. The lighter bars correspond to ratings on formality and the darker bars correspond to the ratings on specificity. Since the light bars are higher on the left-hand side of the chart, it indicates that participants rated single-word verbs as more formal much more often than multi-word verbs, represented by the light bars on the right-hand side of the chart. By contrast, the dark bars represent the specificity ratings and they are higher in the middle (showing no difference) and to the right, indicating a slight preference for multi-word verbs to be rated as more specific than single-word verbs.[50]

Since the multi-word verbs are rated as quite a bit less formal and slightly more specific than single-word verbs, it seems as though the preposition or particle on the end of the multi-word verbs adds an air of informality to the expression. It also seems to lead to a more specific interpretation by the language user, perhaps because the general activity is established by the verb root and then the interpretation is narrowed down by the following preposition or particle making one feel that the meaning is more specific.

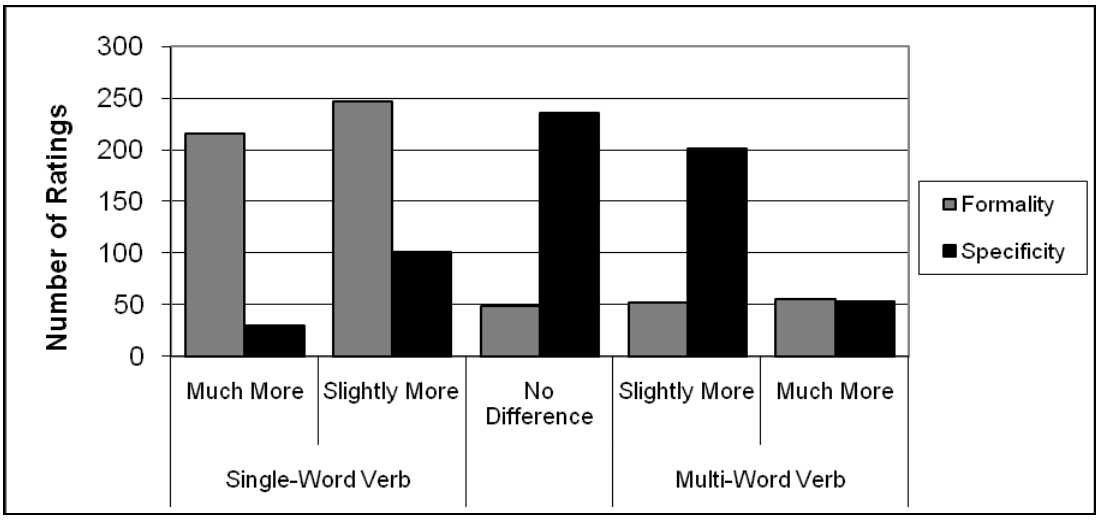

Figure 4.4 Summary of all the ratings given for the XY Target Pairs in terms of both relative formality and relative specificity.

[50] This trend in opposing directions is not actually realized in a significant negative correlation ($r(20)=-0.18$, $p=0.46$)

4.3.2.2. Similarity and Similarity-In-Context Rating Task

For comparisons of similarity I was, again, interested to see if the target and control group varied in terms of the similarity of the synonyms. I also wanted to determine how much influence the sentential framework exerted in terms of narrowing down the meaning of the verbs in question. For this experiment, the ratings were given along a uni-directional 5-point scale with 0 corresponding to words "not really" having the same meaning and 5 corresponding to words "absolutely" having the same meaning. Since these pairs were chosen as synonyms, I expected them to have high similarity ratings and I did not expect to find a difference between the target XY pairs and the control XX pairs. Figure 4.5 summarizes the ratings given for the different synonym pair types and different context conditions.

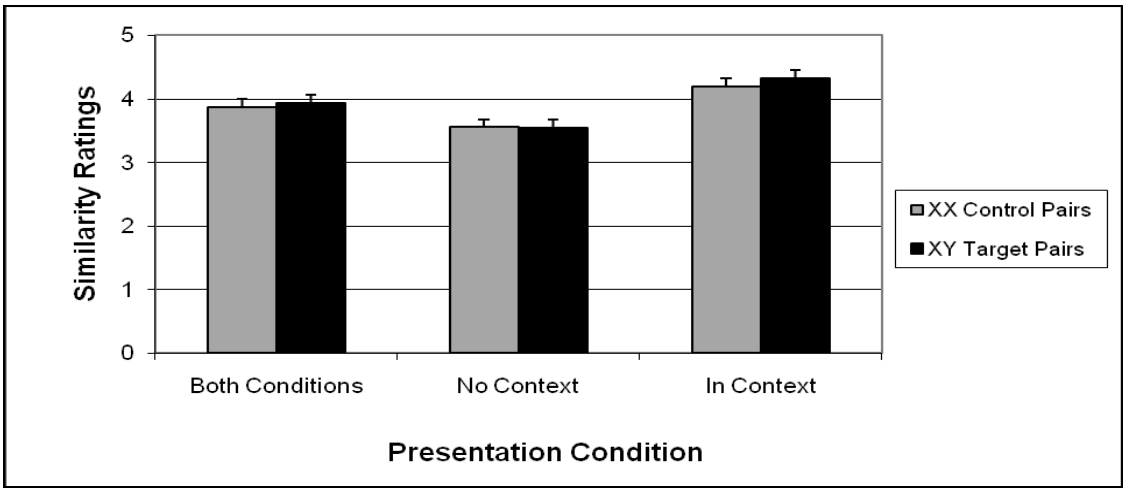

Figure 4.5. Results of the Synonym Similarity Rating Task for the different synonym pair types (XX versus XY) across the different presentation conditions (No Context vs. In Context).

As can be seen in Figure 4.5,[51] similarity ratings were very much the same for the two Synonym Pair Types within each presentation condition. There was no statistical difference in ratings for the XX Control Pairs (3.87/5) and the XY Target Pairs (3.93/5) when trials from both presentation conditions were pooled

[51] All error bars presented on charts in this dissertation represent the standard error value calculated for each group.

together ($F(1,61)=0.32$, $p=0.58$ in an items analysis and $F(1,19)=2.49$, $p=0.13$ in a subjects analysis). Similarly, within the No Context condition, both the items and subjects analysis revealed that the difference between similarity ratings for the XX (3.55/5) and the XY (3.54/5) pairs was not significant ($F(1,61)=0.01$, $p=0.9$) and ($F(1,19)=0.05$, $p=0.8$). Within the In Context condition, the difference between the XX (4.19/5) and the XY (4.32/5) pairs was not significant in the items analysis ($F(1,61)=1.04$, $p=0.31$) but was in the subjects analysis ($F(1,19)=6.34$, $p=0.02$). Since the items analysis found no statistical difference and since the Target XY Pairs were actually rated as slightly more similar than the XX Control Pairs, I was not concerned about the one result showing a significant difference in similarity ratings between the XX and XY pairs.

The main effect of presentation condition (i.e., context provided or no context), was, however, significant across all pairs and all analyses. As expected, synonym pairs when presented within a sentential context were rated as significantly more similar (4.24/5) than synonym pairs presented in isolation (3.54/5) ($F(1,124)=69.4$, $p<0.0001$ and $F(1,19)=49.1$, $p<0.0001$).

To summarize, this preliminary experiment confirmed the validity of the target versus control synonym pairs in that they did not appear to differ in terms of formality, specificity, or similarity for monolingual Anglophones. Within the XY Target synonym pairs, certain characteristics were different between the single-word verbs, which were rated as significantly more formal, versus the multi-word verbs, which were rated as significantly more specific. Additionally, the synonym pairs when presented in context[52] returned very high similarity ratings, thus confirming their status as synonyms within the event scenarios that are used in the main production experiment, outlined in the next chapter.

[52] The In Context condition most accurately reflects how speakers process synonyms in the main production experiment since meaning derived from context is what drives lexical choice when describing action from a visual presentation of a sequence of events.

5. Methodology for the Main Production Experiment

5.1. Main Hypothesis – Motivation for the Main Production Experiment

The primary focus of this dissertation is the interaction of French and English in the minds of bilingual speakers of those two languages. In particular, the existence and degree of crosslinguistic influence (from French to English) is being investigated. The linguistic domain at the heart of this inquiry is the semantic-to-lexical interface of verb encoding. To that end, I designed a largely unconstrained language production task to test the lexicalization choices made by bilinguals of French and English in comparison to the choices made by monolingual English speakers. A potentially confounding variable to the effects of crosslinguistic influence is simply the fact that the bilinguals know and use more than one language on a daily basis, regardless of which two languages they might be. Therefore, two distinct but interacting variables are being tested as they related to verb lexicalization: (a) the influence of Language A on Language B, and (b) the effects of knowing and using two languages as opposed to knowing and using only one language. The methodology behind the experiment is outlined below. The results are presented in the following chapter.

5.2. Participants – Language Background Questionnaire

As the critical variable in this experiment was the language status of the speaker, it was very important to discover and document the relevant factors that went into determining the exact nature of that language status. Additionally, other participant-related characteristics such as age, sex, and occupation may play a role in the choices one makes during speech production. For these reasons, I developed two different language background questionnaires (one for the monolinguals and one for the bilinguals) which also gathered basic demographic information on each participant.

5.2.1. Monolingual Questionnaire and Responses

For monolingual participants, of whom there were thirty-five, the questionnaire (provided in Appendix C) was quite short and was completed before the main experiment began. Basic demographic information was collected (i.e., age, sex, occupation, education level, region of L1 acquisition) along with a few questions used to verify their monolingual status. The pool of participants was quite varied with ages ranging from 18 to 76 and educational backgrounds ranging from a completion of basic high school to a graduate degree. Almost all of these participants grew up in western Canada (n=32) along with one participant each from the Canadian provinces of Nova Scotia and Ontario and two participants from the United States. All of the four participants who were from other regions of North America were either currently residing in western Canada or had done so at some point in the past. Twenty-four of the participants were women and twelve were men.

To qualify as a monolingual for this experiment, participants could be acquainted with languages other than English, but they could not have any functional command of that other language or use it with any degree of frequency in their current daily lives. For example, some participants had received some exposure to another language as an academic course (often French) during grade school but did not have any recent significant interactions in that language. The vast majority (i.e., 80 %) declared "NO" when asked the question "Do you know any other language besides English?". I specifically chose to use the word 'know' in the question with the idea that the linguistic lay-person would understand 'knowing a language' to mean that they have a fairly comfortable proficiency in that language. If participants simply took a class in a language many years before or were exposed to different languages as children but never spoke them, they would probably feel that they do not 'know' that language. My main concern was to disallow people who use a second language on a regular basis and to do that, one would definitely have to know a language. For the eight participants who responded "YES", they all indicated that they use their second language "rarely"

or “never” and it was typically a language learned within the context of a school class many years previously.

5.2.2. Bilingual Questionnaire and Responses

In this section, I will detail the format of the questionnaire including the rationale for each question, followed by a summary of the results and a discussion of their potential relevance to the results. Since this is not an experiment testing ultimate attainment of a second language, I felt that I did not need to get rigourous measures of proficiency from the bilinguals as long as I could establish a level of relative proficiency in each language which would allow me to ascertain the dominant language. I did not want, however, to select participants who were still well-entrenched in the acquisition phase of bilingualism. Instead, I wanted relatively stable and fluent bilinguals who have achieved a high level of automaticity in their language production. Automatic processing is characterized as being rapid, effortless, unconscious, and ballistic (in that once it starts, it cannot stop) (Segalowitz & Hulstijn, 2005). Therefore, when recruiting participants, I appealed for bilinguals who function comfortably in both languages and who use both languages regularly on a day-to-day basis. The word ‘comfortable’ was intended to target individuals who process in these languages with little conscious effort. Additionally, if they are required to use both languages regularly on a daily basis, I presumed that they would have reached a level of competence that would allow for this rapid and ballistic processing.

Also during the recruitment phase of the experiment, I queried prospective participants about their knowledge of any additional languages. Any bilinguals who indicated they had knowledge of other languages besides French and English were not asked to participate in the main experiment. Instead, I thanked them for their willingness to be involved and asked if their name could be kept on file in case I ran a future experiment which required multilinguals.

Early on during the recruitment of participants, I realized that it would be very difficult to find the right number of the right types of bilinguals to have perfectly matched groups. Since each bilingual has such a unique acquisitional

history and current state of proficiency, the prospect of finding a specific number with similar linguistic traits was relatively remote. In the end I decided to simply recruit 40 bilinguals of French and English of which a similar number had French versus English as their first language. Once the extensive language background questionnaire was completed and analyzed, I then found out what the bilingual participant breakdown was regarding criteria like L1 (which is not always easy to ascertain), age of L2 acquisition, and current language dominance, for example. The following section outlines the format for the bilingual language background questionnaire for those participants who met the recruitment criteria of the experiment.

5.2.2.1. Questionnaire Format

The questionnaire for the bilinguals (provided in its entirety in Appendix D) was much longer and more detailed than the one completed by the monolinguals since bilinguals, as a group, have quite distinct linguistic histories, especially with regard to their second language. Although I am primarily interested in the difference in processing between bilinguals and monolinguals, I also anticipated differences in processing between different types of bilinguals. Some of the bilingual-specific variables include factors such as which language is L1 versus L2, age of L2 acquisition, context of acquisition, context and frequency of current usage, and overall proficiency level in each language. I created the questionnaire with reference to the content guidelines outlined in Grosjean (1998).

Basic demographic information was collected (i.e., age, sex, occupation, education level). Participants were asked to indicate what their first language was, as well as where they were living at the time to get a sense of the regional variety of that language (the L1 question).

The question which followed asked participants to indicate the general contexts in which they used and developed their L1 (the L1 Development question). This question allowed me to assess the intensity and breadth of exposure to their L1 in their youth. I anticipated that all participants would indicate that they developed their first language in the context of "At home (with

friends and family)" as that is generally how we determine that a language is, in fact, the L1. I was more interested to see if exposure to L1 extended beyond the confines of the home. To this effect, several other context categories were given, such as "Day to day interactions with outside community", "At school – as the main language of instruction", and "At school – as a special subject". Along with the categories mentioned above, participants also had the option of choosing "Other" if there was some other context that they felt relevant for their L1 development and which was not explicitly listed. Using these contexts as a guide, I was able to generate a sense of the degree of immersion in L1 for the participants.

The subsequent set of questions focused on the participants' second language.[53] First they indicated what that second language was (L2 question) and the contexts in which they developed it (L2 Development question). The context options were more numerous for L2 development than for L1 development because L2 development could well extend into adulthood, and in some cases did not even start until adulthood, whereas L1 development (at least to the point of a comfortable proficiency, defined below) would have been concentrated in their youth. Whereas the L1 Development question included the environment of "At school – as the main language of instruction", in the L2 Development question, this was further broken down into the options of either "immersion", whereby the outside community spoke a different language, versus "non-immersion", in which the outside community spoke that same language. Other context options added to the L2 development list included "In an intense language program/course", which would cover adults taking a class that was not part of their basic secondary or post-secondary education, "Travel abroad", and "At work". The L2 Development question was included to offer a sense of how the second language was acquired. Depending on whether the language was acquired in a formal, classroom setting or in a more naturalistic setting may influence lexical choices. Based on their responses to this question, participants in this experiment were classified into the

[53] Participants were screened during the recruitment phase to ensure that none of the bilinguals actually knew more than two languages as the additional language(s) may have had an unintended and indeterminate impact on the outcome of the experiment.

following three categories: (1) *Mixed* – if they had both formal schooling as well as interactions with friends and family or the outside community in that language; (2) *School* – if interactions in the language during acquisition were confined mostly to the classroom; and (3) *Non-School* – if no formal schooling was experienced in the L2.

The following set of questions was created to try to establish the age of L2 acquisition (Age of Acquisition question). Following the practice of categorizing bilinguals as either 'early' or 'late' (as discussed in section 2.2.6.1), I wanted to have full confidence that I classified participants accurately. To do so, I asked the participants three different questions regarding their age in relation to their L2 development. For the first question, participants were asked to state the approximate age at which they "first started having consistent and sustained exposure to the language". Even if they were not actively using the language themselves at that time, the grammar and lexicon of that language may have started to develop in their minds if outside exposure was both consistent and sustained. The second question asked participants to state the approximate age at which they "started using that language to function within a particular environment". At this age, participants would have been engaging more actively in the language, so development would definitely have started. The last question asked participants to decide on an age at which they first felt they "had acquired a comfortable proficiency in this language". Comfortable proficiency was defined for the participants as a state in which they could "function in that language without a lot of conscious effort even though they may not have native-speaker-like ability". This definition was designed to target a point in the bilinguals' language development at which processing had reached a fairly automatic stage (i.e., not requiring much conscious effort) even if they still had deficiencies in some domains of the L2.

The following set of questions dealt with issues of L1 and L2 usage. The first question was related to the bilingual's frequency of usage of both L1 and L2 over the years since they first acquired a comfortable proficiency in each language. I shall call this the General Usage question. The top rating was

"constant/regular use over the years". Many bilinguals checked this category for their L1. Continuing down the frequency scale were the options of, "fairly regular and sustained usage with some short breaks", "periods of regular and sustained usage but with some long breaks", "fairly irregular/inconsistent usage over the years", and "haven't really used it for a long time". In my recruitment of participants, I specifically sought bilinguals who were currently using both of their languages, therefore I did not anticipate any participants to fall into the latter category, which turned out to be the case.

The second frequency of usage question asked the participants to focus on the past few months exclusively and to think about their language interactions on a day-to-day basis. I shall call this the Recent Usage question. For this question, the highest rating was "it is the language of the majority of my interactions every day", followed by "use it quite a bit most days along with my other language". The lower two categories were "use it occasionally but usually interact in my other language" and "don't really use it these days". Again, due to the type of bilinguals I recruited, I did not anticipate anyone falling into the last category which again proved to be true.

The third usage question related to the contexts of their current usage of both languages. I shall call this the Recent Contexts question. The categories for this question were very much like the categories listed earlier in the L2 Development question but without making a distinction between the type of schooling (e.g., immersion vs. non-immersion vs. special subject vs. intense program) and instead making a distinction between using it "At school but as a student" versus "as a teacher". Many of my bilingual participants were teachers who used both languages during their workday at school. I also eliminated the "Travel Abroad" category but kept the "Other" category such that they could always indicate that they recently used it while traveling.

On the topic of language dominance, one of the subsequent questions asked participants to explicitly choose one language as their "strongest language". I shall give this question the title of Speaker-Assessed Dominance.

Many bilinguals function in environments in which they interact with other bilinguals who share the same two languages. In these situations, code-switching often results. Code-switching, defined in section 1.2, involves a mixing of the two languages in distinct and rule-governed ways (see Myers-Scotton, 2005 for a summary). Additionally, in this type of bilingual environment, speakers must keep both languages in a fairly high state of activation as a result of not knowing in which language they will be addressed. Thus, speakers who commonly code-switch may have developed different ways of processing in their two languages as opposed to bilinguals who typically only use their two languages in very discrete environments. To address this distinction, one question asked bilinguals to state how frequently they find themselves in a bilingual environment (which I defined as a situation in which they interact with other French/English bilinguals who use both languages intermittently). This measure will give me a sense of what type of experience they have in dual-code interactions. Categories were listed as "Almost all of the time – at both work/school and in my personal life"; "Much of the time – large portions of my day at work/school or in my personal life"; "occasionally – on certain occasions at work/school or in my personal life"; "rarely – on very rare occasions"; and "never". I called this question the Bilingual Environment question.

Language is rarely in a steady-state of existence in a speaker's mind, even one's first language. At times, especially in the early years of life, speakers augment their lexicons and refine their grammatical processing. At other times, often in their senior years, speakers may find themselves lost for words or taking more time to find them than they did when they were younger (see, for example, Gollan, Montoya, Cera, & Sandoval (2008) and Gollan & Brown (2006) who report lexical retrieval delays and increased frequency of tip-of-the-tongue states related to aging). Even in the interim years we may experience fluxes in proficiency due to a void in or an overabundance of exposure to language. Such flux may be even more prominent in one of a bilingual's languages if it is not

used as regularly or intensely as the other. To address this potential variability,[54] I included a question (the Proficiency Change question) which asked participants to think about whether their proficiency in either language was currently changing. They could choose from, "improving rapidly", "improving slightly", "same as normal", "declining slightly", and "declining rapidly". For example, if participants responded that they are improving or declining rapidly, that could give an indication of current exposure levels and it should more or less correlate to the response on the Recent Usage question.

The final set of seven questions on the questionnaire comprised a self-rating task. I chose not to have an independent evaluation of the bilinguals English and French proficiency for a number of reasons: (1) the absolute measure of proficiency was not an independent variable in the main experiment, (2) conducting independent ratings or testing on both the English and French all 40 bilinguals would have provided logistical challenges, and (3) past research (Fishman & Cooper, 1969) has shown that self-evaluations of language proficiency are highly correlated with proficiency testing. For these reasons, I felt that proficiency self-ratings would provide suitable evaluations for data analysis of the main experiment.

On the self-rating task, participants were asked to think of their language skills in different domains and modalities and to rate their proficiency of the two languages, relative to each other, on the same scale. Each scale was made up of 10 boxes and participants slotted an "E" in the box that they felt best characterized their level in English and an "F" in the box that best corresponded to their level in French. Five descriptive markers were given along the scale to guide the bilingual in their choices. (Please see the questions in Appendix D for individual descriptors.) The first question asked participants to give themselves a General Overall Rating. I wanted participants to offer an initial general assessment before breaking down the language into different components for

[54] In his exhaustive survey of factors which bilingual experiments should control for, Grosjean (1998) indicates that one area typically neglected by researchers is the current state of stability of the two languages. Butler and Hakuta (2004) emphasize that "it is important to note that one's bilingual profile may change over time: bilingualism is not static but dynamic…[It] is constantly changing" (p. 120).

them. The second question (Extent of Vocabulary), specifically addressed how extensive the bilinguals felt their vocabulary was in each language. Question three, Sentence Structure and Verb Tenses, asked speakers to think about their fluency with regards to the grammar of sentence structure and verb tenses, a domain that typically causes a lot of difficulty for language learners. The final four questions addressed the four main domains of language, Listening Comprehension, Speaking Fluency, Reading, and Writing.

For each of the seven questions, the presentation was designed to keep the guiding descriptors as consistent as possible. For example, every scale had, at the highest point along the scale, the descriptor "At least as good as an average native speaker". I specifically used the wording "at least" (as good as) and "average" (native speaker) to encourage participants to always rate their dominant language at the top of the scale and then rate their non-dominant language relative to that. At the low end of the scale, I consistently used the words "very poor". For the points in between, I used titles like "fairly high level", "decent level", and "fairly low level". Each of the main descriptors was followed by additional commentary which helped to operationalize the level. For example, in the Listening Comprehension question, the commentary which accompanied the At least as good as an average native speaker descriptor was "always understand native speakers". For the Fairly high level category, the further description said "can function comfortably without many problems or delays in understanding". (See Appendix D for specific descriptions of each labeled point on each scale).

5.2.2.2. Questionnaire Results

Table 5.1 provides a summary of the different questions which appeared on the questionnaire, the corresponding assessment that I hoped to achieve with that question, and the number of participants who fit each category. A more detailed listing of the results of the questionnaire is located in Appendix E.

Table 5.1

General Results of the Bilingual Language Background Questionnaire.

	Question	Type of Assessment	Results
1	Basic demographic information		
2	L1 (and region)	What is L1	English = 18 French = 22
3	L1 Development	Level of L1 immersion (intensity/breadth of exposure)	High Immersion = 40
4	L2	What is L2	Inverse of L1 Question
5	L2 Development	Acquisitional Contexts for L2	Non-School = 2 School only = 6 Mixed = 32
		French Immersion only, in initial acquisition phase	8
6	Age of Acquisition	Early vs. Late Bilingual	Early = 24 (10 E/F, 14 F/E) Late = 13 (5 E/F, 8 F/E) In Between = 3 (all E/F)
		Years of Comfortable Proficiency in L2	Mean = 23.3 Mode = 14 Median = 22 Range = 1 to 62
7 8 9	General Usage (L1 & L2) Recent Usage (L1 & L2) Recent Contexts (L1 & L2)	Use/Context Dominance – with focus on last few months	English Dom = 24 French Dom = 6 Balanced = 10
10	Speaker-Assessed Dominance	General Language Dominance – as determined by speaker	English = 25 French = 12 Balanced = 3
11	Bilingual Environment	Experience with Dual Code Interactions	High = 10 Mid = 7 Low = 17 Minimal = 6
12	Current Proficiency Change	Stability of Current State	minimal differences
13	Self-rating Task – Proficiency Ratings General Overall Rating Extent of Vocabulary Sentence Structure and Verb Tenses Listening Comprehension Speaking Fluency Reading Writing	Overall Proficiency Ratings in the various domains of language processing	Balanced = 9 Eng Dom Mod = 20 Fr Dom Mod = 8 Eng Dom High = 3 Fr Dom High = 0
		English Speaking Fluency	High Fluency = 31 Mid Fluency = 9
Overall Language Dominance			**Balanced = 3** **Eng Dom = 25** **Fr Dom = 12**

Besides documenting which language was each bilingual's first language, the main participant category that I was able to establish based on the results of this questionnaire was the bilingual's dominant language. The totals from the proficiency rating question in conjunction with speakers' self-assessments as to which language was their stronger language and indications of current usage rates, I was able to classify most of the participants as being either French dominant or English dominant. A small number showed no discernable difference in the proficiency of their two languages and could not decide which language was stronger. These few were classified as balanced bilinguals. Again, please see Appendix E for a detailed account of the responses given by the participants in the different categories and, importantly, how they were used to calculate the measure of language dominance.

5.3. Materials

The materials for this experiment were a set of video clips which functioned as the stimuli used to generate language production data from the participants. In order to generate the types of linguistic structures suitable for answering the question of the influence of French on the production of English, it was necessary to develop a specialized set of soundless video clips instead of utilizing pre-existing media.

5.3.1. Key Linguistic Items

After establishing the set of 60 verb synonym pairs, or key linguistic items, outlined in section 4.1.2, I grouped them thematically in order to develop a series of real-world scenarios depicting these events. I ended up with six distinct scenarios, of various complexity, which I anticipated would generate the key linguistic items. Each scenario involved a mix of the XX Control items and XY Target items. I also created three additional scenarios which contained actions different from those represented by the key linguistic items and which were to act as the French-description scenes for presentation to the bilingual participants only.

After developing detailed scripts for each scene and deciding how each key linguistic item would be depicted as an individual event in the scene, I realized that there were three events (*seize/grab hold of*, *release/let go of*, and *fire/shoot*) which, for reasons of logistics and plot coherence, I could not feasibly incorporate into the existing clips based on the thematic content of each clip.

5.3.2. Video Scenes

After developing the content of each scene, I recruited actors and located the relevant settings, props, and costume items to properly convey the intended events in the most naturalistic fashion. I videotaped the scenarios using a digital camcorder and edited the clips in the laboratory, removing the audio component to render the videos silent. All taping was done in Edmonton, Alberta, Canada in houses and neighbourhoods representing middle-class society. The six target video scenes, for description in English, and the three French filler scenes are named in the Table 5.2 with a brief description of each. The length of each scene is indicated beneath the name.

5.4. Procedure

All of the participants were individually tested in Edmonton, Alberta, Canada, either in the Centre for Comparative Linguistics lab at the University of Alberta or in some other quiet location near or in the participants' home or workplace. For the convenience of my participants, I gave them the option of having the experiment come to them, which did result in a variety of locational settings, as indicated above. However, to minimize register differences that may surface as a result of some participants being tested in a perhaps more formal laboratory setting versus a perhaps less formal home setting, I made a conscious effort to interact with each participant in a friendly, informal, unintimidating manner, regardless of the setting.

Table 5.2

Description of the target and filler video scenes presented to participants.

Target Scenes for Description in English		
1	Classroom (3:01)	A college class takes place starting with the instructor writing on the board in an empty classroom. Soon students arrive and hand in assignments before taking their seats. General classroom activities take place such as lecturing, asking questions, the late arrival of a student, handing back exams, etc., before the students leave at the end of the class.
2	Teacher (1:54)	At the end of a hard day, a teacher is alone in his classroom marking assignments. After remembering it is his mother's birthday, he gives her a call. While on the phone he spills some water on his shirt and accidentally knocks papers off his desk. After the call, he collects the papers, takes off his tie, and gets back to work.
3	Note (3:31)	A young woman gets out of bed in the morning and spends some time in her room. She opens the curtains and brushes her hair. She spends some time looking at a nutcracker doll and starts to cry. She lights a candle, reads a note, and then writes a note of her own. But she does not send her response because she tears it up before angrily leaving the room.
4	Car (5:01)	A young man drives home to find some things in his driveway waiting for him to do. Someone had been working on a van and left it blocking the entrance to the garage. The young man wants to move the van but realizes he must inflate a tire on the van first. He tries to do that with no luck and then accidentally drops the keys under the van. He takes a water break but ends up cleaning the top of another car with the water he spills. He then finds a beach ball and starts to blow it up but it explodes in his face.
5	Sports (3:57)	Two teenage sisters take some sports equipment out onto the lawn at their place and invent a couple of games to play. The first game involves trying to get a ball to rebound off a tree and then land in a target circle on the grass. The second game involves bouncing a tennis ball on the ground and then trying to hit it on the bounce. Their afternoon ends when one of the balls hits the front window of the house and their dad comes out yelling but the girls just laugh at him.
6	Errands (5:46)	A young man writes out a list of errands to do for the day (with the text obscured to the viewer). He then gets started by going to a neighbour's house to borrow a shovel so he can finish digging the trench in his back yard. Unfortunately he breaks the shovel so he must fix it before he returns it to his neighbour. Then he mails a letter and checks his own mail. He then heads out to the grocery store and the bank before returning home to check the last items off his list.
Filler Scenes for Description in French		
1	La Routine de Matin (3:13)	A young man goes through his morning routine including washing his face, brushing his teeth, and giving breakfast to the dog. He and the dog get ready and go out for a jog.
2	Dans le Jardin (3:41)	A woman does some gardening at the end of the season. She digs up some bulbs and cuts down some dead flower bushes. She then rakes some leaves before putting away her gear.
3	Le Dîner (4:23)	A woman makes a salad for her lunch. She rips up some lettuce, cuts up some tomatoes, and grates some carrots. She adds some sprouts and dressing before sitting down to eat.

I began by introducing myself and explaining that the experiment was designed to investigate how language is processed in speakers' minds. I did not tell them which aspect of language processing I was interested in (i.e., their lexical choices during oral descriptions, in particular their choice of verbs) as I did not want them to become self-conscious of the words that they were using. Although the bilingual participants were aware that they were recruited for this experiment because of their bilingualism in French and English, I made efforts to minimize their conscious recognition of that fact for the first portion of the experiment. I specifically made no mention of French or of bilingualism in our initial interchange. As a native English speaker, I simply welcomed participants and explained that the experiment involved basic oral descriptions of scenes. The welcome letter/consent form which they were presented also avoided direct mention of specific languages and of bilingualism. These measures were put in place in order to induce a monolingual mode of linguistic processing as much as was possible. After signing the consent form, participants were directed to sit in front of a computer screen, I explained the procedure of the experiment orally (as outlined below) and that I would be recording their descriptions using a hand-held digital audio recorder.

The procedure of the experiment, which I had explained to the participants, was quite straightforward in nature. Participants were seated in front of a computer screen and asked to view the silent scenes presented and to describe the action out loud as it proceeded as if they were sharing it with a friend who could not see the screen. Before each scene, they were presented with a prompt sheet (see Appendix F) on which the main characters and the main objects in the scene were labeled. I did not want participants, native-speaker or not, fumbling to retrieve names of people or other nouns when my primary goal was to see what verb choices they were going to make. I went over each prompt sheet with each participant, being very careful to use as little biasing language as possible (avoiding specific dynamic verbs, instead using constructions like "there is a…", or "a student has a…", or "the main character interacts with these items", etc.). The prompt sheet remained in front of the participant throughout the scene for

reference if required. Before each scene, I also gave them a brief verbal introduction in order to set up the basic theme. I was careful not to use any of the verbs I had targeted for production. (E.g., "In this scene we have Frank arriving home at the end of the day to find some work waiting for him"). The participants' descriptions were recorded with a digital audio recorder. So as to avoid any kind of sequence effect, the order of presentation of the six clips was deliberately randomized for the participants.

The presentation of tasks was slightly different for the two main participant groups (bilingual versus monolingual). For both groups, the first task was to read and fill in the consent form. Monolinguals were then asked to fill in a short questionnaire which gathered basic demographic information and asked if they knew any other languages in order to verify their previously-claimed status of being a monolingual (as outlined above in section 5.2 of this chapter.)

Monolinguals were then told that they were going to view six video scenes, depicting everyday activities, and that their task was to describe the action of the scenes as if to a friend who could not see the screen. They were also told to focus more on the actions of the participants than on the physical description of the scene. As mentioned above, they were given the prompt sheet and a verbal introduction to each scene before it started.

At the conclusion of the experiment, I told the participants which aspect of their speech production I was targeting and explained how I was going to compare their verb choices to the choices made by bilinguals of French and English who may be influenced by their knowledge of French into making different kinds of choices from monolinguals when speaking English. I also gave them a debriefing sheet with a general description of the rationale of the experiment and my contact information.

The sequence of tasks was different for the bilingual participants. Because I wanted to see if language mode, as a variable, would have an impact on responses, I did not want the bilingual participants to be thinking about their bilingualism, at least initially, since the first part of the experiment was the monolingual mode component. In order to enhance this mode, I spoke to the

participants in English from the point that they arrived and explained that the first task was to describe some very basic scenes in English. I deliberately avoided overt mention of French or of bilingualism as I wanted to avoid triggering them to access their French lexicon or to even think much about their other language.[55] Later in the experiment, the participants were instructed to start thinking about their two languages for the purposes of filling in the Language Background Questionnaire. At this point, participants may have begun to shift out of the strictly monolingual mode of processing. In the final phase of tasks, participants described scenes in both French and English and I spoke to them in both languages as well, thus establishing them near the bilingual end of the continuum according to criteria outlined by Grosjean (1998, 2001).

Once the initial task of reading and signing the consent form was completed, participants were given a brief overview of the experiment and its three distinct parts. They were told that the first part involved watching some video clips and describing the action as it occurred. Part two consisted of participants filling out a questionnaire before concluding with more scene descriptions in part three. The first part of the bilingual experiment was very much the same as the monolingual experiment. Participants were introduced to the topic of the clip, given a prompt sheet in English, and told to describe the action as if to a friend who could not see what was happening. They were shown three of the six target scenes, which they described in English. At the conclusion of part one, I told the participants that we were going to take a break and go through a language background questionnaire together, the results of which were outlined at the beginning of this chapter. Before each section of the questionnaire, I gave a brief overview or an example of how to answer to prevent any misunderstandings. Participants wrote down the answers themselves but I

[55] Grosjean (1998) suggests that to be in a truly monolingual mode, the bilingual participant must not even know that the experiment has anything to do with bilingualism or that the person running the experiment knows both of the participants' languages. For this experiment, participants knew that they were recruited as bilinguals of French and English but references to that fact were thereafter kept to a minimum. I was the person who ran all of the bilingual participants through the experiment and I did not indicate to them prior to the experiment that I am also (somewhat) bilingual. Thus, although I was not able to apply Grosjean's strict monolingual mode conditions, I did what I could to avoid moving participants along the continuum toward the bilingual end of the mode continuum.

monitored throughout. Because participants were forced to think explicitly about and answer questions about both of their languages, they would have begun to move into a bilingual mode of processing, according to Grosjean (1998, 2001).

The third and last section of the experiment verified the participants' status as being within a bilingual mode as it required them to alternate their scene descriptions between French and English, thus activating both languages repeatedly. In this section, participants viewed six scenes starting with one which was to be described in French. The second scene was one of the three remaining English-description scenes. The remainder of the scenes (two French filler scenes and two English target scenes) were presented alternately, one French followed by one English, etc., until completion. The prompt sheets had French labels for the video clips to be described in French and English labels for the video scenes to be described in English. When presenting the prompt sheets, I spoke to the bilingual participants in French for the French-description videos and in English for the English-description videos. As was the case for monolinguals, the presentation of the different video clips was ordered such that different participants typically viewed and described scenes in a different sequence. In order to elicit approximately the same number of descriptions for each scene within the monolingual versus bilingual mode, I separated the six target scenes into two groups with the Teacher, Errands, and Sports scenes being in one group and the Classroom, Note, and Car scenes being in the other. The first group of clips was presented to approximately half of the participants in the monolingual mode part of the experiment and presented to the other half of the participants during the bilingual mode component of the experiment, and vice versa for the second group of clips. By making two groups I was better able to ensure the clip-by-mode presentation was balanced. The order in which the clips were presented within this general structure was planned to avoid as much as possible repetition between different participants.

Once all six scenes had been described, I then told the participants which aspect of their speech I was going to analyze more closely once the data had been processed, as I did for the monolingual participants. I explained that I was

particularly interested in seeing what choices they made between the multi-word and single-word synonym pairs since French does not have multi-word verbs. Therefore, if their production in English was being influenced by French, in that the same pattern of encoding was being used for both languages, then bilingual participants would be using less multi-word verb structures than monolingual participants who do not have the same subconscious constraint. Typically, bilinguals would then tell me their impressions of their own responses or an anecdote about some other crosslinguistic influence which they had noticed at some point in the past. Before leaving, participants were given the debriefing sheet which included my contact information.

5.5. Data Preparation and Coding

Once all of the raw data had been gathered, I then took the audio recordings of all of the participants' scene descriptions and transcribed them in order to isolate all the verbs. To listen to the audio recordings, I used a program called ExpressScribe which enabled me to control the playback while I was transcribing into a separate program. I typed the descriptions into Excel using a system of entering the infinitive form of the verb into the first column and then entering the complement and following adverbial information into the next column. By not including the subject information, I was able to speed up the process and isolate each verb as the first data point on each line.

Besides omitting the subject information (unless it occurred post-verbally in an inverted structure), I also deliberately chose not to transcribe auxiliary verb structures such as true auxiliaries (e.g., *to be, to have, to do*), modals (e.g., *could, must, will*, etc.), and catenative structures (e.g., *be going to, be about to*, etc.), as well as aspectual marking expressions (e.g., *start to, continue to, proceed to*, etc.). Since the purpose of the experiment is to assess the lexicalization of events in terms of their dynamic actions, this additional verbal information was deemed irrelevant and as such was not recorded. Another area where I deliberately omitted verbs in the transcription was when they referred to the speaker's experience in describing the scene, such as *We see a room* or *It looks like she is*

tired. In the latter case, for example, I would omit the *looks like* portion and simply transcribe *be* as the verb (in the first column) and *tired* as the complement (in the second). However, if the speaker said *She looks tired*, where the subject refers specifically to a person in the scene, I would include the verb *look* in the transcription in addition to the complement *tired*.

Once I had completed a transcription for a specific scene I numbered all of the verbs sequentially so that I could reconstruct the order of mention, if required. I then went through each response line and coded each verb for (a) if it was part of one of the Key Events[56] and which Key Event it was part of, and (b) the verb type, as per Table 5.3.

A distinction was made between the first four categories, Active (A), Copula (C), Possessive (Poss) and Psychological (Ps) to allow for an analysis of differential usages of those verb types although no predictions were pre-established which would have influenced the design of the experiment. In order to see if the participant groups encoded MOTION, PATH, and MANNER differently, certain motion verbs were not treated strictly as Active (A) verbs. Motion (M) verbs were coded distinctly if they adhered to the following criteria: (a) the subject was an animate being (e.g., not a ball or a letter for which MANNER is not such a relevant feature), (b) the subject/AGENT is performing and undergoing the motion (thus the verbs are logically intransitive[57]), and (c) the motion involves a certain degree of displacement (thus excluding situations where the AGENT is simply moving in the same place or does not move very much, in which cases MANNER characteristics are not very salient). The category M refers to bare motion roots such as *move*, or *come* and *go*, which are also encoded deictically with reference to the speaker. MM are verbs in which the MANNER is conflated with the basic fact of motion. Therefore, verbs like *walk*, *run*, and *jump* fall into this category. MP verbs have the PATH conflated with motion, which leaves no room for any MANNER specification. Words such as *enter, exit, leave, cross,*

[56] Each 'Key Event' corresponded to one of the Key Linguistic Item pairs.
[57] By 'logically intransitive' I mean that despite the presence of a syntactic direct object, the NP is not functioning as a PATIENT or THEME entity which is being affect by the verb. For these motion verbs which also have PATH encoded in the verb root (e.g., *enter, leave, cross*, etc.), the direct object is functioning as a GROUND entity, as a spatial reference point for the action.

circle, drop, rise are MP verbs. The MId category refers to more idiomatic or metaphoric expressions of motion such as *make one's way*, which is typically followed by a PP of PATH, and *head*, which seems almost entirely interchangeable with *go* in that it can surface before a PP of PATH (e.g., *head to the store*) or before a particle (e.g., *head out/in/over*, etc.).

The logic behind separating all these different motion verbs was because French and English are different in the ways that they encode PATH and MANNER information (as outlined in section 3.4). French encodes PATH in the verb root which leaves little room in the root for a specification of MANNER information. French speakers might therefore attend to MANNER information less than speakers of languages in which PATH information is typically encoded in a satellite constituent like a PP which leaves room in the verb root for an indication of MANNER. Since English allows both patterns for encoding PATH information, bilinguals might follow the French pattern more often (as a result of CLI). Even if they do not follow the French pattern and encode PATH information in a PP, they may choose the bare motion MOTION root instead of a MANNER/MOTION root more often than monolingual English speakers who do not have the PATH-blocking-MANNER constraint to abide by.

Table 5.3

Verb-type Categories Used to Code Verbs.

Code	Verb Type	Example
A	Active	***phone*** *his mom*
C	Copula	***be*** *happy*
Poss	Possessive	***have*** *some time*
Ps	Psychological	***realize*** *it is too late*
M	Bare Motion (Intransitive only)	***go/come/move*** *into the house*
MM	Motion & Manner (Intrans only)	***run/walk/jump*** *towards the house*
MP	Motion & Path (Intrans only)	***enter/leave/exit/cross/rise/drop***
MId	Motion – Idiomatic (Intrans only)	***head/make one's way*** *to the house*
VPC-T	VPC – Transitive	***put out*** *the candle/****put*** *the candle* ***out***
VPC-I	VPC - Intransitive	***sit down***
VPC-M	VPC - Bare motion (Intran)	***go/come/move*** *away/in/up/out, etc.*
VPC-MM	VPC – Motion/Man (Intran)	***walk/run/jump*** *away/in/up/out, etc.*
VPC-MId	VPC - Idiomatic Motion root	***head*** *away/in/up/out, etc.*
A-NonR	Active V with non-required Particle	***open up*** *the letter,* ***gather*** *it* ***up****, etc.*
Prt NP	Particle before Direct Object	***put out*** *the candle*
NP Prt	Direct Object before the Particle	***put*** *the candle* ***out***

Verb-particle constructions were coded differentially as well. VPC-T refers to transitive VPCs in which the particle encodes some kind of result with regard to the direct object (e.g., a resulting location, *put your hand* ***up*** or state, *blow the balloon* ***up***). For native English speakers, the order with which the direct object (DO) and the particle surface is variable and influenced by a collection of factors such as length of the DO, the informational status of the DO (e.g., is it given or new information) and whether the DO is in pronominal form. Since bilinguals may not be as sensitive to such factors as monolinguals, they may exhibit different behaviour with regard to the positioning of the particle in relation to the DO. Additionally, even though French does not have particles, per se, it does have adverbs, which have a function which is similar to particles in that they modify the interpretation of the verb. As discussed in section 3.4, the typical placement of adverbs is quite different in French (i.e., between the verb and direct object) compared to English (i.e., either preverbally or after the direct object). In keeping with the French adverb positioning, bilinguals may prefer the inter-argument position (i.e., between the verb and DO) for particles as well. Therefore, for transitive VPCs, I also tracked the order of mention of the particle and the DO (i.e., Prt NP versus NP Prt).

Intransitive VPCs are slightly different in that there is no direct object for which the particle indicates the resulting state. Instead, the collective effect of the verb and particle is on the subject. For example, in the expression *she came in* the particle indicates the resulting state of the subject: now she is *in* and she got to that location by *coming*. Since no DO exists, there is no choice to be made with regard to whether the particle surfaces before or after it. In that way, intransitive VPCs may be treated more as a single unit since they occur in adjacent position more often (with the only constituents potentially intervening being specifying particles such as *back* (see section 3.3.1) or adverbs such as *right*). Any intransitive VPCs which referred to strict motion events were also coded with regard to whether MANNER was indicated in the verb root. The VPC-M category represented VPCs with strictly motion roots (e.g., *go out, come in, move away*)

whereas VPC-MM verbs had both MOTION and MANNER conflated in the verb root (e.g., *walk out, file in, run away*). VPC-MId is restricted to the verb root *head* (e.g., *head out*). Intransitive VPCs not referring to strict motion events were coded VPC-I and included structures like *blow up, breathe in, wake up,* and *spill over*.

There was one additional situation involving VPCs which was coded differently. The A-NonR (A for 'active verb' and NonR for 'non-required') category represents structures with a non-required particle. In these situations, the verb phrase would be totally grammatical either with or without the particle which has the role of contributing a bit of aspectual information, most often giving the event a sense of completion in a new resultant state (see section 3.3). Examples of A-NonR structures are *open (up) the letter, loosen (up) his tie, count (up) his money,* etc.

Once all of the participants' oral descriptions had been transcribed and coded, tabulations of verb types for the different participant groups was quite straightforward utilizing the pivot tables feature built into Excel which allows the user to specify search and numerical criteria which the program then uses to generate tables of information almost instantly. For example, the database for this experiment was almost 30,000 rows long but I could request the program to calculate how many times a given participant (e.g., participant PTB003) or a given group of participants (e.g., all English-dominant bilinguals) uttered the verb *be,* for instance. The results of the main production experiment are detailed in the following chapter.

6. Results of the Main Production Experiment

6.1. Groups for Comparison

The primary comparison I will make in the analysis of the results of the main experiment is between the two main groups: monolingual English speakers versus bilingual speakers of both English and French. In section1.2, I introduced this study by discussing some of the potential differences in the lexical choices made by bilingual versus monolingual speakers. In particular, I spoke about bilingualism as having a *limiting effect*, *expanding effect*, or *modifying effect* on the lexical output of speakers. The type and degree of those different effects is largely dependent on a bilingual's proficiency in the language being spoken. For example, a bilingual processing in his or her non-dominant language may show, in comparison to a monolingual speaker, a more limited range of lexical items in addition to differences in the rates of usage of the lexical items due to the modifying effects of both crosslinguistic influence and the use of simplification strategies. By contrast, a bilingual processing in her or his dominant language may show, in comparison to a monolingual, a more expanded range of lexical items and differences in the rates of usage of the lexical items chosen due to the modifying effect of crosslinguistic influence only. Since language dominance has been hypothesized to be a critical variable in lexical choices of bilinguals, most of the data have been analyzed based on between-group comparisons in which language dominance is a determining factor.

As reported in section 6.1 and Appendix E, 25 of the 40 bilingual participants were classified as English dominant and 12 were classified as French dominant. The 3 remaining bilingual participants demonstrated such a balance in their on-going exposure to and proficiency in both languages that they were classified as balanced bilinguals. Three participants is far too few to be seen as reflective of balanced bilinguals in general, thus I omitted those three participants from any statistical analysis based on language dominance.

Of the 25 English-dominant bilinguals, seven actually have French as their first language. All of these switched-dominance bilinguals were exposed to English early in life and subsequently grew up in largely Anglophone communities in which many of them attended Anglophone schools. As one of my primary goals in this study was to establish whether the acquisition of a second language has a measurable effect on how a speaker processes in his or her first language, I also occasionally analyzed the data based on the first language of the participants which enabled me to make a comparison between native speakers of English who do not know another language (i.e., monolinguals) and native speakers of English who do know another language (i.e., E/F bilinguals). In particular, I was looking for instances in which the E/F bilinguals showed either an expanded lexical range or differences in usage rates which could be accounted for by crosslinguistic influence. Categorizing bilinguals based on L1 also allowed for inclusion of the three balanced bilinguals. In addition, it provided the opportunity to further subcategorize the participants based on their age of acquisition of the L2 in cases in which such an analysis might have offered further insight into lexical processing in the mind of bilingual speakers.

Figure 6.1 shows a breakdown of the participants based on L1 (light grey circles with dashes for the boundary) and language dominance (dark grey circles with a solid boundary). Numbers of participants within each category are listed in brackets following each label.

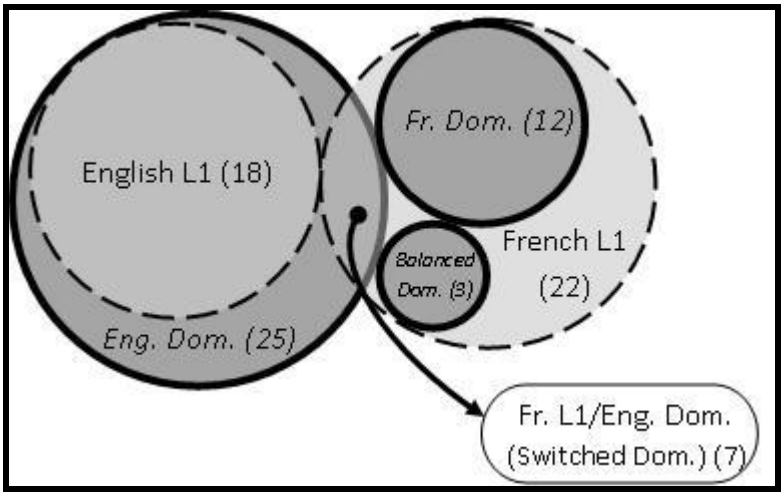

Figure 6.1. A breakdown of participants based on language dominance and L1.

Once the main comparison of monolinguals (n=35) to bilinguals as a group (n=40) had been executed, the analysis was, at times, extended to compare monolinguals to the different sub-groups of bilinguals based on language dominance (English dominant, n=25; French dominant n=12). Since seven members of the English-dominant group actually have French as their first language, in cases where the English-dominant group showed significantly different behaviour from monolinguals, I also ran statistical comparisons in which bilinguals were categorized based on L1 (English L1, n=18; French L1, n=22). This further analysis (comparing monolingual native speakers of English to bilingual native speakers of English) allowed me to see if native speakers of English behaved significantly differently depending on whether or not they subsequently acquired French.

6.2. Initial Observations

With regard to tallying the data, the first point to make is that a large number of verbs were generated outside of the key linguistic units which were being targeted. Additionally, participants were fairly inconsistent in terms of whether or not they produced one of the targeted lexical items in their description of the relevant event. Both eventualities are to be expected in a very unconstrained production experiment of this nature.

A related outcome was that participants showed a great deal of variation one from another. The largest difference I found was in the level of detail that participants provided, from very general descriptions of overall activities to highly detailed running commentaries of the action. It is useful to think about situations as being broken down into macro-events and, unless the situation is punctual (i.e., taking no measurable amount of time), each macro-event can be further broken down into micro-events and some of those micro-events may be composed of sub-micro-events. So, for example, the situation of MAILING A LETTER can be subdivided into the macro-events of putting a letter in the envelope, sealing it, putting a stamp on it, taking it to the mailbox, and inserting it into the mailbox. Notice that some of those macro-events have distinct micro-events and so on and

so forth. Sealing an envelope, for instance, involves licking the envelope and pressing the flap down. Licking the envelope involves opening the mouth, sticking out the tongue, bringing the envelope to the tongue and then running the tongue along the glued area. Figure 6.2 below demonstrates just how conceptually involved even such a simple event as mailing a letter is.

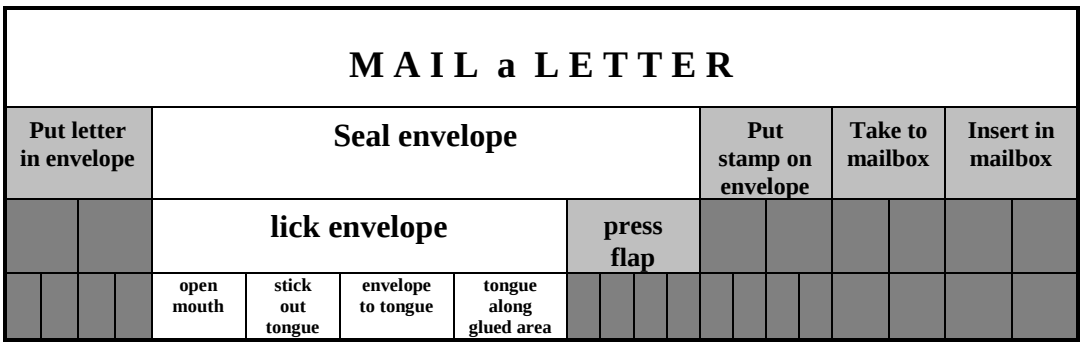

Figure 6.2. The situation of MAILING A LETTER broken down into macro-events, micro-events, and sub-micro-events.

The level of specificity of participants' descriptions varied a great deal. Some described down to the micro-event level by articulating statements about, for example, licking the envelope. Other participants preferred to watch in silence for short stretches and then to mention the more general situational level by saying things about going to mail a letter, for instance.

When looking at the complete data set, some of the key linguistic items were mentioned very infrequently or not at all. For example, out of 75 participants, the target event of *illuminating/lighting up* was only mentioned three times and the fact that the result of putting water on the cloth was to *dampen/get (the cloth) wet* was only referred to five times. In both of these instances, the target event was enabling a subsequent and, obviously, more important event such as locating an object in the dark or washing a car – events which were explicitly mentioned by most of the participants.

At the other extreme, some of the target expressions were mentioned numerous times by the same participant since the actions appeared in more than one scene and were sometimes repeated within the same scene. For example,

people were *grabbing/picking up* items and *exiting/leaving/going out of* things in all of the six target scenes. As evident in the following section, a great deal of variability emerged in terms of how frequently the different target expressions were mentioned.

On the positive side of conducting a very unconstrained language production task is the fact that some of the unanticipated data were actually very relevant to the hypothesis being tested by this experiment. As a result, some additional target synonym pairs were added to the analysis such as *buy/pick up* (with regard to milk at the store in the Errands Scene), *insert/put in* (with regard to the bank card at the ATM again in the Errands Scene), *attach/hook up* (with regard to the nozzle of the pump onto the tire in the Car Scene), and *retrieve/get back* (with regard to the keys which were dropped under the van in the Car Scene), and so on. Even though these synonym pairings were not part of the preliminary testing (e.g., measuring formality, specificity, degree of similarity, and commonality of translation), I included them in the analysis.

The remaining sections of this chapter report on the specific verb counts generated by the production experiment, beginning with a general picture of participant behaviour before breaking both the participant pools and linguistic items into more specific categories.

6.3. General Counts

The main experiment generated 28,850 verbs uttered by the participants over the course of the six scenes, 15,572 by the 40 bilinguals and 13,278 by the 35 monolinguals. The average number used by the two main participant groups was very similar, as shown in Table 6.1, with the bilinguals using more verbs than the monolinguals, although not significantly so ($F(1,73) = 0.19$, $p = 0.66$).

Table 6.1

Total Verb Count and the Average across the Two Main Participant Groups.

Group	Total Verb Count	Average[58]
Bilinguals (n=40)	15572	389
Monolinguals (n=35)	13278	379
Total (n=75)	28850	385

Since the six scenes were quite different in duration and complexity, they generated different lengths of descriptions and, subsequently, different quantities of verbs. Also, there was one monolingual participant who never fully grasped the nature of the task and who, despite subtle prompting, did not really describe the action as it proceeded. The number of verbs generated by that participant was remarkably lower than any other participant (e.g., more than two standard deviations lower than the average for all monolinguals). Therefore, I removed that participant's data from the calculation of overall verb count per scene, shown in Table 6.2. An average of 65 verbs per scene was uttered by the monolinguals compared to 67 verbs per scene by the bilinguals. Unsurprisingly, this difference is not significant ($F(1,72) = 0.135$, $p = 0.714$).

Due to technical issues (such as recorder malfunctions and computer display problems), out of the potential 450 scenes presented (75 participants by 6 scenes), I was not able to gather nine of the descriptions.[59] These omissions play a role in establishing accurate total verb counts per participant since the particular scene that was omitted for the different participants would have a different degree of impact. Therefore, in order to establish a total verb count for each participant group corrected for the data-omission problem, I augmented the totals for all the

[58] The data presented in all of the tables and figures are either the raw counts found within each group or, as in this case, the collective average across each group. For example, for total verb counts, the 40 bilinguals uttered 15572 for an average of 389. Statistical operations such as ANOVAs and correlations, on the other hand, involved the calculation of averages for each participant which was then averaged across each group.

[59] The breakdown of unintended scene omissions is as follows:

- Scenes omitted: Car (3); Note (2); Classroom, Teacher, Errands, Sports (all 1).
- Participants affected: two scenes missing from two bilinguals and one monolingual: 1 scene missing from two bilinguals and one monolingual.

participants with missing data (n=6) with the average for the scenes that were missing.

Table 6.2

Average Number of Verbs Generated for each Scene Omitting One Monolingual Participant.

SCENE	**Average Verb Count**	**Monolingual Average**	**Bilingual Average**
Teacher	36	36	37
Classroom	41	41	42
Note	52	53	52
Car	80	81	80
Sports	88	86	91
Errands	96	99	96
Average Across All Scenes	**65**	**65**	**67**

6.4. Overall Verb Use

6.4.1. Total Verb Count

Although I did not establish a count of all the words uttered by each participant (since the crucial data for my analysis were verbs), I contend that calculating the number of verbs used by each participant will give a relative (as opposed to absolute) sense of how talkative or verbose the participants were. Calculating the total number of verbs (e.g., number of verb tokens) used by each participant allows us to see whether or not the averages across the different Language Status categories reveals verbosity distinctions, as shown in Table 6.3 (omitting the one monolingual participant who did not adhere to the task requirements).

Table 6.3

Total Verb Counts Averaged across the Main Participant Groups.

	Average	Lowest-Highest	Range	Standard Dev.
Monolinguals (n=34)	394	205-581	376	89.5
Bilinguals (n=40)	398	207-605	398	98.1

The verbosity of the monolinguals and bilinguals was remarkably similar, with the bilinguals actually uttering a slightly higher number of verbs, on average. This difference was not significant (F (1,72) = 0.03, p = 0.86). The bilingual group also showed a slightly higher standard deviation as would be expected from a group that included some speakers processing in their dominant language and some processing in their non-dominant language; however, an Equality of Variance F test revealed that this difference was also not significant (F (1,72) = 1.2, p = 0.59).

It would be expected that verbosity rates would vary when comparing the different types of bilinguals based on language dominance. In particular, bilinguals who are processing in their non-dominant language might well speak less than their dominant-language peers as a way of avoiding potential dysfluencies when speaking a language in which they may not be as comfortable. Conversely, bilinguals processing in their dominant language may be even more verbose than monolingual English speakers if, in fact, their bilingualism has an expanding effect on lexical selection (as hypothesized earlier). In this regard, the increased verbosity of English-dominant bilinguals may be the result of the desire to exercise their enhanced linguistic dexterity as much as possible.

The results of the total verb counts for these different groups of bilinguals, shown in Figure 6.3, does offer some support for these hypotheses. As predicted, the French-dominant bilinguals were the least verbose (using an average of 351 verbs) whereas the English-dominant bilinguals were the most verbose (using an average of 417 verbs). Although the monolingual speakers used an average number of verbs (394) at a level in between the two groups of bilinguals, the differences were not significant (F(1, 57) = 0.90, p = 0.35 for monolinguals

compared to English-dominant bilinguals and $F(1, 44) = 1.30$, $p = 0.26$ for monolinguals compared to French-dominant bilinguals). The difference in the level of verbosity between the two different groups of bilinguals was, however, extremely close to being significant ($F(1, 35) = 4.04$, $p = 0.05$).

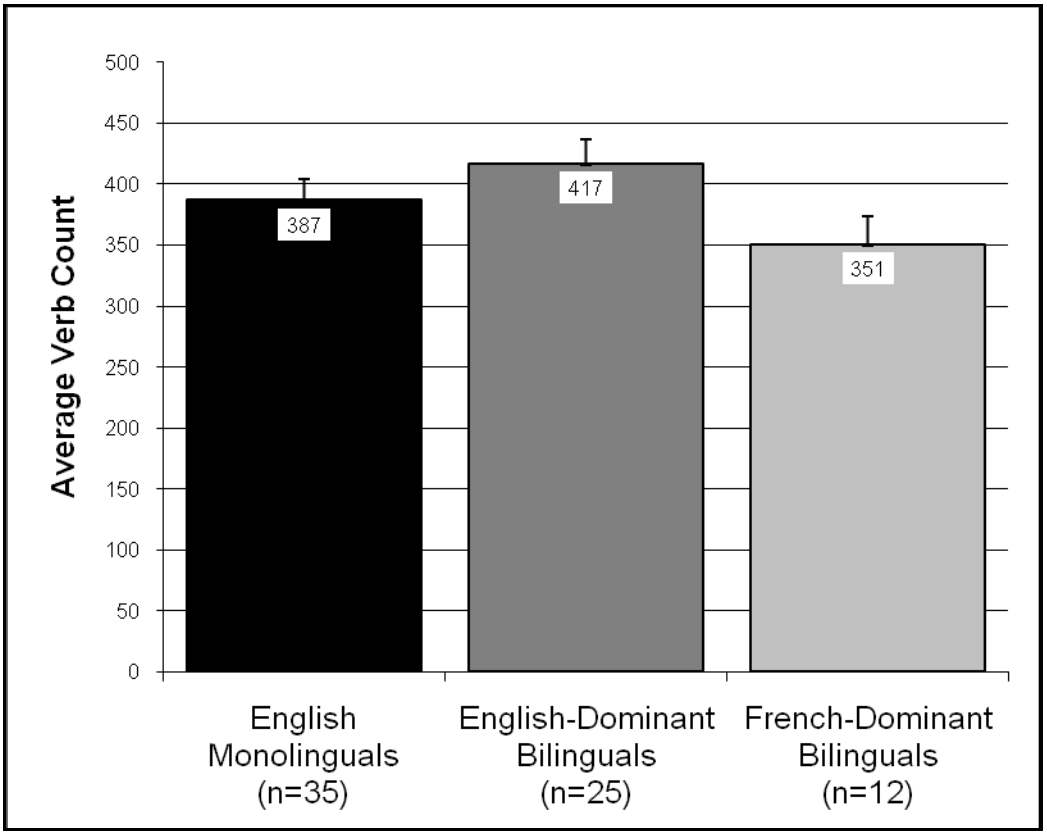

Figure 6.3. Total verb counts averaged across participant groups sorted by language dominance.

Since the English-dominant bilingual group (n=25) included speakers who have both English (n=18) and French (n=7) as their first language, a comparison based on L1 may reveal whether being bilingual and speaking in both one's first and dominant language results in characteristic linguistic behaviour. In the following analysis, those seven switched-dominance bilinguals are now separated from the English L1 bilinguals and the French L1 bilingual category also includes the three balanced bilinguals who were not part of the previous analysis. Figure 6.4 shows a breakdown of the average verb counts based on first language.

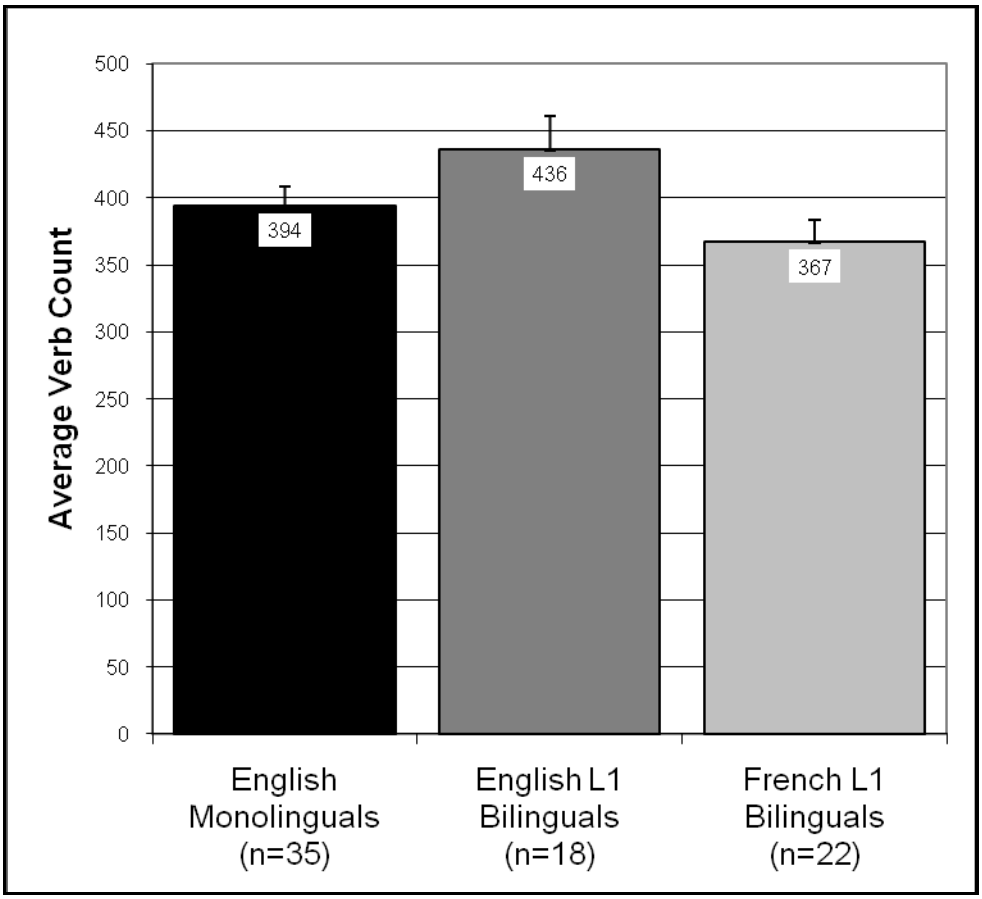

Figure 6.4. Total verb counts averaged across participant groups sorted by first language.

In this analysis, the average total verb count is increased for the English-dominant bilinguals once only those who have English as their L1 are included (436 verbs). And since the average for the monolinguals stays the same, the difference between the monolinguals and the English-classified (i.e., English dominant in the last analysis versus English L1 in this analysis) bilinguals is increased. The difference between the monolingual speakers and the English L1 bilinguals is, again, not significant ($F(1,50) = 2.35$, $p = 0.13$), although the trend does seem to suggest the potential for a change in linguistic behavior in L1 subsequent to the acquisition of an L2.

Unsurprisingly, the French L1 bilinguals were the least verbose (367 verbs, on average), even with inclusion of the balanced bilinguals and the English-dominant bilinguals. The differences in verb counts between the French

L1 bilinguals and the monolinguals was not significantly different ($F(1, 54) = 1.43$, $p = 0.24$) but, between the French L1 bilinguals and the English L1 bilinguals, the total verb counts were significantly different ($F(1, 38) = 5.6$, $p > 0.05$). Thus, the participants in this experiment who were speaking in their first and dominant language had a clear verbosity advantage over participants who were speaking in their second language, regardless of proficiency in that second language.

Not only did the French L1 speakers use the fewest number of verbs, they also varied the least from each other as compared to the other groups, showing a lower standard deviation (79.9) than the English L1 bilinguals (107.3) and the monolingual English speakers (89.5). Despite this being an interesting trend, reflecting more homogeneity in verbosity amongst those processing in their second language as compared to native speakers, the difference between the L1 French group and the other two groups, even pooled together, is not significant in the Equality of Variance test ($F(1, 55) = 1.80$, $p = 0.21$ compared to the English L1 bilinguals; $F(1, 38) = 1.26$, $p = 0.57$ compared to the monolingual English speakers; and $F(1, 73) = 1.47$, $p = 0.30$ compared to all the native English speakers, monolingual and bilingual).

6.4.2. Unique Verb Counts

Whereas the total verb counts discussed in the last section give an indication of a speaker's verbosity, a count of the number of different, or unique, verbs a speaker uses gives an indication of the range of lexical diversity. Even though the English-dominant bilinguals uttered more verbs than both the French-dominant bilinguals and the monolingual English speakers, perhaps they also exhibit more repetition than the other groups and do not, in fact, use a wider variety of verbs as well. The totals for these 'Unique Verb Counts' are outlined below.

A total of approximately[60] 1258 different types of verb forms[61] were used by the participants within the descriptions of the six scenes: 1014 by the bilinguals (average of 25.4) and 863 (average of 24.7) by the monolinguals. Focusing on the verb roots only, (by which I mean the verb portion when it is part of a complex verbal structure), approximately 711 different verbs were used: 591 by the bilinguals (average of 14.8) and 519 by the monolinguals (average of 14.8). Once again, the monolingual and bilingual groups show fairly similar behaviour.

By breaking the bilingual group into categories based on language dominance, as was done in the Total Verb Count analysis above, we can see if verbosity distinctions correspond to diversity distinctions as well. An initial count reveals that the English-dominant bilinguals, as a group, use 904 different verb roots whereas the monolinguals use 863, even though there were 10 fewer English-dominant bilinguals than monolinguals describing the scenes (i.e., 25 versus 35). To get a true measure of the average unique verb usage of the different groups, and the corresponding ANOVA, a unique verb count must be established for each participant. Under this analysis, the English-dominant bilinguals used an average of 130 unique verb roots, whereas the monolinguals used an average of 119 unique verb roots, as shown in Figure 6.5. This difference is approaching significance ($F(1, 57) = 3.37$, $p = 0.06$).

Once again, if the switched-dominance bilinguals are removed from the English-dominant pool, differences are slightly exaggerated with the English L1 bilinguals using an average of 132 different verb roots compared to the monolingual average of 119. This difference does reach a level of significance ($F(1, 57) = 4.07$, $p < 0.05$). There seems to be a consistent pattern exhibited by both verbosity and diversity totals. Collectively, it appears as though speakers have enhanced 'lexical dexterity' if they are bilingual and if they are processing in their dominant language (especially if it is also their first language).

[60] This number is approximate because a small number of verbs used by the participants (around 0.2%) were unintelligible and therefore could not be transcribed accurately.
[61] Total verb forms includes all the different verb-particle constructions as well as individual verb roots.

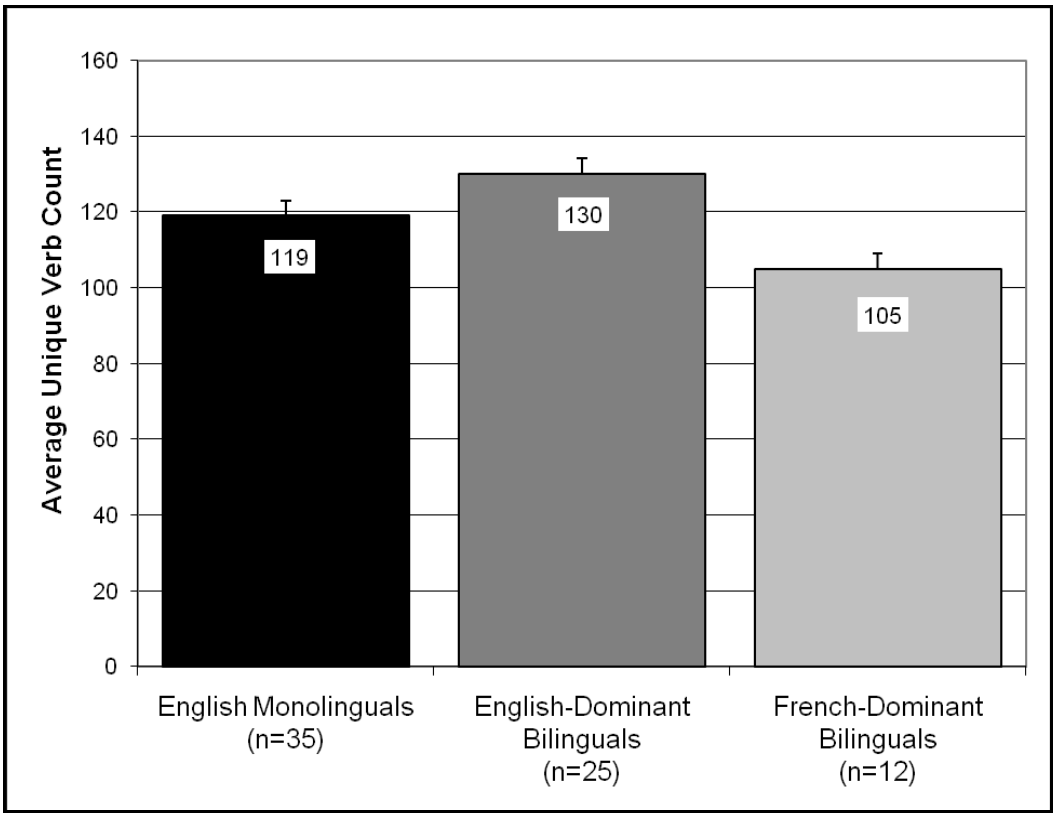

Figure 6.5. Unique verb root counts averaged across participant groups sorted by language dominance.

In keeping with this idea of enhanced lexical dexterity, I was interested to see what kinds of verbs were used exclusively by the English-dominant bilinguals, but which were never uttered by the large monolingual group. The English-dominant bilinguals are the group which could be expected to display both crosslinguistic transfer effects and an expanded vocabulary in their dominant language. As discussed in the introduction, bilinguals processing in their dominant language will probably have had enough exposure in that language to make them aware of subtle distinctions between synonyms and, unlike monolinguals, they have that additional experience in dealing with the issue of choosing between multiple linguistic forms which correspond to the same core meaning when they elect to speak one language versus the other. The set of verbs that the English-dominant bilinguals used exclusively suggests that both of the above factors may be at play, as shown by the sampling of these verbs in (63 - 65). In terms of an expanded vocabulary, many of the verbs are quite

semantically complex in that they would be hyponyms of more basic verbs (63). Additionally, some hyponyms take the form of compounds, often quite novel[62] (64). Usage of some of the verbs could also be prompted by crosslinguistic transfer in that they are either cognates or follow the French conflation patterns (65).

(63) *chatter, chip (the ball), cock (one's arm), commend, consider, converse, dance, fidget, finger, fish (in pocket), flinch, follow suit, gaze, glow, grimace, howl, key in, launch, linger, meander, peek, puff (cheeks), request, rock, rummage around, scramble, scribble down, scrunch up, shred, shuffle, slap (the ball), sip, spew out, sponge up, uncap*

(64) *hand-wave, duct-tape, overhand-throw, shot-put, speed-walk*

(65) *circle, decline, depart, distribute, observe, post, remark, respond.*

These words, among others, which were used exclusively by the English-dominant bilinguals, seem to demonstrate a high level of lexical dexterity as would be expected of speakers who are functioning in their dominant language and who are especially well-versed at lexical selection as a product of making choices between one language or the other every time they speak.

It could be, however, that a higher degree of education is prompting enhanced lexical dexterity. In this particular study, level of education does not seem to be contributing significantly to the range of verbs produced by the participants. The education levels of the participants was fairly consistent across groups (e.g., all participants had at least completed high-school and around 50% of both groups had completed an undergraduate education, for example). Additionally, an analysis of all the monolingual speakers reveals no statistical correlation between level of education and number of unique verb roots used by each participant ($r(35)=0.10$, $p=0.58$).

Returning to the results of the Unique Verb Count analysis shown in Figure 6.5, one can see a clear contrast between bilinguals processing in their dominant language and those functioning in their non-dominant language. For those functioning in their non-dominant language lexical selection is rather

[62] Linguistic creativity of this nature, I would argue, is another characteristic of lexical dexterity.

restricted. As with the total verb count results above, the French-dominant bilinguals used the lowest range of different verbs roots, an average of 105 per speaker. This count is significantly lower than both the monolinguals ($F(1, 44) = 3.9$, $p > 0.05$) and the English-dominant bilinguals ($F(1, 35) = 17.46$, $p > 0.05$). This result echoes the conclusion drawn in the last section that speech in one's non-dominant language is characterized by certain lexical limitations, less verbosity (indicated in the last analysis) and less diversity (shown here) of verb choice. We could say that processing in one's non-dominant language (a state never experienced by monolinguals) leads to an effect of underdeveloped lexical dexterity.

However, perhaps diversity is purely a product of verbosity: the more one speaks, the wider the range of lexical items that one uses. In order to control for the total number of verbs uttered by each participant, a verb-choice variability measure was calculated.

6.5. Verb-Choice Variability

A measure which may be even more correlated to proficiency or basic comfort level in English is verb-choice variability: how often a speaker chooses a new verb versus a verb already spoken. I calculated this measure in two ways. The first count considers all the individual multi-word verbs as separate items and the second set counts only the distinct verb roots. The most meaningful way to view the number of different verbs used by each participant is to compare that number (i.e., number of verb types) to the overall number of verbs uttered (i.e., number of verb tokens).

Before calculating the percent variability in verb choice for each participant, I prepared the data in two ways. First, I needed to control for number of utterances since percent variability decreases as verb use increases.[63]

[63] One can think of it this way; the percent variability calculation involves the token count as the denominator and the type count as the numerator. Invariably, the denominator will increase more rapidly than the numerator since every time a speaker utters a verb, the token count is augmented, but the type count only goes up if that verb was not already used. Each time the denominator increases but the numerator does not, the drop in percentage will be larger than the increase in percentage if both numerator and denominator are augmented. Since each group uttered a

Therefore, I restricted the analysis to the first fifteen verbs uttered by each participant in each of the six video scenes. Another potential impact on percent variability is the case of speaker repeating themselves when describing the same event. As mentioned in section 6.2, it was sometimes the case that a participant would repeat the description of an event while waiting for a new event to begin on the video, resulting in utterances like *He's washing the car, washing, washing. Still washing the car*. In such a case, the speaker's variability in verb use would be very low (i.e., ¼, or 25%). In the initial coding process, I indicated for each verb whether it was a subsequent mention (i.e., a repetition) within that same event. Therefore, I could easily omit the 'filler repetitions' from the analysis. Once these items were removed, the token count for each participant was in the range of 85 to 90.[64]

Of those 85 to 90 verbs, I established how many were unique verbs and then divided that total by the token count to derive a percentage variability score for both the full-verb forms and the verb-root forms. In the verb-root analysis, verb-particle constructions like *put up* and *put out* were counted as the same (since they share the root *put*), thus all of the rates for root variability were lower than for full verb variability. The results of the analysis are presented in Figure 6.6.

Once again, distinctions between groups based on their linguistic behaviour only become evident once the bilinguals are subdivided into categories based on their language dominance. Unsurprisingly, the French-dominant bilinguals showed the lowest rates of variability for both verb types. In terms of the calculation based on the full verb forms, the French-dominant bilinguals showed significantly lower variability than both the monolingual group ($F(1,45)= 5.21$, $p>0.05$) and the English-dominant bilinguals ($F(1,35)= 5.15$, $p>0.05$). The English-dominant bilinguals and the monolingual English speakers demonstrated

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different number of verbs, on average, a calculation based on the entire data set for each participant would be inaccurate at establishing the true verb choice variability measure.

[64] Although the percentage variability rate was not calculated on exactly the same number of verbs per participant (since not all participants uttered 15 verbs in each scene), the range only differs by around 5% which should not impact the results to any great degree. Additionally, for those few participants who were missing scene descriptions, I included slightly more than 15 verbs from each of the scenes for which I did have data until it reached the range of 85-90 verbs in total.

almost identical full-verb variability rates (61.9% and 61.2% respectively). No lexical dexterity distinctions existed between these two groups in terms of verb-choice variability.

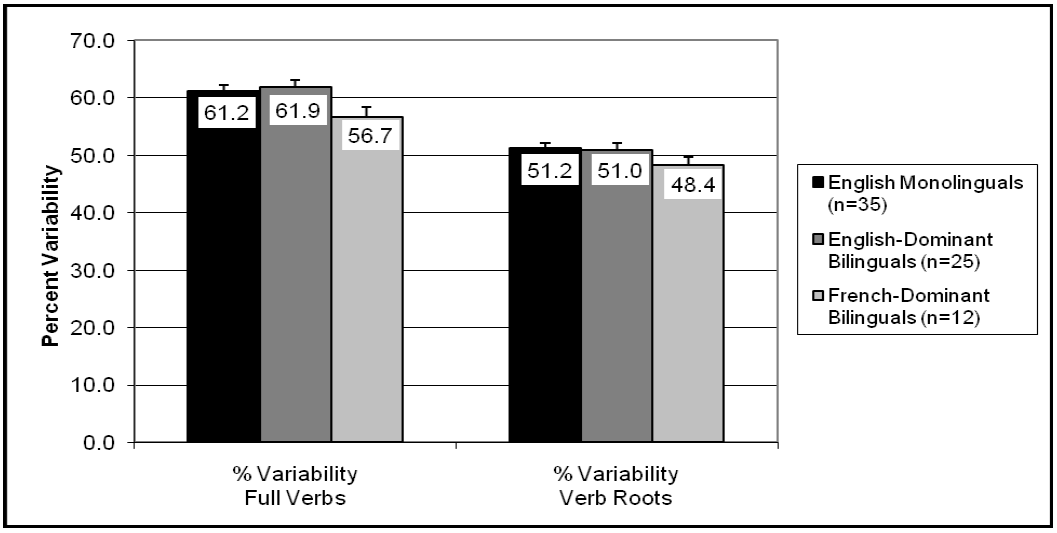

Figure 6.6. Verb-choice variability for both Full Verb forms and Verb Roots only across the different language groups based on language dominance.

Turning to the analysis of verb roots only, the trend still exists with the French-dominant bilinguals showing the lowest rates of variability; however, the difference between that rate (48.4%) and the rates for the monolinguals (51.2%) and the English-dominant bilinguals (51.0%) is no longer significant ($F(1,45)= 2.31$, $p=0.14$) and ($F(1,35)= 1.87$, $p=0.18$, respectively).

One may wonder why the verb choice variability rate for the French-dominant bilinguals was closer to the rates of the other groups in the verb root analysis as compared to the full verb analysis. An answer may be found in the nature of the linguistic units used in those analyses. When considering the full verb forms, each single-word verb and multi-word verb is counted separately. For the verb root analysis, however, many different multi-word verbs would be classified as the same if they share the same root. Therefore, if the French-dominant bilinguals used a smaller number of multi-word verbs (such as VPCs and V+P sequences) and were instead describing the scenes with single-word

synonyms, their verb-choice variability rate would increase relative to the other groups who use more multi-word verbs. For example, when describing the video scenes, one could describe the following actions: *putting* a golf club together (vs. *assembling* it), *putting* a hand up (vs. *raising* it), *putting* a candle out (vs. *extinguishing* it), and *putting* a rope down on the grass (vs. *setting* it on the grass). A speaker opting for the multi-word verb form could well use the same verb root to describe all of those events whereas a speaker opting for the simple verb expression would be using different roots each time.

Therefore, the next analysis to consider is the overall frequency with which the different groups of speakers use simple versus complex verb structures. To do so, I looked only at the set of verbs associated with the key events, as those were the ones I had coded for construction type (e.g., single- vs. multi-word form). The multi-word category consisted of both verb-particle constructions (e.g., *blow up*) and V+P sequences which can be replaced by a single-unit synonym (e.g., *go across* vs. *cross*).

6.6. Treatment of the Data

Much of the analysis from this point on involved measuring the ratio of two options as chosen by the participants. The statistical treatment of the data employed a combination of Chi-Square (χ^2) analysis and Analysis of Variance (i.e., ANOVA). The advantage of the Chi-Square test is that it allowed me to deal directly with the proportions of the raw observations. However, this analysis is insensitive to within-group variance. By converting the proportions into a percentage for each participant and then using an ANOVA, any in-group variance is taken into consideration. The drawback to ANOVA is that percentages can change dramatically when dealing with small numbers of observations. In cases where the data set was particularly small (i.e., less than 10 data points per participant), I employed a Chi-Square test. By contrast, when dealing with a large data set, I restricted the analysis to ANOVA. Occasionally, I performed an analysis using both types of tests, especially if the size of the data set was not particularly large or small.

All of the ANOVAs were calculated as a subjects analysis for two reasons: (a) my main hypothesis deals with behavioural distinctions between monolingual and bilingual speakers, thus a subjects analysis should offer insight into these populations at a more general level and (b) there was no preordained, structured, linguistic stimulus set being tested, thus the 'items' for an items analysis were actually determined by the experimental output. These items were not undergoing any kind of treatment or test; therefore, this experiment cannot offer insight into how different types of verbs are processed differently in different situations.

6.7. Single-Word versus Multi-Word Verb Forms

The rates[65] with which participants chose to articulate single-word verbs versus multi-word verbs is one of the key measurements in this study. In the video scene design phase of the experiment (reported in section 5.3), a list of key linguistic items was established which included synonym pairs in which the members had the same number of free morphemes (the XX Control pairs, e.g., *phone/call* or *switch on/turn on*) and synonym pairs in which the members had a different number of free morphemes (the XY Target pairs, e.g., *raise/put up*). Certain 'Key Events' were enacted within the videos with the goal of eliciting one member of the synonym pair by the participants. All the verbs that the participants produced to describe each of those Key Events was coded as either being a single-unit verb or a multi-unit verb. A calculation of the rates of single-unit verb usage by two main participant groups (monolingual vs. bilingual) was, once again, very similar. The monolinguals used 50.1% single-word verbs whereas the bilinguals used 50.7% single-word verbs, a non-significant difference ($F(1,73)=0.53$, $p=0.47$).

However, as was the case earlier, once the bilingual group was broken down further, some patterns began to emerge. As shown in Figure 6.7, the French-dominant bilinguals use a higher percentage of single-word verbs than both the English-dominant and monolinguals, as would be expected. The English monolinguals and the English-dominant bilinguals used about the same rate as

[65] All of the remaining calculations reported in this results section were based on token counts, unless otherwise indicated.

each other. The only significant difference in rate of single-word usage was between the higher rate of the French-dominant bilinguals, at 55%, and the lower rate of monolingual English speakers, at 50%, ($F(1,45)=4.64$, $p<0.05$). Since the Key Events would all be encoded with single-unit verbs in French, this result points to the possibility of some covert transfer at work in which the dominant language (i.e., French) is influencing the rates with which different lexical units are chosen in the non-dominant language output (i.e., English) of the bilinguals.

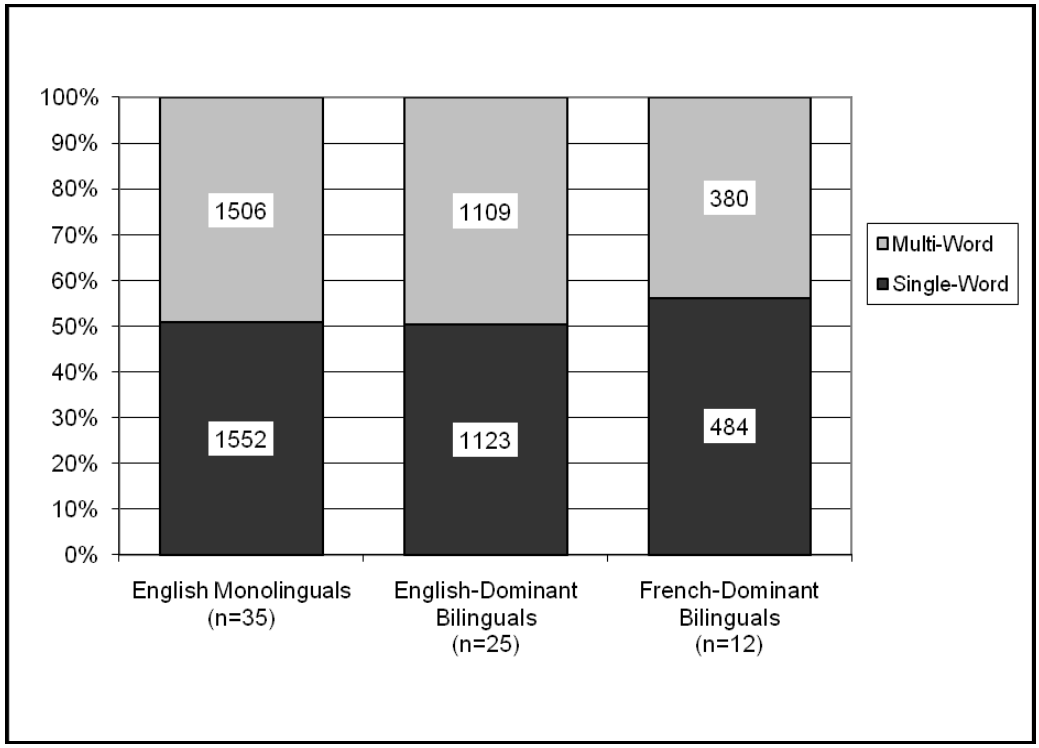

Figure 6.7. Number of verbs used for all key events based on construction type for the different bilingual groups based on language dominance (with raw numbers indicated on each bar).

6.7.1. Level of Formality

In one of the preliminary tests reported in section 4.3, relative formality ratings were gathered on both the XY Target Pairs and the XX Control Pairs. Within the XY Target Pairs, it was found that the single-word members were rated as significantly more formal than the multi-word members of the synonym pairs. The results in the Single-Word versus Multi-Word Verbs section above

show that the French-dominant bilinguals, most of whom learned English later in life, chose to use single-words instead of their multi-word synonyms more often than the English monolingual group. Rather than this being an effect of crosslinguistic transfer, it could be the case that this group prefers the more formal option. All eight of the late French/English bilinguals had the bulk of their initial exposure to English within the context of a classroom. As discussed in section 2.2.6, speakers adopt different registers in different situations. Joos (1967) identified the general register found in both the classroom and workplace as 'formal', in comparison to the more casual register of face-to-face interactions amongst acquaintances. Therefore, the types of words acquired by bilinguals who learned their L2 in a classroom setting may be different from those acquired by bilinguals who learned their L2 in more naturalistic contexts in which less formal language is common.

I was able to use the relative formality ratings gathered in the preliminary experiment to see if that variable had a crucial impact on the word choice of the French-dominant and late French/English bilingual groups. For all of the key linguistic items uttered when describing the key events, an average relative formality[66] rating was calculated for each participant. As each word's rating was relative to its synonym, words rated as more formal were given a + value and words rated as less formal were given a – value. All of the averages for each participant group were negative, indicating an overall preference for the less formal options. In the discussion below, I have reversed the polarity of the numbers, indicating the positive value rather than negative value, and labeled it as Degree of Informality (as compared to the other synonym in the preset pair). The averaged values, out of 2, were converted into percentages and are shown in Figure 6.8.

[66] The effectiveness of this analysis is limited by several factors; however, since the relative formality ratings had already been gathered, it was worth incorporating them with the data from the main production experiment to investigate the interaction of formality on word choice. Improvements to this analysis could be made by (a) having absolute formality ratings rather than ratings that were relative to the other member of the preset synonym pair (because in language production, one is not weighing options between strictly (these) two words, for instance), and (b) having formality ratings for all the words uttered in the key events and not just for the predetermined synonym set.

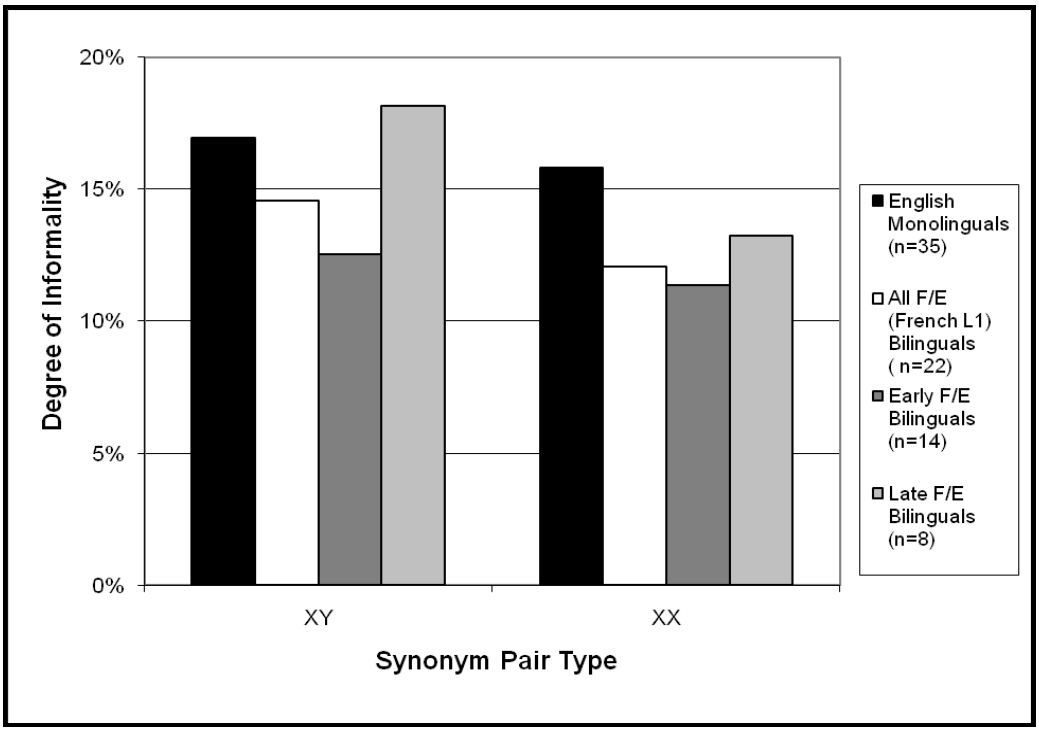

Figure 6.8. Average relative informality ratings for verbs uttered by different participant groups in both XY Target events and XX Control events.

Figure 6.8 only presents the data for the French L1 bilinguals (and monolinguals as a point for comparison), as they were the ones for whom formality was hypothesized to play a role (see section 2.2.6.1). The dark bar on the left of each grouping is the average for the monolingual speakers, which acts as a reference point. The lightest bars show the average for all the French L1 bilinguals, and the last two bars in each set represent the French L1 bilinguals who acquired English early in life followed by those who acquired English later in life.

The first apparent distinction shown in Figure 6.8 is that the XY scenes generated words with higher informality ratings than the XX scenes, a difference approaching significance ($F(1, 74) = 3.51$, $p=0.07$). This result was to be expected since the XY scenes offered the potential for participants to use multi-word expressions much more often than the XX scenes, and, since multi-word

expressions were rated as more informal, choosing multi-word expressions instead of single-word expressions will raise that rating value.

As would be expected, all the F/E bilingual speakers as a group opted for words of slightly less informality (thus rated as more formal) than the monolingual English speakers, although this difference is not significant ($F(1, 55) = 1.07$, $p=0.31$). More interesting are the results of the two different F/E bilingual groups, those who learned English early in life (the *early* F/E bilinguals) versus those who learned English later in life (the *late* F/E bilinguals). The late F/E bilinguals were hypothesized to choose more formal words as a product of their scholastic acquisition context. However, this group uttered verbs with higher *informality* ratings than the early F/E bilinguals. (But, once again, the difference is not significant: ($F(1, 20) = 0.85$, $p=0.37$). It seems as though formality on its own is not a crucial factor in influencing verb choice. This slightly higher informality value attached to the words uttered by the late F/E bilinguals could well have something to do with those speakers' overall proficiency in English. For example, many of the highly formal words are also very infrequent words (such as *extinguish* and *inflate*[67]) which someone with less overall proficiency may not have in their active lexicon. Another feature of lexical choice when processing in one's non-dominant language is a preference for more generic terms, such as *put* or *give*, in situations where a hyponym would also be appropriate, like *set* or *hand*. (See sections 6.9 and 6.10 on the target event analysis and the control event analysis for further discussion). In both of these situations (e.g., *putting/setting* and *giving/handing*), the hyponym is rated as being more formal than the more generic term, thus elevating the average informality ratings for the non-dominant speakers, all of whom have French as their first language.

The crucial comparison for teasing apart the effects of formality from number of constituents is the XX scenes, since the number of constituents is the same within each synonym pair potentially triggered by the these scenes. For the

[67] For example, in a Google-based frequency calculation I performed for cognates (see section 6.11.1), *extinguish* and *inflate* were tied for the lowest frequency rating of all the English verbs included in that calculation.

XX scenes, the F/E bilinguals showed similar formality levels (to monolinguals) in the words they chose to articulate, with no significant differences. ($F(1, 55) = 0.83$, $p=0.37$ for the comparison of monolinguals to French L1 bilinguals and $F(1, 41) = 0.10$, $p=0.75$ for the comparison of monolinguals to late F/E bilinguals). Thus, it does not seem that degree of formality is influencing the bilinguals' choice in opting for more single-word verbs than the monolingual group.

6.8. General Verb-Type Frequency

One of the construction types that results in English multi-word verbs that have single-word synonyms in English and single-word translations in French is the verb-particle construction (VPC). The higher rate of single-word synonyms used by the French-dominant bilinguals may be due to an avoidance of VPC relative to the other two groups. English VPCs are reputed to be fairly tricky constructions to learn in one's second language, in large part due to the very idiosyncratic nature of the large set of non-compositional or idiomatic cases. Therefore, it seems reasonable that L2 speakers of English would avoid VPCs especially when a single-word near synonym exists as well.

The calculations in this section were performed on the entire set of verbs generated in the experiment since all of the verbs were coded for basic verb type. Figure 6.9 offers a general picture of verb-type choice by the different participant groups. In this chart, the rate with which each verb type was used is represented as a proportion (i.e., a percentage) of the entire set of verbs uttered by that group of speakers.

Most of the sections within each vertical bar are very similar in size when comparing monolinguals to bilinguals, meaning that both groups use approximately the same rate of each verb type. There are slight differences, however, in terms of section height for both copula verbs (which are used significantly more by the bilinguals, $F(1,73)=7.38$, $p<0.05$) and VPCs (of which the monolinguals use a higher proportion, although not significantly so, $F(1,73)=1.38$, $p=0.25$).

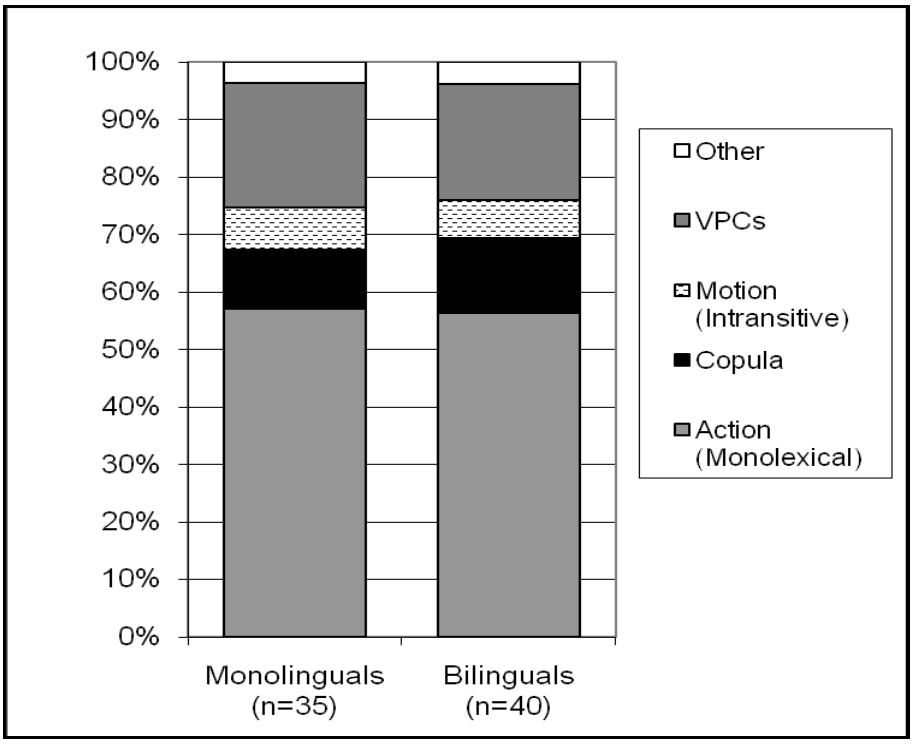

Figure 6.9. Proportions of verbs generated, classified by general verb type.

6.8.1. Copula Rates[68]

Copulas are used to describe a state of *being* as opposed to an action, so perhaps the bilinguals spent more time giving a basic description of the scene than did the monolinguals. Describing the scene as opposed to the action may be a communicative strategy used by bilinguals if they are having difficulty retrieving the specific active verb. For example, if speakers cannot retrieve the word *extinguish* and they avoid VPCs like *put out*, they could still acknowledge an event by using a copula construction and saying something like (66).

(66) *She used the spoon and the candle IS NOW OUT.*

If increased rate of copula usage is a proficiency-based factor (i.e., used more by those with lower proficiency in English), one would expect to find some differences between the French-dominant bilinguals (who have lower English proficiency) and the other groups. Alternatively, increased use of copulas could be a case of crosslinguistic transfer. As mentioned in section 3.4, V-languages

[68] The data showing rates of verb use in any remaining charts reflect raw totals for each group; however, participant averages were used in the calculation of any ANOVAs.

tend to set the scene for motion events by giving static descriptions of the setting prior to encoding the actual motion event. Such static scene setting would undoubtedly involve the use of copula verbs. Therefore, speakers of French may use a higher copula/active verb ratio than speakers of English. Once again, it is the French-dominant bilinguals who would be expected to use a higher rate of copula verbs if it was an effect of crosslinguistic transfer.

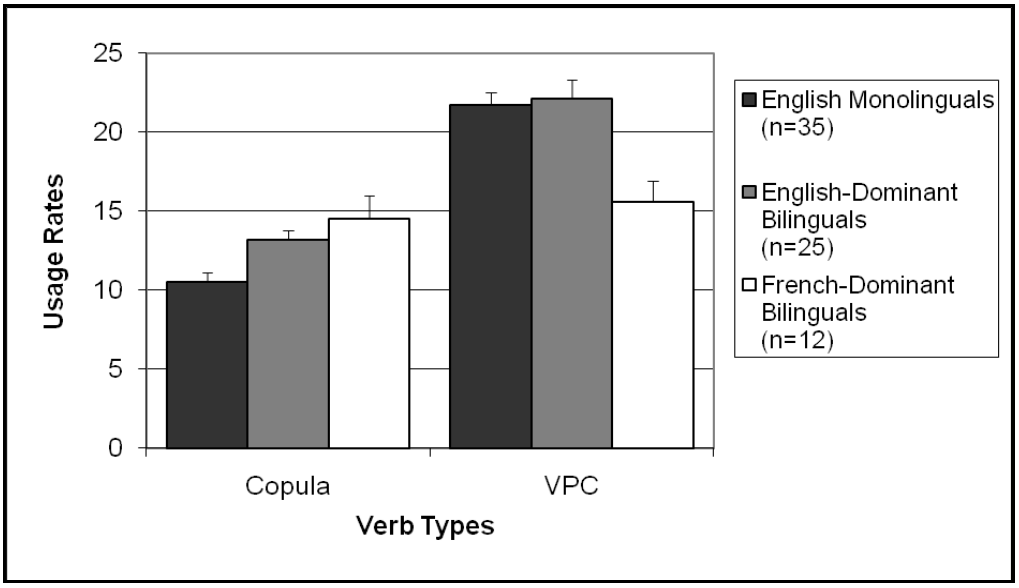

Figure 6.10. Rates with which copula and verb-particle constructions are used by the different participant groups.

Figure 6.10 includes the breakdown of both copula and VPC usage by monolinguals and bilinguals separated into categories based on language dominance. As mentioned above, the bilinguals as a group used a higher rate of copula verbs than the monolinguals. In keeping with the hypothesis that increased copula usage is employed either as a simplification strategy or as an effect of crosslinguistic transfer, it is the French-dominant bilinguals (those with both lower proficiency in English and stronger linguistic instincts in French) who seem to opt for this type of verbal expression more than the other groups. The French-dominant bilinguals used copulas significantly more than the monolingual English speakers ($F(1,45)=8.86$, $p<0.05$) who, by virtue of being monolingual native speakers, should not need to employ simplification strategies in a cognitively

undemanding task such as describing basic, everyday events enacted in the videos. Even when compared to the English-dominant bilinguals, the French-dominant show a higher rate of copula use which verges on being statistically significant ($F(1,35)=3.58$, $p=0.07$). Whether the higher copula-use rate by French-dominant bilinguals is a response to the cognitive complexity of the task which results in a simplification strategy being employed or the result of some kind of crosslinguistic transfer effect, it seems clear this group describes scenes with a distinct flavor when compared to the other two main groups. In fact, if the three balanced bilinguals are pooled in with the English-dominant bilinguals and the English monolingual speakers, to comprise a 'high proficiency English' group, this group collectively uses significantly fewer copula verbs (relative to other verb types) than the French-dominant bilinguals ($F(1,73)=7.67$, $p<0.05$).

6.8.2. VPC Rates

With regard to the second set of bars on Figure 6.10 representing rates of verb-particle construction usage, we again see behavioural distinctions based on language dominance. The French-dominant bilinguals use a markedly lower rate of VPCs than both the monolinguals ($F(1,45)=15.6$, $p<0.05$) and the English-dominant bilinguals ($F(1,35)=11.6$, $p<0.05$). The fact that the English-dominant bilinguals do not show a different rate of VPC usage from the monolinguals suggests that there is no crosslinguistic influence from French biasing these speakers to use single-word verbs rather than VPCs. If the three balanced bilinguals are grouped together with both the English-dominant bilinguals and the monolingual English, and as such creating a category of high-proficiency English speakers, one characteristic of this group is fairly frequent verb-particle construction usage, somewhere around 22% of the time for describing these particular video scenes. The fact that the French-dominant bilinguals use a significantly lower rate of VPCs suggests that they are either (a) following the French pattern of encoding the same meaning within one lexical item, (b)

avoiding a structure that does not have an equivalent in their dominant language, or (c) avoiding the additional complexity inherent in VPCs. [69]

6.8.2.1.Non-Required Particle Use

For most of the verb-particle constructions that were generated in this experiment, the presence of the particle was required either to make the proposition grammatical (67) or to convey a key semantic component that distinguished the simple-verb predicate from the VPC predicate (68).

(67) a. **She put her hand./She put {up} her hand {up}.*

b. **He used the cloth to soak the water./He used the cloth to soak {up} the water {up}.*

(68) a. *The ball hit the tree and bounced. ≠ The ball hit the tree and bounced back.*

b. *She breathed slowly. ≠ She breathed in slowly.*

However, a small proportion of the utterances included particles that were either not required for precisely conveying the main action of the event or were not required for guaranteeing grammaticality of the utterance. For example, one could accurately describe the same scene using either of the options listed in (69).

(69) a. *She sent the letter. / She sent {off} the letter {off}.*

b. *He opened the mailbox. / He opened {up} the mailbox {up}.*

c. *They chatted for a while. / They chatted away for a while.*

I do not want to assert that these particles make no semantic or stylistic contribution because they clearly do.[70] They simply are not required in order to generate a grammatical and accurate account of the scenes in question. For this reason, I refer to these particles as *non-required particles* (see section 3.3).

[69] I considered VPCs to be more complex structures than single-word verbs for the following reasons, among others: (a) speakers must be able to distinguish between different non-compositional VPCs which share the same root (e.g., *fill in* vs. *fill out* vs. *fill up*), (b) speakers must be aware of the semantic contribution of the particle when it is non-required, as explained in section 3.3.2 (e.g., *open* vs. *open up*), (c) speakers must choose the position of the particle in transitive verb constructions (i.e., pre-object or post-object position).

[70] See Jackendoff (1997), Brinton (1988), Lindner (1981), for example, for discussions on the aspectual contribution made by some of these non-required particles.

Importantly, the particle does not change either the basic meaning or the transitivity of the verb.

Participants used non-required particles on 32 different verb roots. Here are some examples:

(70) *chat away, close up, continue on, send off, wipe down.*

Up is the most common non-required particle occurring on about 14 different roots, a sampling of which are listed below:

(71) *count up, finish up, fold up, gather up, loosen up, rest up, seal up*

If certain bilinguals avoid verb-particle constructions in general, then they will probably use a very small number of non-required particles, since they are precisely that, not required to convey the basic action in a grammatical fashion. In terms of raw numbers of non-required particle usage, the monolinguals used the most, 185 (or 5.29 per person) as opposed to the bilinguals using only 83 (or 2.08 per person). Since non-required particles only occur with active verbs and not all active verbs can take a non-required particle, it is not very revealing to compare the number of non-required particles to the total number of verbs generated by this task. To get an informative picture, one must focus only on those verb roots for which the non-required particles are possible.

From the list of verbs + non-required particle combinations that occurred in the data, I chose for analysis those which had at least five separate occurrences. To get an initial taste of the general usage of these forms, I calculated a percentage of how often the non-required particle was included. Clearly, it is much more natural to include the non-required particle on certain verb roots more than others, with *gather up* being the most common form involving non-required particle inclusion (i.e., 32%).

Table 6.4

Occurrences of Non-Required Particles as Compared to Basic Roots Only.

Verb + N.R. Prt	**Verb Root Only**	**V+Prt**	**Total**	**% of N.R. Prt.**
close up	360	9	369	**2%**
gather up	15	7	22	**33%**
loosen up	82	6	88	**7%**
open up	548	119	667	**18%**
pump away	130	6	136	**4%**

Once the totals from Table 6.4 are broken down based on the two main participant groups, we can see an increased preference for non-required particle use by the monolinguals (14%) as compared to the complete bilingual group (9%), a statistically significant difference ($F(1,73)=4.3$, $p<0.05$). An analysis of the rates for the different bilingual groups, as shown in Figure 6.11, reveals that the French-dominant bilinguals, those with the lowest proficiency in English, use the non-required particles the least (at 3%), significantly less often than both the monolinguals ($F(1,45)=7.1$, $p<0.05$) and the English-dominant bilinguals (at 12%, $F(1,35)=9.4$, $p<0.05$). A very similar pattern emerges once the analysis is confined to instances of *open* versus *open up* only. Monolinguals use *open up* significantly more (24%) than the bilinguals as a group (14%) ($F(1,72)=4.8$, $p<0.05$). The French-dominant bilinguals, in particular, use *open up* significantly less (5%) than the monolinguals ($F(1,44)=8.4$, $p<0.05$) and the English-dominant bilinguals (19%) ($F(1,35)=4.3$, $p<0.05$).

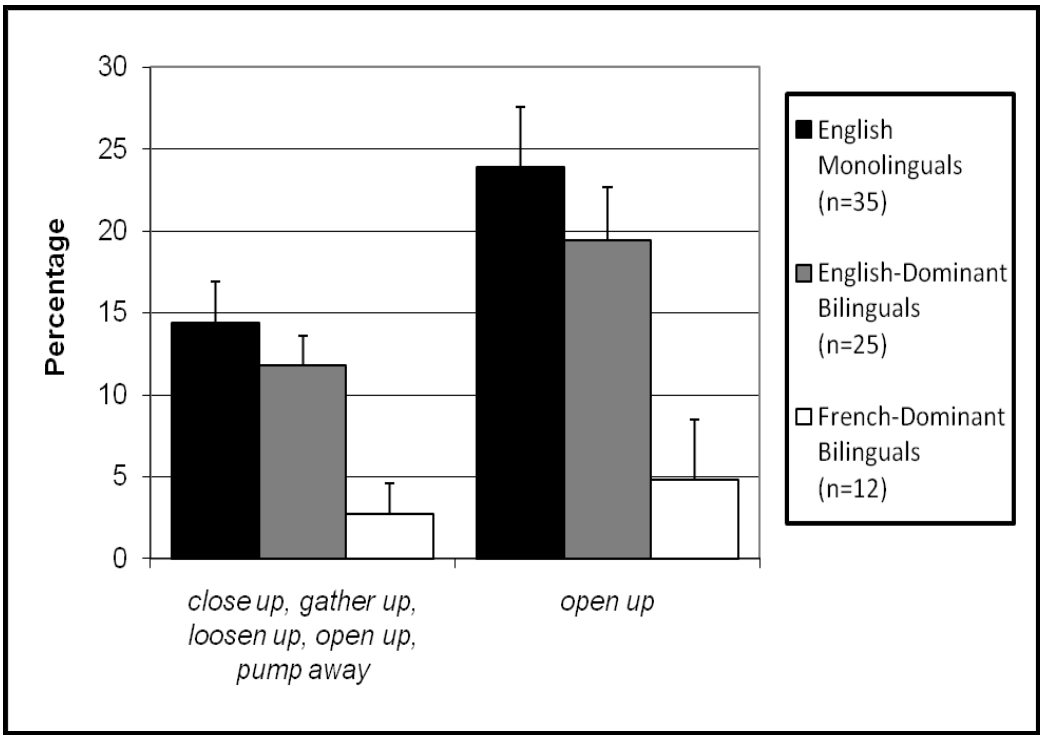

Figure 6.11. Rates with which non-required particles are used by the different participant groups.

I also calculated how many participants uttered at least one *open up* and found that 27 of the 35 monolinguals used the form (constituting 77% of all monolinguals) but only 22 of the 40 bilinguals used it (55%). Of these 22 bilinguals, 18 were English dominant (72% of that group), 2 were balanced (67%), and 2 were French dominant (17%). Clearly, non-required particle use is not characteristic of the speech of non-English-dominant bilinguals.

I have noticed in the past that caregivers use non-required particles quite often when addressing young children. They frequently say things like *finish up your lunch*, *drink up that milk*, and *open up the drawer, please*. It may be that the rate of non-required particle use is particularly intense in infant-directed speech by caregivers. If one is learning English as a second language, and not within the context of one's home, perhaps exposure to these non-required particles is much diminished relative to naturalistic first language acquisition. If such were the case, then the small group of English-dominant bilinguals who actually have

French as their first language (F/E) may behave more like their French-dominant L1 French peers.

As shown in Figure 6.12, once the F/E bilinguals have been removed from the English-dominant bilingual group, we see that the rate of *open up* usage is almost identical between the monolinguals (23.9%) and the E/F bilinguals (23.4%). The non-required particle usage rate for the F/E bilinguals, on the other hand, is quite a bit lower and varies with dominance with the French-dominant bilinguals using fewer non-required particles (4.8%) than those F/E bilinguals who are not French dominant (which includes both the three balanced bilinguals as well as the seven English-dominant bilinguals) who include the non-required particle 9.9% of the time. Confining the comparisons to within the bilingual participants, we find that the E/F bilinguals use significantly higher rates of *open up* than both F/E bilingual groups, regardless of dominance ($F(1,28)=11.7$, $p<0.05$ for E/F versus dominant F/E and $F(1,26)=5.3$, $p<0.05$ for E/F versus switched-dominant F/E) Thus, it seems that frequent non-required particle use is characteristic of the speech of English native speakers (both monolingual and bilingual) in comparison to English spoken as a second language.

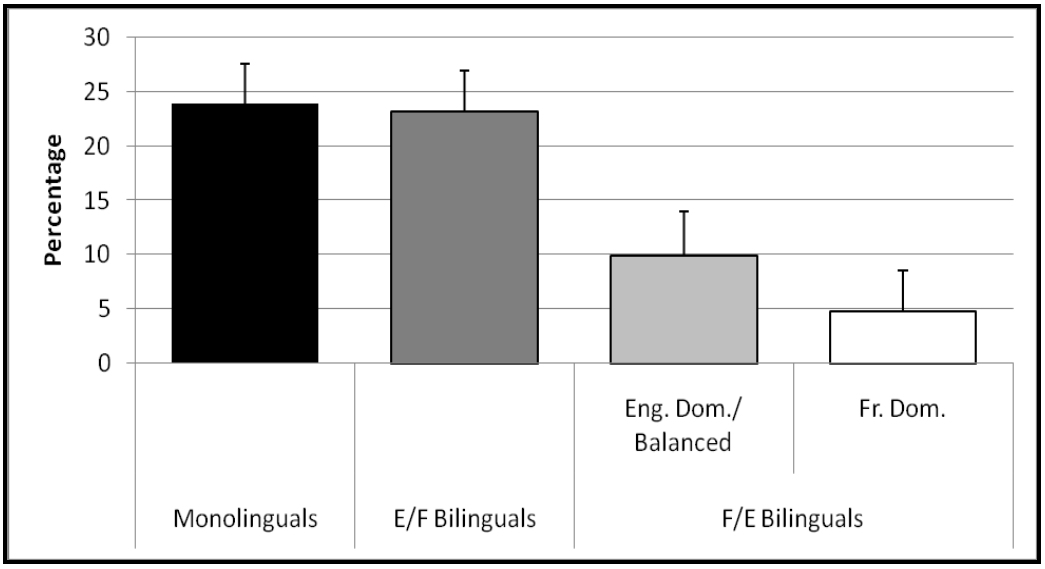

Figure 6.12. Frequency of *open up* in relation to *open* by the different participant groups based on L1 and dominance.

6.8.2.2. Particle Placement

I coded the data for the placement of the particle as the result of an overall impression of the data I had that certain patterns of particle placement existed for different transitive VPCs. For example, it seemed that more people would *pick up something* rather than *pick something up*. I coded transitive VPC for whether the particle surfaced directly adjacent to the verb root (i.e., Prt-NP sequence) or whether it surfaced after the direct object NP (i.e., NP-Prt sequence). This coding would allow me to see if the data would support my impressionistic observation that the patterns of particle placement were different for the different VPCs and if both monolinguals and bilinguals followed the same basic pattern.

There are certain constraints on particle placement that needed to be factored in. For example, if the direct object NP is in pronominal form, then the only grammatical place for it to surface is between the verb root and the particle (e.g., *put it down* and not **put down it*). Also, as soon as a secondary particle such as *back* is used to specify the main particle, again the most grammatical position for the main particle is after the direct object NP (e.g., *put the doll back down* and not **put back down the doll*). Therefore, all cases which included either a pronominal direct object or a specifying particle were omitted.

Another factor in determining particle placement could be whether or not there is an additional PP after the particle as in *put the book down on the table*. The questionable grammaticality of the alternative particle placement (i.e., ? *put down the book on the table*) requires caution when dealing with VPCs with following PPs. It may be that the decision to encode the endpoint (or ground) of the action occurs only after the decision has already been made to put the particle after the direct object. Alternatively, the speaker may have the pre-established intention of encoding the ground within the expression and therefore he or she deliberately chooses the post-object position for the particle. Since there is no way of knowing which mental process comes first, I omitted any VPCs which were immediately followed by a PP functioning to further specify the location indicated by that particle. The particles from the remaining VPC forms in the data

should all have relatively unrestricted placement options, either pre- or post-object position.

For all VPCs used by all participants (2839), there seems to be a preference for the Prt-NP ordering (1993) with 70.2% usage. Many of the different VPCs were only used a few times so I decided to focus on some of the forms more frequently used. Table 6.5 presents a list of all the VPCs used by monolinguals at least 15 times, ordered from the lowest to highest percentage of occurrences following the Prt-NP order.

A few observations are worth mentioning. First, it seems that the root *put* somehow influences speakers to choose the post-object position for the particle. Of this VPC set above, all of the *put* forms (e.g., *put together, put down, put out, put in, put on*) followed the Prt-NP order less than or equal to 50% of the time. As a group, there were only 65 occurrences of Prt-NP as compared to 106 occurrences of NP-Prt. Thus, the order preferred by the majority of VPCs (i.e., the Prt-NP ordering), only existed for 38% of the *put* VPC. *Put*, is a transitive locative verb in that its complement structure requires both a direct object NP and a locative adverbial of some nature. If the locative adverbial is in the form of a PP, then the most natural position for it is in post-object position.

(72) a. *put [the book]*$_{NP}$ *[on the ground]*$_{PP}$

b. ?*put [on the ground]*$_{PP}$ *[the book]*$_{NP}$

It seems reasonable that speakers would mimic that ordering when the locative adverbial is in the form of a particle instead of a complete PP.

The second pattern to note is that monolingual English speakers seem to prefer to articulate the particle *up* in pre-object position.[71] For all the *up*-VPCs in this list, the Prt-NP order occurs between 65% (for *rip up*) and 94% (for *pick up*)

[71] The length of the direct object noun phrase has been recognized to effect the placement of the particle (for example, see Gries, 2003) such that the longer the direct object is, the more likely the particle will come in front. In the case of the particle *up*, the length of the object did not seem to impact its placement to any large degree. For example, in the VPC *pick up*, the particle *up* occurred in pre-object position with very short NPs (e.g., *he picked up papers, he picked up the keys*) and, more surprisingly, it occurred in post-object position (only 6% of the time in total) with very long NPs (e.g., *he picked the papers he knocked off the desk up*).

of the time. The average frequency for the Prt-NP order for all the *up*-VPCs is 90%[72] (439/487).

Table 6.5

VPCs Ranked According to Occurrence of the Prt-NP Word Order for Monolinguals.

	NP-Prt	Prt-NP	Total	% Prt-NP
put together	16	5	21	**23.8%**
put down	49	25	74	**33.8%**
put out	14	10	24	**41.7%**
take off	30	23	53	**43.4%**
put in	18	16	34	**47.1%**
put on	9	9	18	**50.0%**
write down	7	8	15	**53.3%**
hand back	7	11	18	**61.1%**
take out	22	40	62	**64.5%**
rip up	8	15	23	**65.2%**
blow out	6	12	18	**66.7%**
pump up	8	17	25	**68.0%**
turn off	9	23	32	**71.9%**
cross off	9	26	35	**74.3%**
blow up	6	19	25	**76.0%**
turn on	10	36	46	**78.3%**
cover up	3	16	19	**84.2%**
pull out	2	21	23	**91.3%**
hand in	2	25	27	**92.6%**
open up	4	50	54	**92.6%**
pick up	19	322	341	**94.4%**
Totals	258	729	987	**73.9%**

The fact that there was so much variability between individual VPCs in terms of particle placement led me to think that I should not treat them as a group when comparing particle placement between monolinguals and bilinguals. My concern was that if certain participants preferred certain VPCs, and used them

[72] This percentage is augmented by the very high number of the verb *pick up* generated by this experiment. *Pick up* is the VPC in which the particle surfaces in pre-object position more often than any other VPC.

very frequently, it could potentially skew the results. To get around this potential confound, I confined the analysis of particle position to the three most frequently used transitive VPCs: *put down*, *take out*, and *pick up*, as shown in Figures 6.13 to 6.15. Coincidentally, these three VPCs had quite distinct preferences for particle position based on monolingual usage, with rates for the Prt-NP order 34%, 65%, and 94% of the time, respectively.

Figures 6.13 through 6.15 represent the raw totals of all instances of particles by all participants (once cases with pronominal direct objects or following PPs had been removed). As there were not enough data points per individual participants to perform an informative ANOVA, the statistical comparisons were made using a Chi-Square analysis. In order for each speaker's data to only be counted once in the x^2 (thus avoiding the case in which an individual participant's results weighed too heavily into the analysis), I rendered a Positioning Preference value for each participant. If they used the Prt-NP ordering more often than the NP-Prt ordering, they were attributed the Prt-NP preference. If they used the NP-Prt ordering more often, they were attributed the NP-Prt preference. If they used both orderings the same number of times, they were not included in the analysis as they did not demonstrate a preference.

Looking at the data from each of these VPCs separately, we do see some differences in the rates of particle positioning between the main participant groups, monolinguals and bilinguals, although not always in the same direction. In the case of *put down* shown in Figure 6.13, both bilinguals and monolinguals showed a strong preference for the *put*-NP-Prt sequencing, in keeping with the canonical ordering of arguments when the locative adverbial is a full PP (e.g., *put [the book]*$_{\text{NP}}$ *[on the ground]*$_{\text{PP}}$*)*. The monolinguals seemed to allow for the non-canonical order slightly more often although this difference is not significant (x^2=0.91, df=1, p=0.34). The rates for the different subgroupings of bilinguals were remarkably similar, with both English-dominant and French-dominant bilinguals demonstrating around 30% usage of the Prt-NP ordering.

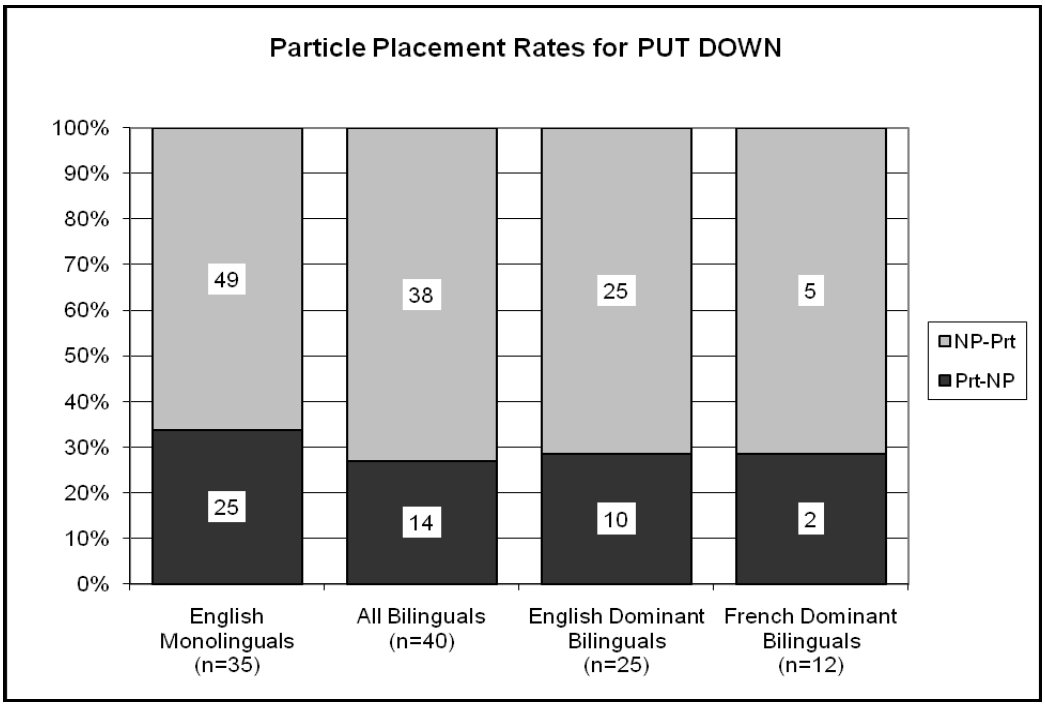

Figure 6.13. Particle placement rates for the VPC *put down* across different participant groups.

For the VPC *take out* shown in Figure 6.14, the difference between the main participant groups in terms of particle placement was slightly larger, with the bilinguals preferring the Prt-NP ordering more than the monolingual group. Using the Positioning Preference values for each participant, the difference between monolinguals and bilinguals in particle placement for *take out* is not significant (x^2=1.09, *df*=1, *p*=0.30). However, if the comparison for analysis is between participants who never used the NP-Prt ordering versus those who used the NP-Prt ordering at least once, some significant differences do emerge.[73] If a participant never uses the NP-Prt ordering, it could reflect an avoidance of the structure in which the particle is disjointed from its verb. Only 28% of the monolinguals (5/18) did not use the NP-Prt ordering at least once whereas 56% of the bilinguals (9/16) uttered the particle after the direct object NP. Due, in part, to

[73] For this analysis, I removed participants who only used the verb *take out* once since a pattern of behaviour can only be realized if more than one instance is recorded. Of the remaining participants, monolinguals produced *take out* an average of 3.1 times versus 3.3 times by the bilinguals.

the small numbers of tokens that went into the analysis,[74] the comparison is not quite significant (x^2=2.84, *df*=1, *p*=0.09); however, there does seem to be a trend in that the bilinguals tend to stick to one ordering more often than the monolingual English speakers.

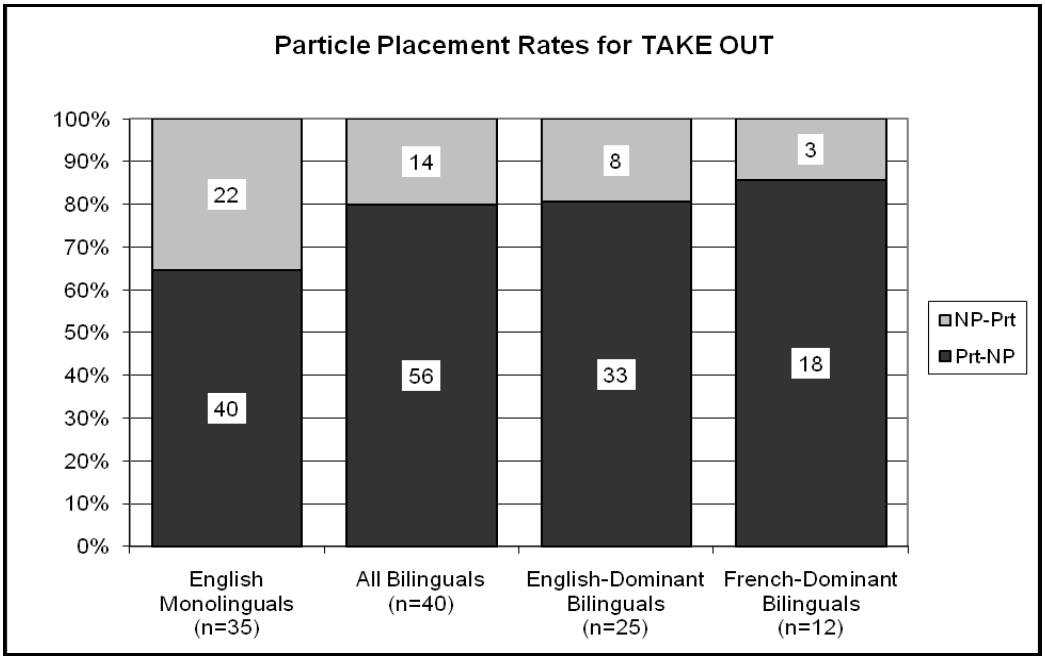

Figure 6.14. Particle placement rates for the VPC *take out* across different participant groups.

The larger data set for *pick up*, presented in Figure 6.15, allows for an ANOVA analysis which is beneficial since a x^2 analysis on this data set will be largely uninformative due to the strong overall preference for the Prt-NP ordering. Before running an ANOVA, I corrected the data by eliminating any participants who only uttered *pick up* once since the average for that person would automatically be 100% in either direction and would not be reflective of a pattern for that individual. Once the data were corrected, the monolinguals used the Prt-NP ordering 94% of the time compared to 99% of the time for the bilinguals (a statistically significant difference, $F(1,67)=6.5$, $p<0.05$) . Even the English-dominant bilinguals (at 99%) show a significantly higher rate of pre-object position for the particle than the English monolinguals ($F(1,55)=4.1$, $p<0.05$).

[74] For example, if the same ratio existed with twice the number of participants the χ^2 would be significant.

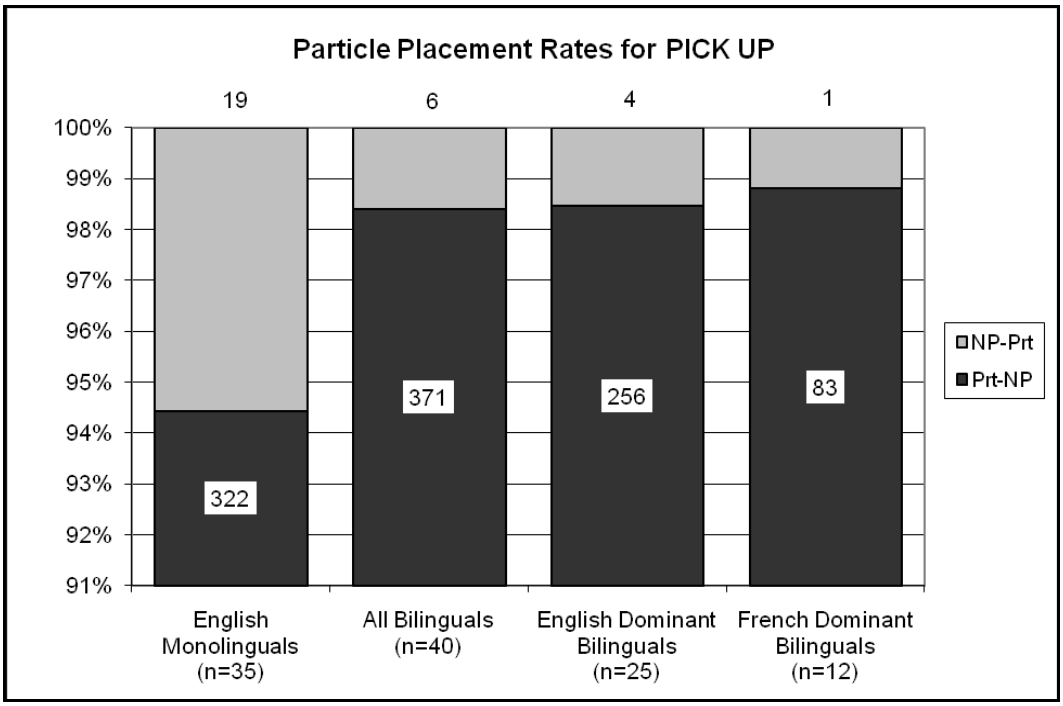

Figure 6.15. Particle placement rates for the VPC *pick up* across different participant groups.

Unlike the verb root *put* which is a locative transitive verb and, as such, requires overt linguistic encoding of the endpoint of the action¸ *take* and *pick* are basic transitive verbs. It is perfectly grammatical to use the verb *take* or *pick* without indicating a ground reference point for the FIGURE entity. *Put down*, *take out*, and *pick up* have all been classified as VPCs in this study. However, it could be that they are representative of two different subclasses of VPC in which the degree of connectedness of the verb and the particle is the distinguishing characteristic. Because the simple verb *put* and the complex verb *put down* share the same root, the phonetic and semantic overlap will undoubtedly ensure that these two lexical items are strongly connected in a speaker's mental lexicon. In the case of the locative transitive simple verb (i.e., *put*), the argument structure is such that information must be expressed in the order of *putting* something (FIGURE) somewhere (GROUND). And since expression of the ground entity is obligatory, speakers become habituated to the sequence of the locative phrase being the final element. In the VPC *put down*, which shares the same root, speakers may be inclined to treat the particle as an independent unit which can be

used to fulfill the final argument position (with the difference being that the actual ground entity is implied rather than explicitly expressed, as it would be in a PP in that position). Like the PP, the particle *down* is required by the root *put*, but it may be treated as more distinct from the verb root as compared to particles which combine with roots that do not require expression of some ground reference point, such as *take out* and *pick up*. In these latter cases, the particle is treated more as an inherent component of the verb itself and, as such, is typically articulated adjacent to the verb root.

If such a distinction in the strength of the verb-particle relationship does exist, it may be that these characteristics are exaggerated by bilinguals who, collectively, have greater linguistic demands on cognition than do monolinguals; treat the particle in *put down* as an adverb which would surface in post-object position – treat the particle in *take out* and *pick up* as being strongly connected to the root and, as such, produce those two lexical units sequentially. Figure 6.16 shows how the bilinguals differ from the monolinguals in the direction of reduced variability of particle placement for each VPC. Since there are numerous factors that contribute to the ultimate positioning of the particle (for a detailed overview, see Gries (2003)), there will always be variability. But perhaps the reduction of variability shown by the bilinguals is a testament to the fundamental natures of the different VPCs.

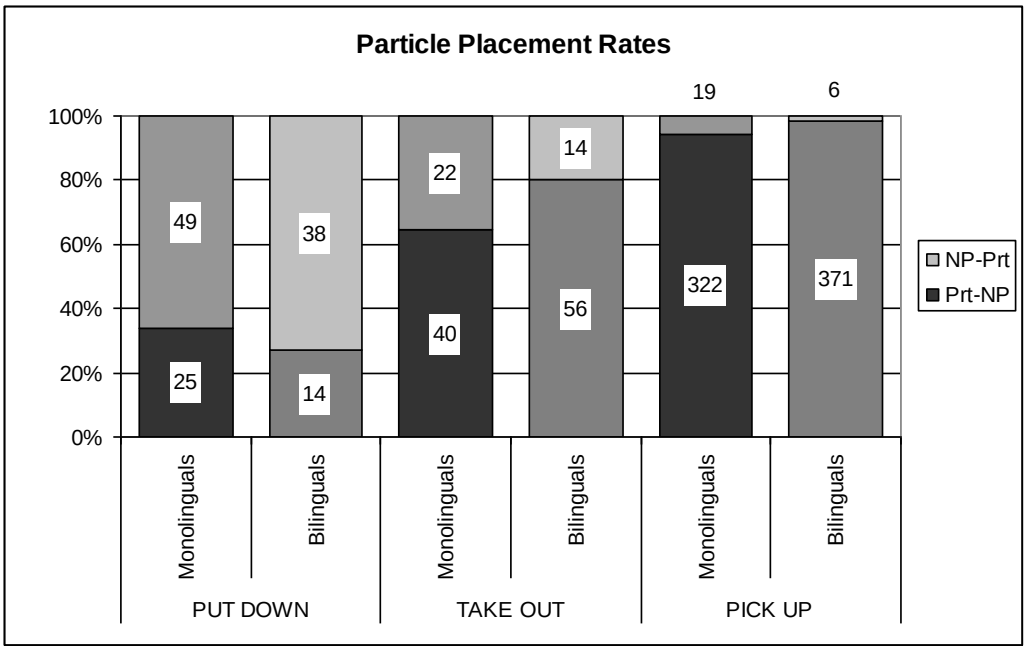

Figure 6.16. Particle placement rates by monolinguals and bilinguals for three VPCs: *put down*, *take out*, and *pick up*.

6.8.2.3.The Specifying Particle *Back*

Like non-required particles, the presence of the specifying particle *back* (e.g., *plug the fan back in*) is not necessary to complete a grammatical phrase, although it adds semantic complexity to the proposition. It also involves syntactic complexity in that it influences the placement of the particle to the post-object position (as argued in section 3.3.1). The inclusion of the word, therefore, adds semantic and syntactic complexity without being grammatically obligatory. It may be, therefore, that bilinguals avoid this structure to avoid extra complexity. I restricted the analysis to the frequency of *back* within VPCs which have one of these four verbs as its root: *come, go, walk, put* (e.g., *come back in, go back home, walk back over, put back down*, etc.) as these were the only VPCs which used the specifying particle *back* to any large degree.

Contrary to this prediction, bilinguals actually used the specifying particle *back* more often within this set of VPCs (12.5%) than monolinguals (10.2%). Even the French-dominant bilinguals used *back* more frequently than the monolinguals, at 12.3%. None of the differences between groups was significant

either using a x^2 or ANOVA analysis. Thus, there was no difference in the rates of use of the specifying particle *back* which can be attributed to the differences in speaking status. It seems that the importance of contributing the semantic complexity to the phrase with the inclusion of *back* may outweigh the cost of any grammatical complexity that goes along with it. Or, the additional grammatical complexity is so minor that is does not discourage less proficient bilinguals from using this structure.

6.9. XY Target Pairs

The next two sections of this chapter offer a more in-depth analysis regarding the key linguistic items which the videos were designed to generate. First, I will outline the results involving the XY Target pairs followed by the results involving the XX Control pairs. As I mentioned in section 6.2, several of the key scenes in the video clips did not generate specific mention of the key linguistic items by many of the participants. Thus, in the following two sections, I have only included target pairs in which verbs were uttered at least ten times. Another point relevant to the discussion in the following two sections is that when analyzing the results of a fairly unconstrained production experiment such as this, the depth and breadth of data directly addressing the central hypothesis is somewhat unpredictable and inconsistent across participants. Since the key linguistic units were functioning as the behavioural output in the experiment rather than the linguistic input (e.g., the stimulus), it is sometimes necessary to talk in detail about specific items whose distribution either supports the central hypothesis or seems to contradict it, in which case alternative explanations can be offered.

The XY Target pairs were labeled 'target' because they embodied the critical distinction of packaging verbal information into one word (as is typical in French) versus packaging the same information in a distributed fashion across more than just the verb root itself. Therefore, all of the synonym pairs in this set have a single-word encoding versus a multiple-word encoding of the same basic semantic content. If bilinguals show a higher rate of single-word encodings in

their scene descriptions, it may be the result of the crosslinguistic transfer of the basic French lexicalization pattern into English; bilinguals are conditioned to encapsulating meaning into one word in French so, given the option, they may choose the same pattern in English.

The preset items from the XY Target pairs were mentioned 1936 times in the course of the production task. Table 6.6 shows the breakdown of those verbs in terms of who uttered them (monolinguals versus bilinguals) and what structural classification they belonged to (single-word verbs versus multi-word verbs). For an easier comparison, the last column shows the ratios converted into a percentage of single-word verb usage. In keeping with the hypothesis above, the bilinguals, collectively, used a significantly higher rate of single-word verbs (43%) than the monolinguals (35%) ($F(1,73)=4.5$, $p<0.05$).

Table 6.6

Proportions of Single- to Multi-word Verbs from the XY Target Pairs Used by Monolinguals and Bilinguals.

	Single-word Verb	Multi-word Verb	% Single-word Verb
Monolinguals (n=35)	309	564	35%
Bilinguals (n=40)	461	602	43%
- English Dominant (n=25)	314	408	43%
- French Dominant (n=12)	125	143	47%

Table 6.6 also presents the totals for the two different bilingual groups (keeping in mind that the totals for the three balanced bilinguals are not shown). As expected, the French-dominant bilinguals showed the highest rate of single-word verbs (47%), significantly higher than the monolinguals ($F(1,45)=5.9$, $p<0.05$). Even the English-dominant bilinguals encoded information into single-word verbs (at 43%) much more frequently than the monolinguals, although the difference between those two groups of high proficiency English speakers was not quite significant ($F(1,73)=4.5$, $p=0.10$).[75] At first glance, it appears as though a

[75] The statistical test used to achieve this result was a two-tailed ANOVA; however, an argument could be made for using a one-tailed t-test for a comparison such as this because there would be no

crosslinguistic transfer of lexicalization patterns is a contributing factor in determining lexical choice for the bilinguals. However, it is worth examining the individual pairs that constitute this linguistic category (i.e., XY Target pairs) to develop the picture more fully.

I have divided the presentation of the individual XY Target pair results into three different sections based on the overall number of tokens generated by the main production task with the objective of keeping together those pairs that are somewhat comparable in terms of quantity generated. Figure 6.17 includes synonym pairs for which one or the other member was mentioned 50 or fewer times. Figure 6.19 includes synonym pairs for which one or the other member was mentioned between 50 and 100 times. The synonym pairs included in Figure 6.20 were mentioned over 100 times in the course of the experiment.

For most of the synonym pairs in Figure 6.17, the bilinguals used a higher percentage of the single-word verbs than the monolingual speakers (i.e., the light bar extends farther to the right than the dark bar). In terms of those few pairs (e.g., *absorb/soak up, awaken/wake up, rebound/bounce back*) for which the bilinguals used less of the single-word option, contrary to expectation, there were too few data points for most of these pairs to draw any kind of confident statistical conclusion. The exception was for the pair *return/bring back*, which showed a fairly strong monolingual preference for *return* (10 out of 12 participants) compared to the bilinguals of whom only 5 of 11 revealed the same preference. The difference of these ratios is bordering on being significant (x^2=3.6, df=1, p=0.06). A potential motivating factor for this result is explored in more detail in section 6.9.1 below.

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reason to suspect that the monolingual speakers would use more single-word encodings due to CLI from French because they have no knowledge of French to exert such an effect. Using a one-tailed t-test on this data set reveals a significant difference between the higher percentage of single-word verbs used by English-dominant bilinguals and the lower percentage of single-word verbs used by English monolinguals (t(1,58)=1.7, p<0.05).

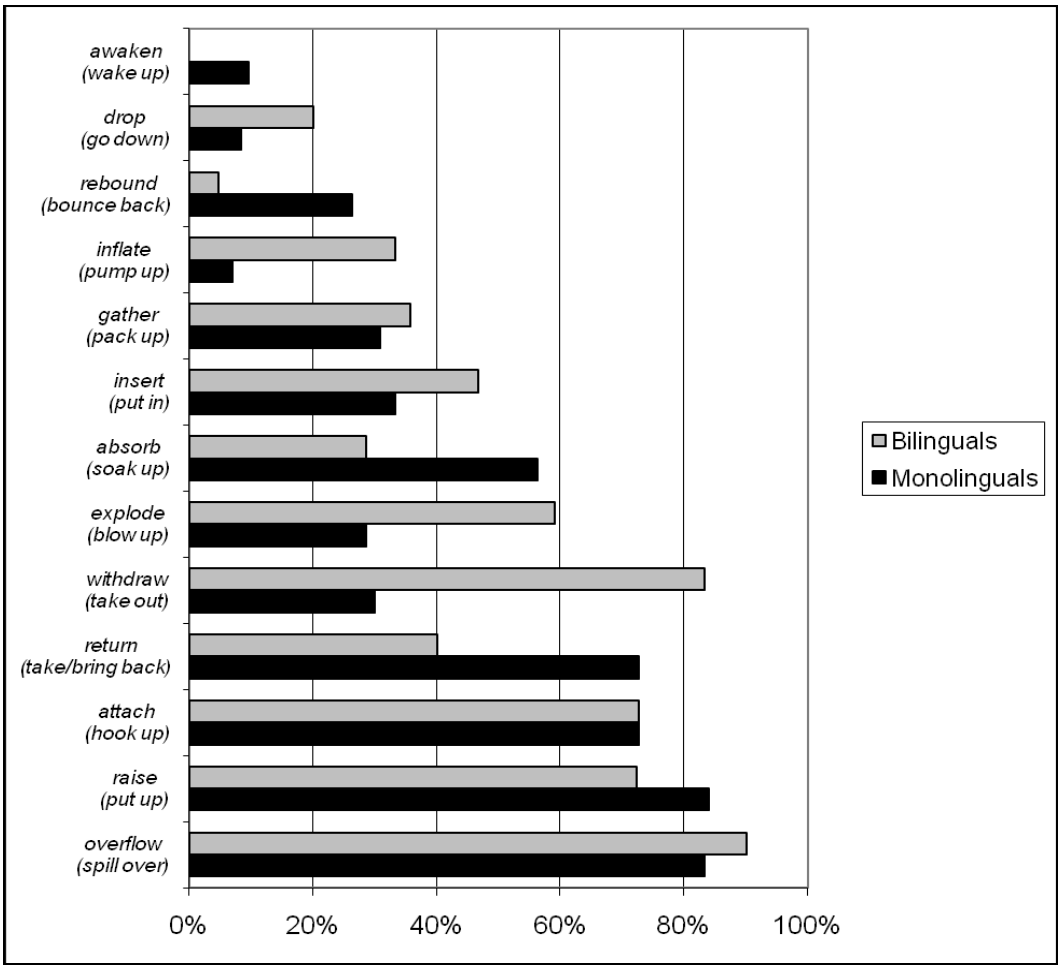

Figure 6.17. Rates with which the single-word synonym was uttered compared to the multi-word synonym for XY Target pairs mentioned 50 or fewer times.

With regard to the pairs which exhibited the predicted usage patterns (with the bilinguals choosing more of the single-word encodings than the monolinguals), three were statistically relevant. More bilinguals than monolinguals preferred the single-word verbs in the pairs *withdraw/take out*, *explode/blow up*, and *inflate/pump up*, as shown in Figure 6.18 in which the dark bar is much larger within the three bilingual columns than in the three monolingual columns. The differences in monolingual and bilingual ratios is significant for the first two pairs, *withdraw/take out* and *inflate/pump up* (x^2=8.17, *df*=1, p<0.01and x^2=4.5, *df*=1, p<0.05 respectively) and approaching significance for the pair *explode/blow up* (x^2=3.6, *df*=1, p=0.06). The nature of these particular

pairs is examined in more detail after the results for the remaining XY Target pairs is presented below.

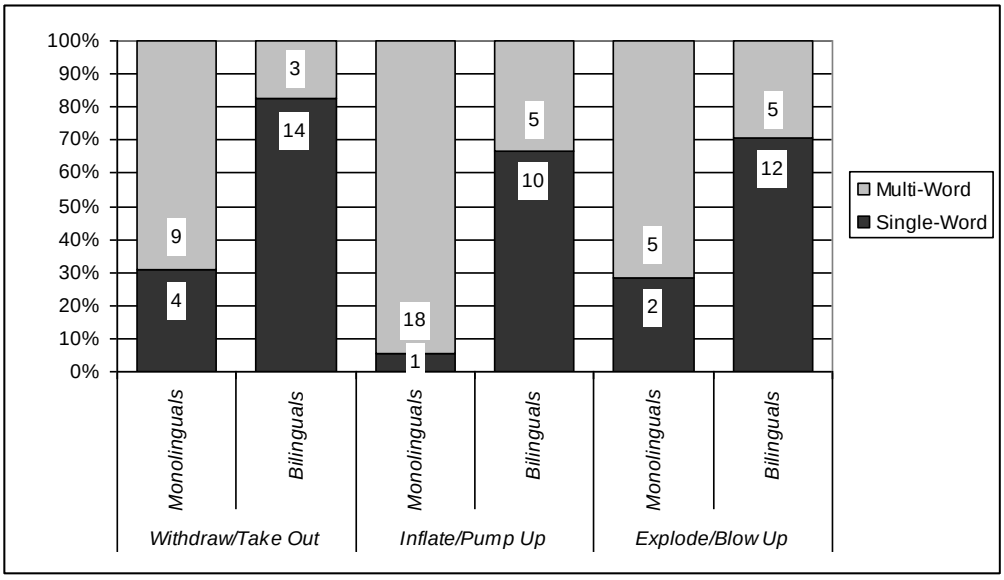

Figure 6.18. XY Target pairs showing contrasting usage between monolingual and bilingual participants.

As shown in Figure 6.19, the pattern of behaviour within the synonym pairs mentioned between 50 and 100 times in the production experiment was as predicted. The bilinguals showed a higher rate of single-word usage than the monolinguals in all pairs. The only significant difference in single-word verb usage rate, given the still relatively small number of data points being used in the analysis, was for the pair *hide/cover up*, in which case a larger proportion of bilinguals preferred *hide* (54%, or 14/26) than monolinguals (13%, or 3/24) (x^2=9.5, *df*=1, p<0.01).[76]

[76] A number of participants encoded the action as the single-word verb *cover*. The results are very similar if those participants who preferred *cover* are pooled with those participants who preferred *hide* (to make a larger single-word preference group for each type of speaker). In this case, 28% of the monolinguals preferred the single-word encoding compared to 66% of the bilinguals (x^2=9.2, *df*=1, p<0.01).

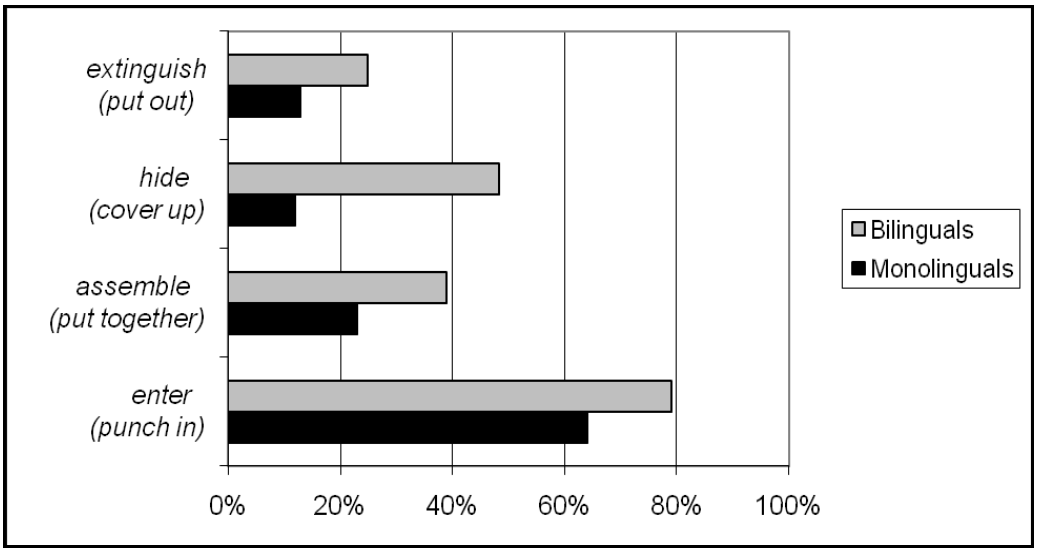

Figure 6.19. Rates with which the single-word synonym option was uttered for XY Target pairs mentioned between 50 and 100 times.

With regard to the synonym pairs mentioned over 100 times in the production task, shown in Figure 6.20, all of these pairs except one showed a very similar rate of single-word usage between the monolinguals and bilinguals. The exception is the pair *remove/take off* for which the bilinguals showed a greater tendency to choose the single-word verb *remove* than the monolingual speakers. However, once the data are corrected so that each participant is only counted once, the difference in the number of bilinguals who preferred *remove* (20%, or 7/35) compared to the number of monolinguals who preferred *remove* (13%, or 4/30) was not statistically significant (x^2=0.51, *df*=1, *p*=0.48).[77]

[77] An ANOVA was also unrevealing in this regard as the per participant numbers were still quite low with many participants only using one of these forms between one and three times ($F(1,69)=0.97$, $p=0.33$).

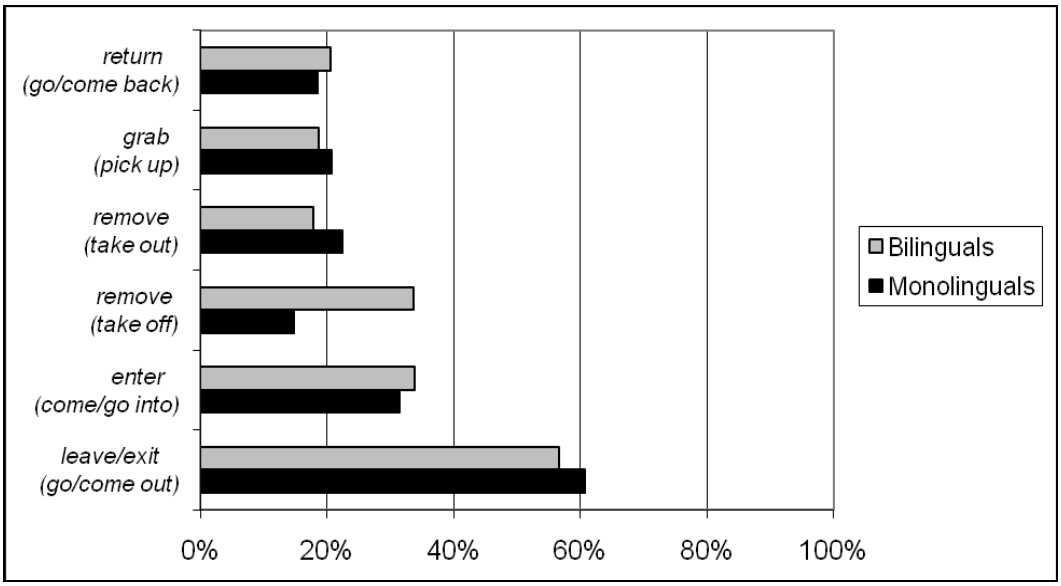

Figure 6.20. Rates with which the single-word synonym was uttered compared to the multi-word synonym for XY Target pairs mentioned over 100 times.

6.9.1. XY Target Pairs *withdraw/take out, inflate/pump up, explode/blow up, hide/cover up, return/bring back*

There is something about the XY Target pairs of *withdraw/take out, inflate/pump up, explode/blow up,* and *hide/cover up* which seems to predispose bilinguals to choose the single-word encoding more often than monolinguals do. If crosslinguistic transfer from French into English is taking place, it could be that is there something about this set of synonyms (beyond the basic single- versus multi-word encoding distinction) which enhances such transfer. When comparing the English synonyms to their French translation equivalent, we see some additional structural overlap in the single-word synonyms. For example, *inflate* and *explode* also share certain word form characteristics with their translation equivalents of *gonfler* and *exploser*. Although the form overlap may not be as extensive as found in traditional cognate pairs, due to the fact that some phonemes and graphemes do correspond, I will consider them to be cognates for the purpose of this study.

The translation equivalents of *withdraw* and *retirer* do not have any phoneme/grapheme overlap (and, thus, are not cognates); however, they do have a

similar morphological structure: two main content morphemes with the second denoting the major action within the event (i.e., *draw*, as in "moving something toward something else" and *tirer* often translated as *tug* or *pull*). In fact, *draw* is given as one of the translations for *tirer* in an on-line translation reference (www.wordreference.com). The first morpheme for both words is not nearly so transparent,[78] but they have the important role of marking the words as being different from simply *draw* and *tirer*. Perhaps this structural parallel in the morphology of the two words is influencing word choice since the distribution of information amongst the lexical units is the same, thus the same lexicalization pattern can be used in both languages. By contrast, *taking out* requires initial mention of the main action followed by some specifying information – quite a different lexicalization.

The greater preference for *hide* versus *cover up* amongst bilinguals as compared to monolinguals does not seem to have an explanation in terms of additional structural overlap with the French translation equivalent of *cacher*.[79] Instead, it could be a case of bilinguals avoiding the verb-particle construction, even the English-dominant bilinguals. By pooling all the participants who preferred either *hide* or *cover* and comparing that total against those who preferred *cover up*, we again see some discrepancies between the participant groups. 21 monolinguals preferred *cover up* and only 8 preferred a non-*cover up* alternative. By contrast, only 12 bilinguals preferred *cover up* with 23 preferring another encoding (x^2=9.2, *df*=1, p<0.005). Even comparing monolinguals (21/8) to English-dominant bilinguals, of whom 9 preferred *cover up* compared to 13 who did not, reveals a significant difference in the preference ratios (x^2=5.1, *df*=1, p<0.05).[80] These pairs may be particularly fruitful for further study within an

[78] There are numerous meaning of *with* in the Merriam-Webster online dictionary. Perhaps the sense of 'in the possession of' most closely fits in the word *withdraw*. Kopecka (2006) indicates that *re*, in French, is a Latin derived satellite prefix meaning 'back' or 'backwards'.
[79] Even the fact that *cover* has the cognate *couvrir* in French did not seem to dissuade bilinguals from making *hide* their preference for describing the action in question.
[80] Another potential argument to account for the difference in the preference for *hide* versus *cover up* could be that, although these two expressions both describe the event in question, they are not actually synonyms since one is actually the cause of the other; covering something up (with an opaque material) entails that the object becomes hidden. The relationship is assymetrical, however, in that if something is hidden, it has not necessarily been covered up. It could be that the

experiment designed to generate a greater quantity and consistency of data, for example, as part of a forced-choice paradigm.

The only synonyms that exhibited an unexpected distribution were the pair *return/bring back* for which a higher percentage of monolinguals preferred the single-word encoding *return* (83%) compared to the bilinguals (45%). *Return* is a highly polysemous word. The online Merriam-Webster dictionary (2009) reports eight main senses of the verb *return* with a total of 18 different sub-senses covering both transitive and intransitive usages. The *return* that was being analyzed within this pair is one of the transitive interpretations of the verb, best defined by sense 2(a) "to bring, send, or put back to a former or proper place". An intransitive sense of *return* was also being tested in this study, within the synonym set of *return/go back*. French, on the other hand, does not have a single verb which covers both transitive and intransitive situations of motion back to a former position. The main translation equivalent of the transitive *return* is *rendre*, whereas the translation equivalent of the intransitive *return* is the cognate *retourner*. The fact that bilinguals are less inclined to encode the event of returning an object to a former place (i.e., the transitive event) using the verb *return* could be because they reserve that verb for intransitive situations in which the French translation equivalent is a cognate. Thus, cognation could also be playing a role in the distribution of *return/bring back*, but one of influencing bilinguals away from choosing a form that has phonological and graphemic correspondence with the French verb that is only a translation equivalent for a different sense of the English verb.

6.10. XX Control Pairs

It is important to examine the control XX synonym pairs as well to see if they exhibit differential usage between the two main participant groups, because if they do, there must be some additional criteria at play besides the number of words used to encode the concept. As for the XY Target pairs in the previous

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bilinguals are focusing more on the outcome of the action rather than the action that lead to that outcome. I could find no evidence elsewhere in this study to support such speculation that bilinguals and monolinguals are actually focusing on different aspects of individual events.

section, the XX Control pairs have been divided into three groups based on the number of instances they were used in the production task. Figures 6.21 to 6.23 present the results for these three groups. The charts have been organized slightly differently for the XX pairs than the XY pairs. For these XX pairs, both members have the same number of words thus lexical complexity cannot determine which item will be used to generate a percent usage rate. Instead, I used the member of each synonym pair which was mentioned the most often as the comparison form.

Figure 6.21 lists the pairs which were mentioned 50 or fewer times in the production task. Although the length of the monolingual and bilingual bars seems quite different for some of these pairs, the data points used in the comparison are often so sparse that few firm conclusions can be drawn. For example, monolinguals only made reference to *fixing/repairing* twice, and each word was used once, whereas the bilinguals mentioned this event 10 times, nine of which were via the word *fix*. For this pair, there was an insufficient amount of data to make a statistical comparison.

There were two pairs, however, which did show a telling difference when the data points were counted as part of a 'participant preference' value. For example, whereas 82% (14 of 17) of the bilinguals preferred *stroke* to *caress*, only 50% (6 of 12) of the monolinguals preferred *stroke* with the other 50% preferring *caress*. A statistical comparison of the ratios of *stroke* to *caress* usage shows a difference bordering on significant (x^2=3.4, *df*=1, *p*=0.06). The other synonym pair of note is *give back* versus *hand back*. Without exception, the monolinguals preferred the expression *hand back* (19 of 19), whereas only 57% (13 of 23) of the bilinguals preferred *hand back* with the other 43% preferring *give back*, with the difference between these two groups being significant (x^2=10.8, *df*=1, *p*=0.001). I will return to a discussion of why these two synonym pairs are treated differently by the two main participant groups following the presentation of the results of the other XX Control pairs below.

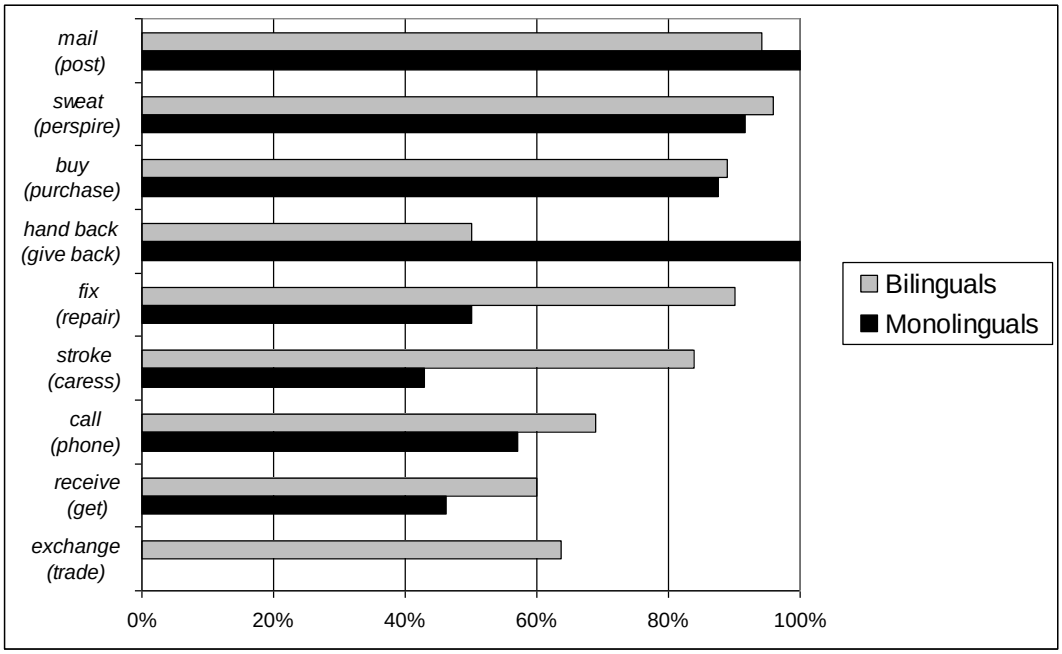

Figure 6.21. Usage rates of the XX Control pairs which were mentioned 50 or fewer times.

Figure 6.22 lists the pairs which were mentioned between 50 and 100 times in the production task. These pairs showed very consistent distribution between monolinguals and bilinguals except for the last two on the list. A very high percentage of monolinguals (26 of 28, or 93%) had a preference for *clap* as opposed to *applaud* whereas only 61% of bilinguals (19 out of 31) showed the same preference. The difference in the *applaud* to *clap* ratios between these two groups is significant (x^2=8.1, *df*=1, p<0.005). Similarly, 69% of monolinguals (11 of 16) showed a preference for *grab* as opposed to *take*, whereas only half of the bilinguals preferred *take* (11 of 22). Although a comparison of ratios does not reveal a significant difference between the groups (x^2=1.3, *df*=1, p=0.5), this synonym pair may be worthy of further testing to see if the pattern persists with a larger pool of participants (since many participants did not encode the event with either of these options in this study).

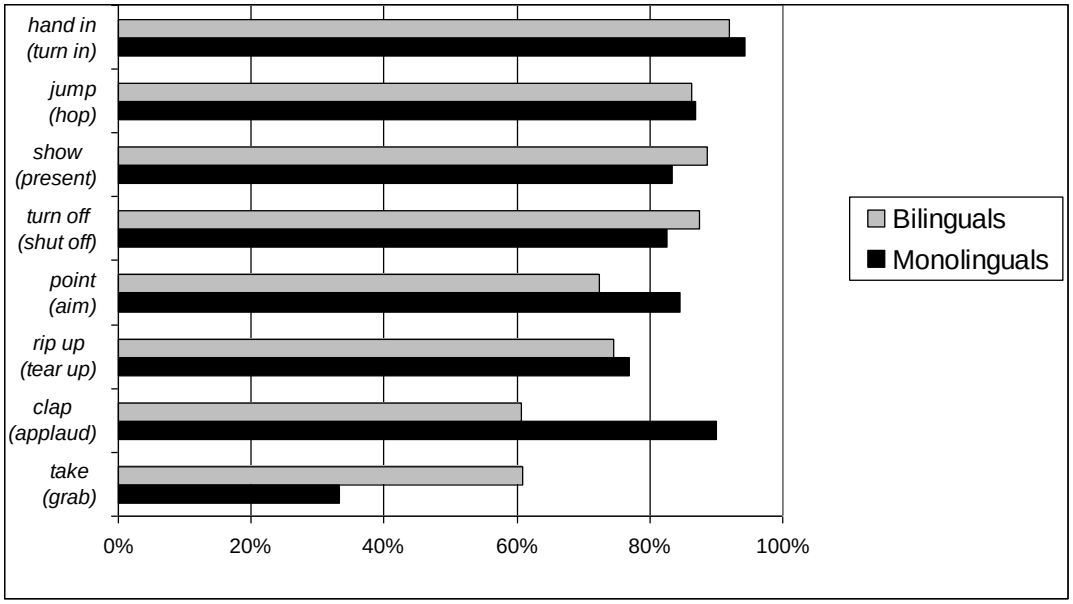

Figure 6.22. Usage rates of the XX Control pairs which were mentioned between 50 and 100 times.

Figure 6.23 lists the pairs which were mentioned over 100 times in the production task. As for the last set, these pairs showed very consistent distribution between monolinguals and bilinguals except for the pair *mark/correct*. Monolinguals showed a stronger preference for *mark* (86/93, or 93%) than the bilinguals (53/73, or 73%). *Mark* was the verb of choice for 94% of the monolinguals (31 of 33) but for only 70% of the bilinguals (23 of 33). The differences in both usage rates and participant preference were significant ($F(1,66)=6.6$, $p<0.05$ and $x^2=6.5$, $df=1$, $p<0.05$).

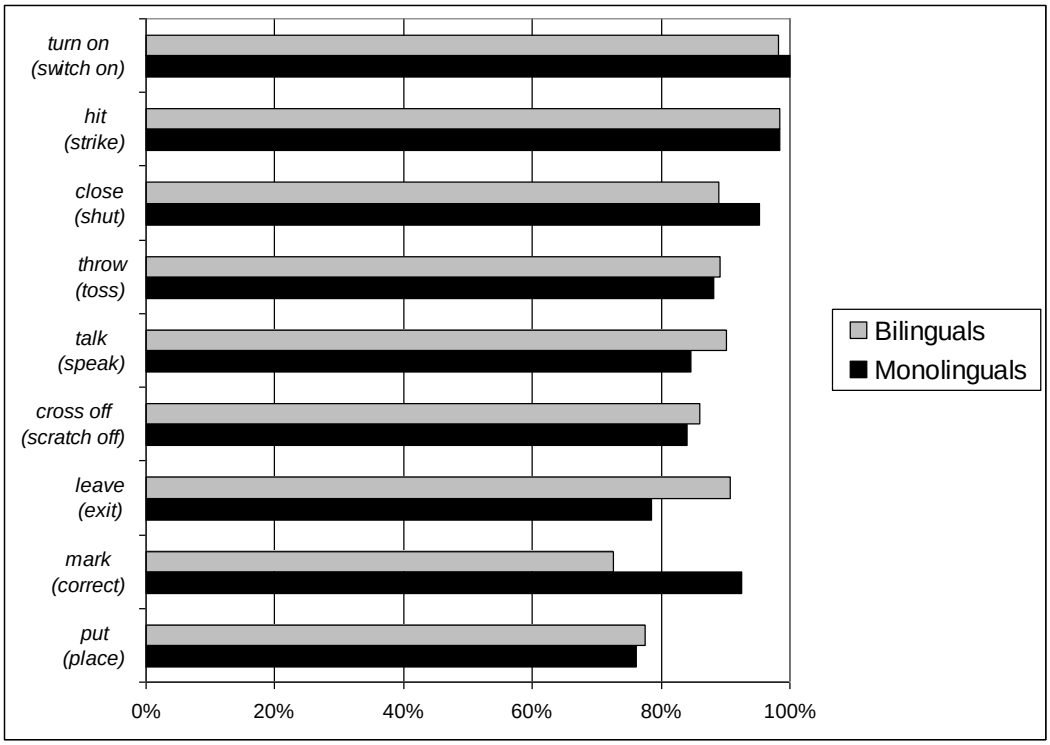

Figure 6.23. Usage rates of the XX Control pairs which were mentioned over 100 times.

6.10.1. XX Control Pairs *caress/stroke, hand/give back, clap/applaud, mark/correct*

The XX Control pairs which were highlighted earlier as demonstrating divergent behaviour between monolinguals and bilinguals (i.e., *caress/stroke, hand/give back, clap/applaud, mark/correct*) require further examination. The differences in word choice preferences cannot be explained by differential lexicalization patterns since both synonym options are structurally similar (e.g., same number of free morphemes, all mono-morphemic roots, etc.). Therefore, there must be some other factor(s) at play to influence these differences in word choice. As was the case for some of the XY Target pairs which showed differential distribution between monolinguals and bilinguals, it seems that the form overlap that makes one of the synonyms a cognate with its French translation equivalent is influencing the usage of that synonym in English for the bilingual participants. This effect of crosslinguistic transfer is demonstrated in the

pairs *clap/applaud* (with the French translation of *applaudir*) and *mark/correct* (with the French translation of *corriger*), and offers an explanation for the reduced usage of the cognate *caress* by bilinguals. Section 6.11 below investigates cognation as an independent variable in greater detail.

First, however, we need to account for why monolinguals actually used a significantly higher rate of *caress* as compared to *stroke* than the bilinguals, even though *caress* has a French cognate *caresser*. Cognates are words which share a large degree of both semantic and form overlap (as discussed in section 2.2.6.3); however, they do not necessarily have exactly the same meanings and/or exactly the same forms. In the case of *caress* versus *caresser*, I was told by a native French speaking informant that the word *caresser* in French typically has a sexual connotation. In English, *caress* has a strong emotional connotation, which could definitely be sexual in certain contexts, but it does not have to be. The video scene which depicted the *stroke/caress* event involved a sad, pensive woman gently stroking/caressing the hair of a wooden doll she kept in her room. The scene was definitely emotional but not at all sexual. Perhaps the sexual nuance that often accompanies *caresser* in French prevented the bilinguals from choosing to describe the event using the English verb *caress*. Of the five bilinguals who chose the word *caress*, four were English-dominant bilinguals who may not actually have that sexual connotation associated with the word *caresser* thus they would see no reason not to use its cognate when describing a patently non-sexual activity.

Besides the fact that in some synonym pairs one member is a cognate with its French translation equivalent, a different situation exists for pairs like *hand back* versus *give back*. In this case, the differential usage between bilinguals and monolinguals may be related to the specificity of the term chosen, or, in other words, where on the semantic hierarchy the words fit in relation to each other. For instance, *hand* is lower on the semantic hierarchy than *give*. *Hand* is a hyponym of *give*; there are different ways of giving something back, one of which is by *hand*. The bilinguals used the more general term (i.e., *give*) more often than the monolinguals. This same pattern emerged for the pairs *take* and *grab*, for

which the bilinguals used the more generic *take* in relation to the more precise *grab* more often than the monolinguals (although this difference was not significant). The words higher on the semantic hierarchy should be much more functional than their hyponyms as they can be used in a wider variety of circumstances. In some cases, it seems as though French actually does not have a translation equivalent for the hyponym in the form of a single verb encoding. In the Translation Task reported in section 4.2, *remettre* was a common translation equivalent offered for both *hand back* and *give back*. If one wanted to specify the nature of the redistribution, a secondary phrase would be required as in *remettre par main*.

There were several events in the main experiment which could have been lexicalized using either *hand* or *give* as the basic root (e.g., *hand/give back, hand/give in, hand/give to*, etc.). Figure 6.24 shows the relative usage rates of *hand* compared to *give* across the different participant groups. After all of those responses have been pooled together, the data set is large enough to run some ANOVA comparisons. The use of a more generic term would classify as a simplification strategy since the speaker could use the same term to describe a larger number of events than possible with the more specific hyponym. Thus, we would expect the bilinguals with less proficiency in English (i.e., the French-dominant bilinguals) to use employ this strategy more often.

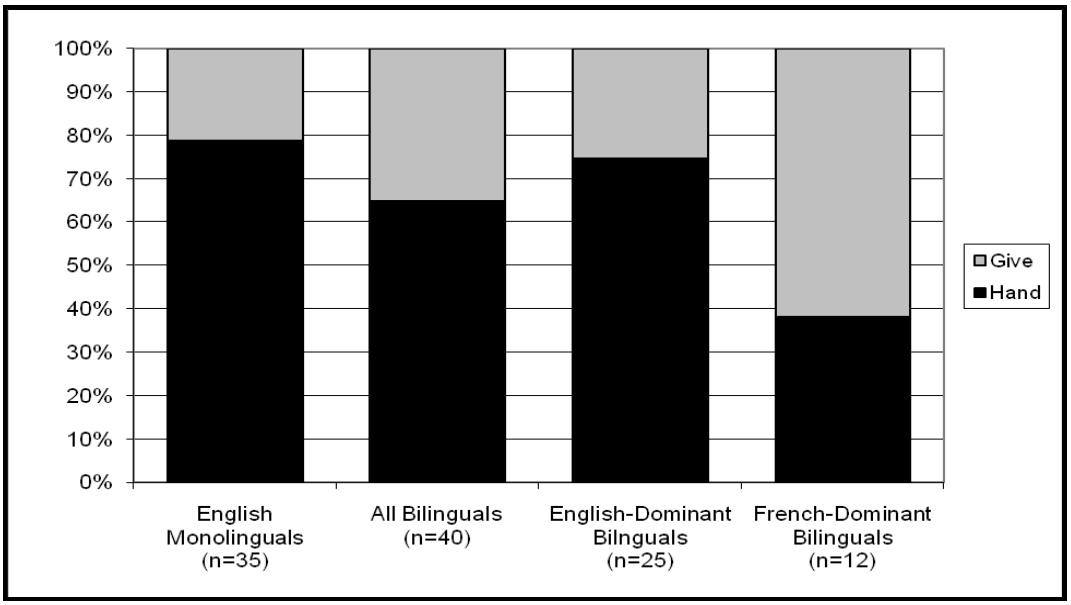

Figure 6.24. Occurrences of *give* versus *hand* across the participant groups.

Whereas the monolinguals showed a strong preference to describe those events with the root *hand* (79%), the bilinguals used *give* more often resulting in a '% Hand' rate which was significantly lower (65%) ($F(1,72)=6.96$, $p<0.05$). Obviously, the French-dominant bilinguals made a sizeable contribution to this disparity since they actually used *give* more often than they used *hand* (i.e., only 38% for *hand*). Not only did the French-dominant bilinguals use *hand* significantly less often than the monolingual English speakers ($F(1,45)=19.52$, $p<0.0001$), their word choice was also significantly different from the English-dominant bilinguals ($F(1,34)=9.69$, $p<0.005$). It seems as though once speakers of English have acquired the habit of lexicalizing the higher degree of specificity right into the verb root, the influence of French does not then block that level of information encoding. However, if French is the first and dominant language,[81] speakers are not conditioned to lexicalize that degree of specificity in the verb

[81] If French is the first language but not the dominant language, as is the case for the seven switched-dominance bilinguals, the high level of proficiency in English seems to allow these speakers to opt for the hyponym, without compromising fluency, to the same degree as for monolinguals. The '%-Hand' rate for this group of English-dominant F/E bilinguals was 70%, very similar to the rate for monolinguals and the other English-dominant bilinguals.

root and since communication in English is not impeded by the utterance of the hypernym *give*, there is little motivation to change those habits.

6.10.2. *Shut* versus *Close*

A note on the pair *shut/close* is worth mentioning at this point to complete the analysis of the XX Control pairs. In the preliminary experiments (reported in section 4.2 and 4.3), *shut* and *close* were rated as having a very high rate of semantic similarity. In the translation task, they were translated into the same French word (*fermer*) 97% of the time. They received some of the highest ratings of all the synonym pairs in terms of having the same level of specificity, formality, and similarity of meaning both in and out of context. Due to this high degree of overlap of semantic features, one would expect that speakers might use them more or less indiscriminately, about half the time using one and half the time using the other. Yet in the main production task, that was not the case at all. *Close* and *shut* were not used variably at all. In fact, *shut* was only chosen 8% of the time. *Close* was the overwhelmingly preferred term to describe doors being put into the closed position.

In this case, there must be an additional factor at play in determining lexical choice. Perhaps it is a connotational difference in which *shut* evokes more of a sense of urgency which was not conveyed by the video scenes in the experiment. Perhaps it is a collocational difference in that when the object being *shut/closed* is a door, speakers prefer the combination of *close* and *door*. Regardless of the cause of this lopsided result, it does reinforce the notion that there is more to the usage of a word than simply strict semantic considerations.

6.11. Cognation

It seems, from the previous analysis, that one factor influencing word choice for the bilingual participants may be whether a cognate exists for that word in the other language. Because the monolinguals have no knowledge of the cognates as being cognates, it must be factors unrelated to their structural and semantic correspondence to the French translation equivalent which determines

their usage rate. By contrast, if the bilinguals know the cognates in both languages, then the semantic and structural overlap between the two words may have an influence on how those words are processed. If cognation was playing a role, in the form of CLI, in the lexical choices made by the bilingual participants, one would expect them to articulate the cognate member of the synonym set more often than the monolinguals, all other factors being equal.

To establish the cognate counts, I isolated the events for which the preset synonyms sets included one member that was a cognate with its French translation equivalent. Of course, people are not restricted to simply making two-way choices between lexical items when they speak. They often have an array of synonyms or lexicalizations to choose from (e.g., *enter/go into/come into/walk into/head into*, etc.). Therefore, I counted the ratio of cognates to the non-cognates that I considered to be the closest synonyms, sometimes more than one, as in the *enter* example above. I excluded lexicalizations which I felt made extra semantic contributions beyond those implied by the cognate. For example, I compared the cognate *absorb* against the non-cognate *soak up* but not against instances of *sop up* since I felt that this verb implied a more willful action from the subject, and, in fact, could well have a different logical subject entirely (e.g., it is the cloth *soaking up* the water but it is the person *sopping up* the water). Table 6.7 lists all the verbs that I determined to be cognates plus the non-cognate synonyms against which they were compared.[82] The last column indicates how often a member from that particular synonym set was mentioned by the participants during the production task.

[82] Although strongly related, the comparisons in this section are slightly different than in section 6.9 and 6.10 (which compared the pre-set target pairs) since the non-cognate totals include instances of synonyms that were not part of the pre-set synonym pairs.

Table 6.7

Cognate/Non-Cognate Sets for the Calculation of a Cognate Use Rate.

Cognate (French form)	**Non-cognate synonym(s)**	**Frequency of Mention**
absorb (absorber)	*soak up*	23
applaud (applaudir)	*clap*	63
assemble (assembler)	*put together*	78
caress (caresser)	*stroke*	39
correct (corriger)	*grade/mark*	179
enter/re-enter (entrer/rentrer)	*come/go/head/walk into*	339
enter/re-enter (entrer/rentrer)	*punch/type in*	100
exchange (échanger)	*trade*	13
explode (exploser)	*blow up/pop*	59
extinguish (éteindre)	*put out*	52
illuminate (illuminer)	*light up*	3
inflate (gonfler)	*pump up/blow up*	168
perspire (transpirer)	*sweat*	47
place/replace (placer)	*lay/put/set (back)*	317
point (pointer)	*aim*	86
post (poster)	*mail*	35
present (présenter)	*show*	65
rebound (rebondir)	*bounce back*	43
receive (recevoir)	*get*	46
repair (réparer)	*fix*	12
return (rendre)	*give/hand/pass back; take back*	165
return (retourner)	*come/go/head/walk back*	273
telephone/phone (téléphoner)	*call*	50

I decided to eliminate two sets of synonyms from the following analysis because the cognate form was used so infrequently that it did not seem to be a very viable option for speakers. For example, *post* was only ever mentioned once whereas *mail* was used 34 times. Similarly, *perspire* was used three times compared to *sweat* being uttered 44 times. I concluded that these four instances of cognate use would not contribute to the overall understanding of the role of cognation in determining word choice so I eliminated them from the analysis. Additionally, since there were only three instances with which a participant chose either *illuminate* or *light up*, I also decided not to include those three instances as

they would make such an insignificant contribution to understanding the influence of cognates on lexical choice in English.

Another factor that may influence the degree of influence of a cognate is the actual frequency of that verb in French. For example, if a cognate is so infrequent that francophones rarely use that verb, it is unlikely to contribute much influence to the bilingual's verb choice in English. Additionally, by looking at the basic frequencies of the different synonyms in English, one can get a sense of how susceptible a verb may be to having its activation increased due to crosslinguistic form overlap.

6.11.1. Relative Frequency of Cognates

In order to establish frequency counts in a relatively consistent manner across the two languages, I chose to use a corpus of naturally occurring language – the world wide web – as the source of those counts. The Google search engine has the capacity to search through billions of webpages per second and return an approximate number of pages that contain the particular search term entered by the user. There were two main reasons why I chose to establish frequency counts in this way. First, pre-existing databases of lexical frequency such as CELEX (Baayen, Piepenbrock, & van Rijn, 1993) or the Brown Corpus (Francis & Kucera, 1982) do not contain frequencies for complex verb structures such as VPCs or V plus P sequences, thus I was required to do a more detailed corpus search to establish frequencies for those types of structures. Secondly, these databases do not have data for both French and English. Although I am not comparing crosslinguistic frequencies directly, it is useful to have results in the two languages that are somewhat consistent in terms of method of establishment and basic ranges.

Google allows users to constrain the results to pages of a particular language. Thus, for the French counts, I limited the language to 'French' and for the English counts, I limited the language to 'English'.[83] Since my main goal was to get relative counts (relative to the other verbs within that language), I simply

[83] I did not limit the search to pages from Canada. It would be interesting to see how comparable those results would be to the ones I obtained for this study.

searched for the infinitive forms of the verbs, on the presumption that all these dynamic verbs are more or less alike in terms of how often they are used in the infinitive as opposed to in a certain inflected form. This search technique is also based on the presumption that the number of pages (which is the count that is returned by the search engine) reflects the actual number of usages of a verb, again relative to the other verbs being searched for. For example, there is nothing about certain verbs that makes them surface more or less frequently within a page than other verbs but not more or less frequently between pages.

When searching in French, the majority of hits seemed to return pages in which the lexical item was being used as a verb[84] since the French infinitive suffixes make these forms distinct as verbs. In English, on the other hand, there is no overt infinitive marker on the verbs thus the number of hits for that form would include pages in which the verb could be used finitely as well,[85] along with instances in which it is used as a noun (e.g., *present, caress, telephone, exchange, return, point, place, post*) or adjective (e.g., *correct*). Again, since I was not directly comparing frequencies between the two languages, I did not consider this to be problematic. The fact that some verbs in English have higher degrees of both semantic and syntactic multifunctionality may be seen as artificially increasing the frequency counts for those verbs. However, the frequency counts that are used in most psycholinguist research are lemmatized counts (in which the various inflections on the verb are ignored) and often include cross-categorical homonyms as well.[86]

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[84] A couple of exceptions I noticed were (a) *pointer* returning French pages talking about the *English Pointer* and (b) *poster* returning French pages selling *posters*, obviously borrowed from English.

[85] For regular verbs, the search term could match any inflection, including the 3rd person singular non-past form *–s* since the Google matches look within words, as evidenced by my search for *regulat* returning pages which included terms like *regulate* and *regulation* but which had no instances of *regulat* precisely.

[86] See Gahl (2008) for a discussion of Jescheniak & Levelt's (1994) hypothesis that the locus of frequency effects is at the word-form level (in which case frequency is collectively established for each set of homophones and each member of that set would be affected by the frequency in a consistent fashion) as opposed to at the lemma level (in which case the frequency of each distinct lexical unit alone bears on the behavior of speakers regarding that lexical unit.) Although Gahl (2008) presents evidence that lemma frequency also plays a role, she does not argue that word-form frequency is not a contributing factor in speakers` linguistic behaviour.

Establishing a representative frequency for the complex verbs was slightly more problematic. I first recorded the frequency of pages that included the exact phrase of the two words adjacent to each other (e.g., *walk into* or *put together*). I then conducted a second search in which I included the wildcard * symbol between the verb root and the second component (e.g., *walk * into*[87] or put * *together*). The Google search engine operates such that the * represents a single word; however, certain words, like determiners and numbers are not counted. Thus, the search for *put * together* would return both the examples *put it together* and *put the pieces together*. I stopped at one wildcard star, rather than recording a count with two stars and so on, because after a few trials at increasing the number of stars, the number of webpage hits became markedly decreased and of those that I viewed more closely, the two critical words seemed less likely to be part of the same complex verbal structure the farther apart they were in the text.

I added the two counts together and subtracted from that the count of pages that included the same complex verb structure in both adjacent sequencing (e.g., *put together*) and when separated (e.g., *put * together*).[88] The wildcard search had the disadvantage of bringing into the count the potential for the inclusion of forms that do not correspond to the complex verb structures being studied (e.g., "…*<u>bounce</u> the ball <u>back</u>…"* versus "…*<u>bounce</u> the ball. <u>Back</u> at the gym…"*). To control for this variable, I viewed 40 pages for each of the complex verb structures and recorded whether the two words were used in a complex verb structure or not. To marginally randomize the webpages, I looked at the first webpage listed on each of the first 40 pages of results (with 10 websites listed per page). I established a ratio of the number of webpages out of 40 in which the words were used as part of that complex verb relationship. This ratio was then transferred to the totals previously established for each of the complex verb structures.

[87] The second search was warranted for the V + P cases as well since they can also surface with an intervening word, not in the form of a direct object but instead as a specifying particle (e.g., *walk right into the fire*) or an adverb (e.g., *walk swiftly into the room*).

[88] Unfortunately, the OR function that is built into the Google search engine did not seem to work for establishing accurate page counts since searching for either the adjacent configuration or separated configuration at the same time invariably returned fewer pages than either the adjacent or separated configurations by themselves when searched independently.

In order to have ranges of data in the two languages that are somewhat comparable (for the sake of consistency and ease of understanding patterns), I manipulated the counts in the following way. There are vastly more websites in English than in French on the world wide web, thus there will obviously be higher counts for English verbs than for French verbs. In order to get a sense of the actually number of sites that Google analyzes, I conducted a search in each language using definite determiners (i.e., *the* and *le* respectively) as my search terms. On the day that I conducted these webpage counts, over 25 billion English sites were reported to contain *the* and just over 1 billion French sites were reported to contain *le*.[89] In fact, there were 21.5 times the number of English pages than French pages. To make the counts between languages more even, I multiplied the frequency counts that I gathered on the French words by 21.5, based on the logic that the relative counts between verbs would be maintained if there were 21.5 times the number of French sites to be searched.

Gahl (2008) reports that "the function relating word frequency to behavioural measures in many reported psycholinguistic experiments is approximately logarithmic: a given absolute difference in frequency will have a larger effect in the lower-frequency ranges than in the higher-frequency ranges" (p. 483-4). In other words, lexical frequency can account for linguistic behaviour much more fully if the raw totals are log-transformed, which, in effect, makes the frequency differences in the lower ranges more relevant than differences in the higher ranges. Because the verb counts generated by this Google search were so vast (e.g., almost one billion hits for the verb *return*), a basic log-transformation (with a base of 10) did not seem to reflect telltale differences between verbs. To establish values that I felt were more reflective of the actual differences in frequency counts, I divided all of the totals by 1000 before conducting a log-transformation. Using this procedure, the range of results for the frequency of single-unit English verbs was 2.6 to 6.5. The final modification I made was to anchor the scales in both French and English to the frequency of the most

[89] I also searched the feminine definite determiner *la* but fewer pages were returned so I used the more frequent *le* as the critical search term.

commonly occurring verbs in each language, the verb *be*[90] in English and its translation equivalent *être* in French. I altered the base value of the logarithmic functions so that the results for these two verbs would be 10 and, thus, mark the top of the scale. For all of the English verbs, the log function involved the base value of 5.2, and for the French verbs, the base value was 4.9. After these manipulations, the range of totals for the French verbs was 6.2 (*gonfler*) to 8.4 (*recevoir*) and the range of totals for the English simple verbs was 4.9 (*extinguish*) to 9.1 (*get*) and for the English complex verbs, 3.3 (*head back*) to 8.2 (*go back*).

Table 6.8 indicates the relative frequencies for the cognates across the two languages in addition to the non-cognate synonyms in English. In cases in which there is more than one option, the highest frequency is given and the form it corresponds to is bolded. The table is ordered based on the frequency of the French verbs, with the most frequent verb listed in the first row. The final column indicates the difference in frequency of each English cognate and its most frequent synonym.

Since I then had two separate frequency counts for English words, one Google-derived and one from my experiment, I decided to compare the two. I confined the counts from my experiment to the monolingual speakers. Although these two different counts were quite different in nature, in that the Google counts did not discriminate between the different functions and meanings of the lexical items whereas in this experiment only one specific use and meaning was being targeted, a correlation still existed ($r(18)=0.48$, $p=0.03$) which lends credence to the values established in both frequency counts ratings.[91]

[90] Since the English verb frequencies gathered previously included all non-past inflected forms, I established a count for this verb in any of the following forms: *be*, *am*, *is*, or *are*. To be as accurate as possible in this total, I conducted 14 separate searches in which the different variants of the verb were searched independently or in combination with other forms but always excluding instances of pages that included the forms that were not targeting in that particular search. I then totaled the counts over the 14 different searches.

[91] The fact that one of the counts was log-transformed and the other dealt with raw totals did not seem to be a problem since I reran the correlation after conducting a log-transformation (with a base of 2) on the counts from this study and the correlation to the Google totals strengthened ($r(20)=0.59$, $p=0.005$).

Table 6.8

Log-transformed Frequency Counts for English and French Cognates Plus English Non-cognate Synonyms.

French form	**Frq.**	**English Cognate**	**Frq.**	**Non-cognate synonym(s)**	**Frq.**	**Frq. Dif.**
recevoir	8.4	*receive*	8.0	*get*	9.1	-1.1
entrer/*rentrer*	8.3	***enter***/*re-enter*	8.3	*come*/***go***/*head*/*walk* ***into***	7.7	+0.6
entrer/*rentrer*	8.3	***enter***/*re-enter*	8.3	*punch*/***type in***	6.4	+1.9
presenter	8.0	*present*	8.2	*show*	8.9	-0.7
exploser	8.0	*explode*	5.9	*blow up*/***pop***	8.0	-2.1
telephone	7.8	*(tele)****phone***	8.4	*call*	8.5	-0.1
pointer	7.3	*point*	8.5	*aim*	7.7	+0.8
échanger	7.3	*exchange*	7.8	*trade*	8.1	-0.4
corriger	7.2	*correct*	7.7	*grade*/***mark***	8.2	-0.5
rebondir	7.2	*rebound*	7.3	*bounce back*	5.0	+2.3
retourner	7.1	*return*[92]	8.4	*come*/***go***/*head*/*walk* ***back***	8.2	+0.2
réparer	7.1	*repair*	7.6	*fix*	7.4	+0.2
placer	6.9	***place***/*replace*	8.7	*lay*/*put*/***set*** *(back)*	8.7	0.0
éteindre	6.7	*extinguish*	4.9	*put out*	6.7	-2.8
absorber	6.6	*absorb*	6.1	*soak up*	4.4	+1.7
assembler	6.5	*assemble*	6.0	*put together*	7.1	-1.1
caresser	6.5	*caress*	6.1	*stroke*	6.7	-0.6
gonfler	6.2	*inflate*	4.9	*pump up*/***blow up***	6.6	-1.7
applaudir	6.2	*applaud*	5.3	*clap*	6.0	-0.7

Frq. = Google-based frequency count

From the results of Table 6.8, it seems reasonable to expect the biggest crosslinguistic influence to come from relatively high frequency French cognates in cases where the non-cognate translation equivalent in English seems to be the more frequent naturally occurring item (indicated by a negative value in the last column). French forms like *recevoir* and *exploser* would fall into that category. Even less frequent forms in French may exert an influence in cases in which the non-cognate translation is otherwise more frequent, as would be the case for French forms like *corriger*, *éteindre*, *assembler*, *caresser*, *gonfler*, and *applaudir*. This set of cognates I called 'predicted-effect cognates' as opposed to the

[92]I chose not to classify the transitive usage of *return* as being a cognate with the French translation equivalent *rendre* since there was quite a bit less form overlap between *return* and *rendre* compared to *return* and *retourner* and because the results of section 6.9 suggest that the cognate status of *return*/*retourner* actually discourages bilinguals from choosing *return* to describe transitive events that would be described using *rendre* in French.

remaining ones from Table 6.8, which I referred to as 'unpredicted-effect cognates'.

6.11.2. Cognate-Usage Rates

The initial analysis was carried out over the complete set of all cognates versus their non-cognate synonyms. Of the complete set, the monolinguals used a total of 313 cognates compared to 1142 non-cognate forms and the bilinguals used 418 cognates compared to 1223 non-cognate forms. For each participant, a '% Cognate' score was tabulated by dividing the number of cognates they generated by the total number of cognate plus non-cognate items. Group averages were then established. The monolinguals used the cognates 20% of the time. As would be expected, the bilinguals opted for the cognate forms more frequently and used them 25% of the time, although this difference is not significant ($F(1, 73)=1.7$, $p=0.20$). An interesting pattern is revealed when the % Cognate rates are broken down based on the dominance of the bilinguals. The group with the highest cognate-usage rate is the English-dominant bilingual group who opt for cognates (as opposed to their non-cognate synonyms) 28% of the time. By contrast, French-dominant bilinguals only use cognates 22% of the time. An ANOVA comparison between the English monolinguals and the English-dominant bilinguals does not reveal a statistically significant higher cognate-usage rate for English-dominant bilinguals ($F(1, 58)=2.7$, $p=0.11$); however, the result of a two-tailed t-test does border on significance ($t(1, 58)=1.6$, $p=0.05$).[93] Thus, it does seem possible that knowledge of French is influencing the English lexical choices made by the English-dominant bilinguals. A possible reason why the English-dominant bilinguals used a higher rate of cognates than the French-dominant bilinguals (who one would expect to experience greater levels of CLI) is explored in section 6.11.2.2 below.

[93] The rationale for using a one-tailed t-test would be that there is no reason to expect that monolinguals would use more cognates than bilinguals since they have no knowledge of which English words are in fact cognates with French words.

However, once the list of cognate/non-cognate comparisons was limited to the predicted-effect cognates (i.e., *applaud, assemble, caress, correct, explode, extinguish, inflate, receive*), the difference was significant ($F(1, 73)=18.6$, $p<0.0001$) with the monolinguals using the cognate forms 13% of the time to 32% for the bilinguals.

6.11.2.1. Usage Rates for Predicted-Effect Cognates

A breakdown of the usage rates of the predicted-effect cognates (as compared to their non-cognate synonyms) for the individual pairs is shown in Figure 6.25. All of the individual cognates were used more by the bilinguals than the monolinguals apart from *assemble*, which was used at a very similar rate, and *caress*, which was used quite a bit more by the monolinguals than the bilinguals.

Because the raw values per synonym set per person were very small (e.g., often used between zero and two times), I was not able to run an ANOVA analysis for the individual synonym sets. Instead, I determined a cognate or non-cognate preference for each individual participant for the set in question. I was then able to run a Chi-Square anlaysis on the proportional data that was generated. For example, 12 of the bilinguals preferred the cognate *applaud* whereas 19 preferred the cognate *clap* (for a 12/19 ratio) as compared to the monolinguals of whom only two preferred *applaud* and 26 preferred *clap* (for a ration of 2/26). The difference in those two ratios is significant ($x^2=8.1$, $df=1$, $p=0.004$). Using this procedure, significant differences in the ratios, with the bilinguals preferring the cognate option more often, also emerged for *explode* (Biling: 12/16 vs. Monoling: 2/19; $x^2=6.5$, $df=1$, $p=0.01$), *inflate* (Biling: 11/22 vs. Monoling: 0/30; $x^2=12.1$, $df=1$, $p=0.001$), and *correct* (Biling: 11/25 vs. Monoling: 2/32; $x^2=7.04$, $df=1$, $p=0.008$).

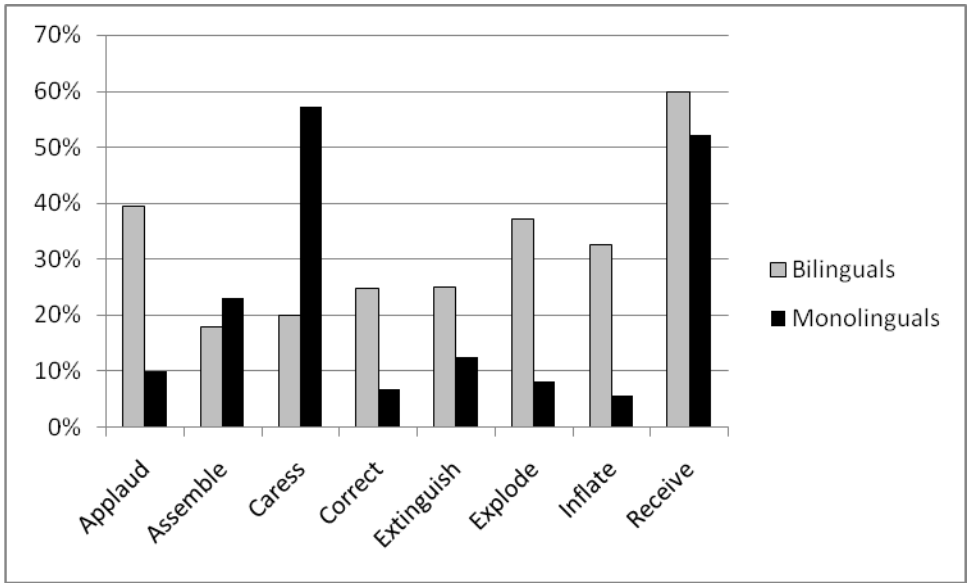

Figure 6.25. Cognate-usage rates for the predicted-effect cognates.

Although *caress* was used much more frequently by the monolinguals than the bilinguals, once each participant was only counted once within the Chi-Square analysis, there were only 29 tokens for consideration and the higher monolingual usage rate for *caress* did not quite reach significance (Biling: 3/14 vs. Monoling: 6/6; x^2=3.4, *df*=1, *p*=0.06). It is unsurprising that this result seems to contradict the pattern emerging for the other cognates, considering the important semantic distinction between the English *caress* and the French cognate *caresser* discussed in the previous section.

I reran the ANOVA analysis on the cognate-use rate of the predicted-effect cognate set but this time without inclusion of *caress*/*stroke* due to the connotational distinction that bilinguals may have transferred into English for the word *caress*. Thus, the remaining cognates that were part of this analysis were *applaud, assemble, correct, explode, extinguish, inflate,* and *receive*. The strength of difference in cognate-use rate between the bilinguals and monolinguals was increased ($F(1, 73)=24.0$, $p<0.0001$) with the monolinguals now choosing cognates 12% of the time compared to 33% by the bilinguals.

6.11.2.2. Usage Rates for Unpredicted-Effect Cognates

An analysis of the unpredicted-effect cognates compared to their non-cognate synonyms is fairly uninformative. For a number of them (e.g., *repair*, *exchange*, *absorb*), there were too few tokens for any sort of comparison to be made. For others, the cognate was mentioned so infrequently in comparison to its synonyms that it seemed not to accurately portray the scene that the participants were describing (e.g., *present*, *rebound*). The sets for which I had enough data to conduct an analysis and for which the cognate seemed a viable descriptor (see Figure 6.26) mostly reveal no cognate effect, as was expected based on their status as unpredicted-effect cognates. The exception was the cognate *enter* for the non-spatial interpretation of that verb (e.g., *enter data*) which did show a cognate effect for the bilinguals. 17 bilinguals preferred *enter* over its other synonyms and 15 bilinguals preferred the other synonyms. By comparison, only 8 monolinguals preferred *enter* and 23 preferred a non-cognate synonym. An analysis of the proportional data 17/15 versus 8/23 rendered a significant difference (x^2=4.9, *df*=1, *p*=0.03).

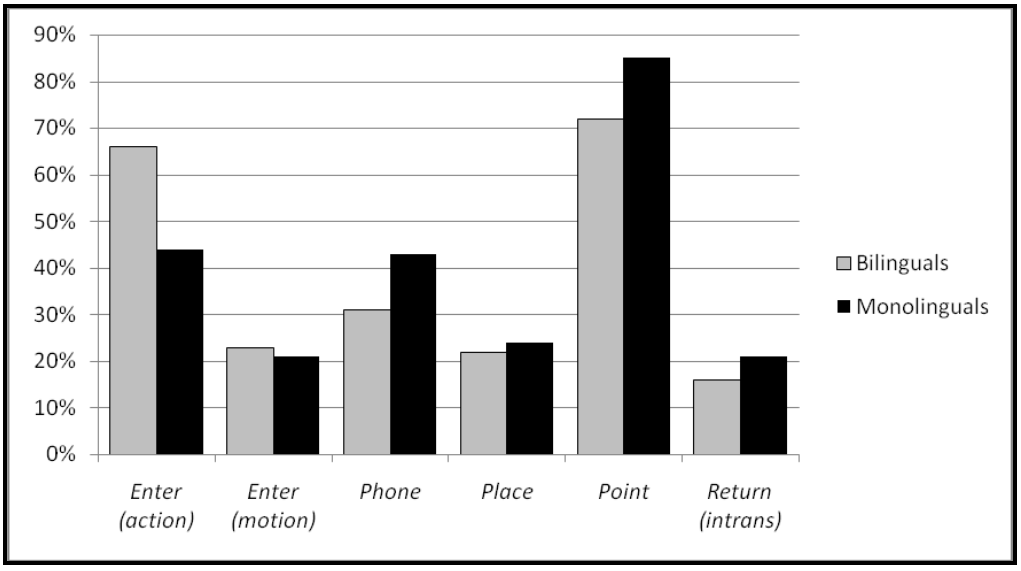

Figure 6.26. Cognate-usage rates for the unpredicted-effect cognates.

Some of the sets in this analysis actually seem to suggest a reverse-cognate effect in that the bilinguals use the cognate *less* frequently than the monolinguals, although none of the differences in usage between bilinguals and

monolinguals was significant. If all of these non-cognate effect sets are grouped together, the data set is large enough to explore further to see if there is actually something about these words that bias bilinguals against choosing the cognate. Figure 6.27 presents the cognate-usage rate for these sets with participants subdivided by language dominance. This sub-categorization seems to show some divergent behavior amongst the bilinguals, with the English-dominant bilinguals uttering the cognate option more often than the monolinguals and the French-dominant bilinguals choosing the cognate less often than the monolinguals. (None of the differences is significant although the results for the English-dominant versus French-dominant bilinguals ($F(1, 35)=2.48$, $p=0.12$) suggest that this distinction may be worthy of closer investigation in a study designed specifically to test the dominance/cognation interaction). The fact that the English-dominant bilinguals who had French as their Ll show an elevated cognate-usage rate seems to suggest that perhaps some crosslinguistic effect is at play since these switched-dominance bilinguals would be expected to have a higher degree of crosslinguistic interplay than the English-dominant bilinguals who did not learn French until some point later in life.

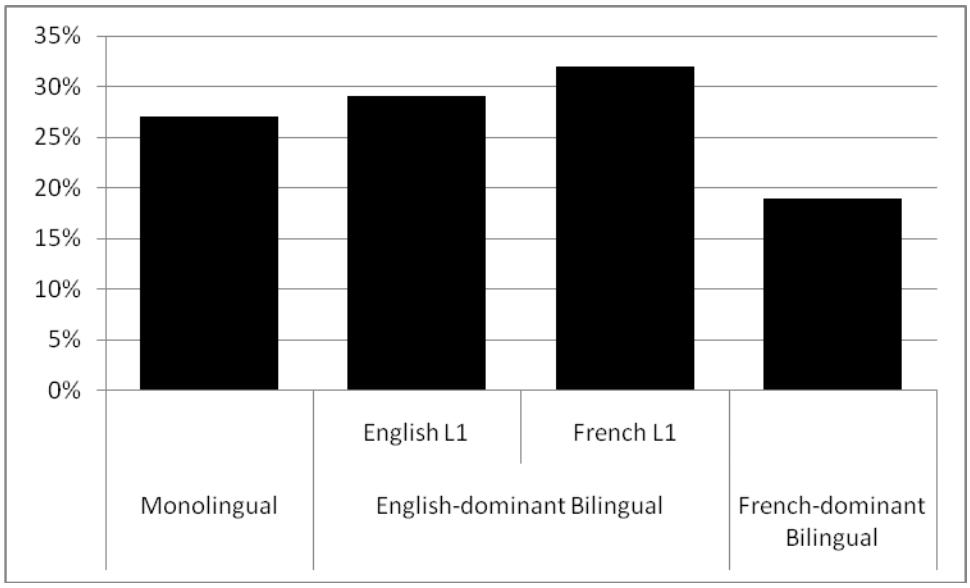

Figure 6.27. Unpredicted-effect cognate-usage rates based on language dominance and L1.

With regard to the French-dominant bilinguals, it seems that the crosslinguistic effect of cognation, which may be influencing the choices of the English-dominant bilinguals, is being blocked by some stronger factor in lexical choice for the group which one would expect to show the highest degree of transfer (i.e., the French-dominant bilinguals). As we saw previously, this additional factor may be a simplification strategy at work for the bilinguals with lower proficiency in English. Within each of the synonym sets in question, the cognate would be characterized as more semantically complex than its synonyms, if considering the verb root only. For example, intransitive *return*, implies motion away from and back towards some point of origin. The synonyms that *return* was compared against do not have the same degree of complexity within the verb-root component which conveys motion in a single direction only, either away from or towards the point of origin (e.g., *go, come*). The added semantic feature of returning to the point of origin is contributed by the particle *back*. Similarly, the cognate *enter* involves both the semantic notions of motion and of crossing a boundary into a contained space. The semantic composition of the synonyms of *enter* is somewhat different. It is the verb root that encodes the fact of motion (e.g., *go* and *come*) with the destination of that motion being conveyed by a particle (e.g., *in*) or PP (e.g., *into the room*). For the other sets, the cognates of *phone, place,* and *point* are all hyponyms of their synonyms *call, put,* and *aim*, respectively. *Phoning* is only one way of *calling* someone, *placing* is only one way of *putting* something, and *pointing* is only one way of *aiming*.

Some bilinguals may occasionally experience lexical access challenges that hinder production. A strategy that may alleviate this situation is to limit lexical searches to more generic (or semantically light) verbs which can then be modified with the addition of particles or adverbials to express further distinctions if warranted by the situation. The bilinguals' fluency would be enhanced since they would not need to spend extra time searching for very semantically precise (but less frequent) verbs. This type of strategy would be more expected for bilinguals who are not processing in their dominant language. When

simplification strategies are not required, because bilinguals are speaking in their dominant language, the influence of cognation has more potential to be realized.

All in all, it seems as though cognation is definitely one of the many factors involved in the lexical choices made by bilinguals. For the English-dominant bilinguals who have a more complete repertoire of words at their disposal and more fluent access to this lexical store, the CLI of cognation may play a greater role than it does for bilinguals who have a lower proficiency in English and who exhibit a more limited verbal output. For the bilinguals who have dominance in another language, in this case French, the fluency-enhancing strategy of opting for more generic verbs seems to outweigh the contribution made by the CLI of cognation.

6.12. Motion Events

A key difference in the lexicalization patterns of French and English is how Motion events are communicated. As discussed earlier, if path information is being expressed along with the fact of motion, French packages it into the verb root (e.g., *entrer*), whereas English allows for path information to be either part of the verb root (e.g., for Romance roots like *enter*) or in a satellite constituent like a particle (e.g., *go out*). For manner of motion information to be expressed as well, French speakers must throw in an additional subordinate clause since there is no room left in the verb root. As a consequence, native speakers of French often omit descriptions of manner entirely. English speakers, on the other hand, have the option of packaging manner into the verb root itself if the path information is encoded in a following adverbial. With this distinction in mind, I was interested to see how the bilinguals would package path and manner information in this experiment.

For this analysis, I focused purely on instances of dislocative (moving from one place to another), intransitive motion in which the subject was [+human] and the motion was self-propelled (e.g., not involving some mode of transportation like a car). There were 2938 instances of motion verbs used throughout the experiment. Verbs were classified into the following categories:

Bare Motion, Idiomatic Motion, Motion/Path conflation, and Motion/Manner conflation. All of the different motion verbs generated by this experiment are shown below, classified by type.

Table 6.9

Classification of all Intransitive Motion Verbs.

Motion Verb Type	No.	Examples
Bare Motion	1239	*go, come, move*
Idiomatic Motion	96	*head, make one's way*
Motion/Path	566	*approach, arrive, depart, enter, exit, leave, proceed, re-enter, return*
Motion/Manner	1037	*crawl, dance, file, march, meander, roll, run, rush, sashay, side-step, skip, speed walk, step, stomp, storm, stride, stroll, strut, walk*

Move is the most fundamental Bare Motion verb, expressing motion and nothing else. Obviously speakers feel *move* is not sufficiently descriptive to refer to dislocative, self-propelled motion performed by [+human] subjects since only 50 instances of this verb occurred. The Bare Motion verbs *come* and *go* are more descriptive because they also encode a deixis reference of motion relative to the speaker, *go* being motion away from the speaker and *come* being motion towards the speaker. They were also used much more often by the participants with 586 occurrences of *come* and 603 occurrences of *go*.

The Idiomatic Motion category includes expressions like *to make one's way* and *to head (somewhere)*. I included this category because these verbs are not simple, literal encodings of motion and, as such, may be used differently by different categories of speakers. The Motion/Path conflation verbs all express a path in conjunction with an expressed or implied spatial reference point (e.g., *enter (the room), approach (the front), return (to her seat), leave (the house),* etc.) Motion/Manner conflation verbs include some indication of the manner with which the subject is moving. Figure 6.28 offers a breakdown of the rates of usage of each motion verb type for first the monolinguals and bilinguals as a whole and then the bilinguals classified according to their language of dominance.

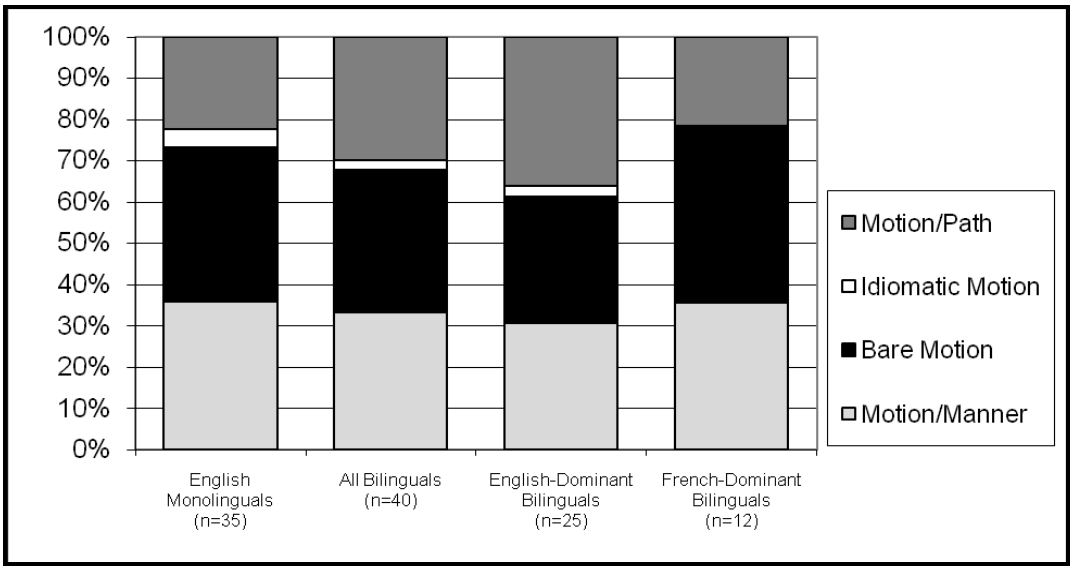

Figure 6.28. Number of intransitive motion verbs used across participant groups.

The white portion of the column in the Figure 6.28 represents instances of Idiomatic Motion verbs like *head* and *make one's way* which were used sparingly by all groups. Unsurprisingly, the French-dominant bilinguals uttered them the least often, less than 1% of the time. The English-dominant bilinguals used them slightly more often (2.6%) and the monolingual speakers used the highest proportion (4.5%) of Idiomatic Motion verbs. There was no significant interaction between these groups and the rates with which they used the Idiomatic Motion verbs ($F(2,69)=1.02$, $p=0.37$).

The MANNER/MOTION verb sections of each bar (light grey at the bottom) are remarkably similar in size. It seems that the French-dominant bilinguals did not purposefully avoid the conflation of motion and manner information in the verb root even though that pattern is not allowed in French (if PATH information is also being encoded). There were no significant differences between the participant groups (monolingual, English-dominant, French-dominant) in terms of rates of MANNER/MOTION conflation ($F(2,69)=0.45$, $p=0.64$).

At first glance, the results for the PATH/MOTION verbs (the dark grey portion of the bars found at the top) seemed consistent with the hypothesis of crosslinguistic transfer influencing higher rates of MOTION and PATH conflations for bilinguals, at 30%, compared to monolinguals, at 22% (a difference on the

verge of significance, $F(1,73)=3.83$, $p=0.05$).[94] However, once the bilingual group is sub-divided based on dominance, an unexpected pattern is revealed. If crosslinguistic influence was a key factor in influencing bilinguals to choose verbs in which MOTION and PATH are conflated, then the French-dominant bilinguals should exhibit the highest rates. Surprisingly, the French-dominant bilinguals actually show the lowest rate of MOTION/PATH conflation, even lower (although only marginally) than the monolinguals. Obviously it was the very high rates of MOTION/PATH conflations by the English-dominant bilinguals (36%) which was raising the level for the whole group of bilinguals. The English-dominant bilinguals conflated PATH with MOTION in verb roots significantly more often than both the French-dominant bilinguals ($F(1,35)=5.46$, $p<0.05$) and the monolinguals speakers ($F(1,58)=10.15$, $p<0.005$). Somewhat surprisingly, it seems that the English-dominant bilinguals are susceptible to the crosslinguistic influence of the French lexicalization pattern whereas the French-dominant bilinguals are not.

What could be driving such disparate results, especially amongst the bilingual speakers? The answer to this question may be suggested by the results of the Bare Motion verb rates. Where the French-dominant bilinguals used fewer MOTION/PATH verbs than the other groups, they used more Bare Motion verbs. Over 42% of all motion verbs used by the French-dominant bilinguals were bare motion roots with no conflation of PATH or MANNER information. On the contrary, where the English-dominant bilinguals used more MOTION/PATH verbs than the other groups, they used fewer Bare Motion verbs (30%). The difference in rates of Bare Motion verbs between the French-dominant and English-dominant bilinguals is very close to being significant ($F(1,35)=3.68$, $p=0.06$). It seems that the French-dominant bilinguals prefer using the basic verbs of motion as opposed to conflating more information in the verb root. It may be that they subconsciously acknowledge that French and English work slightly differently in terms of motion verb lexicalization patterns and therefore utilize the

[94] As done earlier, if the data are subjected to a one-tailed t-test based on the assumption that the monolingual English speakers would not be expected to show higher rates of PATH/MOTION conflation as the result of CLI from French since they have no knowledge of French, the result does reach a level of significance ($t(1,73)=2.0$, $p<0.05$).

multifunctional nature of the basic motion verbs to maximize their fluency. Verbs like *go* and *come* and *move* can either be used in isolation or they can be combined with adverbials of PATH or subordinate clauses of MANNER if there is also a need to express those features. Thus, by sticking to basic motion verbs, the French-dominant speakers do not need to consider verb conflation when speaking, which may increase fluency. Conversely, it appears that the bilinguals who are dominant in English and are speaking their dominant language and thus have fluent access to the full repertoire of verb options, are more easily influenced by the French pattern such that they opt for more MOTION/PATH conflated verbs. For the French-dominant bilinguals, the simplification strategy of opting for more bare motion verbs (which can be specified more fully, if necessary, with following adverbials) seems to trump the effects of crosslinguistic transfer. For the English-dominant bilinguals, simplification strategies are not required thus the crosslinguistic influence has more potential to be a factor in lexical choice.

The difference between monolingual speakers and English-dominant bilinguals with regard to the frequency with which PATH and MOTION are conflated into the verb root can be analyzed further to see if this is a case of English native speakers changing their lexical choice habits due to the acquisition of a second language. The English-dominant bilingual category includes 18 people who have English as their first language and seven who have French as their first language (i.e., switched-dominance bilinguals defined in section 2.2.6.1). As shown in Figure 6.29, the English L1 bilinguals conflated PATH and motion 32% of the time compared to the 22% shown by the monolinguals, a difference which is significant ($F(1,51)=4.6$, $p<0.05$). Thus, it does seem to be the case that the acquisition of French has the subsequent effect of changing the lexicalization habits of the native English speaker, at least with regard to the frequency with which PATH information is encoded into the verb root.

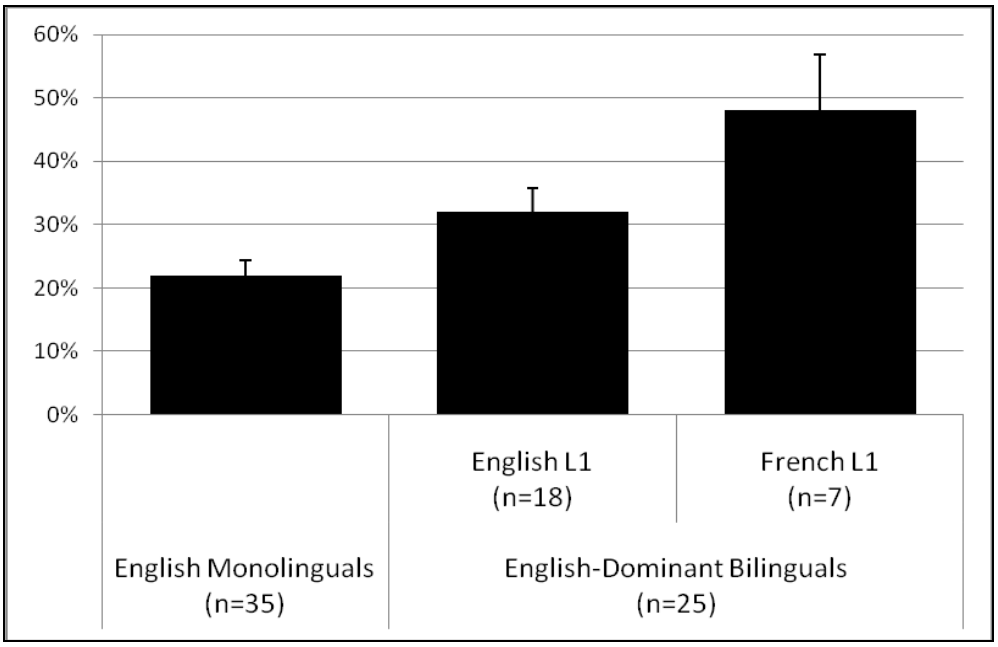

Figure 6.29 Percent of motion verbs that included PATH conflation.

The results for the switched-dominance bilinguals (the L1 French, English-dominant bilinguals) are even more extreme. Those participants who noted French as their first language but who were classified as English dominant conflated path into the verb roots 48% of the time. As would be expected, the difference between these switched-dominance bilinguals versus the monolingual speakers was significant ($F(1,40)=14.8$, $p<0.0005$). In addition, the difference in path conflation rate for this group was almost significantly higher than the L1 English, English-dominant bilinguals ($F(1,23)=4.0$, $p=0.06$). Those bilinguals showing the highest degree of crosslinguistic transfer were the ones who have a very high proficiency in English, and thus have a fully developed and accessible lexicon, and who have been exposed to French from birth, and thus have the experience in French that would drive crosslinguistic transfer.

In summary, the participants in this experiment demonstrated some very consistent behaviour in terms of their choices of intransitive motion verbs. There were, however, a few situations in which the participants' bilingualism could account for small differences, either as a product of language transfer, in the case of the English-dominant bilinguals who use an increased rate of motion/path

verbs, or as a simplification strategy in the bilinguals' non-dominant language, in the case of the French-dominant bilinguals' preference for Basic Motion verbs.

6.13. French Immersion Bilinguals

This set of results concerns a subgroup of participants. In the discussion on the bilingual participants in section 5.2, I indicated that a handful of the E/F bilinguals primarily acquired their French through French Immersion schooling in Canada. In this setting, the students are primarily Anglophone thus their peers are not native French speakers. The French input from the teachers adheres, presumably, to a standard French grammar, however much of their social interactions at school would be in some kind of inter-language, both productively and receptively. For this reason, it may be that the ultimate attainment or processing habits acquired are different for the French Immersion E/F Bilinguals than for non French-Immersion E/F Bilinguals. This experiment was not designed to test this variable but it is worth checking while a large data set is available.

I found no differences between the French Immersion E/F Bilinguals (n=8) and the other E/F Bilinguals (n=10) in any of the analyses: Single- vs. Multi-word encodings, VPC %, Cognate Use Rates, Non-required *Up* Rates, or frequency of Motion and Path conflations. In terms of verb choice, it seems that being an E/F bilingual is the crucial determinant in behaviour, regardless of how the acquisition of French took place.

6.14. Language Mode

The main experiment was designed to test the independent variable of language mode. All of the bilingual participants began the experiment at the monolingual end of the mode continuum in that all of the preliminary interactions with the experimenter plus the instructions for the task were delivered in English, the language being tested. After the bilingual participant had finished describing three of the video scenes, a shift along the mode continuum began when the bilingual completed the language background questionnaire. At this time, the

bilingual began to think explicitly about his or her bilingualism. Upon completing the language background questionnaire, the bilingual was then presented with a video clip to be described in French, thus firmly establishing the bilingual at some point towards the bilingual end of the mode continuum. The bilingual continued to give verbal descriptions of the following five video scenes in the order of English then French and so on. Thus, the first three target video scenes were described in English, while in the monolingual mode (prior to the language background questionnaire being completed), with the remaining three target video scenes being described in English while in the bilingual mode.

As discussed in section 2.2.6.2, the language mode in which a bilingual is functioning may alter the speaker's behavior by increasing activation of the language not-in-use thereby potentially enhancing any crosslinguistic influence. Table 6.10 offers a break-down of the main results of the experiment for the general pool of bilinguals based on language mode. It is quite clear that, as a group, the behavior of the bilinguals remained very consistent within both the monolingual mode and the bilingual mode.[95]

Table 6.10

Comparison of Bilingual Totals in the Monolingual Mode versus the Bilingual Mode Portion of the Experiment

	Monolingual Mode	Bilingual Mode
Single- vs. Multi-word Encodings	52%	51%
VPC Percentage	20%	21%
Cognate Use Rate	28%	28%
Non-required *Up* Usage	15%	14%
Motion and Path Conflation Rate	18%	23%

If the language mode totals are compared for the bilingual subgroups (based on language dominance), the results are quite similar. The only comparisons that seem to show a revealing difference are the last two, the rate of

[95] Such a result reaffirms the validity of the experiment. For example, if the results of the experiment were not a true reflection of the phenomenon in question, there could well be large discrepancies in the totals for the two halves of the experiment. In addition, the six scenes were balanced as much as possible in terms of how often they were described in the two language modes. This control measure seems to have been effective.

non-required *up* usage (which both English-dominant and French-dominant use more of in the monolingual mode), and the rate with which PATH is conflated with MOTION in verb roots (which both groups do more of in the bilingual mode). However, none of these comparisons shows a significant difference that would suggest it is the mode variable driving these differences. (For the English-dominant bilinguals, the results for the MOTION/PATH verbs followed by the non-required *up* usage were $F(1,24)=0.72$, $p=0.40$ and $F(1,24)=0.15$, $p=0.70$. For the French-dominant bilinguals, the results were $F(1,11)=0.77$, $p=0.40$ and $F(1,12)=1.69$, $p=0.22$, respectively).

Table 6.11

Comparison of Bilingual Totals, in the Monolingual Mode versus the Bilingual Mode Portion of the Experiment, for Bilinguals Classified by Dominance.

	English-Dominant Bilinguals		French-Dominant Bilinguals	
	MM	BM	MM	BM
Single- vs. Multi-word Encodings	51%	49%	57%	55%
VPC Percentage	22%	22%	15%	16%
Cognate Use Rate	28%	28%	26%	29%
Non-required *Up* Usage	22%	17%	7%	0%
Motion and Path Conflation Rate	23%	27%	11%	16%

MM = Monolingual Mode
BM = Bilingual Mode

With such a large collection of spontaneously generated verbs as were collected in this experiment (28 850), a wide range of analyses and comparisons were available and necessary to explore the nature of bilingual language production. In the following chapter, the results will be summarized and discussed within the framework of bilingual lexical choice established in section 1.2.

7. Discussion and Conclusion

7.1. Revisiting the Framework for Bilingual Lexical Choice

Considering the large number of factors (outlined in Chapter 2) which contribute to the ultimate output form of language, it is somewhat surprising that, for most of us, speaking in one language or another seems to occur so effortlessly. This dissertation presents the argument that the state of bilingualism augments the degree of complexity of the speech production process due to two distinct factors. The first factor involves the potential for the forms and frequencies of one language to be transferred to the other. In this case, it is the exact nature (e.g., grammar and lexicon) of the two languages that will determine the type and degree of influence. The second factor relates to the idea that knowing and using more than one language will result in certain storage and processing limitations relative to monolingual speakers, regardless of what those individual languages are. These two factors – crosslinguistic influence (CLI) and the basic state of bilingualism – have been explored in this study and are summarized below.[96]

This study focused on one particular aspect of language production: the end result of lexicalization or, in other words, the lexical items ultimately chosen for articulation. Figures 1.1 and 1.2, first presented in the introduction and reprinted here, demonstrate how the two bilingual-related factors of CLI and the state of being a bilingual may impact the lexical choices made by bilinguals. CLI has the potential to affect the frequency with which speakers choose certain lexical items over others. In such cases, bilingualism is exerting a *modifying effect* on the language, by altering the rates with which certain forms are chosen by bilinguals in comparison to monolinguals. CLI which results in frequency-of-use modifications are classified as cases of covert transfer as they are not readily

[96] On the basis of the evidence presented in this study, the explanatory framework that I provided is certainly consistent with the data. This conclusion does not preclude, however, the potential relevance of other variables such as the individual lexical learning histories of the participants or collocational effects within the participants' verbal output. Against the background of the findings of this study, it could also be profitable to explore whether such variables are also related to the observed data.

observable within an experimental paradigm using chronometric or accuracy measures.

A = monolingual preference, **B** = hypernym for A, more general term, **C** = has structural equivalent in bilingual's other language, **D** & **E** = low frequency terms

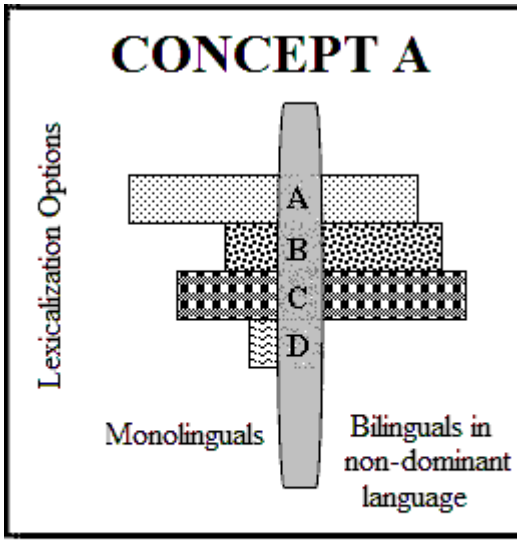

Figure 1.1 Lexical choices of bilinguals in their non-dominant language as compared to monolinguals

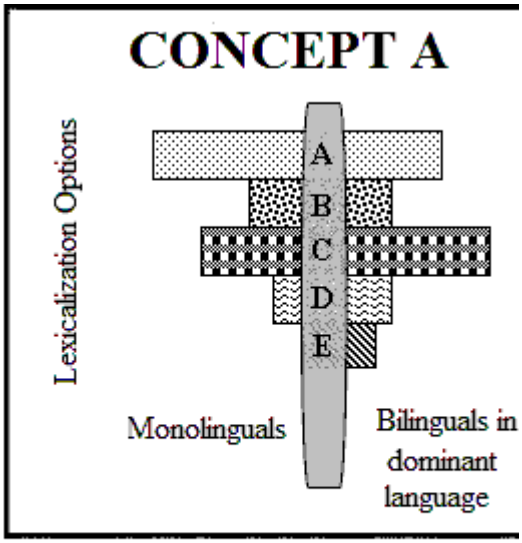

Figure 1.2 Lexical choices of bilinguals in their dominant language as compared to monolinguals

The general state of being a bilingual may have a couple of distinct effects on language production. Due to the fact that bilinguals must use and store up to twice as many lexical items as a monolingual, in order to function with equal success in the same environments, they may encounter limitations on those cognitive resources which require them to employ simplification strategies. Using simplification strategies to lighten the cognitive load would be an example of bilingualism having a *limiting effect* on the lexical choices made by bilinguals. On the other hand, bilinguals who regularly use both of their languages in a mixture of environments have more experience than monolinguals at choosing from amongst lexical items which have a high degree of semantic overlap. Every time bilinguals of this type speak, they must decide between translation-equivalent words in order to produce one which belongs to the language-in-use. Because of this regular practice that bilinguals receive in terms of lexical

discrimination, they may develop or demonstrate this skill by choosing more low frequency synonyms or by choosing hyponyms rather than superordinate terms. In this case, bilingualism would be having an *expanding effect* on the lexical choices by allowing the bilingual easier access to these words than a monolingual speaker might experience. The results of the main production experiment are summarized below as they relate to these three different effects.

7.2. Potential Effects of Bilingualism on English Dynamic-Verb Lexicalization

The main production experiment reported in this study provided evidence for each of the potential effects of bilingualism on the lexicalization of English dynamic verbs: *expanding*, *limiting*, and *modifying*. Each of these effects is outlined below, beginning with the least robust effect.

7.2.1. Expanding Effects

The extra practice in lexical discrimination that bilinguals receive as a product of being bilingual may give them enhanced skills in lexical dexterity, at least in situations in which bilinguals are speaking in their first and dominant language. The English L1 bilinguals (all English dominant) who participated in my experiment showed a significantly higher percentage of verb-choice variability than both the French L1 bilinguals and the monolingual English speakers. Since both the E/F bilinguals (i.e., L1 English/L2 French) and the monolinguals were all native speakers of English, it seems that the addition of the second language for the bilinguals endowed them with enhanced lexical dexterity which was realized in this experiment in the production of a wide range of lexical items, many of which would be very specific descriptions found low on the semantic hierarchy and with fairly low frequencies. This result was independent of the fact that this group was also more verbose than both the monolinguals and the F/E bilinguals (L1 French/L2 English), although not to a significant degree.

7.2.2. Limiting Effects

The main motivation for concluding that bilingualism can have a limiting effect on speakers' lexical choices is that they seem, at times, to be employing certain simplification strategies. As would be expected, most of the results pointing to a limiting effect were for the French-dominant bilinguals (all of whom had French as their L1). These simplification strategies were employed by the speakers who had a lower level of proficiency in English, those speakers for whom strategies to enhance production fluency would be valuable.

The most basic type of simplification strategy would be to talk less, such that the routines and procedures required to communicate successfully would not be required as frequently. In terms of the total verb count results in this experiment, it seems that the L1 of the participants was the key determinant of verbosity. The F/E bilinguals used significantly fewer total verbs than both the E/F bilinguals and the monolinguals, all of whom have English as their L1. In addition to talking less, the F/E bilinguals also used a less diverse range of verbs and, once the results from each participant were controlled for the number of verbs uttered, the F/E bilinguals showed a lower variability in the different verbs they used. In other words, the F/E bilinguals seemed to be confined to a smaller stock of verbs in their descriptions of the scenes in question. If we can consider bilinguals speaking in their first and dominant language to have enhanced lexical dexterity, it may be germane to suggest that bilinguals speaking in their second and non-dominant language have an under-developed level of lexical dexterity.

Other indications of the use of simplification strategies by French-dominant bilinguals were their elevated usage of copula verbs and their decreased usage of VPCs compared to the other groups. In section 6.8, I argued how copula-verb use could be interpreted as a simplification strategy in that it enables the speaker to avoid finding the relevant descriptive verb while still communicating the result of the action by encoding the resultant state in a copular clause. Similarly, I offered a suggestion for why VPCs could be considered more complex than simple-verb alternatives. Therefore, if bilinguals use fewer VPCs, they may simply be avoiding a more complex structure in their speech. In the

case of copular verbs rates, the F/E switched-dominance bilinguals (those bilinguals with French as the L1 but who show English dominance) showed a significantly lower rate than the F/E French-dominant bilinguals. Thus, it seems that as the proficiency level in English increases, the reliance on copular verbs as a simplification strategy decreases.

There was one possible simplification strategy which may have been shared by all bilinguals, both French dominant and English dominant. At least in a comparison of the relative frequencies of the verbs *hand* and *give*, bilinguals, as a whole, used the superordinate term *give* significantly more frequently than monolingual speakers. It could be that even bilinguals speaking in their dominant language need to lighten the cognitive load occasionally by opting for higher frequency and more generic descriptors. However, this case could also be an occurrence of crosslinguistic transfer (as outlined below) since there is a translation equivalent in French which shares the same morphological structure as *give* (i.e., *mettre*) but there is no verb in French which has the manner of giving encoded directly in the verb stem (i.e., **mainer*). Instead, the specification of the manner of giving must be encoded in a subsequent phrase (i.e., *mettre par main*). Thus, the fact that all bilinguals used a higher *give*-to-*hand* ratio than monolinguals could simply be a transfer of the lexicalization pattern found in French

7.2.3. Modifying Effects

The main hypothesis behind the main production experiment was that bilinguals of French and English are influenced by French in their production of English. In particular, the lexicalization patterns that exist in French are adopted, when applicable, and followed during the lexicalization of English verbal expressions. The measurement of such transfer is in the relative frequencies with which certain structures and forms are used in English, in cases where the language has variable encodings – one encoding following the French pattern and one encoding following the non-French pattern. Such transfer is deemed covert in that it is not readily observable and can only be determined by counting the

frequencies with which each linguistic variable is used. In particular, one can conclude that covert transfer has taken place if bilinguals use the English forms and structures that have an equivalent instantiation in French significantly more often than monolingual speakers who are not influenced by the French lexicalizations. Similarly, if bilinguals use the English forms and structures that do not have an equivalent instantiation in French significantly less often than monolinguals, that is another instance of covert transfer.

The results of this experiment point to numerous instances of CLI in the form of covert transfer, as outlined below. The experiment was initially designed to test the linguistic behaviour of two main groups: bilinguals of French and English and monolingual English speakers. As seen above, specific *expanding* and *limiting effects* of bilingualism seem to be restricted to particular sub-groups of bilinguals based on factors such as dominance and L1. The *modifying effect* of bilingualism, on the other hand, seems to exert an influence on all the bilinguals, when treated as a group, for certain cases. For example, bilinguals used more copula verbs and more single-word verbs within the XY scenes than monolinguals. I suggested above that using copulas may be a simplification strategy; however, it may also be interpreted as a case of CLI, at least in terms of the encoding of motion events. As outlined in section 3.4, Slobin (1996, 2000) has argued that speakers of V-languages, including French, use static scene-setting clauses, from which the path of motion of some entity can be inferred, more often than speakers of S-languages, like English, who overtly express the path in the main motion-event clause. If this pattern of behaviour is manifest for speakers of French and English specifically, motion event descriptions in French would likely involve the use of copula verbs more often than motion event descriptions in English. Transferring this French pattern to English would increase the rate of copula verbs used by bilinguals.

The key linguistic items initially created to direct the development of the video scenes were synonym pairs in which one item was a single-word encoding, following the French pattern, and the other item was a multi-word encoding, not following the French pattern. Thus the frequency with which the structurally

different synonyms were used, was the crucial comparison for this study. Some evidence did surface in support of this type of CLI. As mentioned above, bilinguals used more total single-words within the scenes for which the XY Target pairs were elicited. Specifically, bilinguals used the single-word verbs *withdraw*, *inflate*, and *hide*, significantly more often than monolinguals, in relation to the multi-word counterparts of *take out*, *pump up*, and *cover up*. Additionally, the higher frequency usage of *explode* as compared to *blow up* shown by bilinguals was almost significantly different from monolinguals.

An even more obvious type of CLI takes place when one looks at form equivalence in phoneme/grapheme structure as is found for cognates. Unsurprisingly, bilinguals often used higher rates of words for which a cognate exists in French than monolinguals, who have no knowledge of such crosslinguistic parallelism. In particular, all bilinguals used higher *applaud*-to-*clap*, *correct*-to-*mark*, and *enter*-to-*punch in* ratios than monolinguals. In comparisons between the English-dominant bilinguals versus monolingual English speakers, the results were no longer significant; however, since the majority of the members of the bilingual pool of participants were English dominant (22/40) and, as a group, the bilinguals did show significant lexical choice differences from monolinguals, it seems that all types of bilinguals are susceptible to CLI to a certain degree[97].

Other significant results are found when monolingual frequencies are compared to those of the French-dominant and French L1 bilinguals. In addition to the cases mentioned above, French-dominant bilinguals used more single-word verbs than monolinguals in all events on the videos designed to elicit the key linguistic items in addition to those scenes designed to elicit the XY Target pairs. French-dominant bilinguals also used fewer VPCs in total than both monolinguals and English-dominant bilinguals. In this case, it seems that regular VPC use in English is an indication of proficiency since the English-dominant bilinguals and the English monolinguals use VPCs significantly more often than the French-

[97] Additionally, the one-tailed t-test did reveal a significant difference between the English-dominant bilinguals and the monolingual English speakers (for all the cognates pooled together) in which the English-dominant bilinguals used a higher rate of cognates.

dominant bilinguals. Frequent use of non-required particles, on the other hand, seems to be an indication that one is an English native speaker and not simply someone with a high level of proficiency in English. For this structure, the F/E bilinguals as a group, including those whose dominant language is now English, used significantly fewer non-required particles than the monolinguals and the E/F bilinguals.

There was only one result pointing to a case of reverse transfer (although an experiment designed to generate higher quantities of data per participant may find additional cases) in which the pattern in French seemed to influence the way English native speakers lexicalized events in English to the point where the behaviour of this group was statistically different from monolingual English speakers. In the expression of motion events, English-dominant bilinguals conflated the conceptual component of PATH in the motion verb stem significantly more often than monolingual English speakers. Because this group (as speaking in their dominant language) would not need to employ any simplification strategies, they were more susceptible to the effects of CLI than bilinguals speaking in their non-dominant language. A look within the English-dominant group (n=25) reveals that it is those with French as a first language (the switched dominant bilinguals, n=7) who are the most susceptible to the transfer from French.

One last case of crosslinguistic influence that is worth mentioning concerns certain lexical distinctions in English that bilinguals seem sensitive to as a product of transfer from French. First, it seems that bilinguals make a distinction between internally- and externally-caused motion of an object back to a prior location. In English, the word *return* can be used for both situations, as in (73).

(73) a. *I returned to my seat.*
(The FIGURE, *I*, is causing the motion → internally-caused motion).

b. *I returned the book to the library.*
(The FIGURE, *the book*, is not causing the motion → externally-caused motion).

In French, on the other hand, two different lexical items are used to express those two distinct situations, as in (74).

(74) a. *Je suis <u>retourné</u> à ma place.*

b. *J'ai <u>rendu</u> le livre au biblioteque.*

Since the French verb referring to the internally-caused motion is a closer cognate to the option in English, it seems that some bilinguals reserve the term *return* for describing that type of motion event.

A second type of lexical distinction made by bilinguals based on transfer from French surfaced in the pragmatic constraint against using the word *caress* to talk about an inherently non-sexual action. In French, *caresser* often has a sexual connotation which would incline bilinguals away from using its cognate to describe the action of a girl stroking the hair of a doll. Bilinguals used a much lower *caress*-to-*stroke* ratio than monolinguals.

7.2.4. Interaction of CLI and Simplification Strategies

The final result I would like to mention seems to be motivated by an interplay between crosslinguistic influence and simplification strategies. One type of covert transfer occurs when bilinguals avoid a structure in one language if the equivalent structure does not exist in the other. For example, bilinguals may avoid using VPCs in English, since French does not have multi-word verbs of this nature. In this experiment, it seems that some bilinguals avoided a structure which does have an equivalent in French but which the bilingual recognizes is a non-canonical structure in English. For example, bilinguals may appreciate that English has the capacity to conflate either MANNER (e.g., *scurry*) or PATH (e.g., *enter*) into the motion verb stem or to leave that 'slot' unfilled (e.g., *go*). Although the French pattern involves PATH conflation, bilinguals may appreciate that this lexicalization is not very common or productive in English and therefore they avoid it entirely. The more canonical pattern in English would be either to conflate MANNER or leave the motion verb stem unspecified for both MANNER and PATH. This latter option would be the simpler option since the bilingual would not need to migrate down the semantic hierarchy of lexical items to find a specific

manner verb. Thus, CLI steers the bilingual away from the form which exists in the other language and then a simplification strategy guides the bilingual to choose the less demanding option of those remaining. In this experiment, the French-dominant bilinguals used the lowest rate of PATH/MOTION conflations and the highest rate of bare motion verbs.

The accentuation of a canonical pattern seems to explain the results of the particle placement analysis as well. Different VPCs seem to have different tendencies in terms of where the particle surfaces during language production – adjacent to the verb and before the direct object or removed from the verb and after the direct object. Of the three VPCs that I chose to analyze in more detail, bilinguals always accentuated the tendency that was shown by the monolinguals in terms of particle placement.

As evident in this summary, many cases of CLI from French to English have been revealed in this experiment. In the next section, I outline how these results can inform the debate regarding the process of bilingual lexical selection as outlined in section 2.2.2.

7.3. Implications for Models of Bilingual Language Production

Although the results of this experiment do not isolate the exact point at which crosslinguistic influence takes place, it does suggest the possibility of CLI at different stages in the process of language production. There are four distinct points in the process of lexical access and selection at which CLI may take place: (a) at the point of conceptualization (as per Slobin's (1996) Thinking for Speaking proposal but extended to bilinguals in which case the bilingual is 'thinking' in one language for speaking in the other); (b) at the conceptual-to-lexical interface (in which case 'thinking' is language neutral but the language-specific 'chunking' (Beirwisch & Schreuder, 1992, and Poulisse, 1995) process involves some interaction between the two languages; (c) at the level of lexical selection amongst activated candidates ; or (d) at the level of phonological encoding. I will discuss the results of this experiment in the context of language production

models for the three following lexical cases: (a) description of motion events, (b) use of single- versus multi-word encodings, and (c) use of cognates.

7.3.1. CLI at the Conceptual and the Conceptual-to-Lexical Interface Level of Representation

The description of motion events in this experiment does suggest CLI at both the conceptual level and the conceptual-to-lexical interface. The distinction between these two stages is theoretically very subtle (as discussed in section 2.1). For the purposes of the following discussion, I will identify each stage based on differences in lexical encoding in the following way. Processing distinctions at the conceptual level will be asserted when different verb types are used (i.e., copula versus non-copula) as a reflection of whether the conceptual emphasis is on the description of setting or the description of action. Since the resulting clauses will have quite distinct structure, it seems reasonable to locate these encoding distinctions within the preverbal message, prior to the point at which conceptual features are being mapped onto individual lexical items. Conversely, processing distinctions at the conceptual-to-lexical interface will be asserted when there is not a fundamental distinction of verb type but when the conflation of conceptual information into the lexical units varies (i.e., the conflation of PATH and MANNER information in verbs of motion). In the latter case, there is no independent evidence from this experiment that this type of conflation takes place purely at the conceptual level (although, similarly, there is no evidence to preclude it either) so I will instead treat it as a chunking issue located at the conceptual-to-lexical interface level.

The results of this experiment regarding usage rates for the different verb types indicates that it is possible for the two languages to interact at the conceptual level. Two alternative interpretations were given for the elevated rate of copula verb use by bilinguals, either as a simplification strategy to avoid requiring retrieval of a specific verb or as a transfer of event-conceptualization from French. It could be that this result was disproportionately weighted by the French-dominant bilinguals who had a high copula rate as the result of a simplification strategy; however, an *ad hoc* comparison of participants revealed

that some of the participants who used the highest rates of copula verbs were English-dominant bilinguals and that when those clauses were classified more closely, the English-dominant bilinguals returned higher rates of copula-verbs-for-scene-setting (as opposed to copula verbs for indicating time or mood, etc.) than the monolinguals who used similar overall copula rates. I did not perform a detailed analysis of the function of all the copula verbs used by all the participants, as this experiment was not designed to specifically test how this attested crosslinguistic distinction potentially manifests in bilinguals. Future research, however, could address this question directly by gathering data along the lines of the frog story descriptions (see Berman and Slobin, 1994, and Slobin, 2004, for example), which involve large numbers of motion events, as generated by different populations. In particular, a comparison could be made between monolingual French speakers, bilingual French and English speakers, and monolingual English speakers with regard to their rates of copula verbs, and in particular, those which are used specifically to set the scene of the action.[98]

Motion event descriptions can inform discussion of CLI at the conceptual-to-lexical interface level as well. In this case, I treated differences in the rates with which PATH and MANNER (or nothing) were conflated with the fact of motion into the motion-verb stem as evidence for processing differences at this level. Speakers need to know which of these aspects are typically lexicalized into a single verb in the language they are speaking so that the appropriate conceptual features can be packaged together for efficient mapping onto lexical representations. In bilinguals of contrasting languages (i.e., those who speak both a V-language and an S-language), those packaging distinctions typically need to be kept discrete to prevent the production of ungrammatical constructions. However, although English is primarily an S-language, it does have a small store of motion verbs in which PATH is conflated into the verb stem in the V-language fashion as a result of lexical borrowing from French and Latin. Therefore,

[98] Both de Bot & Schreuder (1993) and Green (1993) suggest that experimental research and modelling implications are lacking regarding how bilinguals deal with the different lexicalization patterns for each language. Although this study does not address exactly how bilinguals resolve crosslinguistic variable lexicalizations, it does suggest that an interaction between languages does occur at this conceptual-to-lexical level of representation.

bilingual speakers of French and English have, at times, the advantage of being able to use the same lexicalization pattern (namely the conflation of PATH into the verb stem) regardless of which language they are speaking. CLI at this level is evidenced by bilinguals using more PATH/MOTION conflations in English than monolingual English speakers, which is exactly the result obtained in this experiment. As would be expected, the bilingual sub-group which showed the highest levels of PATH/MOTION conflation where the F/E switched-dominance bilinguals. This group had French as their first language, and were thus exposed to French lexicalization patterns from birth, but who rated themselves as being dominant in English at the time of the experiment. Arguably, these highly proficient English speakers would have had a wide vocabulary of verbs at their disposal upon which the CLI of the French pattern of PATH/MOTION conflation could be realized. Even the English-dominant bilinguals who had English as their first language showed a higher rate of PATH/MOTION conflation than monolinguals – evidence of reverse transfer. By contrast, the group of French-dominant bilinguals (who had the lowest proficiency in English) actually showed the lowest PATH/MOTION conflation rate (even marginally lower than the monolingual English speakers). The fact that the group that one would expect to display the largest degree of CLI actually presents no evidence of this effect could be due to the over-riding factor of employing a simplification strategy. French-dominant bilinguals used the highest proportion of bare motion verbs (like *come* and *go*) which are superordinate terms and therefore more general and productive (and, not to mention, frequent). By selecting these bare motion verbs, the French-dominant bilinguals could avoid the necessity of specifying a particular path of motion within the verb stem, knowing that English allows ready encoding of PATH (at least) in adjunct phrases if necessary.

As noted previously in the discussion of copula verbs, an experiment could be designed specifically to test this conclusion further by generating frog story descriptions from different groups of French and English speakers (both monolingual and bilingual) and comparing their results. In particular, it would be interesting to see if the reverse transfer (in which the L2 influences the L1) which

was documented in this experiment could be replicated. Future research in this domain could also take the design of Navarro's (2007) experiment but reverse it in terms of the languages being tested. Navarro investigated the PATH/MOTION conflation rates of L2 learners of Spanish to see at which stage of acquisition learners adopted the Spanish lexicalization patterns which are quite distinct from English. Thus, learners were going from the less constrained language (i.e., English, which allows both PATH/MOTION conflation in addition to MANNER/MOTION conflation in conjunction with a PATH adjunct) to the more constrained language. Since L2 learners of Spanish would, at some point, recognize that their utterances in Spanish which follow the English pattern are actually ungrammatical, they would have concrete impetus to re-evaluate their lexical encoding. On the other hand, Spanish speakers who are learning English as an L2 may not have the same level of motivation to adopt the typical English pattern since the Spanish lexicalization (of PATH/MOTION conflation) also exists in English for a small set of motion verbs. The result of the CLI in this case would not be the generation of ungrammatical utterances but perhaps of forms that are inappropriate in pragmatic terms (e.g., style or register). It may take Spanish learners of English longer, therefore, to re-evaluate their lexical encoding habits.

One other linguistic distinction that potentially offers evidence for CLI at the conceptual-to-lexical interface level is whether the conceptual information is mapped onto a single word or distributed across more than one word. In English, this distinction is manifest in pairs of synonyms for which one member of the pair is a single word (e.g., *leave, raise*) and the other member is a verb followed by a particle (e.g., *go out*, *put up*) or a preposition as the head a PP (e.g., *go out of*). Since French does not have equivalent multi-word encodings to the same extent as English, higher rates of single-word use could indicate a lexicalization transfer from French. Some evidence of this type of CLI surfaced in the main experiment in the form of the higher rates of single-word usage in describing the 'key events' (those events included with the goal of eliciting synonyms) by French-dominant bilinguals than by monolinguals (and even by English-dominant bilinguals within the XY target scenes if the results were analyzed using a one-tailed t-test).

7.3.2. CLI at the Lexical and/or Phonological Level of Representation

CLI at the level of lexical selection seems to be driven primarily by the cognate status of words. In keeping with research on lexical decision (Sánchez-Casas and Garcia-Albea, 2005), picture naming (Costa, Caramazza, and Sebastián-Gallés, 2000), verbal fluency (Gollan, Montonya, and Werner, 2002), and TOT states (Gollan and Acenas, 2004), this experiment suggests that there is also a cognate advantage in lexical choice. The cognates represented in this experiment were divided into two categories, those for which the French version was predicted to have an effect on the selection of the English version (because the French form is relatively high frequency and the English form has a lower frequency of occurrence than its non-cognate synonym) as opposed to those for which the French version was predicted to have no effect. A strong cognate advantage surfaced in the 'predicted-effect cognates' whereby the bilinguals, as a group, used the English cognate much more frequently than monolingual English speakers. This cognate advantage can be accounted for in different ways, as outlined below.

Costa (2004, 2005) asserts that the predominant view within current models of language production is that lexical access is target-language nonspecific. In other words, lexical representations within both languages are activated each and every time a bilingual speaks, even when the speech situation only calls for one language. Following this line of thought, both cognates will be activated based on the conceptual to semantic overlap that they share. Since activation spreads to connected nodes, the cognates may then feed activation to each other, elevating the activation level of both nodes. This mutual activation boost could work in two ways, either directly within the lexical level or through feedback from the phonological level. If a bilingual is aware that two words are cognates, a strong connection between the two lexical representations will be established allowing for easy activation flow. Irrespective of the bilingual's overt awareness of cognation, some models of phonological encoding (i.e., interactive models; see Dell, 1986, for example) suggest that activation feeds back from the phonological to lexical level. If such feedback does exist, the phonological

overlap between cognates will spread activation back to both lexical candidates. Such spread of activation should offer an advantage to the cognates in the mind of bilinguals in comparison to monolinguals.[99]

The cognate advantage in lexical choice could also be explained without the pre-requisite of lexical access being target-language non-specific. In this view, the locus of the advantage is in the resting activation level of lexical nodes which is based primarily on the frequency with which that node is accessed. The idea that certain processing differences between bilinguals and monolinguals can be accounted for by the different rates with which speakers come into contact with the words of a language is called the Weaker Links hypothesis (e.g., Gollan and Silverberg, 2001; Gollan, Montoya, & Werner, 2002; Gollan and Acenas, 2004; Gollan, Montoya, Fennema-Notestine, & Morris, 2005; Gollan, Montoya, Cera, & Sandoval, 2008). Because bilinguals, by definition, use both of their languages to a certain degree, each of those languages will be used less by bilinguals than by monolinguals speakers, other factors being equal. As a result, the resting frequency levels of words in a bilingual's lexicon will be lower than the level of words in a monolingual's lexicon which will manifest in processing differences in terms of the efficiency of lexical-to-phonological mapping, in particular. A cognate advantage has previously been demonstrated in two distinct tasks in support of the Weaker Links hypothesis – cognates were shown to (a) reduce the occurrence of tip-of-the-tongue states (Gollan and Acenas, 2004) and (b) enhance verbal fluency (Gollan, Montoya, & Werner, 2002). One way to explain these results is that cognates have an augmented frequency count, relative to other words in the bilinguals' lexicon, which gives them an advantage in lexical retrieval

[99] Because this experiment does not measure the speed of lexical selection, it cannot inform the debate regarding the role of competition amongst lexical candidates from different languages. Some models suggest that they do compete (e.g., inhibition accounts as per Green, 1998, and 'complex access, simple selection' accounts as per Poulisse and Bongaerts, 1994, and La Heij, 2005). Within the framework of these models, both cognates would be highly activated and would consequently be the most fierce competitors, resulting in delayed selection. In other models, although lexical *access* is target-language nonspecific, lexical *selection* is target-language specific, meaning that the system only actually considers for selection words in the target language despite the activation of words in the nontarget language (e.g., Colomé, 2001). In this case, the cognate status should only *benefit* selection thereby accelerating it.

The cognate results of this experiment can be explained in the same way. Following the Weaker Links account, cognates must be extremely closely linked to each other in the lexicons of bilinguals such that encountering one member of the cognate pair also raises the resting level of activation of the other member of the pair. If such were the case, then crosslinguistic frequency differences will make different predictions about the degree of cognate advantage that is afforded in the lexical selection process. Because of the ceiling effect of frequency, in which increased use eventually offers no additional advantage (see Gollan, Montoya, Cera, and Sandoval (2008) for description), the biggest cognate advantage would be realized in situations in which the cognate is relatively low frequency in the target language but fairly high frequency in the nontarget language. If frequency-based resting activation levels are augmented by exposure to either cognate, then the cognate advantage should be much more evident in low frequency words in the target language which have a higher frequency cognate in the non-target language. In this experiment, my predicted-effect cognates fell within this category and they also demonstrated the highest levels of CLI. This hypothesis (that the degree of the cognate advantage is dependent on the relative frequencies of the two cognates) could be empirically tested quite easily within languages which share a large number of cognates. The use of a picture naming paradigm would not only allow for the collection of naming response times but could also include a component of variable lexicalization as was the basis of this experiment. Two types of pictures would have to be developed: those which are typically named with the same label across participants (that is, pictures with a single name) and those which are named variably across participants (that is, they have various synonymous names). For the set of synonymous-names pictures, if one of the viable synonyms is a cognate, that term may be chosen by bilinguals more often than monolinguals.

In sum, the results of this experiment do not exclusively support a specific model of bilingual language production although they do substantiate some proposals more than others. For example, the fact that instances of covert CLI were found (which I have argued could potentially occur at a variety of levels

within the process of lexical selection) is compatible both with the idea that lexical access is target-language non-specific (within competition-based models) and with the proposal that certain processing distinctions between monolinguals and bilinguals are simply the result of a frequency effect (within the Weaker Links framework).

7.4. Other Findings

Although the primary goal of this study was to search for cases of CLI (and secondarily for evidence of simplification strategies) during the lexicalization process, a number of additional implications emerged in this study relating to facts about the English language. The preliminary experiments which were designed to test the relatedness of the purported synonyms revealed the following with regard to the representation of these pairs by monolingual English speakers. In line with the general consensus that true synonymy does not exist in languages, the monolinguals differentiated all members of the synonym pairs to some degree. The specificity ratings of the members of the synonym pairs did not vary to a large degree; however, ratings of formality were, at times, quite distinct. Specificity, being a semantic consideration, seems to be more important than formality, being a pragmatic consideration, in recognizing words as synonyms. The lop-sided preference for the verb *close* over its synonym *shut*, despite this pair being ranked as the least differentiated in terms of specificity, formality, and possible translations into French, point to the fact that there is more to consider than semantic and pragmatic factors during lexical selection.

Another relationship between specificity and formality emerged in the analysis of the synonym pairs for which the two members varied in terms of lexical units (i.e., single-word verbs versus multi-word verbs, most of which were verb-particle constructions). Single-word members were rated as more formal but less specific than their multi-word synonyms. It seems that particles make a contribution of both informality and enhanced specificity within verb encoding.

On the topic of VPCs, the results of this experiment suggest that fairly frequent use of these constructions (almost a quarter of all verbs for the

monolinguals and English L1 bilinguals within the descriptions given) is a characteristic of the speech of native English speakers. The large discrepancy in the usage rates of non-required particles between native speakers and those who have learned English secondarily points to another characteristic of native speech which seems very hard to acquire if English is the second language. The subtle semantic distinction contributed by the non-required particle may not afford enough of a benefit to the bilingual to offset the processing cost of determining which particle is appropriate for which situation. If one follows Kilborn's (1994) suggestion that speaking in L2 versus speaking in L1 are guided by different principles, that of optimality for the native speaker versus economy for the second language speaker, it makes sense that the use of non-required particles would be a later acquisition for L2 speakers.

Another aspect of particles that was uncovered in this study concerns their placement relative to the direct object. The position in which the particle surfaces seems somewhat dependent on the particular combination of verb and particle. For example, *put* VPCs preferred the post-object position whereas *up* VPCs preferred pre-object position. It would be interesting to see if a corpus-based study could replicate these results. This pattern may be related to the spatial or non-spatial nature of the particle. Both Gries (2003) and Diessel and Tomasello (2005) contend that spatial particles tend to surface in post-object position and that non-spatial particles tend to surface in pre-object position. *Put*, being a transitive locative verb, reserves one of its argument positions, most naturally the post-object position, for specification of some location. Although not all VPCs involving *put* require a spatial particle (e.g., *I put off going to the doctor*), many of them do and it would seem natural that the preferred position for those particles would be in the same position (i.e., post-object) as spatial specification in the locative-transitive use of *put*. Conversely, although the particle *up* can be used spatially (e.g., *I put [up] my hand [up]*), in many cases it has more of an aspectual function (e.g., *I opened [up] the door [up]*) which may be driving the preference of its pre-object positioning.

7.5. Future Research

There are several directions that future research in the domain of cross-linguistic influence in language production can take. I will start by outlining the types of modifications and improvements to the experiment design that can be implemented before explaining the benefit of using this paradigm for testing other populations.

The stimulus development for this kind of experiment is fairly time and resource intensive. In order to increase the frequency with which the participants focus on and describe the relevant level of specificity within a situation, one would ideally pilot the video clips of each target event. Any scenes which do not reliably generate the desired descriptions could be re-filmed and retested. Certain filming techniques could be employed which will predispose the participants to describe the relevant level of detail. For example, if the key linguistic item is expressed by a micro-event, like raising one's hand, the relevant action can be run in slow motion or the arm of the actor could be shown as a close up. By contrast, if the key linguistic item is expressed by a macro-event, like the general situation of asking a question (which includes the process of raising one's hand), the event can be repeated within the scene. Even if the micro-level is described the first time, subsequent references will probably move up the hierarchy of specificity so that the macro-event (via the superordinate term) is described.

In terms of the participant pool in this experiment, I did not specifically recruit a particular number of participants with either English or French as their L1 or who learned their second language at a certain age or who had a current level of proficiency in either language. I simply recruited forty bilinguals of French and English who were currently using both languages on a day-to-day basis and who had a comfortable proficiency in both languages. As a result, I had groups that were unmatched in terms of features like L1, language dominance, and age of acquisition. In order to test further some of the conclusions set out earlier in this chapter, it would be necessary to recruit a specific number of bilinguals who matched the relevant criteria. For example, to test the relative importance of language dominance versus L1, it would be better to have sizeable

and equal groups of English-dominant bilinguals with English as their L1 compared to those with French as their L1. Since dominance was a feature that was not established (by way of the Language Background Questionnaire) until the participants had completed the experiment, future studies would have to pre-screen participants to establish group totals prior to commencing with the main task.

To make comparisons amongst all the different groups (2 groups on language status, monolingual versus bilingual; 2 bilingual groups based on L1, French versus English; 4 bilingual groups based on age of L2 acquisition, F/E early, F/E late, E/F early, E/F late; 4 groups based on L1 and dominance, EngDom-EngL1, EngDom-FrL1, FrDom-FrL1, FrDom-EngL1, etc.) a very large pool of bilingual participants would be required. Thus, the location for conducting the experiment is crucial. A large population of willing bilinguals of many different linguistic backgrounds is necessary. A city like Montréal in Canada might be a good location for future studies which require French and English bilinguals since many bilinguals of both first languages reside in the same general region in this part of Québec.

Transcribing and tabulating the results for large participant pools would also be problematic for purely time and resource issues. Transcribing oral descriptions and coding the resulting data is a very time intensive process; therefore, to cope with larger numbers of participants, it may be worth sacrificing some ecological validity of the experiment by showing a series of individual targeted events rather than embedding those events within a more complex but cohesive video scene. By showing a series of separate events, some of the extraneous descriptions can be avoided (although they were not entirely extraneous as the verbs, at least, figured into several of the different global calculations).

In terms of using different participant populations, this experiment could well be applied to other bilingual groups. Although the target stimulus set, in terms of the video scenes that were developed, was geared toward testing the cross-linguistic influence of French on the production of English, the same set of

materials could be used to test bilinguals of English and another language. By choosing a language that is very different from both English and French, for example Mandarin, one could test whether the results of this experiment that were assumed to be the effect of cross-linguistic transfer, were, in fact, just that. Similarly, the results that were interpreted to be due to the non-dominant speakers employing simplification strategies could also be re-assessed.

One large domain for future research is in the area of age of L2 acquisition. Unfortunately, the number of bilinguals who participated in this experiment was not large enough to generate sizeable and consistent sub-groups based on age of acquisition. Therefore, I was not able to perform an informative analysis of the interaction between the factors of age of acquisition and CLI or the use of simplification strategies. One area in which such interactions may be revealed is in the use of non-required particles. I mentioned previously my impressionistic observation that child-directed speech, in English, contains a higher proportion of non-required particles than speech between adults. This supposition could be explicitly tested using existing corpus data. If the data support this supposition, then a potential consequence might be that bilinguals who learned English early in life had a relatively high degree of exposure to these forms at the point when lexicalization behaviours are being established. By contrast, bilinguals who learned English later in life would not have had such intense exposure to these forms and may, therefore, not adopt them in their own English lexicalization behaviour. A comparison of simultaneous bilinguals, early F/E bilinguals, and late F/E bilinguals (controlled for such factors as proficiency in English, length of residency in English-speaking area, etc.) would be interesting.

Another domain for future research is in the further exploration of the idea of an expanding effect of bilingualism, if speaking in one's first and dominant language. Being bilingual gives speakers constant practice in making fine-grained distinctions between words since each and every time they speak a decision must be made between two semantically overlapping forms (i.e., translation equivalents). In this study, I found that bilinguals whose first language was

English (all of whom were English dominant), used more varied sets of verbs than monolinguals – a sign, I indicated, of enhanced lexical dexterity. It would be interesting to see if this type of result could be replicated using a test that measures basic vocabulary sizes (one example of which is the Boston Naming Test or BNT). It appears as though very little testing using the BNT has been conducted on bilingual populations and in those few studies which have used bilinguals, testing was carried out in their non-dominant language (e.g., Kohnert, Hernandez, and Bates, 1998; Roberts, Garcia, Desrochers, and Hernandez, 2002). Unsurprisingly, those studies revealed significantly lower scores for bilinguals processing in their non-dominant language as compared to monolinguals, similar to the result obtained in this study regarding verb-choice variability. A BNT study could be designed to compare scores of monolingual English speakers to a couple of different bilingual groups: English-dominant bilinguals who have English as their L1 and English-dominant bilinguals who have another language as their L1 (i.e., switched-dominance bilinguals).

Another possible direction for future research is in the semantic inquiry of specific synonyms sets. La Heij's complex access, simple selection approach (2005) suggests that all the information required to distinguish between lexical nodes during retrieval is provided by the conceptual system in the form of a preverbal message. For example, if one intends to say *extinguish*, one will say *extinguish* even though the English synonym *put out* or the French translation equivalent *éteindre* could also convey the same basic conceptual information.[100] Following this account, synonyms cannot be absolute but must be differentiated to some critical degree based on their semantic, pragmatic, or distributional properties. It may be the case that these distinguishing properties are actually different for monolinguals and bilinguals, either as the result of some sort of CLI or as a result of the reduced exposure bilinguals have to the words of both languages in comparison to monolingual speakers.

[100] Except in cases in which the process is disturbed somehow, perhaps as the result of cognitive distraction or overload, resulting in a speech error.

An example of CLI leading to distinctions not present in the lexicon of monolinguals surfaced in the translation task which was part of a preliminary experiment in this study. It was noted that bilinguals (all of whom where French L1) translated certain members of synonym pairs, within the same sentential frame, quite differently. *Go out of* was more often translated as *sortir* whereas *leave* was more often translated as *quitter*. Similarly, *take out* was translated more often as *sortir* whereas *remove* was more often translated as *enlever*. The sentential frame for both of these pairs involved motion of some entity across a boundary (i.e., *go out of/leave [the room]* and *take out/remove [the package from the mailbox]*). Slobin and Hoiting (1994, building on observations presented by Aske, 1989, about telicity in Spanish manner verbs) noted a boundary-crossing constraint that exists in certain languages whereby the conflation of MANNER in motion verb stems is disallowed when the motion crosses a boundary of some sort. (See also Slobin, 2006, who says that this is one of the most salient features of V-languages). For example, the French phrase *marcher dans la chambre* must be interpreted as walking *within* the room, not as walking *into* the room. It seems reasonable to expect, therefore, that French speakers would be more sensitive to whether some act of motion crosses a boundary than monolingual English speakers for whom *walk within the room* and *walk into the room* are equally viable phrases. In the translation task, when bilinguals were asked to translate both *go out of* and *take out*, it may have been that the word *out* prompted extra emphasis to be placed on the boundary-crossing nature of the event which generated *sortir* as the most common translation for both those verbs. By contrast, the expressions *leave* and *remove* are not used exclusively to signify motion across a boundary (e.g., one can *leave the bed* and *remove a sticker* without an obvious boundary being crossed). Even though a boundary was crossed in the context given in the experiment, the emphasis on that boundary was not as evident as in the synonymous phrases containing the preposition/particle *out*. An experiment could be designed to see if monolinguals and bilinguals give comparable semantic-similarity ratings to synonyms when one member of the synonym pair more overtly indicates a boundary being crossed than the other.

A difference in the semantic specification of synonyms between bilinguals and monolinguals may also be the result of reduced exposure to the words of each language. Following the premise of the Weaker Links hypothesis, bilinguals, by their very nature, receive less exposure to each of their languages than comparable monolinguals. Presumably, then, low frequency words for monolinguals will be even lower in frequency for bilinguals. The Weaker Links hypothesis posits that this reduced level of exposure leads to weaker links between nodes at the lexical and phonological level of processing. I contend that reduced exposure also leads to less semantic specification, at least for very low frequency words. For example, if bilinguals hear the word *admonish* much less frequently than the synonym *scold*, they not develop a sense of how *admonish* is potentially different in terms of semantics, pragmatics, or distributional features – in this case *admonish* and *scold* would be absolute synonyms for the bilingual. As the bilingual cannot differentiate between the words on meaning and usage factors, important lexical factors like frequency should play a more significant role, leading to the selection of the more frequent *scold*. It may be that English-dominant bilinguals receive enough exposure to English (or did so before they became bilingual if English is their L1) that they acquire the same level of detailed lexical specification as their monolingual counterparts. An experiment that delves into the semantic, pragmatic, and distributional sensitivities that speakers have would lead to some interesting comparisons between monolinguals and different bilingual populations.

7.6. Concluding Remarks

In conclusion, this study provides further evidence for differences in processing between monolingual speakers and bilingual speakers, even when bilinguals are speaking in their first and dominant language and even when bilinguals are in a monolingual mode of processing (i.e., when the nontarget language is not required). This study contributes to the existing body of evidence regarding processing differences by focusing on a largely under-represented domain, namely lexical choice. When choice is between two (or more) viable and

grammatical options, a distinction between speakers is difficult to determine since the output is not directly observable in either overt errors or delayed responses. Rather, a distinction would be covert, in that it is only recognizable once relative frequencies of word choices are established for different speakers. If distinctions in the lexical choices made by monolinguals versus bilinguals are the result of some type of CLI, the transfer triggering those distinctions is called covert. As Ringbom (1998) stated, transfer research has focused too much on errors and needs to look at usage rates of constructions and lexical items. This study offers evidence that bilinguals of French and English are not like monolingual speakers of English in two distinct ways: (a) they are susceptible to covert influences from French in their production of English, and (b) if English is their non-dominant language, they utilize certain simplification strategies which leads to less variable choices in the production of English verbs.

All in all, this study supports the idea that being a bilingual contributes to the complexity of the lexicalization process. Each and every time we speak, we are confronted by lexical choices in terms of the form units we use to convey our intended message. The results presented here suggest that bilingualism can be included as one of the various factors that influence those choices. Additionally, whether or not the bilingual is speaking in his or her dominant language will impact the nature of those influences. The study presented in this dissertation, regarding the variable lexicalization of dynamic events in English, offers further evidence in support of the view that a bilingual is certainly not two monolinguals in one person but is a unique linguistic being individually created out of substantial exposure to more than one language.

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Appendix A – Sentential Contexts for Synonyms in the Translation Task

Table A1

Target Synonym Pairs (XY)			
	Target translation	List A/List B	Sentential Frame
1	*absorber*	***absorb/ soak up***	Which brand of paper towel do you think can __ the most water?
2	*acheter*	***get****/pick up*	Can you _____ some bread for me at the store?
3	*assembler*	***assemble****/put together*	Try to _____ this model of the brain.
4	*attraper*	***grasp****/grab hold of*	See if you can _____ that root over there.
5	*baisser*	***drop****/go down*	How long will it take for the water level to ____ after the flood?
6	*cacher*	***hide****/cover up*	The thieves decided to ____their faces before entering the store.
7	*déborder*	***overflow****/spill over*	Don't fill the glass too much, you don't want the water to _____.
8	*enlever*	***remove****/take off*	At the end of the day, the businessman loves to _____ his tie.
9	*entrer*	***enter****/come into*	My students know they should _____ the classroom in a calm manner.
10	*entrer*	***enter****/type in*	Make sure no one is watching when you ___ your PIN number on the machine.
11	*éteindre*	***extinguish****/put out*	Make sure you _____ the campfire before you leave.
12	*exploser*	***explode****/blow up*	If you mix these two chemicals, the beaker will _____.
13	*gonfler*	***inflate****/pump up*	I need to stop at the gas station to _____ my tire some more.
14	*illuminer*	***illuminate****/light up*	If you press this button, you can _____ centre stage.
15	*lâcher*	***release****/let go of*	At the top of the ski hill, _____ the tow rope before the red pylon.
16	*lever*	***raise****/put up*	The student was always the first to _____ her hand.
17	*mettre*	***place****/set down*	Please _____ the big box of books in the corner.
18	*mouillir*	***dampen****/get wet*	Wipe the tables down with this cloth which you can _____ in the sink.
19	*ramasser*	***gather****/pick up*	After the wind blew them all over, I had to _____ all the pages of my essay.
20	*rebondir*	***rebound****/bounce back*	It's hard to get the ball to _____ to oneself.
21	*remettre*	***return****/hand back*	The students were anxiously waiting for their teacher to _____ their exams.
22	*respirer*	***inhale****/breathe in*	Be careful not to _____ those toxic fumes.
23	*retirer*	***withdraw****/take out*	I need to go to the back to _____ some more money.
24	*retourner*	***return****/take back*	I really should _____ this shovel that I borrowed from my neighbour.
25	*réveiller (se)*	***awaken****/wake up*	If you _____ in the middle of the night, make sure to stay quiet!
26	*revenir*	***return****/come back*	My friend said that she would _____ around 3pm.
27	*sauver (se)*	***flee****/run away*	Every time I try to approach those rabbits in the park, they ____.
28	*sortir*	***leave****/go out of*	In the case of an emergency, we should ____ the room this way.
29	*sortir*	***remove****/take out*	Can you _____ that package from the mailbox?
30	*traverser*	***cross****/go across*	When you ___ the gym floor, watch out for this extension cord.

Table A2

Control Synonym Pairs (XX)			
	Target translation	List A/List B	Sentential Frame
1	*acheter*	**buy**/purchase	Please stop at the store to _____ some milk.
2	*appeler*	**call**/phone	Do not forget to _____ your mom on Mothers' Day.
3	*applaudir*	**clap**/applaud	We all stood up to _____ after our team won the game.
4	*bloquer*	**block**/obstruct	We need to _____ the doorway so the dog does not escape.
5	*briser*	**break**/snap	Be careful with that antique broom, you don't want to ___ it.
6	*caresser*	**stroke**/caress	I love to _____ my baby's hair while she sleeps on my lap.
7	*corriger*	**mark**/correct	The teacher had a huge pile of assignments to _____.
8	*échanger*	**exchange**/trade	If the bowling ball is too big or too small, you can _____ it for a different one.
9	*fermer*	**shut**/close	Before going on vacation, remember to __ all your windows.
10	*frapper*	**hit**/strike	Try to ____ the golf ball right in the middle of the club head.
11	*lancer*	**throw**/toss	Grab that football and _____ it over here.
12	*mettre*	**put**/place	_____ the big candle on that shelf.
13	*montrer*	**show**/present	If you arrive late for class, you must ___ a note to the teacher.
14	*parler*	**speak**/talk	I would like to _____ to somebody at the order desk please.
15	*pleurer*	**cry**/weep	After such a scare, it is only natural to _____ a little bit.
16	*poster*	**mail**/post	Could you please _____ this letter for me?
17	*recevoir*	**get**/receive	If you complete this survey, you will _____ a free gift.
18	*réparer*	**repair**/fix	I really should _____ my bike.
19	*sauter*	**jump**/leap	Can you _____ over this stool and then dunk the basketball?
20	*tirer*	**fire**/shoot	Be sure no one is in the area before you _____ the gun.
21	*toucher*	**touch**/feel	_____ the doll's face to see how smooth it is.
22	*transpirer*	**sweat**/perspire	I always ____ so much when I work out in the crowded gym.
23	*viser*	**point**/aim	When you throw the football, you should ____ at the target with your other hand.
24	*allumer*	**switch on**/turn on	As soon as you get home, _____ the porch light so I know you are there.
25	*déchirer*	**tear up/rip up**	Once I pay off my student loan I am going to __ those papers.
26	*déplacer*	**move aside**/push aside	Could you please _____ the shopping cart which is blocking the door?
27	*écrire*	**write down**/note down	Before you go can you _____ the things you want me to do?
28	*reculer*	**move back**/step back	To make room for the bridal party, please _____ a bit more.
29	*remettre*	**hand in**/turn in	His students were conditioned to _____ their homework at the start of the class.
30	*remettre*	**hand back**/give back	The students were anxiously waiting for their teacher to _____ their exams.

Appendix B – Translation Task Results

Table B1

Target Synonym Pairs (XY)					
	Target translation	Syn. A (% target) Single-word	Syn. B (% target) Multi-word	Average Overlap for single common translation	Average Overlap in all common translations*
1	*absorber*	**absorb** (88%)	**soak up** (92%)	90%	
2	*acheter*	**get** (60%)	**pick up** (31%)	46%	82%
3	*assembler*	**assemble** (100%)	**put together** (67%)	84%	
4	*attraper*	**grasp** (27%)	**grab hold of** (29%)	28%	60%
5	*baisser*	**drop** (42%)	**go down** (44%)	43%	89%
6	*cacher*	**hide** (73%)	**cover up** (38%)	56%	79%
7	*déborder*	**overflow** (81%)	**spill over** (58%)	70%	
8	*enlever*	**remove** (94%)	**take off** (92%)	93%	
9	*entrer*	**enter** (67%)	**come into** (**33%)	48%	67%
10	*entrer*	**enter** (31%)	**type in** (**23%)	28%	62%
11	*éteindre*	**extinguish** (100%)	**put out** (100%)	100%	
12	*exploser*	**explode** (75%)	**blow up** (69%)	72%	
13	*gonfler*	**inflate** (63%)	**pump up** (67%)	65%	
14	*illuminer*	**illuminate** (50%)	**light up** (47%)	49%	
15	*lâcher*	**release** (73%)	**let go of** (69%)	71%	
16	*lever*	**raise** (92%)	**put up** (100%)	96%	
17	*mettre*	**place** (50%)	**set down** (38%)	44%	83%
18	*mouillir*	**dampen** (57%)	**get wet** (85%)	71%	
19	*ramasser*	**gather** (47%)	**pick up** (94%)	71%	
20	*rebondir*	**rebound** (75%)	**bounce back** (91%)	83%	
21	*remettre*	**return** (50%)	**hand back** (56%)	53%	
22	*respirer*	**inhale** (**42%)	**breathe in** (63%)	54%	89%
23	*retirer*	**withdraw** (56%)	**take out** (83%)	70%	
24	*retourner*	**return** (54%)	**take back** (**20%)	36%	61%
25	*réveiller (se)*	**awaken** (100%)	**wake up** (100%)	100%	
26	*revenir*	**return** (94%)	**come back** (83%)	89%	
27	*sauver (se)*	**flee** (47%)	**run away** (**17%)	33%	78%
28	*sortir*	**leave** (**25%)	**go out of** (71%)	50%	77%
29	*sortir*	**remove** (**0%)	**take out** (81%)	0%	11%
30	*traverser*	**cross** (94%)	**go across** (92%)	93%	

*Average overlap for all translations if the average overlap for the single translation is less than 60%.

**= target translation was not the most frequent translation.

Table B2

Control Synonym Pairs (XX)					
	Target translation	Syn. A (% target)	Syn. B (% target)	Average Overlap for single common translation	Average Overlap in all common translations*
1	*acheter*	**buy** (100%)	**purchase** (100%)	100%	
2	*appeler*	**call** (83%)	**phone** (56%)	70%	
3	*applaudir*	**clap** (100%)	**applaud** (100%)	100%	
4	*bloquer*	**block** (81%)	**obstruct** (73%)	77%	
5	*briser*	**break** (81%)	**snap** (73%)	77%	
6	*caresser*	**stroke** (69%)	**caress** (50%)	60%	
7	*corriger*	**mark** (69%)	**correct** (100%)	85%	
8	*échanger*	**exchange** (85%)	**trade** (94%)	90%	
9	*fermer*	**shut** (94%)	**close** (100%)	97%	
10	*frapper*	**hit** (94%)	**strike** (83%)	89%	
11	*lancer*	**throw** (76%)	**toss** (67%)	72%	
12	*mettre*	**put** (88%)	**place** (69%)	79%	
13	*montrer*	**show** (50%)	**present** (**18%)	72%	
14	*parler*	**speak** (94%)	**talk** (100%)	97%	
15	*pleurer*	**cry** (100%)	**weep** (100%)	100%	
16	*poster*	**mail** (62%)	**post** (44%)	53%	93%
17	*recevoir*	**get** (69%)	**receive** (100%)	85%	
18	*réparer*	**repair** (100%)	**fix** (75%)	88%	
19	*sauter*	**jump** (100%)	**leap** (92%)	96%	
20	*tirer*	**fire** (88%)	**shoot** (92%)	90%	
21	*toucher*	**touch** (94%)	**feel** (100%)	97%	
22	*transpirer*	**sweat** (56%)	**perspire** (100%)	78%	
23	*viser*	**point** (*33%)	**aim** (93%)	67%	
24	*allumer*	**switch on** (75%)	**turn on** (75%)	75%	
25	*déchirer*	**tear up** (100%)	**rip up** (91%)	96%	
26	*déplacer*	**move aside** (**29%)	**push aside** (38%)	33%	93%
27	*écrire*	**write down** (58%)	**note down** (69%)	64%	
28	*reculer*	**move back** (92%)	**step back** (100%)	96%	
29	*remettre*	**hand in** (53%)	**turn in** (62%)	58%	
30	*remettre*	**hand back** (53%)	**give back** (23%)	39%	100%

*Average overlap for all translations if the average overlap for the single translation is less than 60%.

**= target translation was not the most frequent translation

Appendix C – Monolingual Language Background Questionnaire

Participant #	
1. **How old** are you?	_____ yrs
2. What is your **sex**?	F ☐ M ☐
3. What is your **occupation**?	
4. What is the **highest** level of **education** you have **completed**? (Check highest level only) ☐ junior high ☐ high school or equivalent ☐ trade/technical school ☐ undergraduate degree ☐ graduate degree	
5. Where did you grow up? (e.g., city/town, province, country)	
6. Do you know any other languages besides English?	YES ☐ NO ☐
7. If 'YES', please explain WHAT language(s) it is and how it is that you came to learn that language (e.g., my parents' language, through school, etc.)	
8. If 'YES', how often do you use that other language in your current daily life?	a lot every day some on most days occasionally quite rarely never

THANK YOU!

Appendix D – Bilingual Language Background Questionnaire

Participant #	
1. **How old** are you?	_____ yrs
2. What is your **sex**?	F ☐ M ☐
3. What is your **occupation**?	

4. What is the **highest** level of **education** you have **completed**?
(Check highest level only)

☐ junior high
☐ high school or equivalent
☐ trade/technical school
☐ undergraduate degree
☐ graduate degree

5. What language (French or English) did you **first learn** when you were a child? (If you learned two at once, indicate both)	
6. Where did you live while you were developing your first language?	

7. In what kinds of **contexts** did you continue to develop your first language?
(check as many as are relevant)

☐ At home (with friends and family)
☐ Day to day interactions with outside community
☐ At school – as the main language of instruction
☐ At school – as a special subject
☐ Other

8. If OTHER, please explain

9. What language (French or English) did you **learn** at some point **after** you had started speaking in your first language?	
10. Where did you live while you were developing your 2nd language?	

11. In what kinds of **contexts** did you develop this second language?
(check as many as are relevant)

☐ At home (with friends and family)
☐ Day-to-day interactions with outside community (business and/or social)
☐ At school – as the main language of instruction (non-immersion)
☐ At school – as the main language of instruction (immersion)

☐ At school – as a special subject or as an isolated language class
☐ In an intense language program/course
☐ Travel abroad
☐ At work
☐ Other

12. If OTHER, please explain

13. Try to think back to determine **how old** you were at these different points in your experience with your second language:

Age of **first exposure**: - age when you first started having *consistent* and *sustained* exposure to the language	
Age of **regular use**: - age when you started using that language regularly to function within a particular environment	
Age of **comfortable proficiency**: - age at which you first felt you had acquired a comfortable proficiency in this language *'Comfortable proficiency' means that you can process in that language without a lot of conscious effort even though you may not have native-speaker-like ability*	

For the next few questions, think about your use of both French and English and check the option that best reflects the status of each language for you.

14. **How often** have you used each language **since first acquiring** a comfortable proficiency in it?

FRENCH	**USAGE RATE**	**ENGLISH**
	constant/regular use over the years	
	fairly regular and sustained usage with some short breaks	
	periods of regular and sustained usage but with some long breaks	
	fairly irregular/inconsistent usage over the years	
	haven't really used it for a long time	

15. **More recently**, (in the past few months at least) **how often** have you been using each language?

FRENCH	**USAGE RATE**	**ENGLISH**
	it is the language of the majority of my interactions every day	
	use it quite a bit most days along with my other language	
	use it occasionally but usually interact in my other language	
	don't really use it these days	

16. In what **contexts** do you use each language nowadays?

FRENCH	CONTEXTS OF USE	ENGLISH
	At home (with friends and family)	
	Day-to-day interactions with outside community (business and/or social)	
	At school (as a student)	
	At school (as a teacher)	
	At work	
	Don't really use it	
	Other	

17. If OTHER, please explain.

18. **How often** are you in a **bilingual environment**?
- interacting with other French/English bilinguals who use both languages intermittently

☐ Almost all of the time – at both work/school and in my personal life
☐ Much of the time – large portions of my day at work/school or in my personal life
☐ Occasionally – on certain occasions at work/school or in my personal life
☐ Rarely – on very rare occasions
☐ Never

19. Which of your languages do you feel is your **strongest language**?

Please think about your **level of proficiency** in each language and check the options that best reflects the status of each language for you.

20. Do you think your **proficiency** in either language is currently going through a **period of change**?

FRENCH	CHANGING PROFICIENCY	ENGLISH
	My proficiency is currently **improving rapidly**	
	My proficiency is currently **improving slightly**	
	My proficiency is about the **same as normal**	
	My proficiency is currently **declining slightly**	
	My proficiency is currently **declining rapidly**	

In the next section, I would like you to think about your language skills in both French and English and rate them on the following scales. Place an **E** at the point along the scale that you feel best matches your current level in **English** and place an **F** at the point along the scale that you feel best matches your current level in **French**.

21. **General Overall Rating**

At least as good as an average native speaker		**Fairly high level** – can function comfortably without too many problems		**Decent level** – occasionally have difficulty but can usually cope well		**Fairly low level** – often encounter problems communicating		**Very poor language skills**	

22. **Extent of Vocabulary**

At least as good as an average native speaker		**Fairly high level** – can function comfortably without many problems in understanding or retrieving words		**Decent level** – occasionally have difficulty understanding or retrieving words but can usually cope well		**Fairly low level** – often encounter problems understanding or retrieving words		**Very poor knowledge of vocabulary**	

23. **Sentence Structure and Verb Tenses**

At least as good as an average native speaker		**Fairly high level** – can function comfortably without many problems in processing and producing grammatical sentences		**Decent level** – occasionally have difficulty processing and producing grammatical sentences		**Fairly low level** – often encounter problems in processing and producing grammatical sentences		**Very poor command of grammatical sentence structure and verb forms**	

24. **Listening Comprehension**

At least as good as an average native speaker – always understand native speakers		**Fairly high level** – can function comfortably without many problems or delays in understanding		**Decent level** – occasionally have problems or delays in understanding spoken language		**Fairly low level** – often encounter problems or delays in understanding spoken language		**Very poor level of understanding spoken language**	

25. **Speaking Fluency**									
At least as good as an average native speaker – can express myself without difficulty or delay		**Fairly high level** – can function comfortably without many problems or delays in producing spoken language		**Decent level** – occasionally have difficulty or delays in producing spoken language		**Fairly low level** – often encounter problems in producing spoken language		**Very poor level of producing spoken language**	

26. **Reading**									
At least as good as an average native speaker		**Fairly high level** – can function comfortably without many problems or delays in reading		**Decent level** – occasionally have difficulty or delays in reading		**Fairly low level** – often encounter problems in reading		**Very poor reading level**	

27. **Writing**									
At least as good as an average native speaker		**Fairly high level** – can function comfortably without many problems or errors in writing		**Decent level** – occasionally encounter problems or errors in writing		**Fairly low level** – often encounter problems or errors in writing		**Very poor writing level**	

Appendix E – Detailed Results of the Bilingual Language Background Questionnaire

The following is a detailed account of the how the participants responded to each question on the Bilingual Language Background Questionnaire.

First Language
(18 English, 22 French)

Most of the participants were from the province of Alberta in Canada (14 English/French, or E/F, Bilinguals and 8 French/English, or F/E Bilinguals). Some other Canadian provinces were represented in the pool as well. Six participants were from Quebec (1 E/F bilinguals and 5 F/E bilinguals), five from Saskatchewan (2 E/F and 3 F/E), three from Ontario (2 E/F and 1 F/E), and one from New Brunswick (F/E). The remaining three F/E bilinguals were from Europe, two from France and one from Belgium. Only one of the participants (from France) was not currently residing in Western Canada. The other two European francophones acquired most of their fluency in English after immigrating to Western Canada.

L1 Development
(All High Immersion)

For 29 of the 40 bilinguals, their L1 was also the main instructional language at school thus they had a high level of immersion (both home and school). Of the 11 remaining, 10 had English as their first language and attended French Immersion schooling. For all of those bilinguals, English was also the main language for basic community/peer interactions thus they also had high levels of immersion in English, their L1. There was just one participant who spoke one language at home, French, but who lived in an Anglophone community, had English as the instructional language at school, and used English for the majority of his interactions with the outside community. However, he did marry another Francophone and French has been the main language in their home for decades, thus, over the course of his life, he has had a high immersion rate in L1 even if his main schooling was conducted primarily in his L2. It may be worth looking more closely at this participant's language production behaviour; however, all in all, I feel quite comfortable in the assessment that all of the bilingual participants had enough exposure to their L1 in their early years to have entrenched the grammar into their minds to the point of calling them native speakers.

L2 Development
(2 Non-School, 6 School Only, 32 Mixed Context, 8 French Immersion)

The vast majority of participants, 32, had a mixed L2 acquisition experience. Only two bilinguals fell into the *Non-School* category. Both of these two had English as their second language and attended French school. However, they both

grew up in Anglophone[101] provinces of Canada (one in Alberta and one in Ontario) so they must have had some formal English as a specialized class at school even though they did not indicate that on the questionnaire. Therefore, I do not have a large or reliable enough pool to draw any kind of conclusions about bilinguals who learn their L2 entirely in non-academic, naturalistic environments. Six of the bilinguals learned the L2 primarily in a school setting. Four of them are English native speakers who went to French Immersion schooling in Canada (two in Alberta, one in Saskatchewan, and one in Ontario). One is an English native speaker who learned French as a special subject at school and carried on to post-secondary as a French student. The other bilingual was a native speaker of French who learned English at school in France. Due to the varied nature of the academic contexts of this group, any conclusions about their behaviour would be tenuous. It may be worthwhile, however, to see if all of the English native speakers who acquired French (at least initially) through French Immersion schooling show some distinct behaviour. Not including the French Immersion students who also had some French exposure in their home-life, there are eight bilinguals who fit into this category.

Age of Acquisition question
(24 Early (10 E/F, 14 F/E), 13 Late (5 E/F, 8 F/E), 3 In Between (all E/F)

In terms of classifying bilinguals as either early or late, I looked at a collective age of L2 acquisition. If all three measures were listed as 10 years or less (n=21), I classified the participant as Early. If all three measures were listed as 11 years or more (n=7), I classified the participant as Late. Since the age of acquisition literature seems to take as the crucial point the age at the start of acquisition (see Meisel, 2004), any bilinguals who indicated both the age of first exposure and the age of regular use as 10 or less were also included in the early category. For these three bilinguals, their stated age of comfortable proficiency was 12, 13, and 15. I included in the late category participants who stated both Regular Use and Comfortable Proficiency as 15 or up (n=5), thinking that even if they did have some exposure prior to 11, it was not regular enough to really start the acquisition process. There was also one participant who did not quite fit the late criteria above in that first exposure took place at 10 (instead of the established mark of 11), however, since the other two ratings were later (13 & 16 respectively) I also included her in the late category. The remaining three bilinguals were not slotted into the early or late category because the ages spanned that division too much. These three "In Between" speakers had first exposure between 3 and 5 years, regular use between 9 and 11 years, and comfortable proficiency between 13 and 17 years.

By subtracting the age of comfortable proficiency from the participants' current age, I was able to establish the length of time each bilingual has had a comfortable

[101] Even though there are many Francophone communities in Alberta and Ontario, English is the only 'official' language for these two provinces. New Brunswick is the only province in Canada in which both French and English are legislated as official languages.

proficiency in his/her L2. Once a fairly steady-state of proficiency has been reached, how much experience a bilingual has in an L2, in terms of years of practice, may impact how that language is used. Most studies testing the variable of length of exposure, which is a variable typically called "Length of Residency" (LoR) in the literature, have actually not found a correlation between LofR and L2 proficiency (see DeKeyser and Larson-Hall, 2005 for a summary). However, since my study investigates lexicalization choices and not proficiency, perhaps LoR may play a role. This group of bilinguals was quite varied in terms of how long they have been functioning with a comfortable proficiency in their L2, ranging from 1 to 62 years. The mean, mode, and median years was 23.3, 14, and 22, respectively.

General Usage / Recent Usage / Recent Contexts
(24 English Dominant, 6 French Dominant, 10 Balanced)

I used these three questions together to establish a Use/Context Rating for each language. Bilinguals were classified as having either High (1-2 pts), Moderate (2><4 pts), or Low (4+ pts) usage in each of their two languages based on an average rating over the three questions. Points were assigned to the General Usage and Recent Usage questions ordinally with the most frequent category receiving 1 point and the next most frequent category receiving 2 points and so on. Points were assigned to the Recent Context question slightly more subjectively. A rating of 1 point was assigned if the participant experienced total immersion in that language. By total immersion, I mean that the speaker interacts in that language in the three main environments of home, work, and the outside community. A rating of 2 points is assigned if the bilingual uses that language in two of the three main environments. A rating of 3 points is assigned if the bilingual uses a language only at home, or only at work, or only at school as a teacher (e.g., teaching in that language). A rating of 4 is assigned if that language is only being used in the outside community or at school as a student. I felt that the usage of a language as a teacher would involve slightly more engagement in that language (e.g., more of the processing which requires language creativity, namely, language production) than usage of a language as a student (e.g., using more receptive processing) thus they were given different ratings. By establishing relative Use/Context Ratings for each language, I could then determine a Use/Context Dominance if one language ranked higher on the scale than the other. Using the above criteria, I rated 24 as being English Dominant, 6 being French Dominant, and 10 being Balanced. Since I conducted this experiment in a primarily Anglophone community (Edmonton, Alberta) and the vast majority of participants were currently residing locally, it was not surprising to find a high percentage fell in the English Dominant or Balanced category in terms of the frequency of use and range of contexts for the two languages, even if French was their first and/or strongest language.

Speaker-Assessed Dominance
(25 English, 12 French, 3 Balanced)

25 bilinguals rated themselves as being stronger in English, 12 as being stronger in French, and 3 participants could not decide and rated themselves as being equally strong in both.

Bilingual Environment question
(10 High levels of experience, 7 Mid, 17 Low, 6 Minimal)

10 participants were classified as High experience in code-switching, 7 participants had a Mid rating, 17 had a Low experience rating, and the remaining 6 were classified as Minimal if they answered either rarely or never.

Proficiency Change
(minimal)

Most of the participants stated no recent change in their proficiency in either language or else a slight decline or slight improvement. One English-dominant bilingual currently not functioning in French very often indicated that her French was declining rapidly. Three English-dominant bilinguals responded that their current proficiency in French was improving rapidly. One French-dominant bilingual responded that his proficiency in English was improving rapidly. Due to the very low numbers of participants who indicated much of a current change of proficiency, I did not test this variable in the main data analysis.

Self-Rating Task – Proficiency Ratings
General Overall Rating / Extent of Vocabulary / Sentence Structure and Verb Tenses / Listening Comprehension / Speaking Fluency / Reading / Writing
(9 Balanced, 20 English Dominant Moderate, 8 French Dominant Moderate, 3 English Dominant High, 0 French Dominant High)

I calculated overall proficiency ratings for each language by adding up the scores for each of the seven questions depending on where on the 10-point scale the ratings appeared. The final score was out of 100 because I decided to give double-weighting to the domains of language that I felt were most relevant to this experiment. Because the main experiment is basically just a production task, whereby participants must retrieve words and compose sentences to describe the action in the video clips, questions 2 (Extent of Vocabulary), 3 (Sentence Structure and Verb Tenses), and 5 (Speaking Fluency) were given double the weight (thus out of 20 not 10 points). I then classified participants into one of five categories: Balanced bilingual, if both languages rated above 90 (n=9), English Dominant Moderate (n=20), or French Dominant Moderate (n=8), if the

rating for the non-dominant language was between 50 and 89, and, English Dominant High (n=3), or French Dominant High (n=0), if the rating for the non-dominant language was less than 50.

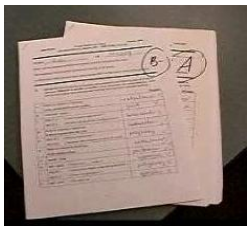
Since the topic of this investigation is whether French has an influence on a bilingual's verb usage in English, the English ratings, especially in terms of speaking proficiency, are particularly relevant. Just focusing on the bilinguals ratings of their English, 31 participants were classified as having High English Speaking Proficiency and 8 had Mid English Speaking Proficiency.

Overall Language Dominance
(3 Balanced, 25 English Dominant, 12 French Dominant)

Collectively, I was able to use a number of the measures above to calculate an Overall Language Dominance score. I initially made 5 groupings (using the same labels as for the Proficiency Rating task explained above) but found that the Moderate Dominant groups were too small to confidently draw any conclusions. Thus I narrowed it down to three groups: English Dominant (n=25), French Dominant (n=12), and Balanced (n=3). Having one group with so few participants (the Balanced group) is not that useful in making statistical comparisons but each of these participants was rated as balanced in each of the measures so there really was no way for me to discriminate and include them in one of the other language dominance groups. Notice that 22 participants listed French as their first language yet only 12 of those are currently dominant in their first language. Such a phenomenon is not uncommon in western Canada where the dominant culture is largely Anglophone. Many of these F/E bilinguals were born into Francophone families within the dominant Anglophone culture thus their first language did not remain their dominant language once they became immersed in the greater society at some stage in their lives.

Appendix F – Prompt Sheets Used During Verbal Description Task

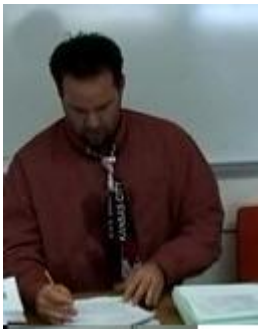
Scene Name	Sports Scene
General Scenario	• two sisters are spending the afternoon doing some outdoor activities at their home
Main Characters	 **LIZ**  **ANGIE**  **DAD**
Main Objects	 **bag (full of equipment)**  **tennis balls** **skipping rope**  **soccer ball**  **golf club (in pieces)**
Other Notes	 

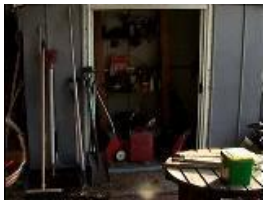
Scene Name	Classroom Scene
General Scenario	• students at a college attend a class
Main Character(s)	• female teacher • students
Main Objects	 **student assignments**  **late note**  **exams**

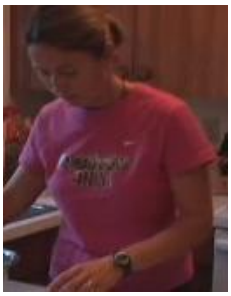
Scene Name Car Scene	
General Scenario	• a man drives home to find that he has a lot of work to do in the driveway
Main Character(s)	• Frank 
Main Objects	 **car**  **van & log**  **tire gauge**  **flat tire**  **water bottle, keys, pump**  **cloth**  **beach ball**  **flashlight**

Scene Name	Errands
General Scenario	• a man spends the day running errands on a list
Main Character(s)	Rick  neighbour 
Main Objects	 **list**  **shovel**  **mailbox**  **parcel/gift**  **letter**  **milk**  **bank machine**

Scene Name	Note
General Scenario	• a woman spends some time in her bedroom in the morning • she has a card that makes her sad
Main Character(s)	• Jane 
Main Objects	 **lamp**  **card**  **doll**  **candle**  **note**

Scene Name	Teacher
General Scenario	• a teacher sits and works in his classroom at the end of the day
Main Character(s)	• teacher 
Main Objects	 **student assignments**  **calendar** **drink** **tie** **cell phone**

Scene Name	Dans le jardin
General Scenario	• Une femme passe l'après-midi chez elle
Main Character(s)	• **Marie** • **un chat** 
Main Objects	 **un sécateur** **un panier** **un seau/ une poubelle**  **une gâche**
	 **les racines**  **un banc**  **un râteau**  **une cabane**

Scene Name Le Diner	
General Scenario	• Une femme prépare une salade pour le diner.
Main Character(s)	Françoise 
Main Objects	**le frigo**  **la laitue** **un bol**  **une planche à découper** **les carottes** **les tomates**  **un éplucheur**  **les germes d'alfalfa**  **une râpe**  **la vinaigrette** **une fourchette**

Scene Name	Routine du matin
General Scenario	• un homme fait la routine de matin
Main Character(s)	• **Frank** • **un chien** 
Main Objects	**une brosse à dents**  **la nourriture sèche pour chiens** **les chaussures**  **une laisse**

Appendix G – All Verbs Generated in the Main Experiment

Verbs followed by number of occurrences spoken by monolingual (ML) then bilingual (BL) speakers

VERB	*ML	BL
abandon	0	1
absorb	9	2
accept	5	4
access	0	3
accompany	0	1
accomplish	2	5
acknowledge	1	2
act	3	1
activate	0	1
add	26	29
address	2	0
adjust	4	8
agree	0	1
aim	6	13
allow	2	2
amend	0	1
analyze	0	1
answer	14	12
apologize	2	4
appear	5	1
applaud	3	13
apply	1	1
approach	10	7
argue	0	1
arouse	0	1
arrange	2	5
arrive	4	11
arrive home	2	1
ask	51	76
assemble	11	8
assess	0	3
attach	10	14
attach together	2	2
attempt	6	2
attend	1	1
avoid	1	1
awaken	2	0
back	1	0
back off	0	3
back up	7	7
ball up	1	2
bang	2	0
bark	6	2
be	1139	1801
be back	24	21
be going on	0	6
bear	0	1
become	3	0

VERB	ML	BL
begin	7	5
believe	5	3
belong	0	1
bend	2	1
bend down	8	9
bend over	7	9
blame	1	1
block	9	9
blot	4	1
blot up	1	1
blow	24	35
blow away	1	2
blow in	0	1
blow out	18	13
blow up	62	45
borrow	17	28
bother	2	3
bounce	104	124
bounce away	0	1
bounce back	16	27
bounce down	0	1
bounce off	16	14
bounce up	1	5
break	64	74
break down	0	1
break off	1	2
break out	1	0
break up with	0	1
breathe	1	3
breathe out	0	1
bring	15	16
bring back	4	6
bring home	1	0
bring in	1	2
bring out	7	4
bring over	1	1
bring up	0	2
brush	9	10
build	0	1
bump	1	1
bunch up	3	1
burn out	0	1
burst	5	5
burst out	0	2
bust	1	2
buy	7	12
call	13	24
call over	0	1

VERB	ML	BL
care	1	2
caress	8	6
carry	32	43
carry on	1	0
carry out	0	1
carve	1	0
catch	1	1
cause	0	1
celebrate	1	4
change	8	11
chase	0	2
chat	6	9
chat away	0	1
chatter	0	1
check	100	110
check back	0	1
check down	0	1
check off	3	3
check out	12	8
check over	4	3
cheer	1	1
chip	0	1
chitchat	1	2
choke	0	1
choose	5	8
circle	0	1
claim	0	1
clap	27	20
clean	16	14
clean off	4	0
clean up	13	8
clear	1	0
click	0	1
click on	0	1
climb	5	0
clip on	0	1
clip together	0	1
close	182	178
close down	0	1
close up	5	4
cock	0	1
collapse	1	0
collect	10	6
comb	40	31
come	135	119
come along	1	0
come apart	1	0
come back	49	68

VERB	ML	BL
come down	0	2
come home	7	7
come in	47	68
come off	2	1
come on	2	5
come out	45	75
come over	3	9
come up	2	7
come up with	1	0
comfort	2	0
commend	0	2
comment	0	3
compare	7	11
complain	0	2
complete	7	7
compose	0	1
concentrate	4	0
conclude	1	0
confirm	2	1
confuse	0	1
congratulate	1	4
connect	3	6
connect together	1	0
consider	0	2
consist of	1	0
contain	0	1
contemplate	2	3
continue	5	20
continue on	2	0
continue out	0	1
converse	0	1
convince	0	1
correct	8	21
cough	0	1
count	13	16
count up	0	1
cover	8	11
cover up	22	16
cradle	1	3
crawl	2	1
create	1	2
cross	31	16
cross off	37	61
cross out	1	9
crumple	1	1
cry	18	19
curve	1	0
cut	1	0
cut off	0	1
dab	5	7

VERB	ML	BL
dampen	2	1
dance	0	1
decide	33	58
decline	0	1
deflate	0	1
deflect	1	1
deflect away	2	0
demonstrate	1	2
depart	0	3
deposit	7	3
describe	5	0
destroy	0	1
determine	0	3
dial	11	12
dial up	0	1
dig	63	70
dig away	0	3
dig down	1	1
dig in	0	1
dig out	1	3
dig up	5	3
direct	1	1
disappear	0	1
discard	1	0
disconnect	2	4
discover	2	4
discuss	9	5
disengage	1	0
dismiss	1	4
disrupt	2	0
distribute	0	4
disturb	2	0
do	175	242
double-check	6	10
double-count	1	0
double-over	1	0
douse	1	0
draw	3	1
draw up	0	2
drink	9	28
drip	1	1
drive	17	22
drive home	3	2
drive in	0	2
drive on	0	1
drive up	7	7
droop	1	0
drop	77	95
drop down	2	2
drop in	0	1
drop off	0	1

VERB	ML	BL
drop out	0	1
dry	0	3
dry off	2	0
dry up	2	1
duct-tape	0	8
duct-taped together	0	2
dump	5	1
dump out	1	0
dust off	0	1
dwiddle in	0	1
eat	0	1
edit	1	0
eject	1	0
elapse	0	1
embrace	0	2
empty	1	2
empty out	1	0
encourage	0	2
end	3	3
end up	4	6
engage	1	1
enjoy	1	0
ensure	1	2
enter	59	98
enter in	3	3
examine	10	13
exchange	1	12
exclaim	1	0
excuse	5	5
execute	0	1
exercise	0	1
exert	1	0
exhale	2	0
exit	27	14
expect	0	3
experience	0	1
explain	37	87
explode	2	13
express	1	0
extend	2	1
extinguish	3	8
eye	0	2
face	0	3
fail	0	2
fall	10	19
fall apart	0	1
fall down	0	1
fall over	2	2
fan	1	0
fasten	2	0

VERB	ML	BL
feel	17	3
feel around	0	1
feel out	1	0
fess up	1	0
fiddle	0	2
fiddle around	2	0
fidget	0	1
figure	2	1
figure out	5	8
file	3	3
file in	1	3
file out	1	0
fill	10	7
fill out	1	0
fill up	9	3
find	59	90
find out	1	2
finger	0	1
finish	11	5
finish off	1	0
finish up	1	1
fish	0	1
fit	0	1
fit together	1	1
fix	3	12
fix up	3	1
flinch	0	1
fling	1	0
flip	0	8
flip away	1	0
flip on	3	1
flip open	0	1
flip over	2	3
flip through	0	1
flip up	1	0
flit	0	1
flow	1	1
fly	3	9
focus	4	1
fold	4	2
fold over	0	1
fold up	3	6
follow	9	7
follow suit	0	1
forget	12	27
form	4	6
frown	0	1
fulfill	1	0
fumble	3	3
garden	0	1
gasp	2	1

VERB	ML	BL
gather	9	6
gather together	0	1
gather up	8	0
gaze	0	2
gesticulate	1	3
gesture	23	7
get	271	243
get ahold of	0	5
get away with	1	0
get back	7	13
get by	1	1
get down	2	4
get home	2	0
get in	4	10
get off	4	5
get on	1	1
get out	13	16
get ready	1	3
get rid of	2	0
get through	0	3
get together	0	1
get up	67	58
get wet	0	1
giggle	4	1
giggle off	0	1
give	73	105
give back	8	24
give in	0	2
give out	3	1
give up	3	5
glance	1	1
glance over	1	1
glance up	0	1
glow	0	1
go	335	346
go across	0	1
go apart	0	1
go around	1	1
go at it	1	0
go away	2	3
go back	93	119
go down	15	11
go home	3	17
go in	8	7
go off	17	14
go on	24	31
go out	5	19
go over	15	16
go through	1	2
go through with	0	1

VERB	ML	BL
go together	1	1
go towards	0	1
go up	6	15
grab	82	101
grab hold of	0	1
grade	6	10
grant	0	1
grasp	1	0
graze	1	0
greet	12	16
grimace	0	3
groan	0	1
grow	0	1
hand	49	41
hand back	26	17
hand in	35	35
hand off	1	0
hand out	20	10
hand over	1	2
handle	0	1
hand-pump	1	0
hand-wave	0	1
hang	1	1
hang around	1	0
hang out	1	0
hang up	10	12
happen	16	32
hate	0	1
have	326	237
have a conversation	0	1
have a drink	0	1
have back	1	0
have got	30	104
have got on	2	3
have on	3	1
head	28	13
head back	5	7
head home	4	2
head in	1	1
head inside	1	0
head off	1	0
head out	7	5
head over	3	1
hear	0	4
heave	0	1
help	3	5
help out	0	2
hesitate	0	2
hide	56	64
hit	166	170
hold	41	59

VERB	ML	BL
hold out	0	2
hold together	1	1
hold up	1	0
hook	3	1
hook up	4	3
hop	9	7
hop out	1	0
hope	0	3
howl	0	1
huff	0	2
hug	10	10
hunch	0	1
hunch over	0	1
ignore	1	0
illuminate	4	0
imagine	0	1
include	1	0
indicate	3	11
inflate	4	25
input	2	0
insert	5	12
inspect	5	4
instruct	7	2
interfere	0	1
interrupt	1	0
intimidate	0	1
invent	1	2
investigate	1	1
involve	1	0
issue	0	1
itch	1	0
jiggle	1	0
join	4	1
joke	0	3
jot down	6	1
juggle	1	0
jump	39	43
jump around	1	1
jump back	0	1
jump over	1	1
keep	1	5
keep in	1	0
key in	0	1
kick	3	5
kick in	1	0
kick over	3	3
kill	0	1
kiss	1	0
kneel	1	0
kneel down	2	0
knock	55	36

VERB	ML	BL
knock down	0	2
knock off	5	2
knock over	8	5
know	13	33
lag	1	0
lag behind	0	1
land	20	14
latch	1	0
laugh	58	71
laugh away	1	0
laugh off	2	0
launch	0	1
lay	14	4
lay down	1	1
lay out	3	2
lead	4	0
lean	10	6
lean back	3	1
lean down	0	1
lean in	1	2
lean over	11	5
lean up	1	0
leap	0	1
learn	0	1
leave	128	194
leave behind	0	1
leave open	0	1
lecture	6	5
lend	0	4
let	6	9
let in	1	4
let out	2	1
lick	21	23
lick up	1	0
lie	1	6
lie out	1	0
lift	4	7
lift out	1	0
lift up	5	5
light	48	50
light up	0	2
like	5	12
line up	0	4
linger	0	1
listen	5	12
loan	1	1
locate	1	6
lock	0	2
look	233	389
look about	0	1
look around	12	25

VERB	ML	BL
look at	218	83
look away	1	2
look back	2	3
look down	5	2
look for	22	13
look in	2	1
look like	0	9
look on	3	0
look out	6	5
look over	11	13
look through	2	0
look up	6	6
loosen	47	35
loosen up	2	4
lose	11	8
love	0	2
lower	1	0
made	1	0
mail	18	16
make	138	134
make back	0	2
make fun	0	1
make it back	0	1
make one's way	1	13
make sure	0	28
make up	1	0
make up its mind	1	0
manage	0	7
manipulate	0	1
manoeuver	1	0
march	1	3
mark	92	56
mark away	3	0
mark down	0	2
mark off	11	1
mean	2	3
meander	0	1
measure	1	5
meet	1	8
meet up with	0	1
miss	50	66
mock	0	1
mop up	8	2
mope around	0	1
motion	8	4
mouth	1	0
move	55	67
move about	0	1
move around	0	1
move aside	1	0

VERB	ML	BL
move away	1	8
move back	9	6
move off	1	1
move on	0	2
move over	3	1
nail	2	0
need	9	17
nod	3	3
note	0	1
notice	30	20
observe	0	1
offer	0	2
offer over	0	1
open	248	300
open up	70	49
order	1	0
organize	3	4
overfill	12	3
overflow	5	9
overhand-throw	0	3
overinflate	1	1
overload	0	1
overlook	0	1
overpour	1	0
overspill	0	1
pace around	0	1
pace off	1	0
pack	1	1
pack up	11	14
pad	3	1
pad down	1	0
panic	0	3
parade	1	0
park	29	37
participate	1	0
pass	15	12
pass around	1	0
pass back	1	1
pass by	0	1
pass down	1	0
pass out	3	2
pass over	1	2
pat	23	18
pat away	0	1
pat down	3	3
pat up	0	2
patch up	0	1
pause	4	2
pay	2	7
pay attention	1	8

VERB	ML	BL
peek	0	2
peel	0	1
peel off	0	2
peer out	0	1
perform	2	0
perspire	2	1
pet	24	28
phone	9	9
pick	5	1
pick out	0	1
pick up	382	430
pile	5	3
pile up	2	3
place	57	61
place back	8	10
place down	3	8
place in	0	2
place together	1	0
play	18	39
play out	1	0
please	0	1
plug	1	1
plug in	0	1
point	58	75
point out	1	2
poise	1	0
polish	1	3
polish up	0	1
ponder	4	3
pop	19	18
pop in	0	1
pop out	1	1
pop up	0	2
pose	1	1
position	1	0
post	0	1
pour	81	69
pour on	0	1
pour out	1	1
practise	0	1
prepare	4	11
present	5	6
press	19	25
press down	1	2
press in	2	3
presume	1	0
pretend	7	5
proceed	7	15
proceed back	0	6
process	8	19
progress	0	1

VERB	ML	BL
prompt	2	0
prop	0	1
protect	0	1
provide	1	1
pry down	1	0
psyche up	1	0
puff	0	3
puff out	0	2
pull	20	21
pull back	7	2
pull down	1	1
pull in	4	5
pull off	6	3
pull on	0	1
pull out	26	29
pull up	15	12
pump	49	81
pump away	4	3
pump down	0	1
pump in	0	1
pump up	28	17
punch	6	2
punch in	12	15
purchase	1	1
push	40	29
push aside	1	1
push away	2	1
push back	3	1
push down	11	6
push in	9	12
push open	0	1
push over	1	5
push together	0	1
push up	1	0
put	220	271
put aside	1	0
put away	16	17
put back	79	87
put down	111	81
put in	39	28
put off	0	2
put on	38	49
put out	24	21
put over	0	1
put together	35	36
put up	10	8
question	1	3
raise	27	17
ramble on	0	1
rant	0	1
reach	35	23

VERB	ML	BL
reach across	1	0
reach down	3	3
reach in	5	6
reach out	1	1
reach over	9	5
reach under	0	2
reach up	1	0
react	0	2
read	72	72
read over	1	0
realize	14	28
re-arrange	1	0
reattach	0	1
rebound	6	1
rebound back	2	0
rebuild	0	1
receive	17	20
receive back	0	1
recheck	1	3
recognize	2	1
recover	1	0
re-enter	3	3
re-examine	0	1
refer	2	1
reference	2	0
reflect	1	0
reflect on	1	0
reinflate	0	1
reinput	1	0
reject	1	0
relax	3	4
remark	0	1
remember	7	9
remind	1	2
reminisce	0	1
remove	38	50
re-open	1	1
reorder	0	1
repair	1	2
repeat	0	1
replace	10	6
request	0	2
respond	0	6
rest	5	2
rest up	0	1
resume	3	2
retake	1	0
retrieve	21	16
retry	1	1
return	37	62
return back	6	2

VERB	ML	BL
return home	13	5
return out	0	1
review	3	0
ricochet	1	1
ring	27	34
rinse	0	1
rip	7	12
rip apart	0	4
rip off	4	5
rip open	0	2
rip up	40	35
rise	2	2
rock	0	2
roll	13	10
roll back	3	8
roll in	1	0
roll off	0	1
roll out	0	1
roll over	2	4
rub	19	22
rub in	0	1
rummage around	0	1
run	28	38
run away	11	9
run back	0	3
run down	1	0
run off	0	2
run over	1	1
rush	0	1
sashay	1	0
sashay back	1	0
say	66	107
scatter	1	0
scold	0	1
scoop	1	2
scoop up	2	1
score	1	0
score out	0	3
scout out	1	0
scramble	0	1
scrape	3	0
scratch	19	29
scratch off	5	10
scratch out	3	2
scream	1	2
screw	4	9
screw in	4	6
screw in together	0	1
screw on	6	3

VERB	ML	BL
screw together	9	10
scribble	0	1
scribble down	0	1
scrub	5	1
scrunch up	0	1
seal	15	22
seal up	4	1
search	0	1
see	98	99
seem	34	50
select	6	12
send	2	10
send away	0	1
send off	1	1
separate	1	1
set	19	3
set down	24	6
set in	0	1
set out	1	0
set up	3	5
shake	50	52
shake off	0	1
share	0	2
shine	4	3
shoo away	1	0
shoot	0	3
shop	2	0
shot put	0	4
shove over	1	0
shovel	4	7
show	40	52
shred	0	1
shrug	20	17
shuffle	0	1
shuffle together	0	1
shut	8	21
shut off	7	6
side-step	1	0
sigh	1	7
sign	6	4
signal	2	1
signify	0	1
sip	0	1
sit	96	104
sit around	1	0
sit back	6	2
sit by	0	1
sit down	103	110
sit up	5	7
situate	1	0

VERB	ML	BL
skip	2	4
skip back	1	0
slam	10	12
slap	0	1
sleep	0	3
sleep in	0	1
slide	1	2
slide over	0	1
sling	1	0
slip	7	10
slow	1	1
slump	0	1
smack	1	0
smash	0	3
smile	13	12
smooth out	0	2
snap in	0	1
snap together	1	0
snuff	2	1
snuff out	7	2
soak up	7	5
sop up	4	2
sort	2	0
sort out	0	1
span	0	1
spare	0	1
speak	17	10
speed walk	0	1
spend	0	2
spew out	0	1
spill	65	64
spill over	1	1
spin around	0	1
spit out	3	1
sponge	0	1
sponge back	0	1
sponge up	0	1
spot	0	2
spread	0	1
spread out	0	1
square	0	1
square up	0	1
squat	1	0
squat down	0	1
squeeze	1	0
squish	0	1
stack	4	3
stack up	1	1
stand	31	40
stand back	2	0
stand by	0	1

VERB	ML	BL
stand up	30	20
stare	4	4
start	5	17
start over	0	1
stay	2	1
steal	0	1
step	10	6
step back	3	2
step out	0	1
stick	2	5
stick out	0	1
stir	1	1
stomp	2	0
stoop	0	1
stoop down	1	0
stop	12	15
storm	2	0
straighten	4	2
straighten out	2	0
stretch	73	81
stretch out	4	10
stretch up	1	1
stride	1	0
strike	14	14
stroke	9	20
stroke off	2	3
stroke out	0	1
stroll in	1	0
stroll out	1	0
struggle	3	2
strut	1	0
study	3	3
stuff	0	1
stumble	4	2
succeed	1	2
suck in	0	1
suck up	1	0
suggest	2	0
swear	0	1
sweat	21	23
sweat up	1	0
swing	23	21
swing around	1	0
swinge off	0	1
swipe	1	3
switch	8	10
switch off	0	1
switch on	0	1
tackle	1	0
take	290	338

VERB	ML	BL
take a seat	0	5
take apart	1	0
take away	1	1
take back	7	8
take in	1	0
take off	71	69
take out	69	79
take place	0	1
take up	1	2
talk	98	96
talk about	3	1
talk back	1	0
tap	0	3
tape	1	2
tape together	6	0
tape up	2	2
teach	6	17
tear	10	13
tear apart	1	4
tear down	0	1
tear off	3	5
tear open	0	1
tear up	12	12
tell	30	34
test	4	3
test out	2	3
thank	6	5
think	19	30
throw	190	202
throw away	1	2
throw back	0	2
throw down	6	11
throw in	0	1
throw off	1	1
throw over	0	1
throw up	8	17
tick off	1	0
tidy	1	0
tighten up	1	0
tilt	1	0
tire out	1	0
toss	20	13
toss aside	2	1
toss back	1	0
toss down	0	1
toss off	0	1
toss over	0	1
toss up	2	0
touch	42	45
trade	2	4
transfer	1	0

VERB	ML	BL
trickle	1	0
trip	1	6
try	154	200
try out	0	1
tuck in	1	0
turn	9	10
turn around	7	11
turn back	0	2
turn in	2	3
turn off	34	47
turn on	49	56
turn out	3	1
turn over	5	7
twiddle	1	1
twist	4	3
twist in	0	1
twist on	0	1
twist together	1	1
type	2	1
type in	0	2
unbutton	8	8
uncap	0	2
underline	4	10
understand	5	3
undo	25	17
unhook	1	2
unlatch	1	0
unload	2	0
unlock	2	1
unloosen	1	0
unpeel	0	1
unscrew	6	7
untangle	1	0
untie	0	13
unwrap	0	3
upset	1	0
use	83	98

VERB	ML	BL
verify	6	11
visit	2	0
wack	1	1
wag	3	0
wait	39	67
wait for	36	9
wake	1	0
wake up	20	13
walk	336	293
walk across	0	1
walk along	0	1
walk around	4	9
walk away	10	22
walk back	63	72
walk behind	0	1
walk by	2	0
walk home	5	1
walk in	17	23
walk off	2	0
walk on	0	1
walk out	12	30
walk over	28	35
walk through	0	1
walk together	1	0
walk up	2	2
want	32	39
wash	22	21
wash down	1	0
watch	10	13
wave	6	7
wave around	0	1
wave away	0	1
wave back	0	1
wave off	0	1
wave over	0	1
wear	3	3
welcome	0	1

VERB	ML	BL
wet	2	2
whack	2	6
wiggle	1	0
win	3	1
wind up	0	2
wing	0	1
wipe	86	89
wipe away	9	13
wipe down	7	8
wipe off	8	6
wipe up	12	16
wish	7	6
withdraw	6	15
wonder	8	14
word	0	2
work	26	52
work at	1	0
work away	1	2
work on	2	0
work out	0	3
work up	4	2
worry	1	0
wrap	0	1
wrap up	3	1
wrestle	1	0
write	164	182
write down	16	14
write in	0	1
write out	0	1
wrote	1	0
yawn	2	6
yell	7	7
unintelligible	1	24