

Quantifying syntactic priming in oral production: A corpus-based
investigation into dyadic interaction of L1-L1 and L2-L2 speakers of
English

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Declaration

I declare that this thesis represents the outcome of my own original research and that it has not been previously included in a thesis or report submitted to this University or to any institution for a degree or other qualification.

Abdalkarim Zawawi

Signed

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Abstract

It is well established that speakers are inclined to repeat themselves or their interlocutors in native language (L1) and second language (L2) conversations. This phenomenon is largely attributed to priming, whereby exposure to a given language form, i.e. prime, facilitates its processing or that of a related form in a subsequent language production, i.e. target.

The present study uses an innovative combination of corpus-linguistic methods and manual analyses to identify syntactic priming of verb-particle constructions (e.g., *taking out a paper vs. taking a paper out*), the dative construction (e.g., giving *Emma a paper vs. giving a paper to Emma*) and the caused-motion construction (e.g., *putting the money in Emma's pocket*), which shares its constituent structure with the prepositional dative and its semantics with both dative alternation variants. These constructions are studied in task-based free dialogues among native English and L1-German L2 speakers of English. Binary logistic regressions from a generalized linear model (GLM) are employed to disentangle the priming effect from other factors that might be predictors for the target. The analysis of all three constructions controls for interaction between primes and prime-target pair intervening distance, lexical boost and speaker identity.

The verb-particle construction results show no evidence for priming as an independent predictor of verb-particle variant reproduction in L1-L1 and L2-L2 conversations. In both language conditions, the reuse of verb-particle constructions can largely be explained by the same set of factors, i.e. the syllable length of the direct object and whether it is new to the discourse. The dative alternation analysis reveals evidence for priming in the L1-L1 and L2-L2 conversations even when controlling for

various discourse-related predictors. In the former condition, the difference in length between the target's themes and recipients and the discourse accessibility of the theme, along with prime-target pair distance and structural similarity, are found to be the best predictors for the target. In the L2-L2 language condition, seven factors are found to best predict the target in the L2 conversations in addition to the identity of the prime, e.g., the pronominality and animacy of the recipient and the concreteness of the theme. The caused-motion analysis shows that it is amenable to priming even though more double object targets follow the caused-motion primes than prepositional dative targets, which are structurally similar to the caused-motion primes.

The study finds little support for the relevance of the prime-target distance to the strength of priming across constructions and language conditions. The results also show that the magnitude of priming is unaffected by the identity of the prime-target pair speaker across constructions and language conditions. Finally, (partial) lexical overlap (the so-called lexical boost) is found to encourage the reuse of particle placement primes in the L2-L2 condition (e.g., *take out the money – put back the money*). For the dative alternation analysis, only some lexical factors (e.g., prime-target main verb lemma match and the semantic class of the target's main verb) boost the magnitude of dative alternation priming in the L2-L2, but not the L1-L1 language condition. In addition, a shared main verb lemma seems to increase the likelihood of reused caused-motion primes.

Taken together, these results indicate that the L1-L1 and L2-L2 reuse of primed constructions is conditioned by the shared constituent structure between prime-target pairs, but also by the mapping of syntactic features to semantic and lexical features of the primed sentence.

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1 Introduction

1.1 Theoretical background to the study

It is well established that humans have a tendency to mimic each other's behaviour. For example, rock-paper-scissors players were found to imitate the gestures of their opponents during the game (Cook, Bird, Lünser, Huck, & Heyes, 2011). Research has shown that humans' decisions can also be motivated by non-human stimuli. For example, playing German music at a wine store that sells French and German wines was found to cause an increase in the German wine sales, relative to the French wines, while playing French music at the same store increased the French wine sales, relative to the German wines (North, 1999). We therefore see that people are sensitive to prompts that then cause them to modify their own behaviours or decisions within a consumer or gaming context.

A compelling body of evidence indicates that speakers have a similar tendency to be influenced by their own or their interlocutors' speech in both their native language (L1) and second language (L2) conversations (Ferreira & Bock, 2006, p. 1111; Pickering & Ferreira, 2008, p. 427). In particular, speakers' reuse of a structure that they have just had experience with can facilitate its processing, serving as a vehicle of fluency, i.e. speed and accuracy of production (Bock, 1986; Corley & Scheepers, 2002; Levelt & Kelter, 1982; Smith & Wheeldon, 2001). At the syntactic level, Branigan, Pickering, Liversedge, Stewart, & Urbach (1995, p. 490) referred to this phenomenon as *syntactic priming*, which they defined as: "... the proposal that processing a particular syntactic structure within a sentence affects the processing of the same (or a related) syntactic structure within a subsequently presented sentence". The initial exposure to the language form, i.e. stimulus, is referred to as the *prime*,

while the form whose processing is affected by the prime is referred to as the *target* or the *response*.

This phenomenon of syntactic priming can be investigated in more than one paradigm. One way of observing priming is by identifying the prime, and then measuring the speakers' reaction time to it, or the accuracy of its recognition or reproduction. A second way of looking at syntactic priming is by selecting a prime form, and tracing its next reuse, or the use of an alternative form to the prime. In this case, priming can be manifested in the higher frequency of a certain form following its prior production, relative to the frequency of an alternative form. For example, the English dative alternation is an instance where speakers can use one of two alternating constructions, i.e. the double object and the prepositional dative constructions (see section 2.11.3). Priming predicts that a prepositional dative prime will encourage speakers to match it with a subsequent prepositional dative target, rather than a double object target. Priming, therefore, is not a repetition effect per se because it can be manifested by more fluent reproduction of a prime. That is, priming a construction can result in faster and more accurate reproduction of the prime, but it also can lead to the repetition of the primed construction in subsequent language production.

This repetition phenomenon caused by priming has been one of the concerns of psycholinguistic research, but also has been investigated and explained within a variationist sociolinguistic framework (Weiner & Labov, 1983, Weatherholtz, Campbell-Kibler, & Jaegar, 2014). Due to the significance of repetition to multiple aspects of language and human communication processes, it has been approached from different angles in the literature, and described with various defining terms (e.g., Levelt & Kelter, 1982; Szmrecsanyi, 2005; Gries, 2005). Taking a processing perspective on the matter, I am mainly interested in the psycholinguistic literature, but

will refer to some of the sociolinguistic literature where appropriate. The next section will review and evaluate the terminology that has been used in the description of priming.

1.2 Defining key constructs

A variety of terms have been suggested to describe the phenomenon of priming. In order to define *syntactic priming*, it is necessary to look at these different terminologies and disentangle the specific meaning of syntactic priming from the other closely related phenomena. For example, in one of the earliest psycholinguistic experimental investigations of production repetition, Levelt and Kelter (1982, p. 78) referred to the phenomenon where an answerer matches the same structures used in the questions they were asked as a *correspondence effect* (see section 2.4.1 for details). While their term communicates the matching of a linguistic choice between speakers in a dialogue, it fails to reflect the underlying psychological aspects of why speakers tend to repeat previously produced structures. Another closely related phenomenon was proposed by Garrod and Anderson (1987, p. 206) which they called *output-input co-ordination*. It was described by Garrod and Doherty (1994, p. 185) as follows: "... in formulating an utterance the speaker will match as closely as possible the lexical, semantic and pragmatic options used to interpret the last relevant utterance from their interlocutor". Branigan, Pickering, & Cleland (2000, p. 21) later reported evidence that interlocutors are also sensitive to syntactic structures and tend to *adjust* their language behaviour to match that of their interlocutors. Very similar to the concept of co-ordination is a phenomenon Garrod and Pickering (2004, p. 8) referred to as *interactive alignment*. In describing the interactive alignment of interlocutors, they wrote: "To come to a common understanding, interlocutors need to align their situation models, which are multi-dimensional representations, containing information

about space, time, causality, intentionality and currently relevant individuals” (Garrod and Pickering, 2004, p. 8). The authors assumed that successful conversation between two interlocutors is contingent on whether they align and share similar representations throughout the conversation (Garrod and Pickering, 2004, p. 8). *Convergence* is a similar term used in the literature for the same phenomenon of co-ordination (Collentine & Collentine, 2013; Fernandez & Grimm, 2014). For Collentine and Collentine (2013, p. 172), convergence means: “...a production behaviour that is indicative of (the mental state of) alignment. It manifests itself at various levels of representation, such as lexical choice [...] or syntax”. Taken together, co-ordination, alignment and convergence are similar in that they refer to a general tendency to repeat language, motivated by speakers’ mental processes. This repetition occurs within and between speakers and is used as a conversation strategy. Speakers also have the tendency of repeating the same words, a phenomenon distinguished from priming and referred to as *entrainment* (Costa, Pickering, & Sorace, 2008; Michel & Smith, to appear 2017).

Priming is a term for a related phenomenon that can lead to repetition. It tends to be used in the literature with a more specific meaning, which must be carefully disentangled from *co-ordination*, *convergence* and *alignment*. Specifically, priming refers to the facilitation effect that result from prior exposure to a form. This facilitation effect can be manifested in the increased speed or accuracy of producing or recognizing that form, or the repetition of the same form, in preference to an alternative form. Furthermore, speakers’ tendency to repeat a recently produced structure was referred to as *persistence* by (Szmrecsanyi, 2005). I will adopt the term *Priming* to refer to this reuse effect caused by prior experience with a prime because (a) a psycholinguistic framework theoretically underlies this thesis, and (b) because priming is the most frequently used term in the literature to describe this type of

repetition phenomenon (Bock, 1995; Pickering & Branigan, 1998; Branigan, Pickering, & Cleland, 1999; Bock et al., 2000; Hartsuiker & Westenberg, 2000; Carbary et al., 2004; Trofimovich, 2005; Gries, 2005; Reitter et al. 2006; Bock et al. 2007; Kim & McDonough, 2007; McDonough & Mackey, 2008; Pickering & Ferreira, 2008; Pietsch & Buch, 2012; Segaert et al., 2013).

1.3 The scope of the earlier studies of syntactic priming

The focus of this thesis is syntactic priming. Syntactic priming has been looked at in a variety of contexts and languages, using a variety of methods. It has been investigated in the context of reading comprehension (Luka & Barsalou, 2005; Arai et al., 2007; Traxler & Tooley, 2008; Carbary et al., 2013; Tooley & Bock, 2014), in listening comprehension (Bock et al., 2007; Thothathiri & Snedeker, 2008a, 2008b), in written production (Pickering & Branigan, 1998; Pickering & Branigan, 1999; Hartsuiker & Westenberg, 2000; Scheepers, 2003) and spoken production (Ferreira, 2003; Mcdonough & Mackey, 2006; Reitter et al., 2006; Kim & McDonough, 2007; Biria & Golestan, 2010; Tooley & Bock, 2014).

Language-wise, the earliest investigations in the 1980s were mostly conducted on native speakers of English (e.g., Bock, 1986; Bock & Kroch, 1989; Bock & Loebell, 1990; Pickering & Branigan, 1998). These studies aimed to understand the role of priming in L1 processing, and how native speakers go about producing and comprehending their L1. Subsequently, more studies emerged where syntactic priming was investigated in the L1 production of languages other than English (e.g., Hartsuiker & Kolk (1998) and Hartsuiker et al. (1999) for Dutch L1; Melinger & Dobel (2005) for German and Dutch L1).

Syntactic priming research, however, did not remain an L1-only territory. A growing body of syntactic priming research began to look at the L2 acquisition of English from a pedagogical perspective (e.g., McDonough, 2006; McDonough & Mackey, 2006; Kim & McDonough, 2007; McDonough & Mackey, 2008; Trofimovich et al., 2013). Furthermore, priming research slowly started to look at L2s other than English (e.g., Trofimovich, 2005; Trofimovich & Gatbonton, 2006; Collentine & Collentine, 2013), and cross-linguistic priming in the production of bilingual speakers (Fricke & Kootstra, 2016; Hartsuiker et al., 2008; see section 2.7).

Syntactic priming has been investigated by applying experimental methods within a laboratory context. Such experiments include a picture description paradigm whereby the participants are exposed to a visual prompt with a written or audible sentence to elicit the prime condition (e.g., Bock, 1986, 1989; Bock & Loebell, 1990; Bock & Griffin, 2000; Melinger & Dobel, 2005; Bock et al., 2007). In such experiments, the participants are typically asked to repeat the prime sentence and then describe the experimental visual prompt in their own words. The participants' description of the experimental picture is taken to be the target.

Sentence completion is another methodology that has been applied in investigating syntactic priming (e.g., Branigan, Pickering, & Cleland, 1999; Hartsuiker & Westenberg, 2000; Scheepers, 2003; Kaschak, Kutta, & Schatschneider, 2011; Kaschak, Kutta, & Coyle, 2014). In such experiments, the participants are provided with fragments of sentences that are manipulated to create a bias towards the production of a construction, e.g., the double object construction, over its alternative, i.e. the prepositional dative construction. The experimental fragments are considered the primes and the participants' written or oral completions of them are taken to be the targets.

A third methodology used to investigate priming is the sentence recall paradigm (e.g., Fox Tree & Meijer, 1999; Ferreira, 2003). Under this paradigm, the participants are presented with a prime sentence that is then followed by a word or number recognition distraction task. The function of the distraction task is to minimize the likelihood that the participants will remember the prime sentence. Subsequently, the participants are encouraged to recall the original prime sentence, their response being audio-recorded. The participants' initial exposure to the prime sentence is considered to be the prime, while the recalled sentence is taken to be the target. In a dative alternation priming experiment, for example, the distraction task can be manipulated to include a ditransitive verb such as 'donate' which then creates a bias for the prepositional dative as opposed to a double object prime. The purpose of a sentence recall task is to determine whether the participants change the original structure of the prime to an alternative structure in their recalled target sentence.

Besides the experimental methods, syntactic priming has been investigated in observational corpus-based studies of L1 production (e.g., Gries, 2005; Szmrecsanyi, 2005; Snider, 2009; Howes et al., 2010; Jaeger & Snider, 2013; Fernández & Grimm, 2014; Healey et al., 2014). These studies mainly traced syntactic features in collections of spoken data produced by L1 speakers. To the best of my knowledge, with the exception of Collentine and Collentine (2013), corpus-based investigations of syntactic priming in L2 production are non-existent.

Besides priming, experimental and corpus-based investigations of priming have tackled topics such as a phenomenon called *lexical boost*, where prime-target shared lexical items are said to strengthen the magnitude of syntactic priming (see 2.13 for a review). Another much-debated question in syntactic priming research is the persistence of syntactic priming over intervening material between prime-target pairs

(see section 2.4). This question is aimed at explaining the mechanisms that underlie syntactic priming (see section 2.3). Furthermore, syntactic priming research has tried to determine whether the identity of the speaker matters in boosting the magnitude of priming (see section 2.8). This study builds upon these earlier works and is motivated by considerations highlighted in the next section.

1.4 Motivation for the study

This study was motivated by methodological and theoretical considerations. First, the scarcity of corpus-based syntactic priming studies of L2 production priming (see above) raises the question of why there have been many corpus-based investigations into the production of L1 speakers, but not of L2 speakers. Perhaps part of the reason is slower development in the creation of L2 spoken corpora, relative to L1 spoken corpora. It is possible that SLA researchers have not had access to an appropriate L2 spoken corpus where examples of alternating structures, such as the double objects and prepositional datives, can be found in sufficient numbers.

Second, there is a need for a syntactic priming study in L1-L1 and L2-L2 dialogues where language production is not based on dictated prime sentences or speech fragments. Third, as I will show in section 2.14, there is a need for a study into priming during spoken production that is not undermined by use of different genres of speech for the analysis of different target constructions.

Finally, besides prime-target structural similarity, it appears that most experimental studies of syntactic priming have only considered one or a very limited number of factors that could lead to the use of a particular target construction (e.g., Bock, 1989; Pickering & Branigan, 1998, 1999; Bock & Griffin, 2000; Branigan et al., 2000; McDonough, 2006). Hence, there is a need for a syntactic priming study that

looks at more than just one target construction, and does so while controlling for prime-target structural similarity and other relevant predictors simultaneously.

The theoretical motivations of the present study can be summarized in four points:

- (1) Despite a compelling body of evidence for the robustness of syntactic priming in experimental investigations of L1-L1 and L2-L2 spoken production, there is corpus-based evidence for and against priming in L1-L1 spoken production (see section 2.14).
- (2) There is mixed evidence in syntactic priming research on the duration of priming as intervening material separating primes from targets (see section 2.4).
- (3) There is mixed evidence regarding the strength of the lexical boost effect in encouraging priming (see section 2.13).
- (4) There is mixed evidence for the relevance of prime-target pair speaker identity for the strength of the syntactic priming effect (see section 2.8).

1.5 Research questions

The central question in this study is to what extent L1-L1 and L2-L2 users repeat their own linguistic choices and those of their interlocutors in task-based free dialogue as a manifestation of priming. There is no shortage of research into syntactic priming on spoken and written L1 production, but less so for syntactic priming in L1-L1 dialogues. In addition, very little research has looked at syntactic priming in L2 speakers conversing with each other in free dialogues.

Using corpus-based and computational methods, this thesis seeks to investigate whether syntactic priming occurs in L1-L1 and L2-L2 natural dialogues. In doing so, this study also attempts to understand the factors that motivate the repetition of a construction as opposed to its alternating construction in spoken L1-L1 and L2-L2 production. The constructions I look at are the verb-particle construction, the dative alternation, and the caused-motion construction. Given the inconsistency in the earlier syntactic priming research over the duration of the effect (see section 2.4), this thesis seeks to evaluate the relevance of the intervening material between the prime-target pair to the magnitude of priming. Finally, I analyse the relevance of speakers' identity to syntactic priming in dyadic L1-L1 and L2-L2 interactions. The specific research questions this study seeks to answer are as follows:

1. How does verb-particle priming in L1-L1 spoken interaction differ from verb-particle priming in L2-L2 spoken interaction?
2. How does dative alternation priming in L1-L1 spoken interaction differ from dative alternation priming in L2-L2 spoken interaction?
3. Is the caused-motion construction amenable to priming?
4. How does caused-motion priming in L1-L1 spoken interaction differ from caused-motion priming in L2-L2 spoken interaction?
5. How does prime-target pair distance affect verb-particle, dative alternation and caused-motion priming in L1-L1 and L2-L2 spoken interaction?
6. How does the lexical similarity between prime and target affect verb-particle, dative alternation and caused-motion priming?

7. How does the prime-target pair's speaker identity affect verb-particle, dative alternation and caused-motion priming in L1-L1 and L2-L2 spoken interaction?
8. How can corpus-linguistic methods be used to disentangle priming effects from other possible predictors of verb-particle and dative alternation in naturalistic discourse?

Knowing that the production of a certain form does encourage its subsequent reproduction, it is expected that the production of the constructions under study will facilitate their reproduction in both the L1-L1 and L2-L2 investigations (RQ 1, 2 and 3) (Goldberg, 2003) (see section 2.12 for a discussion of the theoretical framework). Moreover, given that the task used to collect the data is exactly the same for the L1-L1 and the L2-L2 investigations (see section 3.1), one might expect some similarity in the factors that encourage priming both datasets (RQ4). One might also expect greater priming when prime-target pairs are separated by short intervening material (RQ5). Furthermore, the lexical similarity between prime-target pairs might encourage the subsequent reproduction of the same prime type in L1-L1 and L2-L2 data (RQ6) (see section 2.13). Given that the reproduction of a form is dependent, in part, on the immediately preceding production of the same or a similar form, one might expect a minimal role for the identity of the speaker (RQ7). Finally, corpus methods might be effective in aiding our understanding of priming, especially when it comes to teasing apart the different factors responsible for the reproduction of a given form (RQ8).

1.6 Implications and significance of the study

The findings of this study apply to practice-oriented disciplines in applied linguistics in two ways. First, on the pedagogical level, the study will make recommendations on whether priming might be used as a learning strategy that

teachers of English could use to promote students' learning of the constructions under study. On the methodological level, the study will demonstrate a way to perform a structural analysis of a sentence while keeping in mind the more functional definitions of the constructions under study. To this end, the study evaluates earlier methods of studying syntactic priming and makes methodological recommendations for future studies of the same nature. Before I move on to the structure of the thesis, the following paragraphs will give details about the theoretical significance of the current study.

The significance of the current study goes beyond that of earlier experimental and corpus-based investigations of syntactic priming in two major ways. First, since the earlier experimental studies looked at syntactic priming in spoken language within a laboratory context, such investigations might not qualify as a proper reflection of what goes on in a naturally occurring dialogue in terms of priming (Howes et al., 2010, p. 2009). This study looks at real time free dialogue within a task based context, rather than just conducting an experiment where participants are required to produce a limited number of discontinuous sentences that include a target construction.

Second, this study can be thought of as an extension to corpus-based investigations of priming in that it presents a model to extract and quantify particle placement, dative alternation and caused-motion construction priming in L2 spoken production. As I will show in Chapter 3, an innovative corpus-based methodology can be developed to retrieve and quantify priming instances of certain alternating constructions produced by L2 users, in ways that are to some extent similar to how syntactic priming was quantified in earlier corpus-based investigations of L1 spoken data (see section 3.2 and 3.3).

Uncertainty about the robustness of syntactic priming in dialogues (see sections 2.14.1 and 2.14.2) necessitated the overarching concern in this study of whether or not syntactic priming can be observed across the three target constructions under study in L1-L1 and L2-L2 conversations. By answering this question, our understanding of the strength of syntactic priming and its generalizability to task-based free L1-L1 and L2-L2 dialogues can be extended.

Although extensive research has been carried out on dative alternation priming, very few studies have investigated verb-particle priming (see section 2.11.2), and to the best of my knowledge, no single study exists that has investigated the priming of the caused-motion construction. This thesis of the caused-motion construction within a priming paradigm is significant, because it is the first exploration of caused-motion priming on the basis of shared constituent structure with the prepositional dative construction. Furthermore, by understanding caused-motion priming and that of the other alternations, this thesis will expand our knowledge of the nature of syntactic priming. Finally, by looking at three different alternations, this study will allow us to make inferences about the generalisability of priming or whether it is construction specific.

Crucially, by addressing the research questions outlined in section 1.5, this study will shed light on the similarities and differences in priming production between L1-L1 and L2-L2 conversations. Costa et al. (2008) suggested that two interlocutors with a closely related L1, e.g., Spanish and Italian, are expected to produce their L2 in similar ways given the similarities in their L1s. This study advances our understanding of L2-L2 production by studying the English production of learners with the same L1, i.e. German, and contrasting it with the native production of American speakers in the same free dialogue task.

1.7 The structure of the thesis

This thesis is comprised of six chapters besides this first introduction chapter, in which I have discussed the use of priming terminology and highlighted the motivations and aims of the study. In Chapter 2, I will provide a discussion of relevant theoretical concepts, such as the mechanisms that are thought to underlie syntactic priming, and the relevance of speaker identity and lexical boost to the magnitude of syntactic priming. A description of the three target constructions examined in this study will also be provided in this chapter. Chapter 3 will be devoted to a detailed discussion of the methodological choices that have been made for the purposes of this study. In particular, this chapter will provide a description of the selected corpus, how the target constructions are extracted from it, and the specific steps that are followed in their analysis.

The analysis and results are organized into three chapters. Chapter 4 is dedicated to particle placement analysis; Chapter 5 presents the dative alternation analysis; and Chapter 6 contains the caused-motion construction analysis. Each one of these analysis chapters is built around the main research questions that the analysis of each construction seeks to answer, i.e. syntactic priming, prime-target pair distance, lexical boost and prime-target pair speaker identity and presents the results and discussion for each of the three constructions separately. Finally, Chapter 7 is the conclusion in which I summarize the main findings of the study, highlight its methodological and theoretical contributions, discuss its limitations, and offer recommendations for further research into priming based on this study.

2 Literature review

2.1 Introduction

The main goal of this study is to contrast priming of three different syntactic constructions between L1-L1 and L2-L2 English free and naturalistic dialogues, namely the verb-particle alternation, the dative alternation and the caused-motion construction. Achieving this goal requires devising a workable methodological approach that can quantify syntactic priming in the production of three alternations: particle placement, dative, and caused-motion construction alternations. Before doing so, it is important to understand the basic psycholinguistic processes that are thought to underlie priming. This literature review chapter, therefore, begins with a brief introduction of how language production works in section 2.2, followed by an exploration of the relevant theoretical concepts to language production and the mechanisms that have been proposed to underpin syntactic priming in section 2.3. The intervening material between prime-target pairs and its relevance to the strength of priming is vital to the mechanisms behind syntactic priming, and so it will be discussed in section 2.4.

Section 2.5 explores priming in L1-L1 dialogues and section 2.6 discusses priming in L2-L2 dialogues. Subsequently, section 2.7 will define and show empirical evidence for cross-linguistic priming. Section 2.8 highlights the effect of speaker identity on the magnitude of priming in dialogues. The boundaries of this study of priming are then laid out with a brief discussion of priming at different linguistics levels in section 2.9. This section will lead up to the discussion of syntactic priming, i.e. the major concern of this study, in section 2.10. Section 2.11 will then further define the scope of this study by highlighting the constructions examined in this

thesis. Finally, section 2.13 will be devoted to a definition and a discussion of the lexical boost effect given its relevance to syntactic priming.

Devising a methodological approach of quantifying syntactic priming requires a discussion of the strengths and pitfalls of the earlier experimental and corpus-based investigations of syntactic priming. Therefore, the earlier experimental investigations of priming will be critically reviewed and evaluated in various sections of this chapter, especially as they are cited to illustrate the prime-target distance effect in section 2.4 and the lexical boost effect in section 2.13. The corpus-based studies for and against syntactic priming will be introduced and critically reviewed in Section 2.14. Finally, this study was informed by a number of gaps that have been identified in the literature. These will be summarized and in section 2.15 in the light of the research questions this thesis attempts to answer as well as the reviewed literature.

2.2 How language production works

According to Levelt, Roelofs, & Meyer's (1999) theory of lexical access in speech production, and Levelt's (1999) blueprint of the speaker model, language production begins with a stage of 'conceptualization' where the speaker generates a message that corresponds to their intentions. The second stage is the lexical selection whereby a lemma is selected from the mental lexicon. The third and fourth stages are the morphological and phonetic encoding of the intended message into a linguistic form that is articulated in the fifth stage. In the last stage, the speaker hears themselves and is able to detect errors or disfluencies in the articulated message. In Levelt et al.'s (1999) model of language production, the lexical entries are represented at three levels in the network: the 'conceptual stratum' encoding the lexical concept, the 'lemma stratum' encoding words and their syntactic information and the 'form' stratum encoding morphological and phonetic properties. Levelt et al.'s (1999) language

production model as well as that of (Roelofs, 1993) were extended and used to explain the mechanisms underlying priming in language production (Pickering & Branigan, 1998, 1999).

Pickering and Branigan (1998) identified three levels of information to be represented at the lemma stratum. These include: ‘category information’ encoding whether a word is a noun, a verb or an adjective; ‘featural information’ encoding the number, person, tense, aspect and gender of a word; and ‘combinatorial information’ specifying how a word can be connected with other linguistic units (Pickering & Branigan, 1998, pp. 633–634). Pickering and Branigan (1998) put forward the hypothesis that priming is manifested by activating the lemma stratum. That is, the production of a given word results in the activation of the three categories represented at the lemma stratum. The next section will introduce the two prominent mechanisms underlying syntactic priming, and draws on Pickering and Branigan’s (1998) model to illustrate how syntactic priming works in the alternation between prepositional datives and double objects.

2.3 The mechanism behind syntactic priming

There are two prominent models that attempt to explain the mechanism behind syntactic priming. Section 2.1 will focus on the transient activation mechanism and how it explains the priming effect, and section 2.2 will focus on the implicit learning account of priming and how it could affect speakers’ long-term language behaviour.

2.3.1 The transient activation account

Many scholars have argued that syntactic priming can be explained in terms of “a transient, activation” of syntactic information (Pickering & Branigan, 1998; Branigan et al., 1999, 2000; Garrod & Pickering, 2004). In this first view, syntactic priming happens by activating a certain construction that then remains activated only

for a short period of time. The prior activation of a certain construction increases the chances that the same construction will be subsequently produced when a short distance separates its first activation from the next opportunity for it to be reproduced.

Under the transient activation account, the activation of a structure rapidly declines when the distance between the target and the prime is interrupted with structurally different sentences. The passing of time can also weaken the strength of activation of the recently produced prime, resulting in a rapid decay of the priming effect. That is why the priming effect is assumed to be short-lived in the transient activation account, and leads to only a temporary change in the production of language users. This activation then decreases back to its baseline before exposure to a particular prime construction (Branigan et al., 1999, p. 639).

As an illustration, let us assume that speaker A is a husband to speaker B and that they are having a conversation about their daughter, i.e. Emily.

(1) Speaker A. I am going to show Emily her birthday gift.

As we can see in example (1), Speaker A produced a sentence containing the double object construction. That is, both ‘Emily’ and ‘her birthday gift’ are (in)direct objects to the main verb ‘show’. If speaker A and Speaker B did not have a recent experience with the double object or the prepositional dative constructions (e.g., I showed the birthday gift to Emily), then their initial syntactic representation is visualized in Figure 2.1.

Figure 2.1: Speaker A and B's network's initial state

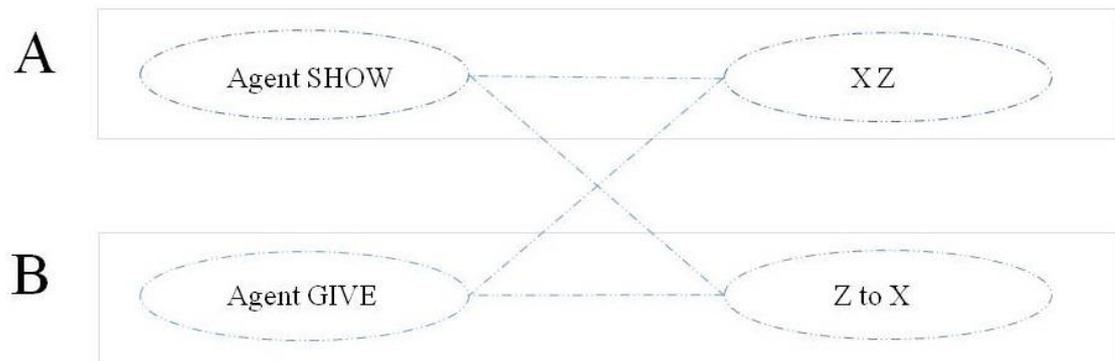
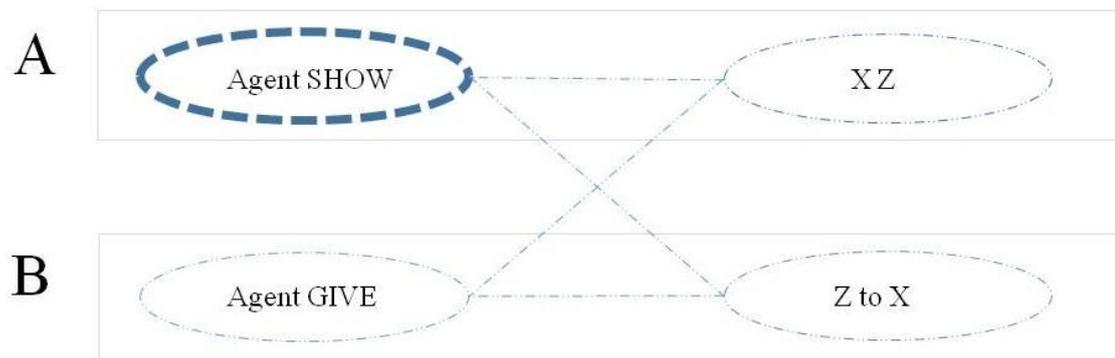


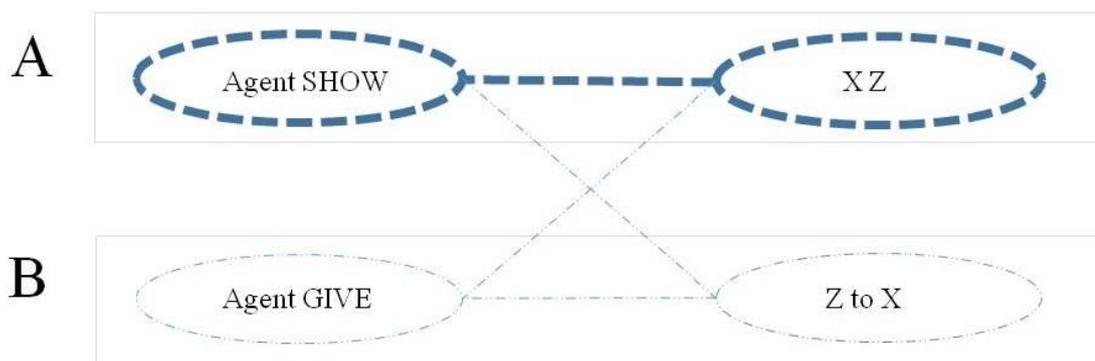
Figure 2.1 shows that prior to the production of the double object construction, both speakers did not have any biases towards the prepositional dative or the double object construction. This is the conceptualization stage where the husband was generating the message. Figure 2.2 below shows the lexical selection stage where the husband decided to use the verb lemma ‘show’ to express the intended message.

Figure 2.2: Lexical selection stage



The husband selected the verb lemma ‘SHOW’, which is a ditransitive verb that takes either the prepositional dative or the double object construction.

Figure 2.3: Bias created by activating the double object construction

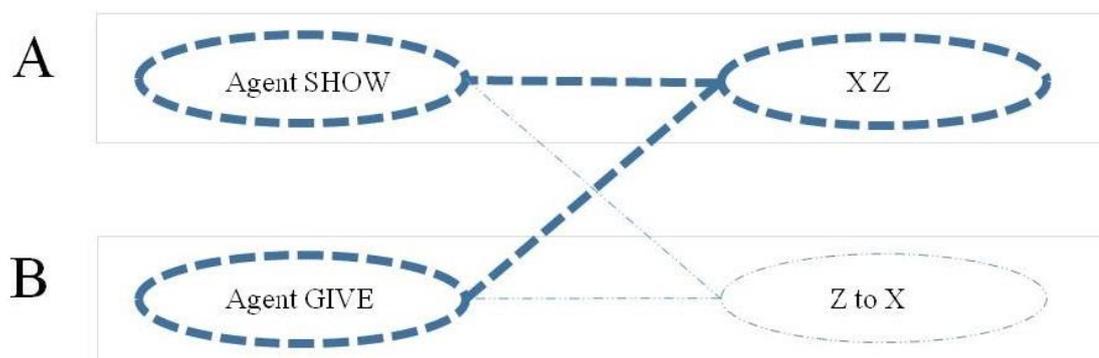


The husband selects the double object variant and thus the NP NP combinatorial node is activated creating the bias for the double object over the prepositional dative construction. The activation of the double object construction does not immediately diminish. Figure 2.3 shows that the network’s state of both interlocutors after being exposed to the double object. The wife then replies:

(2) Speaker B. I already gave Emily the gift.

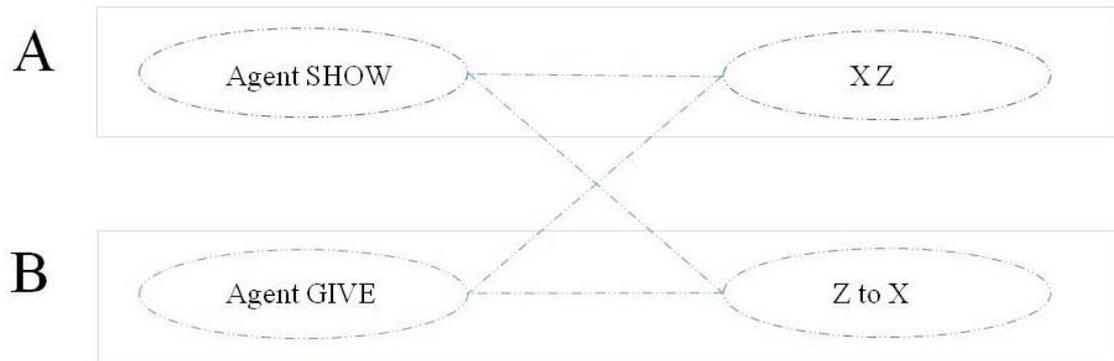
The combinatorial node linking the verb lemma with the double object complement remained activated. The bias created by the earlier production of the double object led to the subsequent reproduction of the double object construction with ‘give’, i.e. a different verb lemma from the prime’s (see Figure 2.4).

Figure 2.4: Reselection of the double object construction



Finally, the double object activation will shortly decrease back to the baseline before the double object was produced (see Figure 2.5).

Figure 2.5: Speaker A and B's networks' final state



As has been shown, syntactic priming can happen even when the verb node of the prime construction is not identical to that of the target construction. Generally, this effect is expected not to persist for a long time under the transient activation account. The next section explains the implicit learning account of syntactic priming, which gives a slightly different explanation for the phenomenon of priming.

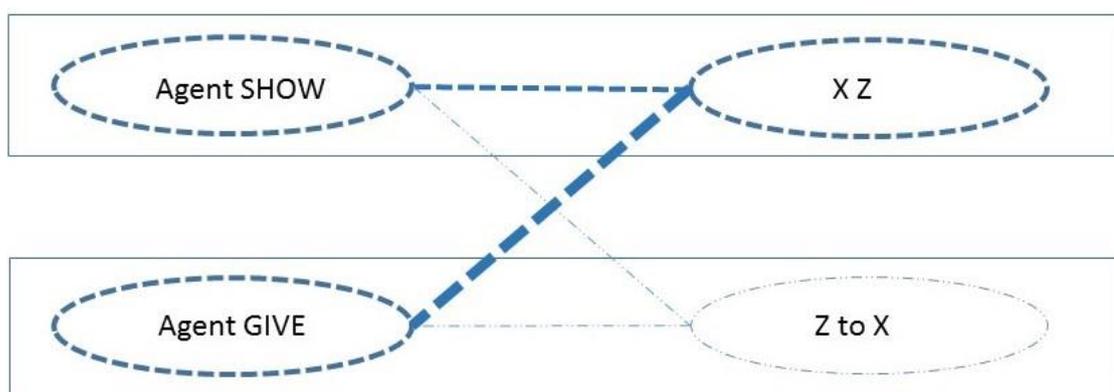
2.3.2 *The implicit learning account*

The second major account is known as the implicit learning mechanism (Bock, 1986; Bock et al., 2007; Bock & Griffin, 2000; Gries, 2005; Chang et al., 2006; Chang et al., 2000; Jaeger & Snider, 2007; Savage et al., 2006). Under this account, the prior experience with a form results in adjusting the processing system responsible for the production of that form (Ferreira & Bock, 2006). The major difference to the transient perspective, therefore, is that this account assumes that the priming effect does not experience an immediate decay. Rather, the priming effect is manifested by an adjustment to the processing system which persists over more semantically and syntactically different intervening material than priming explained by the transient activation account. This account explains the priming of recently produced structures in the same way as the one discussed above, but it diverges on the strength assigned to the duration of this priming effect.

Unlike the transient activation account of priming, the implicit learning account predicts a long-lived persistent priming effect in response to the prime. This long-term persistence is believed to be implicit in nature, as it is unconscious and not hindered by processes of short-term explicit memory (Bock et al., 2007, p. 440). The persistence of the priming effect leads to an observed, consistent long-term change in language behaviour, which therefore leads to some kind of implicit learning (Bock et al., 2000, p. 180). Implicit learning is defined by Bock et al. (2007, p. 439-440) as: “... a type of procedural memory that results from engaging a cognitive mechanism, effectively turning the operation of the mechanism and thereby changing it”.

If we consider the same exchange as in section 2.3.1 for an illustration of the implicit account of priming, the bias for the double object created as a consequence of the recent production of a double object construction persists for a longer period of time. Thus, the speakers’ final networks’ state can be illustrated as in Figure 2.6 below.

Figure 2.6: Speakers’ final network following prior exposure to the double object under the implicit learning account



Under the implicit learning account, the selection of a double object results in a cognitive procedural change, making the double object more likely to be used in the future (Ferreira, 2003, p. 392). Figure 2.6 shows that the combinatorial node linking

the verb lemma with the NP NP node remains activated. Therefore, both speakers are more likely to reselect the double object over the prepositional dative construction even if prime-target pairs were separated by long intervening material, such as subsequent turns in a conversation.

These two accounts have been supported by evidence from experimental investigations of priming. On the one hand, those who held the transient activation of priming provided experimental evidence for priming surviving only over short intervening material, but rapidly diminishing over time. On the other hand, the advocates of the implicit learning account provided evidence for priming surviving over long intervening material between prime-target pairs evidence. Therefore, the length of the intervening material between prime and target seems to be crucial to the interpretation of the mechanism underlying priming, i.e. transient activation vs. implicit learning.

2.4 The duration of the syntactic priming effect

The evidence on the question of prime-target pair distance is mixed. There is no consensus on the maximum distance at which priming can occur. The duration of the syntactic priming effect has been explored in two paradigms: by looking at the intervening time between a prime-target pair (Corley & Scheepers, 2002; Wheeldon & Smith, 2003; Raffray et al., 2014) or quantifying the intervening material between them into words or sentences (Bock & Griffin, 2000; Branigan et al., 1999; Pickering et al., 2000; Bock et al., 2007). Section 2.4.1 reports on studies where syntactic priming was found to decay over the intervening material separating primes from targets, i.e. short-lived effect. A sample of the syntactic priming studies that found evidence for priming surviving over long intervening material, i.e. long-lived effect, is

then reviewed. In doing so, some of the methodological approaches that were followed in earlier experimental investigations of syntactic priming will be evaluated.

2.4.1 Short-lived effect

Levelt and Kelter (1982) were among the first to address the issue of whether the distance in speech production between the prime and the target influences the effect of priming in spoken L1 Dutch production. In their first experiment, the participants were shown pairs of pictures and questions that begin with a preposition and ones that do not, (e.g., **Aan** wie laat Paul zijn stok zien? – **To** whom lets Paul his cane see? vs. Wie laat Paul zijn stok zien? – whom lets Paul see his cane?) (Levelt & Kelter, 1982, p. 81). Respondents can answer these two questions with or without a corresponding preposition, (e.g., **Aan** Michael vs. Michael). Levelt and Kelter (1982, p. 78) referred to responding to a question beginning with a preposition with an answer beginning with a correspondent preposition as the *correspondence effect* (Levelt & Kelter, 1982, p. 78). They found a strong ‘correspondence effect’: respondents’ tended to include a preposition in their answers if the questions they were asked included one.

Levelt and Kelter’s (1982) second experiment tested whether or not respondents showed a greater correspondence effect when they were exposed to distracting information. Instead of one question, the participants were asked two. The order of the questions was manipulated to create the priming conditions. The first condition involved an experimental question that was immediately followed by a corresponding picture. The second condition involved an experimental question that was separated from the corresponding picture by a long or short distracting question. Subsequently, the participants were shown a picture and were asked to answer only the question that corresponds to it. The finding showed that the length of the

distraction question did not significantly affect the size of the correspondence effect (Levelt & Kelter, 1982, p. 85). A correspondence effect was found for the condition where the experimental questions were separated by a distraction question, but slightly higher for when no distracting question separated the experimental question from the corresponding picture (Levelt & Kelter, 1982, p. 86).

The third experiment was a brief interaction over the phone with shopkeepers. In the first condition, the shopkeepers were asked a question beginning with a preposition about the time when they close their shops, or one that does not begin with a preposition, (e.g., *Hoe laat gaat uw winkel dicht?* – *what time does your shop close?*) (Levelt & Kelter, 1982, p. 89). In the second condition, they were asked the same question, but with an additional piece of information at the end (*Hoe laat gaat uw winkel dicht, want ik moet er special voor naar de stad komen, ziet u?* – *what time does your shop close since I have to come into the town especially there for, you see?*) (Levelt & Kelter, 1982, p. 89). The findings suggested a significant correspondence effect in the condition where no additional information was added to the questions. However, no correspondence effect was obtained when over one intervening clause between the question and the answer, i.e. prime and target, occurred (Levelt & Kelter, 1982, p. 90). One issue to raise about Levelt and Kelter's (1982) is that there is very high lexical overlap between the questions they included as primes and the answers provided by the participants. The finding that the respondents retained the preposition when the questions they were asked contained one can potentially be explained by the lexical repetition of the preposition or other components of the question as opposed to a correspondence strategy with the function of increasing fluency.

In line with Levelt and Kelter's study, Branigan et al. (1999) carried out a sentence completion experiment to investigate dative alternation priming in written L1 English. The participants were handed booklets that include sentences to complete.

The fragments contained primes and targets of double objects, (e.g., The woman sent the insurance company ...), and prepositional datives, (e.g., The woman sent the insurance claim ...), adjacent to each other, but sometimes separated with 1 or 4 intervening intransitive fragments (e.g., The moody teenager grumbled ...) (Branigan et al., 1999, p. 636). The intervening fragments contained intransitive verbs that did not induce speakers to produce any of the alternating two constructions. The study revealed a strong priming tendency whereby the participants produced the same construction as the prime when no unrelated sentences interfered between the prime and the target. However, a significant decline in the priming effect was observed when as little as one unrelated sentence interfered between the prime and the target, and no significant priming effect at all when the prime and target were four unrelated sentences apart (Branigan et al., 1999, p. 638). Therefore, the authors argued that their findings are in harmony with the transient activation account of priming, suggesting that the greater prime-target pair distance causes a diminishment in written production priming.

The issue with Branigan et al. (1999) study is that they seem to have assumed that the subsequent reproduction of a primed structure, e.g., the prepositional dative, relative to the double object alternative by necessity is a consequence of successful priming of the primed structure. However, as I will show in section 2.11.4, the choice language users make between a prepositional dative and a double object construction is also subject to factors that are not priming related, e.g., the discourse accessibility of the recipient and the definiteness of the theme, etc... (Bresnan, Cueni, Nikita, & Baayen, 2007, p. 74). It would have benefited Branigan et al.'s (1999) study to consider some of these variables that could change what they constitute as 'priming' and thus might still result in a diminishment of the priming effect over short prime-target distances.

Wheeldon and Smith (2003) came to lend support to the short-lived effect of priming in L1 English spoken production. They conducted two experiments investigating the priming effect of the initial phrase of a noun phrase. The participants were presented with two pictures of two objects on the screen moving in different directions: towards each other, apart from each other, to the right or to the left. The pictures were designed to elicit a sentence with an initial noun phrase containing two nouns making the targets as in the example (3) below:

- (3) Target: The spoon and the car move up/down/apart/together.
- Related: The fish and the eye move apart/together/up/down.
- Unrelated: The fish moves up/down and the eye moves down/up.

(Wheeldon & Smith, 2003, p. 436).

Sentences with an initial noun phrase featuring two nouns were considered related targets. Sentences with an initial phrase containing only one noun were considered unrelated targets. The participants were then asked to describe the experimental pictures which were moving on a screen for a duration of 1500 ms (Wheeldon & Smith, 2003, p. 437). The pictures were removed 500s after the completion of the description. The first experiment design allowed for an interval of two seconds after the completion of each description before a new experimental picture pair was introduced (Wheeldon & Smith, 2003, pp. 437–438). The distance between experimental trials was manipulated by including filler trials with only one or three pictures for each trial (Wheeldon & Smith, 2003, p. 436). The first experiment tested for the internal phrase structure priming without intervening items but also with three intervening items. The second experiment compared priming at no intervening items with priming at one intervening item. Significant priming was observed in experiment 1 only in the first condition where no intervening sentences were included (Wheeldon & Smith, 2003, p. 438). Similarly, no evidence for priming was found when one unrelated intervening trial was included (Wheeldon & Smith, 2003, p. 439).

The short-lived priming effect was interpreted based on the transient activation account where the activation of a node immediately diminishes in order to block the ‘...immediate reselection of linguistic units’ (Wheeldon & Smith, 2003, p. 440). Interestingly, the authors used only one structure to study the duration of syntactic priming and the mechanism that explains it. However, the results might be different if the authors were to conduct the same experimental design to investigate the priming of more structures.

To summarize, syntactic priming in the studies reported in this section where the priming effect diminishes with the increase of prime-target pair distance were interpreted as evidence for the transient activation account of priming. That is, exposure to a prime activates the mental processes responsible for its reproduction. This activation rapidly declines when unrelated sentences separate the prime from the target. The next section will review syntactic priming studies adopting the implicit learning account as an explanation for priming.

2.4.2 Long-lived effect

In a picture description experiment, Bock and Kroch (1989) exposed the participants to initial and final trials of the dative alternation priming. The dative alternation variants were manipulated to ensure that the initial and final trials included the same prepositional dative or double object variant. The initial and final trials were separated by 12 intervening utterances of different syntactic types including four middle trials of the opposite dative alternation variant (Bock & Kroch, 1989, pp. 185–187). The authors found a decrease in the frequency of the double objects following repeated exposure to prepositional dative sentences and an increase in the frequency of the double objects following repeated exposure to double object sentences. Bock and Kroch (1989, p. 187) therefore suggested that speakers have a predisposition for

an automatized repetition of structures that resists modification and persists over a long time (Bock & Kroch, 1989, p. 187).

Wheeldon and Monsell (1992) used a picture naming paradigm to investigate priming. The participants were exposed different kind of stimuli including pictures of objects, definitions, i.e. short descriptions eliciting the production of one word, (e.g., Building in which horses are kept) (Wheeldon & Monsell, 1992, p. 732), and printed words that the speakers had to read aloud. The intervening material was manipulated to create two conditions for long and short intervening material. For the short distance condition, the primes were 2-7 intervening trials amounting to 10-35 seconds. In the long distance condition the primes were separated by a maximum of 120 intervening items amounting to 6-12 minutes (Wheeldon & Monsell, 1992, p. 733). The participants were encouraged to see the stimuli on a screen and respond to it with a word as promptly as possible (Wheeldon & Monsell, 1992, p. 734). The authors found priming in all conditions with a greater facilitation for the production of words at the short distance condition, relative to the long distance condition (Wheeldon & Monsell, 1992, p. 735). In their second and third experiment, the authors tested for the effect of shared phonological word-form. The author found that the prior production of a homophone (e.g., son) does not facilitate the subsequent production of the word 'sun' despite them being 'heterographic' homophones (i.e. two words with different meanings, spelled differently, yet have a similar pronunciation) (Wheeldon & Monsell, 1992, p. 741). The long-lived effect of 6-12 minutes was interpreted as evidence for: "...persisting change in the state of the processing pathway that starts with activation of meaning and terminates with articulation" (Wheeldon and Monsell (1992, p. 739).

Bock and Griffin (2000) conducted two experiments with the intention of evaluating the transient activation as well as the implicit long-term hypotheses. In

their first experiment, the participants were presented with pictures on a screen corresponding to pairs of recorded priming sentences. Half of these pictures were to be described by active or passive sentences, (e.g., An ambulance is hitting a policeman vs. a police man is being hit by an ambulance) (Bock & Griffin, 2000, p. 180). The remaining pictures were designed to encourage the production of prepositional dative and double object sentences, (e.g., A boy is giving an apple to a teacher vs. a boy is giving the teacher an apple) (Bock & Griffin, 2000). The passive sentences shared the same content words as the active sentences. Similarly, the prepositional dative and double object pairs shared the same content words in a dative alternation pair (Bock & Griffin, 2000, p. 180).

The experiment included three conditions: priming sentence, an experimental picture and a filler sentence. The participants' task was to listen to the priming sentence, repeat it out loud and then decide if it had previously occurred within the experiment (Bock & Griffin, 2000, p. 181). Subsequently, the participants were shown the experimental picture and asked to describe the event that shows in their own words, and then decide whether they had seen the same picture previously in the experiment. The second condition was different from the first condition in that the priming sentence was separated from the experimental picture by one interfering sentence: an intransitive sentence, (e.g., The real estate agent blundered) or a predicate adjective, (e.g., The books were expensive) (Bock & Griffin, 2000, p. 180). In the third condition, the prime sentence was separated from the experimental picture by two interfering sentences. Bock and Griffin (2000) estimated the duration of the repetition of the prime sentence and the description of the prime picture by an average of 500 ms added to the recognition time. Therefore, the duration of conditions amounted to an average of 9.0 seconds, 15.2 seconds, and 21.3 seconds for condition one, two and three, respectively (Bock & Griffin, 2000, p. 181). All three conditions

revealed evidence for significant priming whereby the participants produced the primed structure as opposed to the unprimed alternative (Bock & Griffin, 2000, p. 182). However, no significant interaction was found between priming and prime-target pair distance (Bock & Griffin, 2000, p. 182).

In their second experiment, Bock and Griffin (2000) used a similar experimental design to their first experiment, except this time they increased the distance separating the prime sentences from the experimental picture. Three conditions were included: in the first condition, the prime sentences were immediately followed by the experimental pictures. In the second condition, four sentences separated primes from targets. Finally, in the third condition, the prime sentences were separated from the experimental pictures with 10 interfering sentences. Therefore, the duration of conditions amounted to an average of 7.7 seconds for first condition, 33.3 seconds for the second condition and 71.8 seconds for the third condition (Bock & Griffin, 2000, p. 185). Also, this second experiment yielded priming in all three conditions whereby more primed structures were produced relative to unprimed ones. However, the authors did not find significant interaction between priming and prime-target pair distance in their second experiment (Bock & Griffin, 2000). Given the absence for priming decline over as many as 10 interfering sentences, Bock and Griffin (2000) aligned their findings with the implicit learning long-lived effect hypothesis.

However, according to Bock and Griffin (2000) estimates, 10 sentences are equal to 71 seconds, which does not seem a long time for persistent change in the participants' linguistics choice to have been created. Moreover, while it is good practice to focus on more than just one target alternation for a syntactic priming investigation, the authors did not test for discourse-related predictors that could have

contributed to the participants' preference of one structure over its alternate (see sections 4.4.2 and 5.4.2).

Bock and Griffin's (2000) study was replicated by Bock et al. (2007) allowing for two priming conditions: one where the prime-target distance was long, i.e. prime target distance of 0, 4 or 10 sentences, and another where the prime target distance was short, i.e. 0, 1 or 2 sentences (Bock et al., 2007, p. 444). The results from Bock et al.'s (2007) first experiment showed that voice and dative alternation priming occurred at all prime-target distance conditions. However, no evidence was found for a significant interaction between priming and the distance separating primes from targets (Bock et al., 2007, p. 474).

In their second experiment, Bock et al. (2007) attempted to test the implicit learning hypothesis by using a cover task where priming is not directly encoded. To achieve this condition, the experiment was performed over two sessions. In session 1, the participants were offered priming pictures and but no priming sentences. Their task was to describe the event captured in the pictures and repeat each sentence (Bock et al., 2007, p. 451). The participants were also prompted to study the material carefully so that they can recognize them in the second session taking place the next day. In session 2, the participants were given the pictures and priming sentences from the short distance condition of experiment 1 and were asked to decide whether they were exposed to these sentences in the first session. The results showed strong priming effects for both the directly and indirectly encoded priming, but the priming interaction with distance was not significant (Bock et al., 2007, p. 451). The authors interpreted their results in the light of the implicit learning account of priming suggesting that the persistence of the priming effect over a distance of 10 sentences is indicative of changes in language over "long stretches of time" (Bock et al., 2007, p. 456).

Hartsuiker and Westenberg (2000) also seem to have aligned themselves to more towards the implicit learning account of priming. Their experiment investigated the written and spoken priming of two alternative constructions, namely the auxiliary verb and past participle in L1 Dutch spoken and written data. Priming operates in Dutch subordinate clauses when a choice is to be made between a participle-final word order, and an auxiliary final word order (Hartsuiker & Westenberg, 2000, p. B31). The following examples includes fragments to illustrate this alternation.

(4) Ik kon er niet door omdat de weg was .../I could not pass through because the road was ...

(5) Jan vertelde de inspecteur dat hij niets.../John told the detective that he nothing ...

The most likely completion in (4) would be a participle, conceivably 'geblokkeerd' (*blocked*). On the other hand, (5) can be completed with either 'had gezien' (*had seen*) or with 'gezien had' (*seen had*) (Hartsuiker & Westenberg, 2000, p. 31).

Hartsuiker and Westenberg's (2000) used a sentence completion paradigm to prompt the participant to elicit written completion to Dutch subordinate clauses (see example 4 and 5). For the spoken condition, the participants were presented with the fragment sentences on a screen. They were then instructed to read the fragments aloud and come up with fluent completions (Hartsuiker & Westenberg, 2000, p. B33). The spoken and written trials were divided into pre-experimental trials, experimental trials and post experimental trials.

The results demonstrated an increase in the frequency of participle-final targets after participle-final primes, relative to the auxiliary-final targets. Similarly, the data showed an increase in the frequency of auxiliary-final targets after auxiliary-final primes (Hartsuiker & Westenberg, 2000, p. B34). The pre-experimental trials, showed

the participants preferred the participle-final, relative to the auxiliary final word order. This preference, however, slowly diminished in the post-experimental trials, lasting over 12 experimental trials. Hartsuiker and Westenberg's (2000, p. B36) took this as evidence for a long-lasting cumulative priming effect. The authors explained the priming effect in terms of what they referred to as a 'linearization process' whereby the order of words and constituents of primes determines the order of the constituents whose representation has not yet been specified (Hartsuiker & Westenberg, 2000, p. B36).

Kaschak et al. (2011) provided evidence for syntactic priming lasting over a week in a cumulative priming experiment. Cumulative priming tests whether or not "...the relative frequency with which particular constructions (such as the DO and the PO) are produced earlier in an experiment affects the rate at which those constructions are produced later in the experiment" (Kaschak et al., 2011, p. 383). The participants were randomly assigned to two different bias conditions: one where they were induced to produce 100% double objects, and the other where they were induced to produce 100% prepositional datives. In both conditions, the participants were asked to complete sentences which elicited the constructions; i.e. 'The swimmer handed the driver ...' to induce a double object, and 'The swimmer handed the towel ...' to induce a prepositional dative (Kaschak et al., 2011, p. 384). Each prime sentence was followed by 4-5 filler sentences (Kaschak et al., 2011, p. 384). Seven days after completing the task, the participants performed another sentence completion task where they were provided with six fragments that could be completed by either the double object or the prepositional dative constructions. The sentences that were used in the first task were intended to be the primes, while the ones that were used in the second task were intended targets, seven days apart from the primes. The participants were more likely to produce a target prepositional dative after a prepositional dative

bias phase, relative to a double object, and a target double object after a double object bias phase, relative to prepositional dative targets (Kaschak et al., 2011, p. 385).

Kaschak et al.'s (2011) results are therefore consistent with the implicit learning account, as the activation of a given form seemed to persist and caused a long-term change in speakers' language behaviour. However, their study failed to consider factors like the participants daily interactions with other parties, which could have influenced the double object, or prepositional dative initial biases that have been created in the first phase of the experiment. That is, over the course of the one week following the bias phase, the participants with a double object bias could have been naturally exposed to more double object or prepositional dative input through their interaction with other people. Moreover, Kaschak et al. (2011) made no attempt to control for some of the discourse related factors that could affect the use of the prepositional dative over the double object constructions or the other way around (see 5.4.2).

In the same vein, Kaschak et al. (2014) used priming eliciting task to test whether or not the priming effect is maintained by boosting the magnitude of the priming effect in the priming phase. They observed no significant evidence for a persisting priming effect over a lag of one week, when the tasks used to elicit priming in the *biased condition* and the *priming condition* are different. More specifically, they argued the cumulative priming effect could survive across tasks only if they were performed successively in the same experiment. Otherwise, within the span of one week, participants would most likely be exposed to a different input that would obstruct retrieving the priming manipulations in the biased phase of the experiment. When the *bias* and the *priming phases* were performed immediately in succession, retrieving the target structures was possible despite the changing tasks between the two phases (Kaschak et al., 2014, p. 735). Indeed, Kaschak et al.'s (2014) findings are

consistent with one of the general arguments in priming literature that recency is essentially central in boosting the priming effect in language production.

Together, Kaschak et al.'s (2014, 2011) provide support for the implicit learning account. In particular, they provide evidence that there is learning involved in the process of priming a given constituent, which causes a persistent change in its representation. Furthermore, the experiments designed to elicit long-term priming can give insight on how the participants' production was influenced by the experimental priming trials. However, given the long period of time separating the initial trials from the post-experimental trials in Kaschak et al.'s (2014, 2011) experiments, their findings need be taken with caution. That is because language users are exposed to different kinds of input that in turn can affect the bias that has been created.

2.4.3 The multiplicity of syntactic priming

There exists a third multi-factorial view that brings the two major accounts together, and employs them in the understanding of priming patterns (Hartsuiker et al., 2008). This account is motivated by the inconsistency in the results of the syntactic priming studies that, as we saw in sections 2.4.1 and 2.4.2, at times point towards an implicit learning explanation, and at other times more towards the transient activation account of the priming effect. This third account is referred to as the multiplicity of structural priming by Ferreira and Bock (2006, p. 1124), and as the multi-factorial account of syntactic priming by (Hartsuiker et al., 2008, p. 214).

The premise of this account is that priming is not based only on transient activation or implicit learning, but rather both accounts (see Ferreira and Bock, 2006, for a more comprehensive explanation of this account). Ferreira and Bock (2006, p. 1125) argued that on the one hand, the effect of prime-target lexical overlap is conceivably more compatible with the short-lived transient activation account. On the

other hand, the authors suggested that syntactic priming is more compatible with the implicit learning account and can persist over long intervening materials. Moreover, this account of syntactic priming was motivated by acknowledging that the repetition of constructions is not merely due to shared prime-target constituent structures. Rather, the repetition of constructions can be motivated by shared prime-target constituent structures but also nonsyntactic factors which can influence the magnitude of syntactic priming (Ferreira & Bock, 2006, p. 1124). The following section shows empirical support for the multiplicity of syntactic priming account.

2.4.3.1 *Experimental evidence for the multi-factorial account of priming*

With the intention to evaluate the implicit learning and transient activation accounts of priming, Hartsuiker et al. (2008) carried out four computer-mediated chatting experiments investigating the Dutch dative alternation priming, see example (6) and (7) below:

(6) De kok geeft een bal aan de clown
The chef gives a ball to the clown

(7) De kok geeft de clown een bal
The chef gives the clown a ball (Hartsuiker et al., 2008, p. 219)

In the first experiment, a picture appeared on the screen for the participants, native speakers of Dutch, to look at. A priming sentence describing the picture was then generated by a computer. The participants, who were under the impression they were actually communicating with a human, read the sentence and indicated whether or not it corresponds to the picture (Hartsuiker et al., 2008, p. 219). The priming sentences were followed by target sentences generated by the participants as they described the next picture appearing on the screen. The results showed a strong priming effect where the dative alternation variant in the prime was used more

frequently in the target sentence, relative to the other variant (Hartsuiker et al., 2008, p. 220).

In the second experiment, Hartsuiker et al. (2008) manipulated the main verb lemma to allow prime-target combinations with and without a matched main verb lemma. The authors found evidence for a lexical boost, (see section 2.13 for a more detailed discussion), whereby priming was enhanced when prime-target pairs shared the same main verb lemma (Hartsuiker et al., 2008, p. 222). The third experiment investigated the duration of syntactic priming and lexical boost effects in written dialogue. Three duration conditions were created where the targets were produced immediately after the primes, after two fillers, or after three fillers in between prime-target pairs. The fillers consisted of intransitive and transitive sentences. Hartsuiker et al. (2008) found that in the same verb condition, priming was stronger when prime-target pairs were separated by short rather than long intervening material. In particular, priming was significant in the first duration condition with a significant interaction with the main verb lemma match. In the second duration condition, there was a significant priming effect but with no lemma match interaction. In the third duration condition, no evidence for priming or lemma match was found (Hartsuiker et al., 2008, p. 223-224).

In the last experiment, Hartsuiker et al. (2008) ran a similar experiment to experiment 3 to investigate priming in both the written and spoken modality. In the written session, the participants followed the same procedure as experiment 3. In the spoken session, the spoken targets were elicited by having the participants say their sentence descriptions instead of typing them. In the writing session, there was a priming effect across all priming duration conditions, but a significant lexical boost interaction only for the first two duration conditions, i.e. when the targets immediately followed the primes or interrupted by two fillers. In the spoken session, significant

priming was found only for the first two duration conditions but no significant main verb lemma interaction at any of the duration conditions.

Taken together, Hartsuiker et al.'s (2008) indicate to a short-lived effect for the main verb lemma effect consistent with the transient activation account of priming, but a more persistent effect for syntactic priming consistent with the implicit learning account of priming. The authors used this evidence to argue in support of a multifactorial account of priming whereby: "...long term, implicit-learning processes cause speakers to repeat abstract syntax, and in which short-term, lexically driven processes—possibly related to explicit memory of a previous sentence's structure (Bock & Griffin, 2000; Chang et al., 2006)—cause speakers to repeat syntax especially when there is lexical overlap." (Hartsuiker et al., 2008, p. 234).

Having reviewed evidence for the two major accounts of priming, the multiplicity of syntactic priming account seems most appealing. That is because the experimental evidence for the implicit learning account of priming is limited by the lack of control for biases created as a consequence of normal daily interactions that can happen when the priming and target elicitation phases are days apart. Moreover, currently, we do not have conclusive evidence from either implicit learning or transient activation account on the maximum prime-target intervening material before priming begins to decay. After this review of experimental studies, let us now consider theories that explain how speakers come to prime each other in natural dialogue.

2.5 Priming in L1-L1 dialogues

As discussed in Chapter 1, this thesis is concerned with syntactic priming in L1-L1 and L2-L2 dialogues. Pickering and Garrod (2004) proposed the interactive alignment account to explain how priming operates particularly in L1-L1 dialogue.

Under their model, successful dialogue is based on interlocutors aligning their situational models as they develop a joint understanding of the situation at hand and the topic of the conversation they are having (Garrod & Pickering, 2004; Pickering & Garrod, 2004). The situational are "...multi-dimensional representations containing information about space, time, causality, intentionality and currently relevant individuals" (Garrod & Pickering, 2004, p. 8). This process of alignment is characterised by unconscious processes that allow interlocutors to align their representations from one linguistic level to another (Pickering & Garrod, 2004). As an example, alignment at the phonetic level can lead to alignment at the syntactic or semantic levels. As with priming, the alignment process operates through activating a particular aspect of situation models as a result of exposure to an utterance that corresponds with the particular situation model (Pickering & Garrod, 2004).

Alignment has benefits for dialogue. It helps reduce misunderstandings and redundancy in conversations. In a conversation between two partners, the speaker is likely to produce a message that is relevant to the topic being discussed. The listener will have aligned their syntactic and semantic representations to understand the speaker's message (Garrod & Pickering, 2004, p. 9). Alignment is also helpful for utterance planning as it allows time for the speakers to make their utterances more appropriate to their conversation partners. Important for the current study is, whether and how L2 speakers might be able to align to their conversational partner. The next section reviews a theoretical perspective on this question.

2.6 Priming in L2-L2 dialogues

Understanding priming in dialogues between L2 speakers is another concern of this thesis. Costa et al. (2008) expanded Pickering and Garrod's (2004) interactive alignment model (Pickering & Garrod, 2004) to give an account of L1-L2 and L2-L2

dialogues. In particular, Costa et al. (2008, p. 549) argued that in L1-L2 dialogues, a degree of automatic alignment will be involved whereby the L1 speaker will produce utterances that have shared syntactic structures to that of the L2 speaker, i.e. syntactic entrainment (Costa et al., 2008, p. 531). The L1 and L2 speakers will have had different exposures to the language. Therefore, it is possible that an L2 speaker might settle for a word with an easier pronunciation than a synonymous word that their L1 interlocutor has just used if it is difficult for the L2 speaker to pronounce (Costa et al., 2008, p. 538–539).

Crucially, in an L2 dialogue between two non-native speakers, Costa et al. (2008, p. 549) suggested that the similarities between their L1s and the L2 they are using is one of the most important factors that can influence their L2 priming. Two non-native speakers of English therefore are expected to have more similar written and spoken production if they come from a Spanish and an Italian L1 backgrounds, relative to a dialogue in English between two speakers with an Italian and an interlocutor with a Swahili L1 backgrounds. Consequently, the L1 similarities should make it easier for the Italian and Spanish speakers to align their situation models and entrain their utterances. However, the dissimilarities in the L1 between a Swahili L1 speaker and an Italian L1 speaker might make it harder for them to align their situation models and utterances. Additionally, Costa (2008, p. 550) suggested that interlocutors with a similar L1 background should have more similar ‘activation profiles’ as they engage in a dialogue with their L2. Costa (2008, p. 550) proposed an approach for testing this hypothesis by looking at the English interaction of two speakers with a dissimilar L1 background, e.g., Japanese and Spanish, and two speakers with a similar L1 background, e.g., Spanish and Italian. Then it would be possible to compare their phonological alignment by studying their L2 accents (Costa et al., 2008, p. 550). Based on Costa (2008), such an experiment would elicit stronger

alignment in the Spanish-Italian relative to the Spanish-Japanese conversations given the similarities between Spanish and Italian.

If the priming effect, according to the interactive alignment model, can travel across different linguistic levels, i.e. as we explain further in section 2.9, can priming travel across languages? The next section explores this possibility.

2.7 Cross-linguistic priming

Cross-linguistic priming is defined as: “The phenomenon that hearing/producing a syntactic structure in one language will increase the probability of producing a related structure in another language” (Gries & Koostra, 2016, p. 2). This phenomenon has support from bilingualism research where it was found that bilinguals’ processing and production of their L2 may involve simultaneous activation of their own L1 as well as their L2 (Starreveld et al., 2013; Bergmann et al., 2015).

Loebell and Bock's (2003) work is important in this regard as they focused on the cross-linguistic priming in German speakers of English's L1 and L2 production of passive voice and dative alternation. Unlike the voice alternation, German and English do share the same structural configurations of the dative alternation (Loebell & Bock, 2003, p. 796). For each alternation, English primes were elicited by exposing the participants to an English auditory sentence that includes a dative alternation variant, an active sentence or a passive sentence. Then the participants were presented with a picture event and were asked to describe it using a German sentence. The German primes were elicited by first exposing the participants to German auditory sentence and then having the participants describe a picture with an English sentence. Loebell and Bock's (2003, p. 805) study found support for cross-linguistic priming whereby more often than not, the dative alternation primes in one language were matched with the same target variant in the other. The authors also observed that more English

active targets followed the German active primes, relative to the German passive primes. However, no evidence was found to suggest that passive primes generated more passive targets than active primes (Loebell & Bock, 2003, p. 807). Loebell and Bock's (2003) offered an implicit learning explanation for cross-linguistic priming. In particular, they suggested that the bilinguals' production of a construction in one language can be easier and more accessible if the same procedure responsible for the production of that construction are shared between the bilinguals' two languages (Loebell & Bock, 2003). The next section will discuss whether the speakers' identity can make a difference on the magnitude of priming.

2.8 The role of speaker identity in priming

The evidence is mixed on the relevance of the speaker's identity to the strength of priming. The question here is whether priming is influenced by the identity of the prime and target producers being the same or a different person. There is evidence from Gries (2005, p.373-374) that same speaker priming, where the prime and target have been produced by the same speaker, is only slightly stronger than cross-person priming where the prime and target have been produced by two different speakers. Moreover, Howes et al. (2010, p. 2006) found that, in their first experiment, speakers are more sensitive to their own constructions, reproducing their own recently produced dative alternation primes as opposed to the ones recently produced by their interlocutors. In their second experiment, however, no evidence for the interaction between speaker identity and the prime.

Similarly, Healey et al.'s (2014) investigation pointed to a syntactic self-similarity effect, i.e. syntactic similarity across turns produced by the same speaker, which to a large degree, was dependent on lexical prime-target pair similarity. However, in a particle placement priming investigation, Gries (2007) found no

influence for the identity of the speaker on the strength of particle placement priming. Furthermore, Branigan et al. (2000, p. B20-B21) found evidence that speakers in dialogue are sensitive to the linguistic behaviour of their interlocutors as they tend to produce constructions that they have just heard spoken to them. This is in contrast with self-priming, where speakers are influenced by their own prior production more than that of their interlocutors. The lack of self-priming was interpreted to suggest that the comprehension and production share the same mechanism (Branigan et al., 2000, p. B22; Gries, 2007, p. 280).

This section demonstrated that to date, there is no conclusive picture of the influence of speaker identity on the strength of priming. The next sections will show that priming affects all linguistic levels as they review work at the semantic, pragmatic and auditory level. Priming at the syntactic level, which is the main concern in this thesis, will be discussed more elaborately in section 2.10.

2.9 Priming at different linguistic levels

It is widely accepted that priming affects all levels of linguistic processing, including semantics, pragmatics, syntax, phonological and phonetic aspects of language, and morphological processes (Pickering & Branigan, 1998; Garrod & Pickering, 2004; Costa et al., 2008; Trofimovich et al., 2012). The aim of this next section is to demonstrate evidence for semantic, pragmatic and phonological priming.

2.9.1 Semantic Priming

The semantic priming effect refers to the observation that: “the response to a target (dog) is facilitated when it is preceded by a semantically related prime (cat) compared with when the prime is unrelated (car)” (Hyman et al., 2015, p. 911). The semantic priming facilitatory effect, therefore, does not involve the repetition of a

particular form, but rather the production of a form semantically related to the prime in a subsequent position.

In a conversation about 'rainbows', the production of the word 'rainbow' might stimulate the activation of a semantically related concept such as 'sky'. A language user might respond to the same 'rainbow' stimulus (prime) with other semantically related words like 'sun'. Another target might be the colours of a rainbow (e.g., red, blue, yellow, etc.). In a lexical decision task, where speakers have to indicate whether a string of letters is a word, responses for semantically related prime-target words are likely to be faster and more accurate than pairs of words that are semantically unrelated, (e.g., sky - rainbow vs. bike – rainbow) (see Meyer & Schvaneveldt, 1971). Therefore, if a word like 'sky' is the prime, language users are likely to decide that 'rainbow' is a word relative to when the prime is 'bike'. 'Bike' may not prime for 'rainbow' because the two words are not semantically related.

Awareness on the part of language users is often not a pre-requisite for connections to be made between the prime 'rainbow', and the semantically related targets 'sky', 'sun', 'red', 'blue' and 'yellow'. However, language users do sometimes make use of specific strategies at their disposal to reach a goal. The process of generating target words that are semantically related to the prime 'rainbows' is referred to as 'expectancy generation' (e.g., Becker, 1980; Hyman et al., 2015). The process of going back to check for a potential previously mentioned prime that is related to the target 'sky' is referred to as 'retrospective semantic matching' (Hyman et al., 2015, p. 911).

An example of a semantic priming study would be the lexical decision task in the experiment by Devitto and Burgess (2004). The participants were shown two consecutive strings of letters. Their task was to indicate whether or not the second

string of letters is an English word (Devitto & Burgess, 2004, p. 207). The results showed that the monolingual participants who started learning English at birth showed a priming effect for weakly associated words, e.g., ‘city-grass’. A marginal priming effect was recorded for weakly semantic-related words in the data of the participants who came from a native English language background but had been introduced to other languages at one stage in their lives. The participants who learned English as a second language did not show priming effects for weakly related pairs of words. Devitto and Burgess (2004) therefore argued that the participants with the most extensive exposure to a language are more likely to benefit from semantic priming and establish links between vaguely related words than the ones who have not had as extensive an experience of the language. The findings from Devitto and Burgess (2004) experiment therefore demonstrate that the participants’ familiarity with the vocabulary affects semantic priming for weakly related words. Although the authors did consider the participants’ language history and reading ability, they seem to have disregarded the importance of attention which can influence the participants’ performance in a lexical decision task (e.g., see Martens, Ansorge, & Kiefer, 2011).

Semantic priming research, therefore, investigates not the repetition of a specific word, but the production of a target word that is semantically related to the prime word. The next section will look at pragmatic priming.

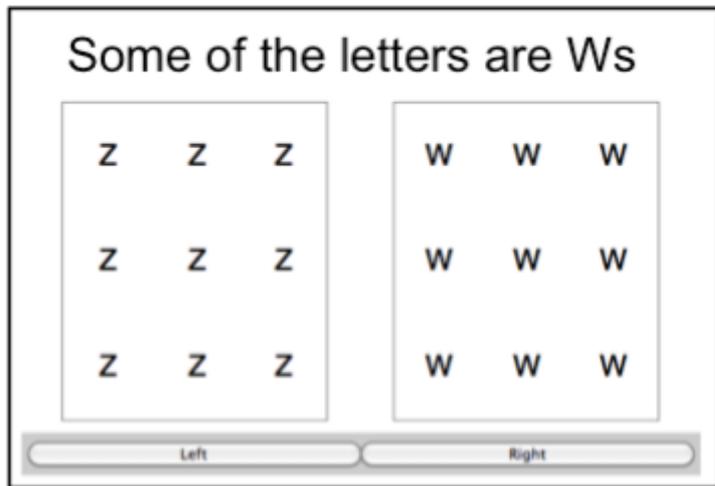
2.9.2 Pragmatic priming

Pragmatic priming can be looked at in terms of the alternation of two possible meanings of a sentence: its initial meaning represented by a sentence which has been uttered, or the other potentially intended meaning that has not been uttered (Bott & Chemla, 2013, p. 227). For example, in a sentence like ‘Laura bought some of her shoes from Primark’, the listener can consider ‘Laura bought all of her shoes from

Primark' as an alternative. The listener can then choose to negate this alternative by deriving the meaning that: 'Laura bought some, *but not all*, of her shoes from Primark'. This process of selecting and negating an alternative to the sentence that has been uttered is referred to as enrichment by negation of alternatives (Bott & Chemla, 2013, p. 227). For Bott and Chemla (2013), a sentence could have a 'weak meaning' if interpreted in its basic form, i.e. without enrichment, while the enrichment of a sentence gives it a 'strong meaning' (Bott & Chemla, 2013, p. 228).

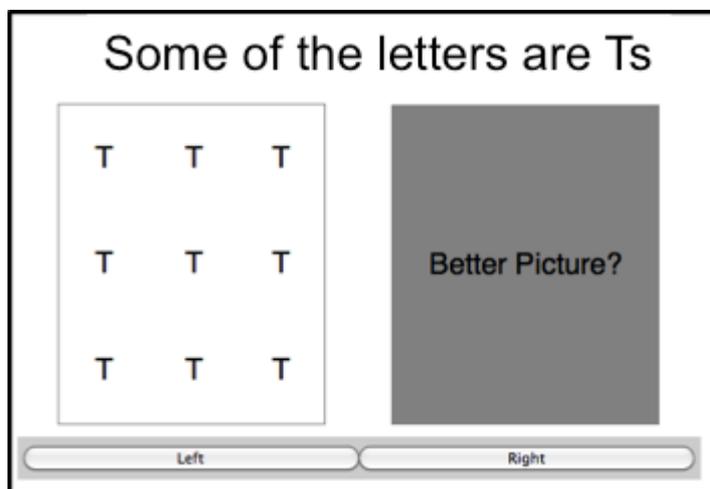
In a picture description paradigm, Bott and Chemla's (2013) asked the participants to choose one of two pictures that describes the sentence they are exposed to. The participants were exposed to weak primes and strong primes. The weak primes included two pictures: a picture representing the basic meaning of the sentence where the strong reading is not possible, and a false picture where the weak and the strong reading of the sentence are wrong (See Figure 2.7). For the strong primes, the participants were shown a weak picture and a strong picture where the two readings of the sentence are possible, i.e. with or without enrichment (Bott & Chemla, 2013, p. 229).

Figure 2.7: Weak primes (Bott & Chemla, 2013)



The picture on the left in Figure 2.7 is a false picture because none of the letters are 'W'. The picture to the right depicts the basic meaning, but not the negated alternative, i.e. 'Some of the letters are Ws, but some are not'. Bott and Chemla's (2013) experiment also involved a probe trial where the participants were asked to read an experimental sentence and shown two pictures as in Figure 2.8.

Figure 2.8: Some probe (Bott & Chemla, 2013, p. 229)



For the probe trials, the participants were shown a weak picture and one that says 'Better picture?' The participants were asked to choose the 'Better picture' option if they felt like the picture on the left does not sufficiently depict the sentence (see Figure 2.8).

The experiment's sequence the authors used was a prime trial, followed by another prime trial and then a probe trial. The primes were manipulated to include primes with some, e.g., 'Some of the letters are As, primes with number, e.g., 'The picture has *three* A letters' and plural primes, e.g., 'There is As in the picture'. These primes can be enriched using the negation of alternatives as follows: 'Some, but not all, of the letters are As', 'The picture has three, but not four, As' and 'There is not an A in the picture, but As', respectively (Bott & Chemla, 2013).

The type of these primes was also manipulated to allow for all possible prime-probe sequences, i.e. weak 'some' prime followed by a 'number' probe trial; strong 'number' prime followed by a 'some' probe trial; weak 'some' prime followed by a 'plural' probe trial (Bott & Chemla, 2013, p. 229). The results showed more strong interpretations following strong primes relative to weak primes.

In their second experiment, Bott and Chemla (2013) replicated their first experiment except they also included ad hoc expressions as an additional prime type, e.g., 'There is a C'. The suggested enrichment for such an expression is: 'There is a C but not a D'. The results from the second experiment confirmed the first experiment findings as more strong interpretations followed strong primes than weak primes. Moreover, the results from the second study suggest between-expressions priming where the enriched some, number and plural expressions can prime each other, but not ad hoc expressions. Enriched ad hoc expressions could not induce enriched interpretations of the other prime expressions (Bott & Chemla, 2013, p. 230).

Finally, Bott and Chemla's (2013) third experiment replicated their second experiment, except that 20 ad hoc bias trials were added at the start of the experiment. Significant priming was found for all four prime types. Robust priming was found where some and number prime types primed each other. However, no evidence was

found to suggest that enriched ad hoc expressions could prime enriched some or number expressions. Bott and Chemla (2013, p. 231) attributed the lack of support for between-expressions priming of ad hoc expressions despite the evidence for robust within expression priming for the same prime type was to: "... priming of the search for alternatives, and not priming of the mechanism that negates the alternatives".

Priming at the pragmatic level, therefore, stretches the notion of alternatives from a given word or a construction to a group of words or rather a whole sentence. That is, the focus in pragmatic priming is not only on a sentence that a speaker said per se, but also on what the speaker could have said instead.

So far, we have discussed priming at the semantic and pragmatic levels. Section 2.9.3 gives a brief overview of priming research from a socio-linguistic point of view.

2.9.3 Priming at the level of speech and social factors

Auditory priming refers to "...a time and/or accuracy benefit for repeated ("familiar") versus nonrepeated ("novel") words and word combinations..." (Trofimovich, 2005, p. 481). The processing of a word, therefore, is made faster and more accurate by the effect of auditory priming. Even when prime-target words are not semantically related, they still are likely to prime each other if they sound the same. Frisson et al. (2014) found evidence for a priming effect for rhyming prime-target words that look alike (e.g., bear-gear), and prime-target words with low orthographic but high phonological overlap (e.g., fruit-chute).

Moreover, in a word-recognition task, Sheffert (1998) found evidence that her participants identified repeated words more accurately if they were produced with the same voice as opposed to a voice they were unfamiliar with. Similarly, the

changes in intonation between a prime and a target word was found to result in lower priming effects than when the prime-target word intonation is maintained (Church & Schacter, 1994). Language users are therefore sensitive to distinctive phonological qualities of an individual speaker's voice.

From the perspective of socio-linguistic research, priming is motivated by social factors. The premise of the socio-linguistic studies of priming is grounded in communication accommodation theory whereby speakers' speaking manners and linguistic choices can on the one hand serve the function of maintaining disassociation from their partners. On the other hand, the linguistic choices speakers make can minimize their social distance with their partners (Giles et al., 1991, p. 2). For Giles et al. (1991, p. 7), convergence is: "...a strategy whereby individuals adapt to each other's communicative behaviours in terms of a wide range of linguistic-prosodic-nonverbal features including speech rate, pausal phenomena and utterance length, phonological variants, smiling, gaze and so on...". Divergence is also a strategy whereby: "...speakers accentuate speech and nonverbal differences between themselves and others." (Giles et al., 1991, p. 8).

Babel (2010) used a speech production task to investigate phonetic accommodation of New Zealand speakers as they respond to primes from an Australian talker. The Australian and New Zealand dialects have a few key differences pertaining to vowel pronunciation (for a review, see Watson et al., 2008). In the pre-task stage, the New Zealand English speakers were presented with words with an /h/ onset and a /d/ coda with a vowel nucleus (e.g., hid, hood, had, etc.) (Babel, 2010, p. 442). The participants were asked to read these words aloud. Then they were presented with a list of target words which they were also asked to read aloud. Subsequently, the New Zealand English speakers were exposed to target words that were produced by the Australian talker. The New Zealand English speakers' task

was to show they recognize these words by saying them aloud. Finally, in the post-task stage, the participants were asked to read aloud the hVd words as with the pre-task stage, except that the order of the words was randomized (Babel, 2010, p. 443).

Prior to the actual task, the participants were divided into positive and negative groups. The group with a positive condition were presented with the following text that helps shaping a positive view of the Australian talker:

The Australian talker you are about to hear was actually born in Auckland. At a young age, however, he and his parents moved to Melbourne where he has lived since. His grandparents and the rest of his extended family still live in New Zealand, so he visits frequently. In fact, he is currently looking for employment in New Zealand so that his children may live closer to their great-grandparents (Babel, 2010, p. 443).

The participants with the negative condition were presented with the following text to form a negative view of the Australian talker:

The Australian talker you are about to hear was born in Sydney. Like many Australians, he has strong negative opinions of New Zealand. For one, he thinks that New Zealanders are rather stupid and that they lack culture. In addition, he finds the entire population backwards and naïve. In his mind, New Zealand is provincial and has a horrid cricket team. He never intends to visit New Zealand because of these views (Babel, 2010, p. 443).

The positive condition was predicted to induce convergence where the social distance between New Zealand English speaker and the Australian talker are minimized. The negative condition, however, was predicted to induce divergence where the social distance between the participants and the talker is maximized. The results showed an effect of convergence where all the New Zealand English speakers

adapted their vowel production to that of the Australian talker. The results also showed greater convergence for participants with an induced positive perspective on Australia.

The results from Babel (2010) validate the importance of the social factors in our understanding of priming. Priming can be thought of as a socially motivated tool speakers use to serve a meaningful purpose in their conversations. Our pre-existing feelings and sentiments about a conversation partner can lead us to make linguistic communicative choices as to whether to converge with them or diverge from them.

Section 2.9 has offered an overview of priming research at the semantic pragmatic and auditory linguistic levels. Section 2.10 will introduce syntactic priming: the major concern of this thesis.

2.10 Syntactic Priming

The major focus of this thesis is the investigation of priming at the syntactic level. The effects of the prime-target pair shared phonological features and what the speaker intended for the prime sentence to mean fall outside the scope of this thesis. However, the lexical boost effect and its influence on the strength of syntactic priming fall within the boundaries of this investigation (see section 2.13 for a detailed explanation of the lexical boost effect). Importantly, this study looks at syntactic priming in spoken L1-L1 and L2-L2 spoken production.

Syntactic priming refers to: "...the proposal that processing a particular syntactic structure within a sentence affects the processing of the same (or a related) syntactic structure within a subsequently presented sentence) (Branigan, 1995, p. 490). Syntactic priming is manifested through the reuse of a recently produced syntactic form as opposed to its acceptable alternative form.

Experiments on syntactic priming have targeted a limited number of structures that can have an acceptable alternative. Among the most well-studied of these English structures is the dative alternation (Bock, 1989; Pickering & Branigan, 1999; Branigan et al., 2000; Bock et al., 2007), voice alternation (Bock, 1986; Savage, Lieven, Theakston, & Tomasello, 2003), wh-questions with obligatory auxiliary verbs (McDonough & Mackey, 2008; McDonough & Chaikitmongkol, 2010) and relative clauses (Desmet & Declercq, 2006; Scheepers, 2003). The syntactic priming facilitation effect can be measured in terms of the frequency of a target structure produced after exposure to a prior prime structure, relative to a newly introduced alternative structure (McDonough & Trofimovich, 2009, p. 99). Hence, the focus in syntactic priming studies is not on the overall frequency of use of a particular syntactic structure, but rather on the choice between two acceptable alternative structures.

2.11 Target structures

The purpose of this section is to define the target constructions examined in this thesis. I will begin by defining the particle placement alternation in section 2.11.1. Section 2.11.3 will be dedicated to the introduction of the alternation between prepositional datives and double object constructions. In section 2.11.5, the caused-motion construction will be described along with the alternation involved in the investigation of this construction. The purpose of this section is also to review some of the literature focusing on the priming of these structures, and to highlight the amenability of these target constructions for syntactic priming investigation.

2.11.1 *Verb-Particle construction*

The verb-particle construction consists of an agent, i.e. a noun phrase, a verb, a particle and a patient i.e. a noun phrase. This construction can appear in two orders:

(8) Dad picked up the parcel

(9) Dad picked the parcel up

As we can see, both example (8) and (9) have all components of the verb-particle construction. The noun phrase ‘Dad’ has the semantic category of an agent, the noun phrase ‘the parcel’ is the patient direct object that was picked up by dad, ‘pick’ in its past tense is the verb and the particle is ‘up’. The verb-particle constructions in examples (8) and (9) are different in their word order. In (8), the particle is placed in an immediate post-verbal position. In (9) the particle is placed in a final position following the direct object. Gries (2003, p.3) refers to this word order alternation with the term ‘particle placement’. Gries (2003, p.3) uses the term ‘verb-particle construction’ to cover both constructions in example (8). Both terms will be used interchangeably all across this thesis covering the two alternating variants, i.e. when the particle is placed in an immediate post-verbal position and when it is placed in a final position following the direct object.

The verb-particle construction occurs in English, German and several Germanic languages (Dehe, 2005, p. 185). Because this thesis is concerned with American English L1 and L1 German L2 speakers of English, I will only be referring to English and German grammar where necessary. German grammar allows the particle placement variant where the particle is delayed to a final position following the direct object as in example (10) below. However, German does not allow the verb-particle variant where the particle is adjacent to the verb preceding the direct object as in example (11). German grammar allows a verb-particle word order where by the

particle is inseparable from the verb following the direct object in a final position as in (12). (13) is also an example of a verb-particle sequence allowed in German with an auxiliary in its main clause:

(10) Sie sagten das Konzert **ab**. (Dehe, 2005, p. 187)

They said the concert off

‘They called off the concert’

(11) *Sie **absagten** das Konzert. (Dehe, 2005, p. 187)

They off-said the concert

‘They called off the concert’

(12) Sie wollten das Konzert **absagen** (Dehe, 2005, p. 187)

They wanted the concert off-say

‘They wanted to call off the concert’

(13) Sie haben das Konzert **absagten**. (Dehe, 2005, p. 187)

They have the concert off-said

‘They called off the concert’

The German particle placement alternation therefore is restricted to the movement of the particle being in a post-verbal position, separated from the verb and placed after the direct object as in (10), or in a preverbal position, inseparable from the verb which is preceded by the direct object as in (12) and (13). English grammar is less restrictive with the placement of the particle. The English particle can be separated from the verb or adjacent to it with a long noun phrase as a direct object as in (14) and (15).

(14) They called **off** the highly anticipated alternative music concert.

(15) They called the highly anticipated alternative music concert **off**

The verb-particle construction, however, is constrained by the length of the direct object. In the English verb-particle constructions with long direct objects, the

particle tends to occur in an immediate post-verbal position, leaving the long direct objects to a final position (Wasow, 1997, p. 353, Goldberg, 2016, p. 17). This is not to say, however, that (14) or (15) are not grammatical sentence. Both (14) and (15) share the meaning that an alternative music party is not going to take place anymore.

Despite the difference in their word order, both English verb-particle construction variants instantiate the same semantic predication (Goldberg, 2016, p. 1). The semantic and syntactic similarity of both verb-particle variants makes it possible to study particle placement within a syntactic priming paradigm (Bock, 1986; Konopka & Bock, 2009; Shin & Christianson, 2012). That is, the initial exposure to English particle placement sequences where the particle is placed in a final position following the direct object induce the subsequent production of the same variant or its alternative variant. Let us now review some of the priming studies focusing on the verb-particle alternation.

2.11.2 Earlier work on verb-particle alternation

The particle placement construction is one of the less studied alternation within a priming paradigm (Szmrecsanyi, 2005; Gries, 2005; Konopka & Bock, 2009). I will summarize and review Konopka and Bock's (2009) in this section and will leave the discussion of Szmrecsanyi's (2005) and Gries' (2005) studies for section 2.14 where the corpus-based investigations of syntactic priming are discussed.

Konopka and Bock (2009) conducted three experiments focusing on the idiomaticity aspect of the verb-particle construction variants. Idiomatic phrasal verbs are those with a figurative meaning that cannot be inferred from the main verb itself, e.g., "pull off a robbery" (Konopka & Bock, 2009, p. 68). In their first experiment, the participants were asked to read a group of sentences from a screen, perform a distraction task and then recall aloud the sentences they had read. The trial sentences

were manipulated so that each prime sentence containing a verb-particle construction was paired with a target in the following sentences. Half of these pairs included the same prime and target variants while the other half included mismatched verb-particle prime-target variants. The direct object in the prime-target pairs was systematically manipulated whereby some verb-particle construction included long direct objects while the others included short direct objects (Konopka & Bock, 2009, p. 73). Finally, all prime-target pairs were manipulated to ensure the absence of lexical overlap.

Konopka and Bock's first experiment (2009) showed that verb-particle constructions with post-object particles primed the production of targets with post-object particles. Similarly, the constructions with immediate post-verbal particles primed the production of the constructions with immediate post-verbal particles relative to the verb-particle variant with a post-object particle. Moreover, the first experiment showed that the participants changed 89% of the primes with post-object particles, where the object equals or more than seven syllables long, into targets with immediate post-verbal particles in the recall reproduction of primes' stage (Konopka & Bock, 2009, p. 78).

In their second experiment, Konopka and Bock (2009) used the same procedure as in their first experiment to compare two conditions: priming of idiomatic verb-particle constructions against priming of non-idiomatic verb-particle constructions. However, this time they also included whether the verb-particle construction is structurally frozen (e.g., *The new material gave off a weird smell*), or flexible (e.g., *The graduating senior sent his application in*) as an independent variable (Konopka & Bock, 2009, pp. 81–84) (see Peterson et. al (2001) for a discussion of structural frozenness and flexibility). Konopka and Bock (2009) found a stronger priming effect for the non-idiomatic verb-particle condition relative to the

idiomatic verb-particle primes. I will not report on Konopka and Bock's (2009) third experiment on prime-target lexical overlap as it is an issue that I discuss in section 2.13.

The findings from Konopka and Bock (2009) suggest that the idiomaticity of the verb in the priming sentence did not affect the priming of the particle placement patterns (Konopka & Bock, 2009, p. 79). That is because complex direct objects might overcome the priming strength and cause the shift from an immediate post-verbal particle in the prime to a post-object particle in the target. Konopka and Bock's (2009) validated that the placement of a particle within a verb-particle construction is a fitting alternation for a syntactic priming investigation. Most importantly, the study showed evidence that in a particle placement alternation investigation, factors that are not-priming related need to be factored in, e.g., the length and complexity of the direct object. Non-priming relating factors could have a big enough predictive effect of the particle placement use. I will explore the importance of semantic factors further in section 2.14, but, for now, let us consider the most studied alternation in syntactic priming research: the dative alternation construction.

2.11.3 *Dative alternation construction*

The alternation referred to in this section is illustrated in the examples below:

(16) My friend sent his mom a letter

(17) My friend sent a letter to his mom

Different terms were used to describe the two examples that we see above. The alternation between example (16) and (17) was referred to as the 'ditransitive alternation' (Jaeger & Snider, 2007, 2013; Jaeger, 2010; Snider, 2009). Another group of studies used the term 'dative alternation' to describe the two examples (Branigan, 1995; Hollmann, 2003; Gries, 2005; Bresnan et al., 2007; Thothathiri & Snedeker,

2008a; Bresnan & Ford, 2010; Tooley & Bock, 2014). The ‘ditransitive structures’ was used to refer to the construction with a noun phrase theme and recipient, and the one with a noun phrase theme preceding the prepositional phrase recipient argument (Gries & Wulff, 2005; Arai et al., 2007). Snider (2007) did not specify names for the two variants in the two examples; he referred to example (16) as a ditransitive with the NP NP structure, and example (17) as a ditransitive with the NP PP structure. Previous investigations of the dative alternation described example (16) with the term ‘double object’ (Corley & Scheepers, 2002; Bresnan et al., 2007; Snider, 2009; Bresnan & Ford, 2010; Howes et al., 2010; Kim et al., 2013; Segaert et al., 2013; Weatherholtz et al., 2014; Healey et al., 2014), ‘double-object dative’ (Arai et al., 2007; Thothathiri & Snedeker, 2008a; Shin & Christianson, 2012; Tooley & Bock, 2014) and ‘double object ditransitive structure’ (Jaeger & Snider, 2007). Example (17) was described in the literature as ‘prepositional object’ (Corley & Scheepers, 2002; Snider, 2009; Jaeger & Snider, 2013; Weatherholtz et al., 2014; Healey et al., 2014), ‘prepositional dative’ (Bresnan & Ford, 2010; Bresnan et al., 2007; Howes et al., 2010; Kim et al., 2013; Segaert et al., 2013) and ‘dative construction’ (Bresnan & Ford, 2010; Segaert et al., 2013).

For the sake of consistency, I will use term ‘double object’ to describe the construction with a noun phrase theme and a noun phrase recipient, see example (16). The term ‘prepositional dative’ and the ‘dative construction’ will be used interchangeably to refer to the construction with a noun phrase theme preceding a prepositional phrase recipient, see example (17). The ‘dative alternation’ term will refer to both the double object and the prepositional dative together.

Syntactically speaking, there are four arguments in a double object construction: a noun phrase (agent), a main verb (ditransitive), a noun phrase (indirect object), and a noun phrase (direct object). The arguments in a prepositional dative

construction are a noun phrase (agent), a main verb (ditransitive), a noun phrase (direct object), and a prepositional phrase (indirect object). The preposition within the direct prepositional phrase in the prepositional phrase is normally *to*, or *for* (see example (18) and (19)).

(18) The dad_{NP} gave_V his daughter_{NP} a birthday gift_{NP}

(19) The dad_{NP} gave_V a birthday gift_{NP} to his daughter_{PP}

Semantically speaking, the dative alternation construction is understood to be a relation between three components, an agent, a recipient and a theme. The agent in the example (18) and (19) is the dad performing the action of giving a birthday gift, i.e. theme, causing his daughter to receive the birthday gift. This relation of ‘giving’ between the three arguments can be also understood as a change of possession of the birthday gift from the agent, i.e. ‘the dad’ into the recipient, i.e. the daughter. The syntax of the dative alternation construction illustrated in the example (18) and (19), therefore, is constrained by considerations that are semantic in nature (Goldberg, 1995, p. 141-148).

1- *Volitionality of the agent*: this is a constraint on the type of agent allowed in a dative alternation construction. The agent, ‘dad’ must be willing and able to consciously cause the transfer of theme ‘a birthday gift’ to the recipient’s possession, i.e. the daughter. There are instances, however, where the agent of a dative alternation construction is not animate, (e.g., the noise gave me headache). This example counts as a double object construction because it can be explained by invoking the notion of metaphor whereby a casual event is understood to be the causer of a transfer (Goldberg, 1995, p. 144) (for a comprehensive review of the notions of metaphor the agent’s volitionality constraint, please see Goldberg, 1995, p. 143 – 146).

2- *Animacy of the recipient*: The recipient must be an animate being unless it is a casual event causing transfer (e.g., ‘the weather gave us inspiration to spend the afternoon outdoors’) (Goldberg, 1995, p. 146).

3- *A beneficiary or a willing recipient*: the recipient has to benefit or be willing to receive the action of the agent. For Goldberg (1995, p. 146), a sentence like: ‘Sally burned Joe some rice’ is not an acceptable double object construction unless it is understood that Joe prefers to have his rice burnt.

Finally, the alternation between prepositional dative and the double object constructions exists in German language too (see example 20 and 21).

(20) The boy sent his pen pal a letter.

Der Junge schickte seinem Brieffreund einen Brief.

(21) The boy sent a letter to his pen-pal.

Der Junge schickte einen Brief an seinen Brieffreund. (Loebell & Bock, 2003, pp. 796–797).

Examples (20) and (21) show that the same English dative alternation operates in German. In the German translation of example (20), we can see the main verb, ‘schickte’, i.e. sent, followed the agent ‘Der Junge’ i.e. the boy. The recipient ‘seinem Brieffreund’, i.e. his pen pal, occurred before the theme ‘einen Brief’, i.e. the letter. This sequence is the same configuration as the double object in English. In the German translation of example (21), however, the recipient, seinen Brieffreund, was delayed after the theme ‘einen Brief’. This sequence is the same as the English prepositional dative, except for the absence of a correspondent ‘to’ preposition. However, Loebell and Bock (2003) referred to the German rendering of example (21) as a prepositional dative because it has the same semantics and a very similar syntax to the English prepositional dative.

Now that we have introduced the syntax of the dative alternation construction in English and German as well as some of the semantic constraints governing its structure, it is time to review some of the syntactic priming studies which specifically focused on the use of the two dative alternation variants: the prepositional dative and the double object constructions.

2.11.4 Earlier work on dative alternation

Because there is a wealth of experimental priming studies that focused on the alternation between the prepositional dative and the double object, this section will report on two dative alternation experiments; one in L1-L1 production and another in L2-L2 production. More work on dative alternation priming using corpus-based methodology is presented in section 2.14.

Branigan et al. (2000) investigated the dative alternation priming in native English spoken production. The participants were handed cards that represents a ditransitive event paired with double object or prepositional dative descriptions. The experiment also involved a confederate who had received a script indicating which of the dative alternation variants they should use (Branigan et al., 2000, p. B19). The participant and confederate described the pictures on their cards and chose a card that matched their interlocutor's description. The analysis revealed a priming effect whereby the participants produced the dative alternation variants that their interlocutors has just produced (Branigan et al., 2000, p. B20). This priming effect was boosted by the shared main verb lemma between primes and targets. Interestingly, Branigan et al. (2000, p. B20) excluded any non-syntactic explanations for their findings arguing that the prepositional dative and the double object constructions are not reflective of different discourse or rhetorical registers. While it may be true that both alternations of the dative constructions are not exclusive to certain registers, there

is corpus-based evidence for discourse related factors that influence the use of one dative construction variant over the other (see Bresnan et al., 2007). Instead, they argued that their findings are an indication to a tendency on the part of the participants to mirror the syntactic forms used by their interlocutors to serve the function of consolidating successful communication (Branigan et al., 2000, p. B21).

McDonough (2006) investigated syntactic priming in spoken L2 English production of speakers of different L1 backgrounds. The focus of the experiment was the alternation between the prepositional dative and the double object constructions. In the first experiment, the participants were divided into a comprehension group and a production group. They were then presented with pictures that include one verb and a related event and were asked to repeat the confederate's descriptions of the pictures before having to come up with their own descriptions. A researcher was also in the room to remind the participants to use the verbs to elicit either the prepositional dative or the double object construction if they used the verb in its participle form: "e.g., there is a man showing some pictures", or its infinitive form: "the man likes to show some pictures" (McDonough, 2006, p. 189). The confederate was asked to speak first so the primes are delivered before the targets. The participants from the comprehension group were asked to listen to their interlocutor's sentence and find the picture that corresponds to their description. The priming group, however, were asked to repeat their interlocutor's sentence and find the picture that corresponds to it (McDonough & Mackey, 2006, p. 190). Both the production and comprehension groups produced more prepositional dative targets following prepositional dative primes, relative to double object targets and only slightly more double object targets following double object primes than prepositional dative targets.

In their second experiment, McDonough and Mackey (2006) used the same experimental design and procedures as their first experiment, except that this time

they exposed the participants only to double object primes. The results showed that both the comprehension and the production groups produced more prepositional dative targets following double object primes relative to double object targets (McDonough & Mackey, 2006, pp. 195–196). The authors suggested that the lack of priming in their second experiment may have been caused by the participants' lack of awareness of the morphological and semantic constraints which govern the dative alternation (McDonough & Mackey, 2006, p. 197).

It is difficult to generalize Branigan et al. (2000) and McDonough and Mackey's (2006) findings to dyadic L1-L1 or L2-L2 spoken interaction because the participants were instructed even on which verbs they had to use. Besides the confederate, there was even a researcher during the experiment reminding the participants to use the verbs on their picture cards to elicit the prepositional dative or the double object construction (McDonough & Mackey, 2006, p. 189). The experimenter role may have undermined or at least influenced the choices that the participants would have made in a real life spoken dyadic interaction. It is therefore difficult to extend McDonough and Mackey's (2006) results outside the laboratory given the restrictions that were placed on when the participants were permitted to speak and what they were permitted to say. Finally, both Branigan et al. (2000) and McDonough and Mackey (2006) did not control for effects of other dative alternation predictors that could have influenced the participants' choice of dative alternation variant over the other, which may have undermined the validity of their findings (see section 5.4).

2.11.5 The caused-motion construction

The prototypical meaning of the caused-motion construction can be summarized in causing an object to move in a certain direction, i.e. (X CAUSES Y to

MOVE Z) (Goldberg, 1995, p. 152). X is understood to be the causer argument, i.e. the theme, Y is understood to be the theme and Z is the path that the theme will move along (Hwang & Palmer, 2015, p. 51). Thus, a causal relationship can be inferred from a caused-motion construction as in the example (22):

(22) He_{NP} draws_{SVP} her_{NP} into the marriage_{PP}

Example (22) can be understood as: ‘He causes her to be drawn into the marriage’. These semantic roles in example (22) are mapped onto the syntactic structure of the caused-motion construction as follows: a noun-phrase agent, a main verb, a noun-phrase theme and a prepositional phrase indicating the path of the movement. The caused-motion construction therefore has exactly the same constituent structure as the prepositional dative construction (see section 2.11.3).

As with the double object and prepositional dative constructions, Hilpert (2014, p. 36) argues for three constraints on the caused-motion constructions. First, the caused-motion construction must have an agent that is not an instrument. Therefore, a sentence like ‘the scanner uploaded the photo into my desktop’ is not considered an example of a caused-motion construction. Second, the path for the movement of the theme is usually intended (Hilpert, 2014, p. 36). A sentence like ‘John squeezed the orange juice into the oven’ is not an example of a caused-motion construction. Finally, the path of the theme must be fully determined by the causal action (Hilpert, 2014, p. 36). A sentence like ‘Mary allowed the dog to the next village’ is therefore unacceptable because the path of the theme, i.e. dog, is not fully determined by the causal action (Hilpert, 2014, p. 36).

Whereas the syntactic similarity between the caused-motion construction and the prepositional dative construction are obvious, the semantic similarity between both constructions is a little more subtle. However, in order to capture this semantic similarity, the notion of possession metaphor needs to be invoked.

“There is a metaphor that involves understanding possession as the “possessed” being located to the “possessor” transferring an entity to a recipient as causing the entity to move to that recipient, and transferring ownership away from a processor as taking that entity away from the possessor ... The metaphor is itself motivated by the fact that giving is prototypically correlates with movement from a possessor to a recipient” (Goldberg, 1995, p. 89).

Under this understanding of the possession metaphor, it can be argued that the caused-motion construction and the dative alternation construction are semantically similar. For a sentence containing a caused-motion construction like ‘The man sticks the money into his wife’s pocket’, we can look at ‘the money’ as the theme and as the ‘possessed item’. The agent, i.e. the man, then performs the action of transferring his ownership of this item in his position to someone (e.g., his wife’s possession). The recipient of the possessed entity, i.e. the money, in this instance is the man’s wife, into her pocket, which is the path of the transfer.

Goldberg (2006, p.33) confirmed the syntactic and semantic similarity between the prepositional dative and the caused-motion construction. She even went one step further to consider all the following examples as instances of caused-motion construction, especially that they all can be paraphrased by a double object construction (see example 23, 24, 25 and 26).

- (23) Mina sent a book to Mel.
- (24) Mina sent a book to Chicago.
- (25) Mina sent a book toward the front of the room.
- (26) Mina sent a book through the metal detector. (Goldberg, 2006, p. 33).

For the purpose of this thesis, I will maintain that the double object construction has a constituent structure that is different from both the caused-motion and the prepositional dative construction. I will also maintain that the prepositional dative and the caused-motion construction have the same constituent structure and are similar at the semantic level. Finally, I will maintain that the double object construction is semantically similar to both the prepositional dative and caused-motion construction.

So far, this section has introduced the semantics and syntactic structure of the caused-motion construction and its relationship with the prepositional dative and the double object construction. The next section will introduce and evaluate the earlier investigations of caused-motion construction within syntactic priming research.

2.11.6 Earlier work on caused-motion construction

The priming of the caused-motion construction has not been sufficiently investigated. To the exception of Hare and Goldberg (1999), I am not aware of any study that focused on the caused-motion construction and its amenability to priming. I will therefore report on the Hare and Goldberg (1999) study, but also on Bock and Loebell (1990) because both investigated the semantic influences of a particular prime on the target with a different target structure.

Hare and Goldberg (1999) investigated the priming of the ‘provide with’ construction (e.g., the officer provided the soldiers with guns) in native L1 English production. Syntactically speaking, they suggested that this construction shares the same constituent structure as the prepositional dative construction but is semantically similar to the double object construction (Hare & Goldberg, 1999). The participants were provided with ten pictures that can be described either with the prepositional dative or with the double object constructions. These pictures were paired with

prepositional dative, double object, ‘provide with’ or intransitive sentences. Filler pictures and sentences of different types were also included.

When a picture appeared on a screen, the experimenter read the picture aloud. The participants were then asked to decide whether the picture that they were being shown is a new picture or one that was used earlier in the experiment. Subsequently, they were asked to repeat the sentence or describe the event in the picture. The experimenter cued the descriptions of the pictures to the participants by producing only the subject and the main verb (e.g., the man gave...) (Hare & Goldberg, 1999).

The results showed that 32% more double object targets than prepositional datives followed double object primes. Prepositional dative primes triggered 32% more prepositional dative targets relative to double object targets. Finally, provide-with primes generated 28% more double object targets relative to prepositional dative targets (Hare & Goldberg, 1999). Hare and Goldberg (1999) therefore argued that structural priming is not purely syntactic, and that the mapping out of the semantic features of the primes will also have an effect on the linguistic choice made in the target. The link Hare and Goldberg (1999) made between the provide-with structure and the prepositional datives in terms of shared syntax is novel. However, they also disregarded examples that share the same sequence as the prepositional dative, e.g., “and he sticks the wad of money that he won into her pocket” (Example taken from the corpus for the present study, English 22A, 33) (see section 2.11.3 and 2.11.5 for an explanation of the syntax of the prepositional dative and caused-motion constructions).

Hare and Goldberg’s (1999) evidence for target sentences influenced by the semantic features in the prime sentences contradicts the findings of Bock and Loebell (1990). Bock and Loebell (1999) conducted three experiments to assess whether

syntactic similarities across sentences are motivated by conceptual information. In their first experiment, the participants were presented with a picture that they were asked to describe. The pictures were paired with the priming sentences to form experimental primes. Three components were included in all experimental pictures: an agent of the action, an object undergoing the action and an a human recipient of the action (Bock & Loebell, 1990). The priming sentences included prepositional dative (e.g., the wealthy widow gave an old Mercedes to the church), prepositional locative (e.g., the wealthy widow drove an old Mercedes to the church) and double object sentences (e.g., the wealthy widow sold the church an old Mercedes) (Bock & Loebell, 1990). First, the participants were asked to indicate for each item whether it was introduced to them before over the course of the experiment. They were then asked to repeat the priming sentence and then come up with one sentence that describes the event in the experimental picture (Bock & Loebell, 1990, p. 12). The results showed that the participants produced more prepositional dative sentences following prepositional locative and prepositional dative primes, relative to prepositional dative sentences following double object primes (Bock & Loebell, 1990).

In their second experiment, Bock and Loebell (1990) replicated their first experiment's design to test whether a sentence with the locative-by phrase, (e.g., the minister was praying **by** the broken stained glass window), can prime passive targets, (e.g., the minister was cut **by** the broken stained glass window) (Bock & Loebell, 1990). The priming sentences included primes with a locative-by phrase, a full passive prime, i.e. including the preposition **by** and the agent, and an active prime (e.g., the minister fixed the broken glass window) (Bock & Loebell, 1990). The results showed that the proportions of passive targets following passive primes were similar to that of the passive targets following prepositional locative primes. By comparison, the active

primes produced less passive targets than in the passive and locative-by phrase prime conditions.

In their last experiment, Bock and Loebell (1990) tested for whether or not the infinitive to-phrases (e.g., the defendant told a lie **to** protect his defendant), primes the prepositional dative construction with the to-phrase, (e.g., the defendant told a lie **to** the crowded court room) (Bock & Loebell, 1990). The results showed a noticeable increase in the production of dative prepositional dative targets in the prepositional dative prime condition, but the number of infinitive targets in the infinitive prime condition was close to that of the double object target in the double object condition

If the ‘provide-with’ structure can prime the production of prepositional dative and the double object constructions due to its shared syntax with the prepositional dative and shared semantic with the double object (Hare & Goldberg, 1999), then there is no reason why caused-motion construction priming of the dative alternation in both its variants cannot be investigated. Bock and Loebell’s (1990) findings that the locative-by phrase can prime passive sentences and that the locative prepositional phrases can prime the production of prepositional dative over double object constructions are also an additional motivation why the priming of the caused-motion construction is worth studying.

2.12 Syntactic theoretical framework

On thinking about the constructions under study, I am, to a large extent, assuming a model of grammar that is congruent with construction grammar. Construction grammar assumes that constructions are: “...stored pairings of form and function, including morphemes, words, idioms, partially lexically filled and fully general linguistic patterns.” (Goldberg, 2003, p. 219). In an essentially construction-based view of grammar, constructions involving very active thinking, such as the

double object and the prepositional dative, are two separate entities that alternate with one another. This is a different view of grammar from that of, say, a generative approach. According to generative grammar, any structure is the result of building a tree-like structure from the same set of rules. In other words, generative grammar assumes that the dative and the double object are understood as being the outcome of applying a set of generative rules in a particular way (see Beck & Johnson, 2004 for a review). Meanwhile in construction grammar, the double object and the prepositional dative are entities that have a psychological reality in the brain. One can, therefore, predict that certain semantic and form-related factors might encourage the production of a double-object construction over a prepositional dative, and vice versa, given that these are two alternating constructions which are not outcomes of the same set of syntactic rules, as is the case with generative grammar.

Theoretically speaking, the present study relies heavily on usage-based approaches to second language acquisition. Under this theory, a language is a combination of constructions, and the learning of a second language occurs when learners are exposed to that second language in use (Ellis & Wulff, 2014, p. 75). Learning a language also involves learning not just language forms, but also their associations with meanings. The pairing of form and meaning, i.e. constructions, is therefore crucial to learning a second language (Ellis & Wulff, 2014, p. 77). Hence one might predict that the factors responsible for reproduction of the constructions under study are not only structural but also semantic in nature.

2.13 Lexical boost

The question of whether or not syntactic priming is affected by lexical repetition has often been addressed in syntactic priming research. Lexical boost refers to the observation that stronger syntactic priming occurs when there is lexical overlap

between the prime-target pairs, i.e. main verb match between primes and targets (e.g., Pickering & Branigan, 1998). This effect has been looked at in syntactic priming literature mainly through two paradigms. These two paradigms are outlined in the next two subsections.

2.13.1 Lemma identity

The first paradigm looked at the role of the shared prime-target main verb lemma in enhancing the magnitude of syntactic priming. If dative alternation prime-target pairs have ‘give’ as their main verb lemma, then it is expected that the magnitude of priming will be stronger than if the target had a different main verb lemma to that of the prime. Pickering and Branigan (1998) suggested a model of the representation of syntactic information in the mental lexicon (see section 2.2). Under their model, syntactic information is stored at the lemma stratum. Each lexical entry incorporates information about the category of the word, i.e. noun, verb or adjective, etc. Other syntactic information is also incorporated at the lemma level, such as the tense and the number of the verb and the gender of a noun. Finally, the lemma stratum encodes combinatorial information whereby a verb like ‘offer’ can combine with arguments like ‘his girlfriend, or a gift’ to form a larger unit of meaning. When the verb ‘offer’ takes two noun phrase arguments as in ‘Omar offered his girlfriend a gift’, this combinatorial information linking a verb with two noun phrase arguments gets activated. If the verb ‘offer’ is subsequently repeated in a dative construction, then the selection for two noun phrases is more likely to be repeated as opposed to producing a prepositional dative construction where the verb ‘offer’ takes a noun-phrase and a prepositional phrase argument, i.e. ‘and then Omar offered a gift to his mom’. Let us now review some of the work on main verb lemma prime-target pair effect.

2.13.2 *Earlier work on lemma identity*

In Pickering and Branigan's (1998) first experiment, the participants were given written incomplete prime sentences that include a ditransitive verb. Some of these sentences were manipulated to induce the production of a prepositional dative by including a postverbal noun-phrase that is a patient (e.g., the racing driver showed the torn overall ...) (Pickering & Branigan, 1998, p. 637). The other prime fragments included a postverbal noun phrase that is a beneficiary to induce the production of the double object construction (e.g., the racing driver gave the helpful mechanic ...) (Pickering & Branigan, 1998, p. 637). The targets were fragments that contained an agent followed by a ditransitive verb, e.g., 'give', but were not manipulated to induce either dative alternation variant, (e.g., the patient showed ...) (Pickering & Branigan, 1998, p. 637). The order of the fragments was then randomised, included in booklets and handed to the participants to complete. Pickering and Branigan (1998) found evidence for priming when prime-target pairs had different verbs, but an even stronger preference on the part of the participants to repeat the same dative alternation if the prime-target pairs shared the same main verb lemma. Pickering and Branigan's (1998) lexical boost effect associated with the repetition of the main verb lemma finding was replicated in Branigan et al.'s (2000) picture description experiment.

2.13.3 *General similarity effect*

The second lexical boost paradigm considers the effect of prime-target shared lexical material beyond the main verb lemma. Under this paradigm, the strength of the dative alternation priming, for example, may be enhanced not only by the identity of the prime-target main verb, e.g., the ditransitive 'give' used in the prime and in the target. The magnitude syntactic priming effect may also be strengthened by more shared features within the prime and target sentences (Snider, 2009, p. 817).

2.13.4 *Earlier work on the general similarity effect*

Perhaps one of the most influential experimental studies of syntactic priming is that of Bock (1986). In her first experiment, Bock (1986, p. 361) used a picture description paradigm to elicit dative alternation, (e.g., “A rock star sold some cocaine to an undercover agent vs. A rock star sold an undercover agent some cocaine”) and voice alternation, (e.g., “One of the fans punched the referee vs. The referee was punched by one of the fans), priming in her participants’ speech. Bock (1986, p. 364) found more prepositional dative targets following prepositional datives, relative to double object primes, more double object targets following double objects, relative to double object targets, more passive voice sentences following passive voice, relative to active voice primes, and more active voice sentences following active voice, relative to passive voice primes.

In her second and third experiment, however, Bock (1986) focused on the effects of sentence content on the strength of priming. In particular, the second experiment tested if the human agency of voice alternation prime-target pair can influence the strength of priming. The priming sentences comprised active sentences and their corresponding passive sentences. The priming sentences were manipulated so half of them were sentences with a human agent and the other half had a non-human agent. The priming sentences were also manipulated to include a human patient for half of them and a nonhuman agent for the other half (Bock, 1986, p. 369). The events depicted in the transitive target pictures were also manipulated to include an equal number of human and nonhuman agents (see example 26 and 27):

(27) Human agent: The floors are cleaned by a janitor daily

(28) Nonhuman agent: Spring vacation was ruined by a blizzard

(Bock, 1986, p. 370)

The results from the second experiment showed support for priming where the participants produced more passive sentences following passive primes, relative to active primes and vice versa. However, the differences in human agency in the priming sentences did not influence the magnitude of priming (Bock, 1986, p. 371). Bock (1986) found an effect for humanness of the agent manipulations of the target pictures. That is, more events with human agents were described by active voice sentences relative to passive voice sentences. Additionally, the number of passive voice descriptions was higher for events with a nonhuman agent relative to events with a human agent (Bock, 1986, p. 372).

In the third experiment, Bock (1986) used a running recognition task to further investigate the humanness of the agent effect. The third experiment replicated the results from the second experiment, showing that priming passive sentences with a human or a non-human agent elicited more passive than active sentences (Bock, 1986, p. 375). The human agency in the picture events was significant as with the second experiment. However, no effect was found for the human agency manipulation of the priming sentences (Bock, 1986, pp. 375–376). Bock (1986, p. 374) argued that the absence of the agency effect in the priming sentences constitutes evidence for the isolability of certain structural processes in production from the conceptual processes.

The strength in Bock's (1986) study is her ability to manipulate material and create priming conditions and target pictures with a particular focus on the human agency as a factor. However, human agency is only one aspect of the conceptual characteristics of a sentence. Perhaps Bock's (1986) findings could have been solidified by including lexical overlap as a factor especially given the high lexical overlap in the voice and dative alternation prime-target sentences in their study.

Cleland and Pickering (2003) looked at the priming of noun-phrase structure, i.e. (The tall man vs. the man that is tall), in a picture description task. The participants were provided with two sets of cards with different shapes and in different colours. The participants were also partnered with a confederate who was provided with scripted descriptions. The task that the participants performed was to describe the first set of cards to their partners and then select a card that corresponds to their partner's description from the second set of cards. The descriptions, i.e. the primes, were manipulated to include four conditions: (1) the same structure, the same adjective but a different noun, (2) the same structure, a different adjective but the same noun, (3) a different structure, the same adjective but a different noun, (4) a different structure, a different adjective but the same noun) (Cleland & Pickering, 2003, p. 219). A priming main effect was observed where the participants tended to repeat the same structure produced by the confederate, i.e. relative clause or a noun phrase with a pre-nominal adjective. The experiment also demonstrated a lexical boost effect where the shared head noun between primes and targets enhanced the priming effect (Cleland & Pickering, 2003, p. 220). Cleland and Pickering's (2003) lexical boost results, however, contradict the evidence from Healey et al. (2014) where syntactic priming is lower in real conversations compared to chance when lexical overlap is controlled for. We will return to Healey et al.'s (2014) study in section 2.14.2, but for now, let us consider the evidence for syntactic priming in the absence of lexical overlap.

2.13.5 Syntactic priming in the absence of lexical overlap

Another issue addressed in syntactic priming research is whether syntactic priming is dependent on the prime-target lexical overlap. Previous research found support for priming despite the absence of an overlapping prime-target pair's head

word (Bock, 1986; ; Pickering & Branigan, 1998; Branigan et al., 2000; Corley & Scheepers, 2002; Ferreira, 2003; Hartsuiker et al., 2008; Segaert et al., 2011; Wheeldon et al., 2011; Jaeger & Snider, 2013).

Despite the uncertainty in the priming literature about the scope of the lexical boost effect, i.e. whether or not it is an effect specific to the prime-target pair's shared main verb lemma, there seems to be consensus on the inability of prime-target shared function words to enhance syntactic priming (Bock, 1989; Ferreira, 2003; Fox Tree & Meijer, 1999; Pickering & Branigan, 1998). Bock (1989), for example, investigated whether prime-target matched closed-class words can influence dative alternation priming. The participants were handed lists of four sentences: one that includes a prepositional dative with the preposition 'to', another that includes a prepositional dative with the preposition 'for' and their double object paraphrase. Below is an example of a sentence set from the actual experiment (Bock, 1989, p. 171):

Table 2.1: Example of priming sentences set

| Prime type | Examples |
|--------------------------|--|
| Prepositional to-dative | A cheerleader offered a seat to her friend |
| Prepositional for-dative | A cheerleader saved a seat for her friend |
| Double object to-dative | A cheerleader offered her friend a seat |
| Double object for-dative | A cheerleader saved her friend a seat |

For each set of sentences, the participants were handed in a picture corresponding to the events they describe. The participants were asked to indicate if the picture occurred previously in their sets of sentences. The experimenter then read the sentence aloud to the participants who were asked to repeat the sentence. Finally, the participants were asked to describe the event in the picture with their own words.

Bock (1989) found that the type of the preposition used in the prime sentence did not reliably affect the dative structure used in the target. The absence of lexical repetition influence over the magnitude of priming suggests that what is being primed is not the lexical items making up a given construction per se, but rather the syntactic representations that underlie that construction.

The syntactic priming investigations that have been reviewed so far are predominantly experimental in nature. Corpus-based studies, however, have been claimed to be of use only as tools for hypothesis generations, but are unable to investigate evidence of syntactic priming (Branigan, 1995, p. 492). Similarly, Pickering and Branigan (1999, p. 136) argued that corpus-based priming investigations are unable to control for alternative explanations for syntactic priming. These claims are assessed below as we introduce evidence for syntactic priming generated by corpus-based methodology.

2.14 Earlier corpus-based work on syntactic priming

The first investigations of syntactic priming in observational data date back to the early 1980's; e.g., Schenkein, 1980; Weiner and Labov, 1983, and Estival, 1985 (cf. e.g., Pickering & Ferreira, 2008, p. 428). With the emergence of large corpora, and more advanced search and computational techniques, corpus-based research has become effective in researching syntactic priming, mainly in L1 production. Corpus-based investigations also provided evidence that confirmed the lexical boost tendency in L1 production. For example, Gries (2005) showed that the shared identical verb between dative alternation primes targets, considerably boosted the priming effect, relative to when the verbs in primes and targets were varied. A similar lexical boost effect on dative alternation priming was obtained in dyadic conversations (Howes et al., 2010, p. 2008).

In the next section, I will review some corpus-based studies in support of syntactic priming in L1 production and point out how the choice between to alternating constructions can be investigated in a corpus-based design. Section 2.14.2 will introduce corpus-based investigations of syntactic priming in L1 production where no support for syntactic priming was found. Finally, given the scarcity of corpus-based investigations of syntactic priming in L2 production, section 2.14.3 will present corpus-based and experimental evidence for L2 syntactic priming.

2.14.1 Evidence for syntactic priming using corpus-based methodology

A key study of syntactic priming in L1 using corpus-based methods was that of Gries (2005). Gries looked at two kinds of syntactic priming, i.e. dative alternation and particle placement in a sub-corpus of British English extracted from the International Corpus of English (ICE-GB) of written and spoken English. In the analysis, Gries used a generalized linear model (GLM) to account for the nature of the corpus, i.e. written or spoken, among other independent variables, such as the distance between primes and targets, the identity of speakers and the identity of the verb lemma. For both the dative and particle placement alternation, Gries (2005) found evidence for priming whereby the construction used in the prime was subsequently repeated. This syntactic priming effect was found to diminish with an increased distance between primes and targets (Gries, 2005, p. 382). Moreover, Gries' (2005) dative alternation and particle placement investigations showed a significant effect for lemma identity, a finding that fits in with Pickering and Branigan (1998). One weakness in Gries' (2005) study could be that he used a corpus that includes mixed genres of language production, namely: writing, e.g., academic and non-academic, etc., and different formats of speech: e.g., classroom lessons, business transactions and phone calls, etc. (Davies, 2009).

Other corpus-based evidence for syntactic priming comes from Szmrecsanyi (2005), Reitter et al. (2006), Snider (2009) and Gries (2011). Szmrecsanyi (2005, p. 118) used logistic regression models to investigate syntactic priming. The alternations that Szmrecsanyi (2005) looked at include not only the particle placement alternation, but also analytic vs. synthetic comparatives, (e.g., John is cleverer than Marie vs. John is more clever than Mary), and the future marker choice alternation, (e.g., John will see Mary vs. John is going to see Mary) (Szmrecsanyi, 2005, p. 118). For this purpose, two sub-corpora from the spoken component of The British National Corpus (BNC) containing informal and formal encounters were extracted to serve as the data sources. The informal sub-corpus was used to investigate the future marker alternation, and the formal sub-corpus was used to investigate the synthetic vs. analytic comparison (Szmrecsanyi, 2005, pp. 120–121). The Freiburg English Dialect Corpus (FRED) containing formal interviews was used to study the particle placement alternation (Szmrecsanyi, 2005, p. 121).

The previous occurrence of the target, i.e. the prime, was just one of the considered independent variable. Using logistic regression models, Szmrecsanyi (2005) aimed at estimating which of the two alternatives are motivated by the prime as an independent variable as opposed to other independent variables he included in the analysis for each of the target constructions (Szmrecsanyi, 2005, p. 118) (see Szmrecsanyi (2005) for a review of all the independent variables included for each construction). For the particle placement analysis, the study showed that particle placement choice is sensitive not only to the previous particle placement variant, i.e. the prime, but also to other predictors (e.g., the definiteness of the direct object, the complexity of the direct object and the length of the direct object in syllables, etc.) (Szmrecsanyi, 2005, p. 132). For the comparison strategy choice analysis, Szmrecsanyi (2005) found that priming and most of the included variables, (e.g., the

morphological properties of the adjective and the presence of a degree modifier, such as *slightly* and *noticeably*, before the adjective, etc...) were significant predictors of the target (Szmrecsanyi, 2005, p. 126). The results from the future marker analysis suggested that the choice of a marker is subject to priming related predictors such as the preceding marker choice type, but also the contexts of negation for the current future marker choice (Szmrecsanyi, 2005, p. 135).

Szmrecsanyi's (2005) is particularly relevant to the current study because of two reasons: first, instead of looking at just one alternation, he focused on the priming of three primable alternations, which makes the study's findings more generalizable. Second, using a corpus-based methodology, Szmrecsanyi (2005) was able to test for predictors of the constructions that would be very hard to control for in an experimental laboratory setting. Perhaps one limitation of Szmrecsanyi's (2005) study, however, is his use of different spoken data that represent different styles to investigate the three alternations. That is, investigating all three alternations in one spoken corpus representing one style could have boosted the strength of Szmrecsanyi's (2005) findings.

Bresnan et al. (2007) investigated the use of a dative alternation variant over the other, i.e. prepositional dative vs. double object, in the Switchboard telephone conversation corpus. Bresnan et al. (2007, p. 77–78) used logistic regression to control for the dative alternation predictors (e.g., the recipient and theme's discourse accessibility, definiteness and animacy, etc.). Bresnan et al. (2007) suggested that there is evidence for dative alternation priming even when the other predictors were taken in consideration. Moreover, the results showed that inanimate recipients, discourse new recipients and nonpronominal recipients tend to take the prepositional dative, as opposed to the double object variant (Bresnan et al., 2007, p. 83–84).

The reason why Bresnan et al. (2007), and by extension, Gries (2005) and Szmrecsanyi (2005) used a regression analysis is to ensure the simultaneous control for multiple variables which can affect the use of the examined alternations. Given the many predictive variables of the particle placement or dative alternation use (see section 4.4), it is difficult for an experimental investigation of these constructions to simultaneously control for all these predictors or elicit data where all these predictors can be studied.

Despite the evidence that has been reported so far for syntactic priming in experimental and corpus-based studies, some of the more recent corpus-based investigations of syntactic priming in L1 surprisingly failed to find support for syntactic priming. These will be discussed in the next section.

2.14.2 Corpus-based evidence against the robustness of syntactic priming in L1 production

Howes et al. (2010), for example, investigated the dative alternation priming in the Diachronic Corpus of Present-Day Spoken English (DCPSE) including formal and informal face to face conversations as well as telephone conversations (Howes et al., 2010, p. 2005). In order to find out whether the priming of dative alternation in their corpus is greater than it would be expected by chance, they created fake dialogues by randomly matching turns of one speaker from a dialogue with turns of another speaker from a different dialogue. For the first analysis, only the dyadic conversations were extracted for further investigation, i.e. only conversations with two interlocutors. The matched dative alternation variants in the original dialogues were then compared against the matched dative alternation variants in the fake dialogues (Howes et al., 2010, p. 2005). They found that dative alternation priming in the genuine dialogues was not reliably stronger than in the fake dialogues (Howes et al., 2010, p. 2006) suggesting a lack of dative alternation priming in the original corpus.

In their second experiment, Howes et al. (2010) replicated their first experiment except this time they broadened their data by including all dialogues including those that involve more than two speakers (Howes et al., 2010, p. 2007). The results from the second experiment found support for dative alternation priming whereby the number of matched dative alternation variants in the authentic dialogues was greater than those in the fake dialogues. The authors suggested the nature of their data as a potential explanation for the lack of priming in their first experiment. In particular, they suggested that the robust support of priming in experimental and task oriented settings do not generalize well to dialogue samples from a corpus (Howes et al., 2010, p. 2009). Finally, the authors argued that “...the strength and ubiquity of syntactic priming [...] may have been overstated” (Howes et al., 2010, p. 2009).

The generalizability of Howes et al. (2010) findings to syntactic priming is undermined by the fact that they solely focused on the choice between a prepositional dative and a double object construction. Moreover, while they have excluded written production from their data, the corpus they used in both experiments includes data of mixed formal and informal speech style. While the combining face to face formal and informal conversations with telephone conversations to understand priming in dialogue may be taken as a strength, it may also be taken as a weakness because people use different linguistic and rhetorical strategies especially that eye-contact is not available in the context of telephone conversations (Tanaka, 2008, p. 136).

Fernández and Grimm (2014) used a similar methodology to Howes et al. (2010) where fake dialogues were created to compare against the original dialogues. They focused on adults-adults telephone conversations that were extracted from the Switchboard corpus (Godfrey et al., 1992), and child-adult conversations extracted from the CHILDES Database (MacWhinney, 2012). To quantify the syntactic similarity across the turns, Fernández and Grimm (2014, p. 465) considered part-of-

speech sequences, measuring shared bigrams and trigrams. Lower syntactic matches than expected by chance were found for part-of-speech bigrams in adult-adult telephone conversations. Moreover, the differences between original dialogue and the chance condition were not significant for trigrams in adult-adult conversations (Fernández & Grimm, 2014, p. 367).

However, in their investigation of child-adult dialogues, Fernández and Grimm (2014) observed a significant ‘recurrence’ across speakers’ turns that are adjacent. The recurrence effects they observed in the child-adult dialogues diminished and quickly became less significant than expected by chance when they considered turns that were not adjacent. This last finding of Fernández and Grimm (2014) study gives support to the transient activation account of priming where the activation of a construction diminishes quickly over time, i.e. interfering time or sentences (see section, 2.1). Fernández & Grimm’s (2014) method of looking at the similarity in parsing of all their data instead of focusing on specific construction can be confusing. Focusing on specific alternations makes it easier to observe and grasp their syntactic similarity.

In the same vein, Healey et al. (2014) investigated syntactic similarity in face-to-face dialogue extracted from the DCPSC and the British National Corpus (BNC). Healey et al. (2014, p. 3) measured syntactic and lexical similarity in the two corpora by comparing the syntactic and lexical similarity in the original corpora against the syntactic similarity in a ‘chance’ corpus they created by randomizing turns from the original conversations. The authors did not study the priming of specific structures. Instead, they calculated the similarity of all constructions between a given turn and the preceding five turns. Healey et al. (2014) found that the syntactic similarity is largely influenced by lexical similarity. However, when the syntactic similarity in the real DCPSC and BNC conversations was compared against the fake conversations, Healey et al. (2014, p. 3) found that, overall, the syntactic similarity in the real was lower than

the chance condition even when lexical overlap is controlled for. They, therefore, argued for systematic divergence in speaker's use of syntactic constructions even across adjacent turns (Healey et al., 2014, p. 5).

Again, this paradigm of researching the general syntactic similarity through comparing parts of speech trees does not give us a good enough understanding of syntactic priming because of the lack of focus on certain grammatical constructions that we can observe. More importantly, looking at the general syntactic similarity and disregarding specific constructions, Healey et al. (2014) run the risk of overlooking predictors of grammatical sequences that are not syntactic in nature (see 4.4.2 and 5.4.2). Additionally, by relying on automatically parsed corpora, at least from the BNC, Healey et al. (2014) may have run the risk of overlooking false examples of the double objects, i.e. chunks that do not qualify as double objects because of violating one of the double object constraints (see 2.11.3). Finally, despite the fact that the spoken corpora that Healey et al. (2014) used represent speakers of mixed ages and social classes, they did not control for these factors.

So far, we have reviewed corpus evidence for syntactic priming or lack thereof in L1 priming production. Let us now consider corpus-based investigations of L2-L2 syntactic priming.

2.14.3 Corpus-based and experimental evidence for syntactic priming in L2

One of the very few corpus-based attempts to investigate syntactic priming in L2 is Collentine and Collentine (2013). Their operationalization of priming is different from how I operationalize priming in this thesis. Therefore, I will explain Collentine and Collentine's (2013) approach in more detail.

For their target structure, Collentine and Collentine looked at complex sentences that contain nominal clauses in a task of 3D computer chat in L2 Spanish (Collentine & Collentine, 2013). The purpose of the first part of the task was for the

learners to solve a mystery of a crime taking place in the virtual world. In the second task, the learners had to collect clues about a missing person. Following that, the learners were divided into pairs and asked to interact through written chat about the two tasks. The resulting data were compiled into a corpus and automatically tagged for part of speech. Collentine and Collentine (2013) extracted a sub-corpus of native interviews and conversations from the *Corpus del Español* to compare it against the learner data. They then matched a regular expression to identify instances of nominal clauses. Below is an example of a nominal clause in Spanish:

(29) Elena dice que el criminal es Juan

Elena says that the criminal is Juan.

V (finite; epistemic verb) + que (that complementizer) + V (finite; any state/event) (Collentine & Collentine, 2013, p. 173).

(30) Yo creo/pienso/sé que el criminal es Juan.

‘I believe/think/know that the criminal is Juan.’

V (finite; epistemic verb) + que (that complementizer) + V (finite; any state/event) (Collentine & Collentine, 2013, p. 173)

If the nominal clause syntax construction occurred in a given sentence, Collentine and Collentine took it as a prime only if it was not immediately preceded by a sentence that included that construction (Collentine & Collentine, 2013, p. 178). In other words, they did not count targets as primes that might also trigger priming in a following instance of the construction. Collentine and Collentine (2013) then used ANOVA statistics to compare the convergence of nominal clauses between the L1 and the L2 data. Their result showed a significant syntactic convergence effect in the L2 interactions but not in the L1 data. They also showed that when native speakers did not converge following a prime, they resorted to more complex constructions such as

adverbial clauses of purpose where the main and subordinate clauses must have different subjects (e.g., *Juan trabaja para que coma – Juan works so that might eat*) (Collentine & Collentine, 2013, p. 181) in Spanish to express themselves. Learners, due to their low proficiency, relative to the Spanish native speakers, tended to depend on convergence producing less complex causality adverbial clauses which require no such restrictions on the subjects: *Juan trabaja porque el necesita comer – Juan works because he needs to eat* (Collentine & Collentine, 2013).

Collentine and Collentine's (2013) operationalization of priming may be somewhat misguided as a way of quantifying priming in L1 and L2. That is because of the high risk of missing genuine cases of syntactic repetition caused by the production of the target immediately following a prime. The comparison also between the corpus that the researchers built using a specific classroom task-based activity and an already available corpus of interviews and conversation raises questions about the reliability of the comparison. Moreover, it is unclear whether the researchers manually checked the parsing of the machine to avoid potential automatic parsing errors.

What is clear, however, is the fact that syntactic priming in L2-L2 production has not been sufficiently investigated within a corpus-based paradigm. Syntactic priming in L2 production was mainly investigated using experimental methods (McDonough, 2006; Kim & McDonough, 2007; McDonough & Mackey, 2008; McDonough & Chaikitmongkol, 2010; Trofimovich et al., 2013). McDonough and Mackey (2008), for example, investigated whether syntactic priming influences L2 English question development. Their participants were English learners with a Thai mother tongue background. The target structure to be elicited in the study was question formation, i.e. the alternation between questions beginning with a wh-word where the copula is missing, and ones that begin with a wh-word where the copula is maintained (see examples 30 and 31):

(31) What movie that you see last time?

(32) What is the meaning of number 11 on the wall? (McDonough & Mackey, 2008, pp. 33–34)

Question formation was elicited during communicative tasks where the participants interacted with scripted Thai speakers whose English was more advanced than the participants'. The experiment also involved a control group who were only assigned a pre-test and a post-test, but did not participate in the interaction activities.

The results showed a priming effect whereby the participants produced more developmentally advanced questions following exposure to developmentally advanced questions by the interlocutors by the scripted learners, relative to lower or same level questions (McDonough & Mackey, 2008, p. 40). Because the scripted learners' advanced questions caused the participants to produce more advanced questions, McDonough and Mackey (2008), argued that priming is positive and beneficial for the learning of developmentally advanced questions.

Further experimental evidence for the beneficial role of priming in L2 interaction comes from a similar study by McDonough and Chaikitmongkol (2010). The aim of their study was to find out whether priming activities between Thai speaking peers could influence L2 learning in an English classroom context. The experiment elicited wh-question forms that are usually followed by: "an obligatory auxiliary, a subject, and a lexical form" (McDonough & Chaikitmongkol, 2010, p. 823). The alternation, therefore, would be between an incorrect question with a missing auxiliary (e.g., Why students always sleep late?), and one where the auxiliary is correctly inserted (e.g., Why do students always sleep late?).

The participants interacted with their peers to complete four collaborative syntactic priming activities including short passages followed by wh-questions that

contained an auxiliary. The tasks comprised three types of questions: questions without an auxiliary verb, questions with an auxiliary verb in the right place or questions where an auxiliary verb was not needed. The experiment also included a control group that followed the normal curriculum that does not explicitly teach the Wh-questions. Both the priming and control groups sat for an oral pre-test, mid-test and a post-test to investigate the influence of the collaborative task on the subsequent production of Wh-questions (McDonough & Chaikitmongkol, 2010, p. 826).

The results showed that the priming group produced more wh-questions with auxiliary verbs, relative to the control groups (McDonough & Chaikitmongkol, 2010, p. 827). Furthermore, the control group produced more wh-questions with missing auxiliary verbs, relative to the priming group. McDonough and Chaikitmongkol (2010, p. 832) interpreted these results as an indication for a positive effect of priming activities in classroom peer learning. This study, therefore, gave further support to McDonough and Mackey's (2008) argument that priming has a beneficial effect in L2 interaction.

2.15 Summary

The aim of this chapter has been to discuss the relevant theoretical key issues and to give the readers a sense of what priming is, but also situate the present study in the context of earlier empirical experimental and corpus-based investigations into syntactic priming. It was shown in this literature review that many studies have attributed the repetition of a particular language form to speakers' prior exposure to the same form or one that is related to it. In terms of the transient activation model, the first experience with a form gets the nodes responsible for producing it activated. The next time an opportunity arises to produce the same form, say a prepositional dative construction, language users are more likely to use the prepositional dative as opposed

to the double object because the nodes that are responsible for producing a prepositional dative had already been activated due to the earlier exposure to the prepositional dative construction.

This chapter has identified theoretical and methodological gaps in priming research literature. Syntactic priming literature is split over the mechanism that underlies syntactic priming, with no consensus on a prime-target distance cut off point where the magnitude of priming begins to decay (see section 2.3 and 2.4). The evidence is mixed on whether syntactic priming survives over a long prime-target pair distance or that it undergoes rapid decay over short intervening material (see sections 2.4.1 and 2.4.2). It was also shown in section 2.8 that there is no agreement in syntactic priming literature over the role of the speaker in boosting the magnitude of syntactic priming. Similarly, the evidence is mixed on the strength of the prime-target pair shared lexical material effect on syntactic priming. Most importantly, in section 2.14.2, I highlighted counter evidence against the robustness of priming in L1-L1 spoken production, suggesting that earlier studies of syntactic priming may have overstated its robustness (Howes et al., 2010, p. 2009).

The strength of experimental studies of spoken production priming lies in their ability to elicit and control the production of constructions in relation to one or a limited number of predictors. However, their weakness lies in the fact that they do not consider the multiple factors that can influence the use of a construction over its alternative. The type of data used to investigate priming in dialogue and the extent of freedom the participants are given to speak is instrumental to the generalizability of the findings to most dialogues taking place outside the experimental lab context (Costa et al., 2008, p. 543–544).

As exemplified in section 2.14.1, corpus-based methodology is capable of accounting for multiple motivations of the use of two alternative constructions. However, it seems that corpus-based methodology has not been used sufficiently to understand and research syntactic priming in L2-L2 written and spoken production. Moreover, while earlier syntactic priming research did look at dative alternation priming and particle placement priming, it seems as though priming research did shy away from examining alternations that are less straightforward such as caused-motion construction priming.

This thesis, therefore, is informed by the theoretical and methodological gaps that were identified in the syntactic priming literature. The overall design of the syntactic priming investigation in this thesis draws on Costa et al.'s (2008) proposed approach of studying alignment in L2-L2 conversations (see section 2.6). In particular, instead of studying interactions between speakers with two closely related L1s, I focus on dyadic interaction between L2 English speakers who come from the same L1 background, i.e. German. If priming is expected in an English dialogue between a Spanish and an Italian native speaker (Costa et al., 2008, p. 549), then we can predict that priming will occur between two speakers with a German L1 as they engage in a dialogue in English. Another main aim of this thesis is to compare L1-L1 with L2-L2 syntactic priming behaviour in spoken dialogue. I therefore study syntactic priming in L1-L1 dyadic interaction too where the speakers are of an American English L1 background.

This thesis will attempt to devise a methodological approach for the quantification of syntactic priming in dyadic L1-L1 and L2-L2 spoken interaction. This methodological approach will be applied in the quantification of three constructions, i.e. dative alternation, particle placement and caused-motion

constructions in L1-L1 and L2-L2 spoken production. In doing so, I will also investigate the effects of prime-target distance, prime-target shared lexical material and prime-target speaker identity on the strength of syntactic priming. The methodological steps followed in the analysis of the target constructions are outlined and detailed in the next chapter.

3 Methodology

3.1 Introduction

It was argued in Chapter 2 that the experimental studies of syntactic priming looked at priming mechanisms in laboratory isolated contexts, which leaves the question open whether resulting insights apply beyond the sampled participants. This study, however, moves away from that traditional experimental approach to investigate the production of L1-L1 and L2-L2 dyadic interactions, looking at a corpus of free conversations between pairs of interlocutors elicited through a task-based dialogue paradigm. This chapter presents the methodological decisions made in order to analyse primed production of particle placement, dative alternation and caused-motion priming in L1-L1 and L2-L2 spoken data. It begins with a description of the corpus used and participants drawn from it to analyse the L1-L1 and L2-L2 conversation transcripts. In section 3.1.2, I explain why this corpus is fitting to the study of the target structures examined in this thesis. In section 3.2, I discuss the original transcription of the corpus and outline the methodological steps that I used in the preparation of the corpus in order to extract the prime-target observations. Finally, section 3.3 gives an account of the computational methods that were applied in order to disentangle the priming effects from relevant predictors that may influence the use of the examined constructions.

3.1.1 *The GLBCC corpus*

The Giessen - Long Beach Chaplin Corpus (GLBCC) compiles 350,000 words of L1 and L2 users' transcribed conversation. It was built by Andreas H. Jucker, Simone Müller and Sara W. Smith over a period of three years to research reference assignment strategies, and the different ways speakers use to introduce characters

(Müller, 2005, p. 34). The GLBC corpus consists of data produced by speakers of American English, German and other L1s speakers (e.g., Korean, Vietnamese, Gujarati, Urdu, etc). For the current thesis, the American English L1-L1 transcribed conversations were selected for analysis as the L1 corpus. Moreover, the English conversations produced by German speakers with a German L1 background were selected as data for the L2-L2 analysis. Learners of other L1 backgrounds, such as Chinese, Vietnamese and Japanese, were excluded from the analysis. This is because they were expected to produce an L2 that may vary on specific morphosyntactic aspects from that of L2 users with a German L1. This potential variation might be due to the lack of similarity between German and the other learners' L1s (Costa et al., 2008, p. 549). All the corpus data were collected by use of the same interactive task where pairs of students engaged in a dialogue-based task.

The participants were divided into group (A), group (B) and group (C). The group A speakers were asked to watch the full 24-minute Charlie Chaplin silent movie, *The Immigrant*, while group B speakers were asked to watch the second half of it. Speakers A were then asked to narrate, in form of a monologue, to a partner from group B what they had seen of the story. Subsequently, the speakers in group B were asked to describe the second half of the movie to their A interlocutor. Finally, both interlocutors were encouraged to take turns in discussing their thoughts on the movie.

This task design together with the task theme allowed for a highly interactive and engaged discussion on the part of the participants. The task was designed in a way that could prompt the participants to have a conversation in pairs and also have a moment where they narrate the story to their partners (Müller, 2005, p. 35).

Although the task was carried out in a room on a university campus, it is still a task that is very close to an authentic dialogue where conversation partners discussed

a shared content and expressed their opinions of a movie. Because the present study seeks to investigate syntactic priming in spoken interaction (and not self-priming), the transcripts which were largely monologic, with little or no contribution from one of the interlocutors, were removed.

Due to practical reasons, data collection occurred separately for both L1 and L2 groups. For both groups, tasks and procedures were implemented the exact same way and in the same order, which ensures comparability across both groups. Despite the fact that the corpus was not intended to specifically be used for research on morphosyntactic features, the highly interactional nature of the conversations, the identical questions that were used to elicit the L1 and the L2 data, and the identical theme of the conversation make it a suitable data set to compare syntactic priming in task-based free dialogue of L1-L1 versus L2-L2 interlocutors (Rayson & Garside, 2000, p. 2). It is in particular useful because this investigation targeted dyadic conversations, i.e. produced by only two speakers interacting with each other, which allowed interlocutors to smoothly take turns and speech overlap was reduced to the minimum. Moreover, the nature of the task, being a silent movie, did not prime participants towards either of the alternating constructions, and therefore, participants began their narration without having received input e.g., from the actors in the movie. This is important because input might have biased the production of the participants towards either of the alternating constructions against the other and could have reduced the flexibility given to the participants as to which of the alternating constructions to use.

3.1.2 Selected data from the GLBC corpus

From the corpus, I selected transcripts of dyadic conversations by participants with English L1 and German L1 EFL learners. This data sample consists of,

respectively, thirty four participants and seventeen conversations in the L1 data and sixty six participants and thirty three dialogues in the L2 data. The average transcript length is 2347 words by L1 interlocutors and 1762 words by L2 interlocutors. The size of the extracted corpora was calculated after the original transcription scheme had been refined (see section 3.2.1). In terms of their university level, 50% of the L1 users were seniors, 35.71 % were juniors and 14.28% were freshmen. The L2 users included 43.75% juniors, 31.25% freshmen, 18.75% seniors and 6.25% sophomores. The mean age of the L1 users was 24.07 ($SD=5.58$), while the L2 users' mean age was 23.68 ($SD=3.19$). The distribution of the L1 conversations in terms of participants' sex was as follows: 57% of the conversations were dialogues between two females, 29% were dialogues between a male and a female and 14% were dialogues between two males. 75% of the selected L2 conversations were dialogues between two females, while 25% were dialogues between a male and a female. All L1 users were students of linguistics and/or psychology, while the majority of the L2 users were students of English linguistics or English literature (Müller, 2005, p. 51). One can therefore assume that the L2 users have a generally good command of the English language, which was confirmed by the very little syntactic mistakes that could be observed in the L2 transcripts.

The GLBCC also includes a third group of participants. Speakers in this C group were tasked with watching the whole movie and narrating the whole story in the form of a monologue. They are excluded from the analysis. This observational, descriptive task creates opportunities for the speakers to use all target constructions to convey events of movement particularly because the movie that the speakers watched is a silent movie with some moving around and some heavily expressive acting. Particle placement, dative alternation and caused-motion constructions, therefore, in the light of this communicative task can be thought of as features that arise naturally

during the performance of the task. For example, there is a scene in the movie where the waiter removes Charlie Chaplin's hat multiple times, and Charlie Chaplin then puts it back. Figure 3.1 shows this exchange in an L1-L1 conversation and Figure 3.2 shows an extract of an L2-L2 conversation where a speaker is describing the same scene.

Figure 3.1: English transcript 1, Speaker A and B: L1-L1 opportunities for particle placement production

| | | |
|----|---|---|
| 87 | A | That is really interesting |
| 88 | B | I did not describe through where he tells him to take his hat off |
| 89 | B | The waiter takes it off |
| 90 | B | He puts it back on |
| 91 | A | That is another back and forth |
| 92 | A | There was sadness paired with comedy |

Figure 3.2: German transcript 31, Speaker B: L2-L2 opportunities for particle placement production

| | | |
|-----|---|---|
| 108 | B | that's right. |
| 109 | B | OK and the waiter told him to put it off. |
| 110 | B | what he did he just sat there, |
| 111 | B | he didn't know that he had to put the hat off |

Figure 3.1 and Figure 3.2 show that within just very few sentences, the events in the silent movie prompted the L1-L1 and L2-L2 speakers to produce the particle placement construction. The particle placement construction was used to describe this particular scene from the Charlie Chaplin movie with two different main verb lemmas (see Figure 3.1).

My selection of the data from this corpus, however, was not without limitations. First, the task was performed over ten years ago. Therefore, there is no way to interview the participants and ask them directly about the choices they have made when using the constructions under study. Second, the conversations are not available in audio and I had to work with the transcriptions made by the original research team. It was not possible, therefore, to establish the exact time between the

first and the second production of a particular construction. It was then necessary to adopt another method of quantifying the distance between primes and targets in the selected datasets (see section 3.2.1).

3.2 Data preparation and analysis

The approach I followed in the initial stages of the analysis aimed at quantifying and accounting for the potential primed instances of particle placement, dative alternation and caused-motion construction in L1-L1 and L2-L2 spoken data. First, I had to develop a methodology that enabled me to accurately retrieve and count occurrences of these constructions. The L1 and L2 data were organized into and saved as Microsoft Excel files, assigning each conversation a separate sheet and distinguishing turns by speaker identity (speaker A, speaker B). The latter was important to enable filtering by speaker. Finally, transcriptions were ‘cleaned’ and adjusted to allow for automatic comparisons. The next section gives the details of the adjustments.

3.2.1 Cleaning and refinement

The original transcriptions of the corpus included detailed representations of speakers’ speech properties (e.g., laughs, whispers, vocal noises, inhaling and exhaling) and other forms of gestural communication (e.g., demonstrating something, snaps his fingers three times). The transcription of the corpus also included a few transcribers’ comments pointing out examples where they were uncertain about what the speakers said or describing speakers’ actions, (e.g., playing around with some kind of toy dog for about 11.8 seconds), or reactions (e.g., disgusted or moaning).

In order to analyse priming in L1 and L2 spoken interaction data, it is essential to determine the distance between potential primes and the subsequent primed

production by the same speaker or their partner. As pointed out in section 2.4, Prime-target distance was measured in the literature by recording the time between the initial production of a construction and its subsequent production or by counting the number of turns or sentences that occur between a prime and a target. The L1 and L2 data are highly interactive conversations where turns contain several syntactic units with a lot of variation in their length, and often contain typical aspects of speech, i.e., elliptical and incomplete utterances. Therefore, I adopted Foster et al. (2000) AS-units to divide the L1-L1 and L2-L2 conversations into basic syntactic units. Foster et al. (2000, p. 365) define an AS-Unit as: "... a single speaker's utterance consisting of an *independent clause*, or *sub-clausal unit*, together with any *subordinate clause* (s) associated with either".

Due to the highly interactive nature of the corpus, many instances of self-corrected forms were observed. These are forms that occur "... when the speaker identifies an error during or immediately following production and stops and reformulates the speech; self-corrections will therefore include an element of structural change..." (Foster et al., 2000, p. 368). Repetitions and self-corrected forms are normally removed under Foster et al.'s (2000, p. 368) maintaining only the final version of the corrected form.

I will use Figure 3.3 below to further illustrate the treatment of repetitions, self-corrected forms, and all the other steps included in the refinement of the original transcription. The excel sheet to the left is a screenshot of conversation number English124 was taken before the transcription refinement process. The one to the right includes the same part of the conversation after it was cleaned and divided into AS-units (Foster et al., 2000).

Figure 3.3: Conversation English124, before and after transcription refinement

| A | | | A | B |
|----|--|----|---|--|
| 13 | and everyone's throwing up, | 9 | A | and everyone is throwing up |
| 14 | (H) and then they go to eat, | 10 | A | and then they go to eat |
| 15 | and it's really hard to eat, | 11 | A | it is really hard to eat |
| 16 | (H) because s- sin- since the boat is sw- sw-- | 12 | A | because since the boat is |
| 17 | like they're moving back and forth, | 13 | A | like they are moving back and forth |
| 18 | the food moving back and forth th-- | 14 | A | the food moving back and forth, you know to each side |
| 19 | you know to each si=de, | 15 | A | and then they go back outside |
| 20 | (H)... a=nd erm-- | 16 | A | and there is this woman, and her mom |
| 21 | ...(1.4) and then they go back outsi=de, | 17 | A | someone stole her mom's money |
| 22 | and there's this woman, | 18 | A | let us see how whatever I remember |
| 23 | and her mom, | 19 | A | Charlie Chaplin I guess starts gambling with some guys and playing cards |
| 24 | (H) an' her mom-- | 20 | A | and eventually I guess he ends up taking all their money |
| 25 | someone stole her mom's money, | 21 | A | and he steals their money with a gun |
| 26 | (H) an' then-- | 22 | A | and like you know, hold them up with a gun |
| 27 | ...(1.9) ((suppresses a sneeze?)) erm-- | 23 | A | hold them up with a gun |
| 28 | <SV let's see how whatever I remember SV>, | 24 | A | goes takes all their money |
| 29 | (H) and then ...(1.5) the g-- | 25 | A | and then moves to other side of the boat |
| 30 | Charlie Chaplin I guess erm .. starts gambling with some & | 26 | A | and then sees that woman with her |
| 31 | & guys and playing cards, | 27 | A | holding her mom who is crying |
| 32 | and eventually I guess he ends up taking all their money, | 28 | A | and ends up putting the money back in her pocket |
| 33 | (H) and he steals their money with a gun, | 29 | A | and then she does not realize it |
| 34 | an' like you know, hold them up with a gun | | | |
| 35 | hold them up with a gun goes takes all their money | | | |
| 36 | an' then moves to other side of the boat, | | | |

Step 1: Remove repetitions and self-corrected forms if they occurred within the boundaries of a larger AS-unit, e.g., ‘and then ...the g--’, sentence 29. This removal did not affect the distance between primes and targets because I maintained the rest of units where self-corrected forms occurred.

Step 2: Maintain self-corrected forms that occurred as an AS-unit on their own. Lexically identical repetitions of an immediately preceding prime produced by any of the speakers are also maintained as an AS-unit, but excluded as potential primes and targets from the analysis (Fernández & Grimm, 2014, p. 465). This is important because these units count towards the number of units that separate a potential prime from a target, a count that is necessary in considering the distance question. Example (33) below was extracted from the Figure 3.3 to illustrate the treatment of identical lexical repetitions.

- (33) English124A: and like you know, hold them up with a gun
 English124A: hold them up with a gun

Speaker (A) in the first unit produces a prime, i.e. a sentence that includes one variant of the verb-particle construction. However, they seem to have repeated the exact same phrase where the prime occurred, as a way of perhaps using time to plan the next utterance they were going to say. The repetition in this case may be taken as a form of disfluency on the part of speaker (A), or perhaps it was intended to carry some rhetorical purpose. It has been argued that the identical repetition of the same variant of a prime may not be the result of priming, but rather a rhetorical discourse factor that induced the repetition of the syntactic construction (Branigan, 1995, p. 492; Costa et al., 2008, p. 535; Reitter, 2008, p. 17).

Step 3: Remove all transcription symbols and disfluency fillers, e.g., ‘erm’, sentence 20 in the original transcript, because they do not constitute constructions that might have affected the speech of either the speakers or the production of target alternations.

Step 4: Remove all transcribers’ comments e.g., ‘suppresses a sneeze’, sentence 27 in the original transcript. Transcribers did not take part in the actual task and their comments happen outside the task during the transcription process.

Step 5: Maintain all discourse markers such as ‘kind of’ and ‘sort of’. These were maintained in the original speech but not parsed because they fall beyond the scope of this study. Discourse markers that include verbs, i.e. ‘You know...’, i.e. sentence 19, however, were maintained and parsed in the same method as with all other verb phrases (See section 9.3.2).

Step 6: Maintain minor spelling and grammatical inaccuracies because they do not affect the parsing and are a reflection of what was being transcribed (see Figure 3.4).

Figure 3.4: German 31: maintaining minor spelling mistakes

| | | |
|-----|---|--|
| 137 | A | You're going on telling me about the second part without seeing it |
| 138 | B | What about the acting? |
| 139 | B | What do you think of the <u>manor</u> characters? |
| 140 | A | I guess we can leave on number two now |
| 141 | B | Yes, I think so |

Sentence (139) in Figure 3.4 shows an example of minor spelling mistake. It seems that speaker B wanted to use the word ‘minor’ to describe the characters. However, perhaps they produced an inaccurate pronunciation of the word. I maintained this mistake because it is minor, and it does not affect the parsing of the sentence.

Similarly, in sentence (164) in Figure 3.5, there is a grammatical mistake where a German speaker used the quantifier ‘many’ which does not correspond to the uncountable noun ‘money’. This kind of minor grammatical errors was maintained because it does not affect the parsing or the analysis.

Figure 3.5: German 68: maintaining minor grammatical errors

| | | |
|-----|---|---|
| 159 | B | I liked this part. |
| 160 | A | I don't really know the funniest |
| 161 | A | They have some, the part with the money |
| 162 | A | while Charlie Chaplin tries to put money in the pocket of the woman |
| 163 | A | then he thinks bout it, |
| 164 | A | then he yeah puts not so <u>many money</u> in the pocket of the woman |

Step 7: Remove all small chunks like ‘and her mom’ in Figure 3.3 because they do not make for a single AS-unit on their own. The same transcription refinement process was followed with the L1 and L2 conversations to ensure consistency in the analysis.

To sum up, I maintained the original speech as it is, removed all transcription symbols and rearranged the speakers' turns into AS-units that are relatively equal in length. These steps helped standardize the treatment of the L1-L1 and L2-L2 data by keeping the variation in the size of turns in each conversation transcription to a

minimum. The next section will introduce a parsing model to quantify the priming of target structures in L1-L2 and L2-L2 spoken data.

3.2.2 *Parsing and annotation*

Having so far explained the cleaning and refinement of the data in the previous section, it is now possible to present a simple methodology that retrieves instances of potential syntactic priming instances. To do so, it is first necessary to come up with a way of automatically finding the alternating construction of interest. All verb phrases and the immediately following constituents within the same verb phrase were parsed into parts of speech. Constructions that occurred outside the boundaries of a verb phrase but had made it through the cleaning process described above were excluded from the parsing process. These typically are constructions like adverbial phrases and adjectival phrases, discourse markers or idioms, which we are not in the focus of the present study. Examples (34-36) show a few of these cases:

(34) German27B: Gave them money in advance.

(35) English2B: It said like poor and hungry later or whatever.

(36) German202B: He finds some money on the floor in the restaurant as well.

In example (34), the construction ‘in advance’ does not include a verb and is an idiom. Therefore, parsing it does not make a difference to the analysis because the focus of this study is not idioms, but the priming of the particle placement, dative alternation and caused-motion constructions. The sentence in example (35) includes a discourse marker, ‘like’, and adjectives that do not add to the current analysis. Example (36) is ended with an adverbial phrase ‘as well’, which falls beyond the scope of this study. However, what is left of examples (34-36), i.e. the verb phrases, were parsed according to the parsing methodology that I will explain below.

First, Stanford parser was used to annotate the internal grammatical structure of the corpus (Chen & Manning, 2014). Second, all parsing was checked manually to correct any errors and to avoid the risk of excluding genuine cases that might have been erroneously represented by the automatic parser (Jaeger, 2011, p. 172). Third, the grammatical annotation was reduced to include only the target features which all occur at the level of the immediate constituents of the verb phrase. Therefore, the internal structure of every constituent other than the verb phrase was removed, treating them as one phrase unit, without worrying about what they are composed of.

For instance, the agent in example (37) is a complex noun phrase but was parsed as one NP, without worrying about its components. Verb phrases, however, were preserved and treated as the starting point of the analysis, which will search the verb phrase constituents in order to form a comparable pattern. That is, for ‘gave a coin to his brother’, the verb phrase, the noun phrase theme, i.e. ‘a coin’, and the recipient preceded by the preposition ‘to’, were maintained in the parsing. Likewise, prepositional phrases were reduced into a single phrase unit, unless they contained a verb phrase. In the latter case, the embedded verb phrase would be treated as a new starting point for matching a search pattern. In example (38), counting the prepositional phrase ‘to the invigilators who will hand them to the students’ as a single phrase unit and ignoring its components might result in disregarding constructions of interest, such as the prepositional dative in ‘hand them to the students’, where ‘hand’ is the ditransitive main verb, ‘them’ is the direct object theme, and ‘the students’ as the recipient.

(37) The long-bearded young man_{NP} gave_{VP} a coin_{NP} to his young brother_{PP}

(38) The teacher gave the exams to the invigilators_{SPP} who will hand_{VP} them_{NP} to the students_{SPP}

3.2.3 Data extraction and manual revisions

Notepad++ software was used to match the construction of interest using regular expressions. Table 3.1 provides an overview of the abbreviations used for parsing. In the case of the two variants of particle placement, every particle that occurs in a location immediately following or preceding a noun phrase that is an argument of the main verb phrase was identified. Syntactic idiosyncrasies of the main verb were not acknowledged because a verb's tense, aspect, and mood do not seem to have an effect on priming (Gries, 2005, p. 390; Pickering & Branigan, 1998, p. 645). The particle placement search pattern retrieved all the instances where a choice had been made between a VP NP PRT and a VP PRT NP.

Table 3.1: an overview of the abbreviations used for parsing

| Label | Meaning |
|-------|--------------------------------------|
| VP | Verb Phrase |
| NP | Noun Phrase |
| TO | to |
| VB | Verb, base form |
| VBP | Verb, non3rd person singular present |
| VBZ | Verb, 3rd person singular present |
| VBD | Verb, past tense |
| VBG | Verb, gerund or present participle |
| VBN | Verb, past participle |
| PRT | Particle |
| PP | Prepositional phrase |

The regular expressions for particle placement pattern search are as follows:

For a post-verbial particle, the regular expression is: VP (TO VB|VB.?) PRT NP

The regular expression for a particle in a final position is: VP (TO VB|VB.?) NP PRT

Example (39) shows the two variants of particle placement in L2 data after they have been parsed and retrieved using the regular expression search pattern above.

(39) Speaker A: He kept taking money out.

NP VP VBD VP VBG NP PRT

Speaker B: He saw all the waiters beating up this one client

NP VP VBD NP VP VBG PRT NP

The regular expression formula for a dative alternation pattern search:

For prepositional datives: VP (TO VB|VB.?) NP PP

For double objects: VP (TO VB|VB.?) NP NP

Example (40) shows the dative alternation variants in two sentences after they have been parsed and retrieved using the regular expression formulas.

(40) English 10: He ordered her some beans

NP VP VBD NP NP

German 27: He gave this money to the girl

NP VP VBD NP PP

The regular expression for the caused-motion construction is:

VP (TO VB|VB.?) NP PPd

The small case letter 'd' was used to indicate to the path that the theme moves along (see 2.11.5)

Example (41) shows two examples of the caused-motion construction following the parsing the retrieval processes:

(41) English 142: He throws it on the table like all upset

NP VP VBZ NP PPd

German 202/77: He puts the money on the little tray

NP VP VBZ NP PPd

As pointed out in section 2.11 the agent is a shared argument for all the target constructions examined in this thesis. However, for the sake of convenience, I will leave the NP agent arguments from the reorientations of the target constructions in the following chapters. The particle placement variants will be represented as VP NP PRT or VP PRT NP. The dative alternation variants will be represented as either VP NP NP or VP NP PP. Finally, the caused-motion construction will be represented as VP NP PPd.

The extracted target constructions were manually revised for potential tagger errors. The manual revisions of the automatic parsing were extremely important because it helped maintain examples of the target constructions that the automatic parser would have not caught. For example, Figure 3.6 shows an example of the double object and the particle placement construction in the same sentence.

Figure 3.6: German 31: intervening material between the arguments of the particle placement construction

| | | |
|-----|---|--|
| 302 | A | because it looked like they like each other |
| 303 | B | Yeah they are in love with each other |
| 304 | B | because he gave her his seat, you know, and the money back |
| 305 | B | He loves her |

Sentence (304) has two target alternations, i.e. dative alternation and particle placement for the same main verb lemma. While the arguments of the double object

construction are adjacent to each other in sentence (304), the particle ‘back’ is separated from the main verb lemma and the subject that make up the particle placement structure. Therefore, by checking the parsing against the original text, it was possible to catch similar examples by eye and parse them manually.

The search for the double object construction using the regular expression formula outlined above would not have caught examples of the double object as the one in Figure 3.7.

Figure 3.7: German 67: intervening particle between the arguments of the double object construction

| | | |
|-----|---|---|
| 268 | B | he just left it on the table |
| 269 | B | Charlie Chaplin put his own bill onto the coin of the tip |
| 270 | B | and he was totally totally calm and totally cool |
| 271 | B | the waiter came and took his money, |
| 272 | B | he gave him back a little tip like a little cotton |

What we can see in sentence (272) is that a German speaker produced a double object construction with the particle ‘back’ breaking the order of the construction. The particle ‘back’ occurred between the recipient and theme arguments of the double object construction. Because this kind of examples could not be caught by the automatic formula, it was caught by eye as I was revising the parsing against the original transcriptions.

By the same token, it was possible through manual revisions to detect and remove examples that the automatic parsing would have considered genuine cases of the double object construction (see Figure 3.8).

Figure 3.8: German 54: detecting false examples of the double object construction

| | | |
|-----|---|--|
| 181 | B | Charlie doesn't want him to. |
| 182 | B | He's overdoing it. |
| 183 | B | so that in the end the other one says OK then pay your bill yourself |
| 184 | B | the other one then pays with a couple of dollars |

The automatic parsing would have analysed the ‘pay your bill yourself’ sentence as a main verb followed by a compliment of two noun phrases, which the automatic

search would have picked up as a genuine double object construction example. However, ‘yourself’ is not a recipient for money to be paid. The transfer of the payment will be received by the waiter at the restaurant and not by Charlie, who will be making the payment. This example, therefore, was not considered as a double object construction.

The manual checking of the parsing was also helpful in detecting and analysing double object constructions that are not straightforward (see Figure 3.9).

Figure 3.9: German 209: detecting and analysing double object constructions that are not straightforward

| | | |
|----|---|---|
| 26 | A | and she tells him about this |
| 27 | A | and oh no I've forgotten something |
| 28 | A | they throw dices, and he wins |
| 29 | A | as I said before, he wins all the money |

Sentence (26) includes a non-ditransitive use of the main verb “tell”. Instead of the usual dative alternation, the recipient is expressed with the pronoun ‘him’, and then followed by the prepositional phrase argument with “about” expressing the content matter of the speech. The speech itself is not mentioned. Alternation, the key feature of the dative construction, is not present: It is not acceptable to say ‘*tell [about Z] [to X]’. I analysed this construction as a double object construction where the head of the second (direct) object NP has been elided: so ‘tell [X] [about Z]’ is implicitly ‘tell [X] [some things about Z]’ where the about-PP is then a modifier of ‘things’ and then the alternation would be possible: ‘tell [some things about X] [to Z]’.

To summarize, it was possible through this corpus analysis to retrieve examples of cases of the target constructions that are not straightforward. Such cases are usually not targeted in experimental investigations of syntactic priming, where the focus often lies on prime-target sentences with straightforward alternations. The next section will

provide an overview of the computational steps used in quantifying priming and answering the research questions of the thesis.

3.3 *Data treatment*

This analysis relies on two methodological paradigms. Section 3.3.1 provides an overview of the initial exploratory investigation of the L1-L1 and L2-L2 conversations. Section 3.3.2 will be devoted to the regression analysis of all the target constructions examined in this thesis.

3.3.1 *Descriptive statistics*

I will describe in this section the descriptive statistics used to investigate the five major issues this thesis is about.

3.3.1.1 Construction preference

One of the main aims of the descriptive statistics is to arrive at an initial understanding of how the target constructions are distributed in the L1-L1 and L2-L2 conversations. For each of the target constructions, the raw frequency of variants was calculated in the L1-L1 and L2-L2 conversations. The conditional probability of prime-target pairs was then computed as in Pickering and Branigan (1998, p. 638) and Gries (2007, p. 276-277). For example, for the condition of double object targets that followed prepositional dative primes, the conditional probability was computed by dividing the total number of double object targets following prepositional dative primes by the sum of the prepositional dative and double object targets following prepositional dative primes. The overall construction probability for the double object targets was calculated by the total number of double object targets by the total sum of double object and prepositional dative constructions (Pickering & Branigan, 1998, p. 638). Finally, the difference between the conditional probability of the double object

and the overall construction probability was computed to establish whether the conditional probability of the double objects is an improvement on the baseline condition for the dative alternation construction (Gries, 2007, p. 276). A positive outcome was taken as an initial indication for priming.

It is possible for syntactic priming to be observed by focusing on infrequent constructions. By looking at infrequent constructions, which can be easily elicited and measured, one can reduce the risk of counting repeated occurrences of a construction due to them being too frequent. Such an approach is, however, likely to undermine the generalisability of this study because data where frequent constructions might be unprimed, due to other factors, should also be considered. I chose a more holistic approach in my study by looking at three different constructions. This holistic approach is likely to lead to a similar outcome because it also involves looking at the priming of the less frequent caused-motion construction. As I will show in the analysis chapters, it is important not only to focus on the structure of variants, but also to consider the different discourse-related factors that may encourage the production of a dispreferred variant over a preferred one.

3.3.1.2 Prime-target pair distance

As with Bock and Griffin (2000), the intervening sentences between prime-target pairs were taken as a proxy measure for time. The mean, mode and standard deviation were calculated for prime-target pair in L1-L1 and prime-target pairs in the L2-L2 without worrying about the identity of the primes or the targets. Then, the same calculation was performed separately for matched and unmatched prime-target pairs in both the L1-L1 and the L2-L2 conversations.

3.3.1.3 Lexical boost

In order to explore the lexical boost effect, first, the raw frequency of the matched and unmatched prime-target pair lemma was calculated for the L1-L1 and L2-L2 conversations. Then, I considered the conditions where the prime and target had the same or a different construction variant and calculated the raw frequency for matched and unmatched main verb lemma for each condition separately.

3.3.1.4 Speaker identity

The initial investigation of the speakers' identity interaction with the magnitude of priming involved calculating the raw frequency of the prime-target pairs that were produced by the same speaker, i.e. self-priming, and those that were produced by two different speakers, i.e. other priming. Subsequently, the frequency of the matched and unmatched prime-target pairs was calculated for self-priming and other priming separately. These exact same steps were followed for investigating the L1-L1 and the L2-L2 conversations. Section 3.3.2 will now introduce the regression part of the methodology.

3.3.2 GLM

One of the main questions of this thesis is to establish whether previous type, i.e. the prime, is a predictor of the current type, i.e. the target. That entails the need of disentangling priming as a target type predictor from other possible predictors (e.g., see section 4.4 and 5.4). Binary logistic regression models from the generalized linear model will be used to predict the dependent variable, i.e. current type, based on the independent variables in the L1-L1 and L2-L2 data sets.

First, the predictors that are manifested overwhelmingly in one direction but are scarce in the other, (e.g., the high occurrence of the target's definite recipients as

opposed to almost no indefinite recipients in the current dative alternation study) are excluded from the analysis. This is a necessary step to avoid undermining the credibility of the GLM results. A null model will then be run assuming that the target variants in the current type are completely random and unrelated to the independent variables. Subsequently, a full model that includes the predictors that are specific to the construction being examined will be run assuming that the target type is contingent on all the particle placement predictor variables. The interaction between the prime and factors such as lexical boost, prime-target pair distance and speaker identity will not be included in the full model, given the data points that have been identified in L1-L1 and L2-L2 conversations. That is, when including extra factors, the number of data points needs to be considerably increased too. The interactions included in the research questions will, however, still be looked at individually (See Table 4.9 and Table 5.9).

The null and the full models will be compared using the likelihood ratio test the Akaike Information Criterion (AIC) (Burnham & Anderson, 2004). Backward selection will then be carried out which will automatically drop all predicting variables from the full model except for the one(s) which gives the minimum AIC value. All predictors that give the minimum AIC value are considered to be part of the final model which is the best predicting model of the construction in question (see Burnham & Anderson, 2004, for an explanation of AIC model selection).

The rationale for using backward selection as opposed to forward selection is that backward selection makes it possible to identify and immediately eliminate those factors that are not significant predictors of the target. Both backward and forward selection are likely to lead to the same outcome. In my own case, I had a modest-size set of possible predictors, and I needed to eliminate a few to arrive at the strongest predictors. Therefore, backward selection seemed like a good method to use.

Because prime-target distance, lexical boost and speaker identity are central to this thesis, a further analysis step is added to understand whether the size of the priming effect is affected by these predictors. To do so, we will test for an interaction between the prime and these predictors to see if the latter affect the magnitude of the priming effect.

The L1-L1 and L2-L2 GLM results will be shown in the following order:

- A) A summary of the statistical analysis of the full model where all predictors of target types are included.
- B) A summary of the statistical analysis of the final model showing only the best predictors of target types.
- C) The direction of the effect of the predictive variables on target types.
- D) The interaction results between the prime and prime-target pair distance, lexical predictors and the speaker's identity.

The same steps will then be followed when presenting the results of the particle placement, dative alternation and caused-motion construction priming and their interactions with the predictor variables specific to each of these target constructions.

Following Howes et al. (2010) and Szmrecsanyi (2005), the prime-target distance was transferred into a logarithmic scale and included in the L1-L1 and L2-L2 models as an independent predictor. For illustration purposes only, the prime-target pair distance was then rounded to build a plot showing the distance-priming interaction while maintaining the frequency of the observations for each of these bars in each construction (e.g., see Figure 4.6).

To summarize, this chapter has dealt with the methodological steps necessary to data preparation for the analysis of all target constructions. Any methodological steps that are specific to the extraction or analysis of a particular structure will be detailed in its respective analysis chapter. In the next chapter, I apply the methods that were outlined in this chapter to study and quantify particle placement priming.

4 Particle placement priming

4.1 Introduction

This chapter is the first of the three analysis chapters that make up this thesis. It looks at the questions of whether or not there is particle placement priming in the L1-L1 and L2-L2 data, whether the prime-target distance affects particle placement priming, and whether lexical similarity, including prime-target lemma match or direct object overlap, reinforce particle placement priming.

The chapter will begin with emphasising the alternation associated with the particle placement production in section 4.2. It will outline the criteria that were used to decide which of the sentences, that the L1 and L2 interlocutors used, qualify for a variant of the verb-particle construction. Sections 4.3 and 4.4 will then highlight the methodological steps specific to the extraction and the analysis of particle placement prime-target pairs. The results section will show the factors that come out as predictors for the interlocutors' use of either verb-particle variant over the other. Finally, particle placement priming will be discussed in light of the GLM results for both language groups in section 4.6. The discussion section will make inferences on what causes language users to repeat particle placement variants that they have recently been exposed to.

4.2 Target structure: particle placement

The target structures that are looked at in this study are the two alternates of the verb-particle construction. Both alternates include a transitive phrasal verb, a direct object and a particle (Quirk et al., 1985, p. 1153). Example (42) below shows the difference between the two alternates:

- (42) A. He gave **up** his job.
B. He gave his job **up**.

The two sentences in example (42) are semantically equivalent in that they both state that someone resigned and left their job. However, there is a formal distinction between the two sentences particularly in terms of their grammar. In the first sentence, the particle, ‘up’, occurs right before the direct object, ‘his job’, following the transitive verb, ‘give’. However, in the second sentence, the particle, ‘up’, occurs in a final position following the direct object ‘his job’. Therefore, there is an alternation as to where the particle ‘up’ is placed, i.e. whether the particle precedes the direct object of the main verb ‘give’, or is placed in a final position following the direct object. Priming and discourse related predictors have been suggested to affect the position of particles in verb-particle constructions (Gries, 2005; Szmrecsanyi, 2005; Konopka & Bock, 2009).

4.3 Data extraction

In order to create a model for retrieving instances of potential particle placement priming in a large data set, it is first necessary to come up with a way of automatically finding the alternating construction of interest, i.e. the two variants of the particle placement. All verb phrases and the immediately following constituents within the same verb phrase were parsed manually into parts of speech. In case of uncertainty, the Stanford parser was used to confirm the syntactic annotation of the AS-Units in question (Chen, Manning, & Treebank, n.d., 2014). Constructions that occurred outside the boundaries of a verb phrase but had made it through the cleaning process described above were excluded from the parsing process in order to simplify retrieving the particle placement instances. These typically are constructions like

adverbial phrases and adjectival phrases, discourse markers or idioms, which are not in the focus of the present study.

A Notepad++ v6.7.5 code was then used to match the two variants of the particle placement construction using regular expressions. All particles that occurred in a location immediately following or preceding a noun phrase that is an argument of the main verb were identified. Syntactic idiosyncrasies of the main verb were not acknowledged because a verb's tense, aspect, and mood do not seem to have an effect on particle placement priming (Gries, 2005, p. 390; Pickering & Branigan, 1998, p. 645). The particle placement search pattern retrieved all the instances where a choice had been made between a VP NP PRT and a VP PRT NP.

The regular expression for a Particle placement pattern search is:

VP (TO VB|VB.?) PRT NP

VP (TO VB|VB.?) NP PRT

Example (43) shows the two variants of particle placement in L2 data after they have been parsed and retrieved using the regular expression search pattern above.

(43) Speaker A: He kept taking money out.

VP VBD VP VBG NP PRT

Speaker B: He saw all the waiters beating up this one client

VP VBD NP VP VBG PRT NP

Example (44) below shows a match of the particle placement after parsing:

(44) English B: He was taking his hat off for him

VP VBD VP VBG NP PRT PP

The particle placement construction, both in the L1-L1 and L2-L2 data can manifest itself in following four different prime-target pairs:

- Prime = VP PRT NP, Target = VP PRT NP
- Prime = VP NP PRT, Target = VP NP PRT
- Prime = VP PRT NP, Target = VP NP PRT
- Prime = VP NP PRT, Target = VP PRT NP

4.4 Building a particle placement data set

After all particle placement instances had been extracted, it was necessary to organize data points into data sets that can be fed into the statistical software R. That is, one data set was built to include the particle placement primes and targets for all L1-L1 conversations along with all their predictive variables. Another one was built to include L2-L2 particle placement primes, targets and all other independent variables. The following steps were followed in creating L1-L1 and L2-L2 data sets for further statistical analysis of particle placement priming.

Step 1. The current verb-particle variant, i.e. VP PRT NP or VP NP PRT, was taken as the dependent variable.

Step 2. The verb-particle variant preceding the current verb-particle was recorded as an independent variable. Recording the previous variant makes it possible to determine whether the L1-L1 and the L2-L2 interlocutors matched their use of either particle placement variant immediately after exposure to either of them.

Step 3. All verb-particle construction current types that were not preceded by a prime were excluded from the analysis because they occurred at the beginning of the conversations with no prior exposure to either verb-particle variant, i.e. primes.

Consequently, all observations were counted as a prime and as a target except the first

ones, which were counted only as particle placement primes. Furthermore, the last verb-particle type in each conversation was only considered as a target and not a prime because it was not followed by another verb-particle type.

Step 4. Syntactic priming-related predictors and discourse-related predictors of the current type were added as independent variables.

A number of predictors have been suggested to contribute to the priming of the verb-particle construction (Savage et al., 2006; Bock et al., 2007; Kim et al., 2013). The following two sub-sections will highlight how priming and discourse-related predictors were coded for in this study. There are two types of predictors that can affect the use of the verb-particle construction (Szmrecsanyi, 2005). The first set of predictors is priming-related in that it is directly concerned with the distance that separates prime-target pairs, the lexical items that make up primes and targets and the identity of the speakers producing the prime-target pairs. The priming-related predictors are relevant to all target structures that are studied in this thesis. The second set of predictors is discourse related and are directly concerned only with the target itself, rather than the prime-target pair. The discourse related predictors used in this chapter are particular to the particle placement analysis.

4.4.1 Priming-related predictors

The priming related predictors considered in the particle placement analysis are as follows:

Prime-target pair distance: this predictor measures the distance between particle placement prime-target pairs in AS-Units, i.e. whether or not the distance between previous type and current type has any effect on current type. Previous studies presented mixed evidence on whether or not syntactic priming is long lasting or is

likely to rapidly decay over intervening sentences between prime-target pairs (see section 2.4 for details). The independent variable for distance is a numeric record of the difference in AS-units between the sentence where the current variant of the verb-particle construction occurred and the immediately preceding variant.

Main verb lemma identity: it has been observed that the shared main verb lemma between prime and target increases the magnitude of syntactic priming (see section 2.13.1). In order to measure the size of the identical main verb lemma effect of prime-target pairs on the target variant, an independent variable was added to record whether the main verb lemma of the prime is the same as the main verb lemma of the target particle placement variant. If the main verb lemma of the prime was the same as the target, it was coded as ‘1’. If it was not, it was coded as ‘0’.

Shared particle and direct object overlap: if the lexical similarity in a prime-target is assumed to reinforce priming, then the shared particle and direct object between a verb-particle prime and a verb-particle target might also have an effect on the particle placement variant to be used (Ratcliff & Mckoon, 1981). To test this assumption, two independent variables were included; the targets that share the same particle as the primes were coded as ‘1’, and as ‘0’ otherwise. The other independent variable coded whether prime-target pairs shared the same direct object or its referent. Prime-target pairs that shared the same direct object were coded as ‘1’ and as ‘0’ otherwise.

Speaker identity: the prime-target pair distance and main verb lemma match were used as independent variables in the L1-L1 and L2-L2 particle placement GLM analysis. The prime-target distance, speaker identity, lemma match, shared particle and direct object overlap were tested for interaction with the prime (see section 4.5.5).

4.4.2 Discourse related factors

Given the theoretical and empirical considerations for discourse-related predictors that are likely to affect the linguistic choice between the two variants of the verb-particle construction, it is necessary to control for a few more predictors. Szmrecsanyi's (2005) discourse-related predictors for the particle placement alternation were adopted. These were included as additional independent variables as listed below:

News value of the target's direct object: If the direct object of the current verb-particle phrase or its referent had not been mentioned in the previous 5 AS-Units to current type, it was coded as '1'. Otherwise, it was coded as '0' signifying that the direct object is not discourse new (Szmrecsanyi, 2005, p. 129). It has been suggested that when the direct object of a verb-particle is discourse-new, it is more likely to manifest itself in the VP PRT NP variant, as opposed to the VP NP PRT one (Gries, 2003, p. 161).

Definiteness of the target's direct object: If the direct object of current type was definite, it was coded as '1', while indefinite direct objects were coded as '0'. If the direct object is preceded by a definite determiner, then a VP PRT NP variant is more likely to occur (Gries, 2003, p. 161).

Length of the target's direct object in syllables: The length of the direct object of Current type, i.e. the target, is a numeric record of the number of target's direct object syllables. It has been suggested that the longer a direct object in number of syllables, the more likely that a VP PRT NP variant will be favoured (Szmrecsanyi, 2005, p. 129).

Literalness of the verb-particle target type: This variable records whether the meaning of the current verb-particle construction is idiomatic or can be worked out

from the verb-particle combination. If the phrasal construction can be guessed by looking at the combination of the verb and the particle, it was coded as '1'. Otherwise, it was coded as '0' signifying that it is idiomatic. Controlling for this variable is important because literal direct objects of verb-particle constructions tend to prefer the VP NP PRT variant (Szmrecsanyi, 2005, p. 130).

Directionality of the prepositional phrase: This predictor looks at whether or not the target verb-particle construction was followed by a directional prepositional phrase. Verb-particle targets that were followed by a directional prepositional phrase were coded as (1), while targets that were not were coded as (0). Verb-particle constructions that are followed by a directional prepositional phrase tend to take the VP NP PRT shape (for example, Chen 1986). Due to the scarcity of directional prepositional phrases following verb-particle constructions in the L1-L1 conversation, this predictor was only used in the L2-L2 data (see section 3.3.2).

Complexity of the direct object: This independent variable looks at whether the direct object of the target consists of embedded clauses. Verb-particle direct objects that are complex were coded as (1), and as (0) otherwise. Complex direct objects tend to prefer the VP PRT NP as opposed to the VP NP PRT order (Gries, 2003, p. 161). This predictor was used only in the L2-L2 data due to the scarcity of complex direct objects within verb-particle constructions in the L1-L1 conversations.

So far, the steps followed in the preparation of the transcripts, the parsing of the data to retrieve particle placement primes and targets and their predictive variables have been presented. The next section focuses on the statistical methods that were used to quantify particle placement priming the effects of all predictor variables in L1-L1 and L2-L2 particle placement choice.

4.5 Results

This section describes the distribution of both verb-particle prime-target pairs and their variants in the L1-L1 and L2-L2 conversations. It begins with a presentation of the results of the descriptive statistics that were performed to quantify the type and number of the verb-particle construction per sample. The second sub-section will then report the results of the GLM test by showing the full and best models for particle placement priming as well as the variables that were dropped as a result of the backward selection process, (see section 3.3.2). The direction of the predictive factors that can explain the particle placement variants used is also discussed in sections 4.5.4. Finally, the GLM analysis of priming interaction with lexical boost, prime-target pair distance and speaker identity will be presented in section 4.5.5.

4.5.1 Descriptive statistics: quantifying the observations

The search for verb-particle constructions retrieved a total number of 226 verb-particle prime-target pairs in the L1-L1 conversations, and 187 in the L2-L2 conversations. Table 4.1 below shows the proportion of the two particle placement variants primes in L1-L1 and L2-L2 conversations.

Table 4.1: Distributional variation of particle placement across L1-L1 and L2-L2 users

| Corpus | Targets | | |
|--------|---------|-----------------|-----------------|
| | # Pairs | # VP NP PRT (%) | # VP PRT NP (%) |
| L1-L1 | 226 | 178 (78.76%) | 48 (21.24%) |
| L2-L2 | 187 | 130 (69.52%) | 57 (30.48%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Pairs = the number of particle placement prime-target pairs; # VP NP PRT = the number of targets with a VP NP PRT sequence; # VP PRT NP = the number of targets with a VP PRT NP sequence

Table 4.1 shows that more VP NP PRT primes occurred in the L1-L1 conversations than in the L2-L2 conversations. The number of VP PRT NP primes, however, was higher in the L2-L2 conversations than in the L1-L1 conversations. A two-sided Fisher's exact test was performed for significant differences between both sample groups in terms of the particle placement prime variants that were used in their interactions. The outcome showed significant differences in the frequency of use of either particle placement variant primes across L1-L1 and L2-L2 sample groups ($p_{\text{Fisher exact}} = 0.04$).

Turning now to particle placement prime-target pairs, it appears that the L1-L1 group used a matching verb-particle prime-target pair in almost 70% of the cases, and unmatched verb-particle prime-target pairs in just less than 30% of the cases. The L2-L2 group, however, showed a higher tendency of using unmatched verb-particle prime target pairs, almost 10% more than the L1-L1 group.

Table 4.2 shows below the proportion of matched and unmatched particle placement prime-target pairs. The apparent differences between L1-L1 and L2-L2 in terms of the number of matched and unmatched pairs did not translate into significance when a two-sided Fisher's exact test was performed ($p_{\text{Fisher exact}} = 0.08$).

Table 4.2: Proportion of matched and unmatched prime-target pairs in the L1-L1 and L2-L2 conversations

| Prime-target pairs | | | |
|--------------------|---------|-----------------|-------------------|
| Corpus | # Pairs | # Matched pairs | # Unmatched pairs |
| L1-L1 | 226 | 159 (70.35%) | 67 (29.65%) |
| L2-L2 | 187 | 116 (62.03%) | 71 (37.96%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Pairs = number of particle placement prime-target pairs; # Matched pairs = the number of primes that are immediately followed by targets that are of the same verb-particle construction variant; # Unmatched pairs = the number of primes that are immediately followed by targets that are the opposite verb-particle construction variant to the primes.

If we now consider particle placement targets and their primes, it seems that more VP PRT NP primes were followed by VP NP PRT targets that are the opposite sequence to the prime. Table 4.3 below shows proportions of the particle placement targets when the prime was VP PRT NP and VP NP PRT in both language groups. Again, the differences between L1-L1 and L2-L2 particle placement targets following a VP PRT NP prime did not come out significant in a two-sided Fisher's exact test ($p_{\text{Fisher exact}} = 0.41$).

Table 4.3: Particle placement target proportions following exposure to a VP PRT NP prime in L1-L1 and L2-L2 conversations

| Corpus | Targets following VP PRT NP primes | | Targets following VP NP PRT primes | |
|--------|------------------------------------|-----------------|------------------------------------|-----------------|
| | # VP NP PRT (%) | # VP PRT NP (%) | # VP NP PRT (%) | # VP PRT NP (%) |
| L1-L1 | 33 (70.22%) | 14(29.78%) | 145 (81.00%) | 34(19.00%) |
| L2-L2 | 36 (62.05%) | 22 (37.95%) | 94 (72.87%) | 35 (27.13%) |

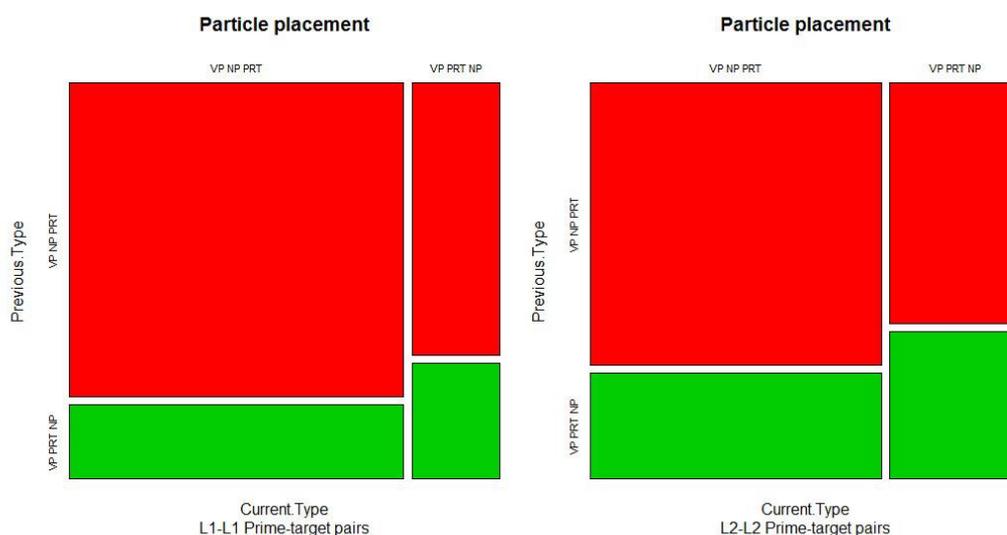
Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2 # VP NP PRT = number of particle placement targets with the VP NP PRT sequence; # VP PRT NP = number of particle placement targets with the VP PRT NP sequence.

When the particle placement primes had the VP NP PRT sequence, the L1 and L2 participants exhibited a tendency of repeating the VP NP PRT primes rather than switching to a VP PRT NP sequence in their particle placement targets. Four out of five times the L1 participants matched the VP NP PRT prime with a VP NP PRT targets. Moreover, seven out of each ten VP NP PRT primes in the L1-L1 conversations were matched with a VP NP PRT target.

Table 4.3 also shows that the L1-L1 and L2-L2 participants are seen to favour a VP NP PRT sequence following exposure to a VP NP PRT prime. In the L1-L1 conversations, only one fifth of the VP NP PRT primes were followed by targets with the VP PRT NP sequence. In the L2-L2 conversations, only one fourth of the VP NP PRT primes were followed by a VP PRT NP targets. The differences in the number and d

istribution of particle placement targets following a VP NP PRT prime did not reach significance in a two-sided Fisher's exact test ($p_{\text{Fisher exact}} = 0.10$). The particle placement prime-target pairs in the L1-L1 and L2-L2 conversations are illustrated in Figure 4.1 below.

Figure 4.1: Particle placement prime-target pairs in L1-L1 and L2-L2 conversations



What we can see in Figure 4.1 is a summary of the particle placement prime-target pairs in L1-L1 and L2-L2 conversations. The two alternates of the particle placement primes, i.e. VP NP PRT and VP PRT NP, are presented in the X-axis. In the Y-axis, we can see the two particle placement alternates as targets. For VP NP PRT primes, the area occupied by VP NP PRT targets along the Y-axis is larger than the one with VP PRT NP targets. For VP PRT NP primes, the area occupied along the Y-axis for VP NP PRT targets is larger than VP PRT NP targets in both L1-L1 and L2-L2 conversations. Both L1 and L2 participants, therefore, seem to have the tendency of favouring VP NP PRT targets following VP NP PRT primes, and VP NP PRT targets following VP PRT NP primes. L1-L1 participants seem to have used the VP NP PRT targets following the VP PRT NP primes slightly more than the L2-L2 participants did.

The conditional probability for each particle placement combination was computed to further understand the alternation between VP NP PRT and VP PRT NP (see section 3.3.1.1). These probability calculations are presented in Table 4.4.

Table 4.4: Conditional probabilities of particle placement prime-target pairs in the L1-L1 and L2-L2 conversations

| Constructional choices | | Targets | | Row totals |
|---|-----------|------------|-----------|------------|
| | | VP NP PRT | VP PRT NP | |
| L1-L1 prime | VP NP PRT | .815 (145) | .185 (33) | 1 (178) |
| | VP PRT NP | .708 (34) | .292 (14) | 1 (48) |
| L1-L1 overall construction probability | | .792 | .208 | 1 |
| L2-L2 prime | VP NP PRT | .723 (94) | .277 (36) | 1 (130) |
| | VP PRT NP | .613 (35) | .387 (22) | 1 (57) |
| L2-L2 overall construction probability | | .690 | .310 | 1 |
| <i>Note.</i> L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Overall construction probability = the relative frequency of particle placement targets; VP NP PRT = the particle placement variant with a VP NP PRT sequence; VP PRT NP = the particle placement variant with a VP PRT NP sequence. | | | | |

Table 4.4 shows that the conditional probability of VP NP PRT targets is almost 2.5 % higher than the baseline following VP NP PRT than following VP PRT NP primes. Moreover, the conditional probability of VP PRT NP is 8.5 % higher than the baseline following VP PRT NP than following VP NP PRT primes. For the L2-L2 conversations, the conditional probability of VP NP PRT targets is almost 3.3 % higher than the baseline after VP NP PRT than following VP PRT NP primes. Finally, the conditional probability of the VP PRT NP targets is 7.7 % higher than the baseline following VP PRT NP than following VP NP PRT primes.

4.5.2 The L1-L1 GLM particle placement results

Table 4.5 and below shows a summary of the outcome of the GLM analysis of the full model in L1-L1 conversations where all the individual predictors of the particle placement targets were included (please see section 3.3.2 for an explanation of GLM and section 4.4 for a summary of the predictors included in the current study).

Table 4.5: Summary of statistical analysis of the full model for the particle placement predictor variables in the L1-L1 conversations

| Independent variables | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-------------------------|---------------------|-------|-------------|-----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| Previous Type | 0.915 | 0.450 | 2.035 | 0.042 | 1.023 | 6.040 | 2.442 | 0.118 |
| Prime-target distance | -0.050 | 0.180 | -0.274 | 0.784 | 0.663 | 1.351 | 2.848 | 0.091 |
| D.O. Definiteness | 0.695 | 0.595 | 1.168 | 0.243 | 0.666 | 7.047 | 0.091 | 0.763 |
| Lemma match | 0.314 | 0.502 | 0.626 | 0.531 | 0.493 | 3.595 | 0.004 | 0.950 |
| D.O. Complexity | -0.265 | 1.011 | -0.262 | 0.793 | 0.099 | 5.484 | 23.853 | <0.001*** |
| Literalness | 0.311 | 0.583 | 0.534 | 0.594 | 0.463 | 4.684 | 1.681 | 0.195 |
| News value of D.O. | 0.987 | 0.446 | 2.210 | 0.027 | 1.119 | 6.508 | 24.657 | <0.001*** |
| Syllable length of D.O. | 0.707 | 0.191 | 3.705 | <0.001*** | 1.430 | 3.026 | 53.572 | <0.001*** |

Note. L1-L1 = dyadic interaction between participants with English as their L1; Coef. = Coefficients for the logistic regression model; D.O. = direct object; S.E = Standard Errors; *** = <0.001; Chi²-test's p value tests for the significance of each independent variable individually against the null model in the L1-L1 conversations; Wald's test p value tests for the significance of individual variables within the full model, i.e. where all L1-L1 particle placement individual predictors are included; Conf. Interval = confidence intervals for the predictor variables; 2.5% = lower limit; 97.5% = upper limit.

L1-L1 full model's chi-square = 63.97, (p = <0.0001)

L1-L1 null model's AIC score = 233.10

L1-L1 full model's AIC score = 185.11

Table 4.5 shows that the particle placement prime-target distance as a predictor is approaching the significance ($p = 0.09$). All other priming-related predictors were not statistically significant and so they could not explain the use of either variant of the particle placement targets. Table 4.5 also shows that three discourse related predictors contribute to the verb-particle use in the targets, i.e. the complexity, news value and syllable length of the object that is the argument of the target's main verb. Table 4.6 below shows the best model that explains the use of particle placement construction in L1-L1 conversation following the backward elimination process (see section 3.3.2).

Table 4.6: Summary of statistical analysis of final model for the particle placement predictor variables in the L1-L1 conversations

| | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-------------------------|---------------------|-------|-------------|-----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | <i>p</i> | 2.5% | 97.5% | Chi ² | <i>p</i> |
| Independent variables | | | | | | | | |
| D.O. news value | 0.782 | 0.409 | 1.912 | 0.056 | 0.92 | 4.88 | 24.657 | <0.001*** |
| Syllable length of D.O. | 0.624 | 0.136 | 4.600 | <0.001*** | 1.46 | 2.49 | 53.572 | <0.001*** |

Note. L1-L1 = dyadic interaction between participants with English as their L1; Coef. = Coefficients for the logistic regression model; D.O. = direct object; S.E = Standard Errors; *** = <0.001; Chi²-test *p* value tests for the significance of each independent variable within the final model individually against the null model in the L1-L1 conversations; Wald's test *p*-value tests for the significance of individual variables within the final model, i.e. where the best predictors of the L1-L1 particle placement targets are included; Conf. Interval = confidence intervals for the predictor variables; 2.5% = lower limit; 97.5% = upper limit.
L1-L1 final model's chi-square = 57.16, ($p = <0.0001$)
L1-L1 final model's AIC score = 179.93

Table 4.6 shows the best model that best explains the use of particle placement variants in the target. The length in syllables and news value of the direct object used in the target itself is the strongest model against the null model that assumes the random distribution of the particle placement construction variants in the L1-L1 conversations.

4.5.3 The L2-L2 GLM particle placement results

Table 4.7 shows a summary of the outcome of the full model with all individual predictor variables of the particle placement construction included.

Table 4.7: Summary of statistical analysis of the full model for the particle placement predictor variables in the L2-L2 conversations

| | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-----------------------|---------------------|-------|-------------|-----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| Independent variables | | | | | | | | |
| Previous type | 0.804 | 0.406 | 1.980 | 0.048 | 1.012 | 5.007 | 2.158 | 0.142 |
| Prime-target distance | -0.104 | 0.169 | -0.614 | 0.539 | 0.644 | 1.254 | 1.081 | 0.299 |
| Lemma match | -0.042 | 0.521 | -0.080 | 0.936 | 0.334 | 2.619 | 0.153 | 0.696 |
| Syllable length | 0.604 | 0.142 | 4.255 | <0.001*** | 1.419 | 2.479 | 45.818 | <0.001*** |
| News value | 0.983 | 0.417 | 2.355 | 0.019 | 1.182 | 6.118 | 22.803 | <0.001*** |
| D.O. definiteness | -0.460 | 0.467 | -0.983 | 0.326 | 0.252 | 1.593 | 6.122 | 0.013* |
| Directionality | -0.086 | 0.534 | -0.162 | 0.872 | 0.305 | 2.541 | 0.192 | 0.661 |
| Literalness | 0.459 | 0.415 | 1.08 | 0.268 | 0.712 | 3.654 | -0.0002 | 0.988 |

Note. L2-L2 = dyadic interaction between participants with English as their L2; Coef. = Coefficients for the logistic regression model; D.O. = direct object; S.E = Standard Errors; * = <0.05; *** = <0.001; Chi²-test p-value tests for the significance of each independent variable individually against the null model in the L2 data; Wald's test p-value tests for the significance of individual variables within the full model, i.e. where all predictors are included; Conf. Interval = confidence intervals for the predictor variables; 2.5% = lower limit; 97.5% = upper limit.

L2-L2 full model's chi-square = 63.85, (p = <0.0001)

L2-L2 null model's AIC score = 233.59

L2-L2 full model's AIC score = 191.29

We can see from Table 4.7 that only three factors came out as statistically significant of the target, i.e. the definiteness of the target's direct object, its length in syllables and its value. None of the priming related factors emerged as statistically significant predictors of the use of the placement targets in the L2-L2 conversations. Table 4.

8 below shows the outcome of the L2-L2 final model that includes the predictors that best explain the particle placement variants used in the target.

Table 4.8: Summary of statistical analysis of final model for the particle placement predictor variables in the L2-L2 conversations

| Independent variables | Parameter Estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-----------------------|---------------------|-------|-------------|-----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| News value | 0.853 | 0.387 | 2.206 | 0.027 | 1.095 | 5.016 | 22.803 | <0.001*** |
| Syllable length | 0.575 | 0.134 | 4.287 | <0.001*** | 1.393 | 2.362 | 45.818 | <0.001*** |

Note. L2-L2 = dyadic interaction between participants with English as their L2; Coef. = Coefficients for the logistic regression model; S.E = Standard Errors; *** = <0.001; Chi² test's p-value tests for the significance of each independent variable individually against the null model in the L2 data; Wald's test p-value tests for the significance of individual variables within the final model, i.e. where the best predictors of the L2-L2 particle placement targets are included; Conf. Interval = confidence intervals for the predictor variables; 2.5% = lower limit; 97.5% = upper limit.
L2-L2 final model's chi-square = 50.623. (p = <0.0001)
L2-L2 final model's AIC = 186.97

As Table 4.8 above shows, the best predictors of the dependent variable, i.e. particle placement target type, are the news value of the target's direct object and its length in syllables.

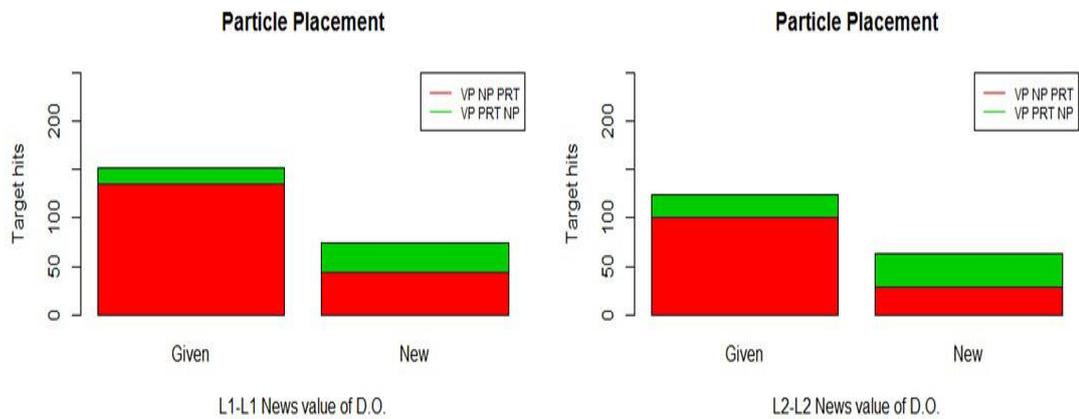
To sum up, both data sets did not show support for particle placement priming. With the exception of prime-target distance in L1-L1 conversations, none of the priming-related factors was statistically significant predictors of the target types in both data sets. The use of particle placement variants in the targets can largely be explained by the same set of factors in both data sets, i.e. direct object news value and syllable length.

4.5.4 Direction of L1-L1 and L2-L2 particle placement predictive factors effects

This section outlines the direction of effects for the particle placement variables that were statistically significant in both L1-L1 and L2-L2 data sets, before

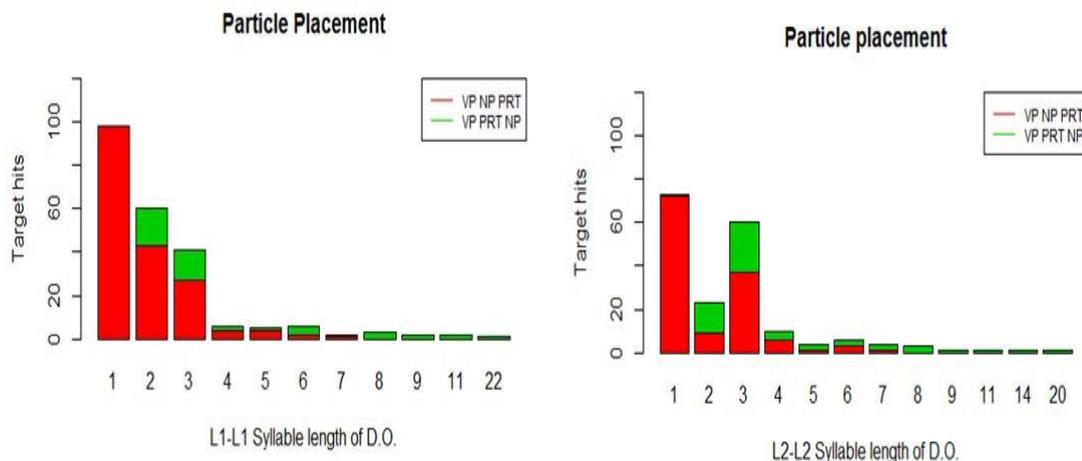
introducing the ones that were significant in either data set. Figure 4.2 below illustrates the direction of direct object news value effect on the target type used.

Figure 4.2: Direction of news value of the direct object effect on the use of verb-particle construction



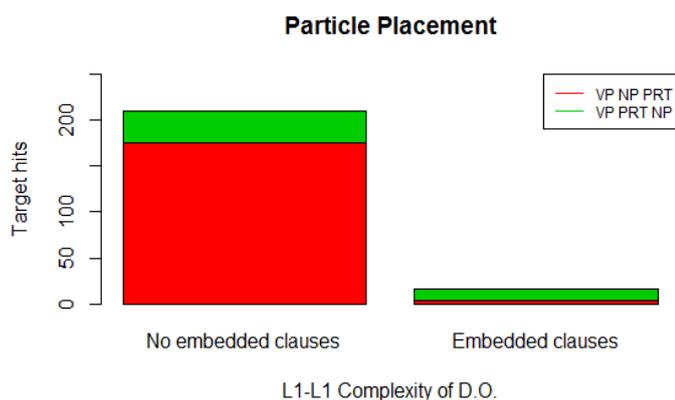
We can see from Figure 4.2 that the L1-L1 and L2-L2 conversations display the same behaviour when the target's direct object was mentioned in the five AS-Units preceding the target and when the direct object is entirely discourse new. There is an increase in the proportion of the VP PRT NP targets when the direct object is discourse new. However, it seems that given direct objects tend to favour the VP NP PRT particle placement pattern.

Figure 4.3: Direction of direct object syllable length effect on the use of verb-particle construction



Both data sets display the same kind of behaviour with regards to direct object syllable length predictor. Looking at Figure 4.4, we can see a greater preference for the VP PRT NP construction as the number of the target’s direct object syllables increases. Monosyllabic and disyllabic direct objects, however, are seen to favour the VP NP PRT particle placement pattern.

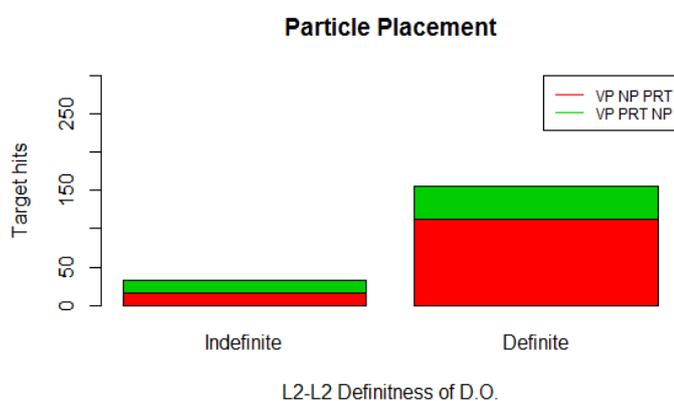
Figure 4.4: Direction of the direct object complexity effect on the use of verb-particle construction in the L1-L1 conversations



As was mentioned in section 4.4.2, complexity as a particle placement predictor was included only in the L1-L1 GLM analysis. Figure 4.4 shows that direct objects that have embedded clauses are seen to prefer the VP PRT NP particle

placement target type. Direct objects that do not include embedded clauses, however, seem to favour the VP NP PRT particle placement pattern.

Figure 4.5 Direction of the direct object definiteness effect on the use of verb-particle construction in the L2-L2 conversations



The definiteness of the target’s direct object predictor was statistically significant only in the L2-L2 conversations, see Table 4.5 and Table 4.7. Figure 4.5 shows that direct objects that are definite tend to prefer the VP NP PRT pattern. The proportion of VP PRT NP pattern, however, is seen to increase when the target’s direct object is indefinite.

4.5.5 L1-L1 and L2-L2 particle placement interaction models

Table 4.9 shows the GLM results for the interaction of the priming related predictors and the speaker’s identity with the particle placement priming effect.

Table 4.9: The outcome of the interaction models in L1-L1 and L2-L2 particle placement priming

| Interactions | L1-L1 | | | L2-L2 | | |
|---------------------------------------|------------------|----------|--------|------------------|-----------|--------|
| | Chi ² | <i>p</i> | AIC | Chi ² | <i>p</i> | AIC |
| Previous type * prime-target distance | 4.09 | 0.04* | 230.38 | 1.29 | 0.26 | 234.57 |
| Previous type * lemma match | 1.02 | 0.31 | 235.55 | 8.85 | 0.003** | 228.24 |
| Previous type * shared particle | 0.72 | 0.40 | 235.11 | 2.27 | 0.13 | 234.70 |
| Previous type * D.O. overlap | 2.05 | 0.15 | 232.98 | 11.91 | <0.001*** | 225.46 |
| Previous type * speaker match | 0.81 | 0.37 | 235.12 | 0.35 | 0.55 | 233.19 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; D.O. = direct object; * = <0.05; ** = <0.01; *** = <0.001; Chi²-test's p-value tests an interaction between the prime and the other predictors included in the table, individually.
L1-L1 null model's AIC = 233.10
L1-L1 independent priming predictor's AIC = 232.64
L2-L2 null model's AIC = 233.59
L2-L2 independent priming predictor's AIC = 233.43

As we can see from Table 4.9, only in the L1-L1 conversations does the prime-target distance affect the size of the particle placement priming effect. In the L2-L2 conversations, we can see that both the shared prime-target main verb lemma and shared prime-target direct object overlap affect the size of the priming effect. These interactions will be further detailed in the following 4.5.5.1, 4.5.5.2 and 4.5.5.3 sections.

4.5.5.1 Prime-target pair distance

As we have seen in Table 4.5 and Table 4.7, prime-target distance was close to significance in the L1-L1 conversations ($p = 0.091$), but irrelevant to the type of the

particle placement used in the target in L2-L2 conversations ($p = 0.299$). Table 4.10 shows the descriptive statistics for all particle placement prime-target pairs distance in L1-L1 and L2-L2 conversations.

Table 4.10: Descriptive statistics of all particle placement prime-target pairs distance in L1-L1 and L2-L2 conversations

| Descriptive statistics | Prime-target pairs | |
|--------------------------|--------------------|----------------|
| | L1-L1 distance | L2-L2 distance |
| Mean (SD) | 16.08 (22.53) | 22.50 (27.09) |
| Median | 6 | 13 |
| Mode | 1 | 1 |
| Maximum | 132 | 115 |
| Minimum | 0 | 0 |
| Upper bound | 19.04 | 26.41 |
| Lower bound | 13.13 | 18.60 |
| Confidence level (95.0%) | 2.95 | 3.91 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = particle placement prime-target pair maximum distance in AS-Units; Minimum = particle placement prime-target pair minimum distance in AS-Units.

Table 4.10 shows that, compared to L2-L2 conversations, prime-target pairs were separated by about six AS-Units less on average in L1-L1 conversation. We can also infer from Table 4.10 that one AS-Unit gap separated most of the particle placement prime-target pairs in both data sets.

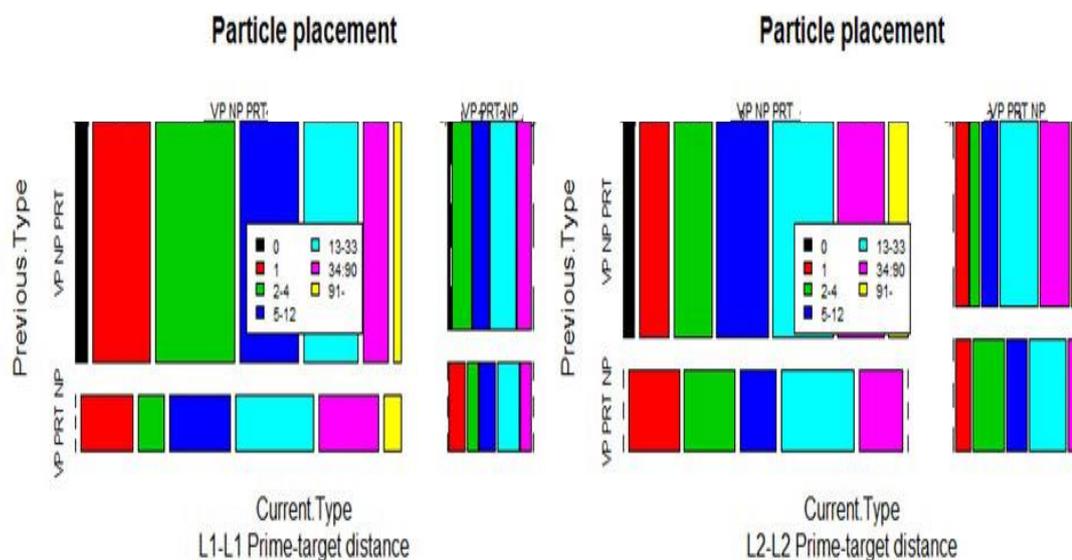
Table 4.11: Descriptive statistics of the matched and unmatched prime-target pairs in the L1-L1 and L2-L2 conversations

| Descriptive statistics | L1-L1 prime-target pairs | | L2-L2 prime-target pairs | |
|--------------------------|--------------------------|--------------------|--------------------------|--------------------|
| | Matched distance | Unmatched distance | Matched distance | Unmatched distance |
| Mean (SD) | 13.65 (22.12) | 21.04 (22.65) | 21.81 (27.53) | 23.63 (26.50) |
| Median | 5 | 13 | 11.5 | 14 |
| Mode | 1 | 1 | 1 | 1 |
| Maximum | 132 | 95 | 115 | 103 |
| Minimum | 0 | 0 | 0 | 1 |
| Upper bound | 17.16 | 26.57 | 26.87 | 29.91 |
| Lower bound | 10.14 | 15.52 | 16.75 | 17.36 |
| Confidence level (95.0%) | 3.51 | 5.52 | 5.06 | 6.27 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = particle placement prime-target pair maximum distance in AS-Units; Minimum = particle placement prime-target pair minimum distance in AS-Units; Matched distance = prime-target pair distance where the prime and target are of the same verb-particle variant; Unmatched distance = prime-target pair distance where the verb-particle variant in the prime is different from the one in the target.

Table 4.11 breaks down the particle placement primes targets into matched and unmatched pairs. On average, unmatched prime-target pairs are separated by eight AS-Units more by comparison to matched pairs in L1-L1 conversations. The same trend can be observed in the L2-L2 conversations where unmatched prime-target pairs were separated by just over two AS-Units more than the matched prime-target pairs. Across data sets, matched prime-target pairs in L2-L2 conversations were separated by an average of eight AS-Units more than matched L1-L1 pairs. Moreover, unmatched prime-target pairs in L1-L1 conversations were separated by an average of two AS-Units less than unmatched prime-target particle placement pairs in the L2-L2 conversations. The VCD package in R studio, (Meyer et al., 2006), was used to produce Figure 4.6 which visualizes the differences between L1-L1 and L2-L2 particle placement prime-target distance (please see section 3.3.2).

Figure 4.6: Particle placement priming interaction with prime-target distance in L1-L1 and L2-L2 conversations



The two particle placement prime patterns are shown along the Y-axis in Figure 4.6 above. The two particle placement target patterns are shown along the X-axis. Each bar represents the frequency of particle placement targets within the respective prime-target distance range. What we can see from Figure 4.6 is that for the L1-L1 VP NP PRT primes, the targets were mostly the VP NP PRT pattern, especially when the distance separating prime-target pairs was 12 AS-Units or fewer. It seems that the areas in black, red, green and blue are greater for VP NP PRT targets, relative to VP PRT NP targets following VP NP PRT primes. The VP PRT NP primes, however, along the Y-axis, were followed by more VP NP PRT targets, relative to VP PRT NP targets across all prime-target distances.

For L2-L2 VP NP RT primes, we can see that the area in black, red and green where the prime-target distance is zero, one or less than four AS-Units, respectively, is slightly larger for VP NP PRT targets, relative to VP PRT NP targets. For VP PRT NP primes, however, it seems that the VP NP PRT target pattern was favoured across all prime-target distances.

4.5.5.2 Lexical boost

Table 4.12 shows that close to one fifth of the L1-L1 and L2-L2 particle prime-target pairs had a matched main verb lemma. One third of the L1-L1 prime-target pair shared the same particle, while just under one fourth of the L2-L2 prime-target pairs shared the same particle. Finally, slightly less than one third of the L1-L1 prime-target pairs have a shared object, while the L2-L2 prime-target had a matched object only one fourth of the time. A two-sided Fisher's exact test establishes that there are no significant differences in the proportions of matched and unmatched lemmas or direct objects between L1-L1 and L2-L2 particle placement prime-target pairs ($p_{\text{Fisher exact}} = 0.610$) and ($p_{\text{Fisher exact}} = 0.089$), respectively. However, the differences between L1-L1 and L2-L2 in terms of shared and unshared particle proportions seem to be significant ($p_{\text{Fisher exact}} = 0.029$).

Table 4.12: Particle placement prime-target pairs' matched and unmatched main verb lemmas, particle, and direct object

| Corpus | # Matched lemma (%) | # Unmatched lemma (%) |
|--------|------------------------|--------------------------|
| L1-L1 | 44 (19.47%) | 182 (80.53%) |
| L2-L2 | 32 (17.11%) | 155 (82.89%) |
| Corpus | # Matched particle (%) | # Unmatched particle (%) |
| L1-L1 | 76 (33.63%) | 150 (66.37%) |
| L2-L2 | 44 (23.53%) | 143 (76.47%) |
| Corpus | # Matched D.O. (%) | # Unmatched D.O. (%) |
| L1-L1 | 66 (29.20%) | 160 (70.80%) |
| L2-L2 | 40 (21.39%) | 147 (82.61%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched lemma = number of particle placement prime-target pairs sharing the same main verb lemma; # Unmatched lemma = number of particle placement prime-target pairs with different main verb lemmas; # Matched particle = number of particle placement prime-target pairs sharing the same particle; # Unmatched particle = number of particle placement prime-target pairs with different particles; # Matched D.O. = number of particle placement prime-target pairs with the same direct object or its referent; # Unmatched D.O. = number of particle placement prime-target pairs sharing the same direct object or its referent.

The proportions of matched and unmatched lemmas, particles and shared objects for particle placement prime-target pairs are shown in Table 4.13. Over two thirds of the L1-L1 prime-target pairs with matched main verb lemmas were of the same verb-particle variant. Four fifths of the L2-L2 prime-target pairs with matched lemmas were of the same verb-particle type. Both the L1-L1 and L2-L2 prime-target pairs with matched particles were of the same verb-particle type two thirds of the time. Finally, the L1-L1 and L2-L2 prime-target pairs with overlapping direct objects were also similar in that they were of the same verb-particle type four fifths of the time.

Table 4.13: Matched and unmatched verb-particle constructions' prime-target pairs in the case of matched and unmatched main verb lemmas, particles and direct objects

| | | Matched Lemma | | Unmatched lemma | |
|--------|---------------------|-----------------------|---------------------|-----------------------|--|
| Corpus | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) | |
| L1-L1 | 31 (70.45%) | 13 (29.55%) | 128 (70.33%) | 54 (29.67%) | |
| L2-L2 | 25 (78.13%) | 7 (21.87%) | 91 (58.71%) | 64 (41.29%) | |
| | | Matched particle | | Unmatched particle | |
| Corpus | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) | |
| L1-L1 | 53 (69.74%) | 23 (30.26%) | 106 (70.67%) | 44 (29.33%) | |
| L2-L2 | 31 (70.45%) | 13 (29.55%) | 85 (59.44%) | 58 (40.56%) | |
| | | Matched D.O. | | Unmatched D.O. | |
| Corpus | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) | |
| L1-L1 | 53 (80.30%) | 13 (19.70%) | 106 (66.25%) | 54 (34.75%) | |
| L2-L2 | 33 (82.50%) | 7 (17.50%) | 83 (56.46%) | 64 (43.54) | |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched pairs = number of particle placement primes immediately followed by particle placement targets with the same VP PRT NP or VP NP PRT sequence as in the prime; # Unmatched pairs = number of particle placement primes followed by particle placement targets with a different verb-particle construction to the one in the prime; Matched lemma = particle placement prime-target pairs sharing the same main verb lemma; Unmatched lemma = particle placement prime-target pairs with different main verb lemmas; Matched particle = particle placement prime-target pairs sharing the same particle; Unmatched particle = particle placement prime-target pairs with different particles; Matched D.O. = particle placement prime-target pairs sharing the same direct object or its referent; Unmatched D.O. = particle placement prime-target pairs with different direct objects.

4.5.5.3 Priming-speaker interaction

We can see from Table 4.14 that in L1-L1 conversations, almost ninety percent of the primes were followed by targets that were produced by the same speaker.

Slightly less than eighty percent of the L2-L2 particle placement prime-target pairs were produced by the same speaker. A two-sided Fisher's exact test suggests that the differences between the L1-L1 and L2-L2 proportions of prime-target pairs produced by the same or different speakers are statistically significant ($p_{\text{Fisher exact}} = 0.009$).

Table 4.14: Verb-particle constructions' prime-target pairs in the case of same and different speaker

| Corpus | # Same speaker (%) | # Different speaker (%) |
|--------|--------------------|-------------------------|
| L1-L1 | 197 (87.17%) | 29 (12.13%) |
| L2-L2 | 144 (77.01%) | 43 (22.99%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Same speaker = number of particle placement prime-target pairs produced by the same speaker; # different speaker = number of particle placement prime-target pairs produced by different speakers.

Table 4.15 shows the proportions of matched and unmatched prime-target pairs in the case where the prime and the target were produced by the same or a different speaker. Just over seventy percent of the L1-L1 prime-target pairs that were produced by the same speaker were matched, i.e. had the same verb-particle construction in the prime and the target. However, close to three fifths of the L2-L2 prime-target pairs that were produced by the same speaker were of the same verb-particle type.

Table 4.15: Matched and unmatched verb-particle constructions' prime-target pairs when they were produced by the same or different speakers

| Corpus | Same speaker | | Different speaker | |
|--------|---------------------|-----------------------|---------------------|-----------------------|
| | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) |
| L1-L1 | 142 (72.08%) | 55 (27.92%) | 17 (58.62%) | 12 (41.38%) |
| L2-L2 | 89 (61.81%) | 55 (38.19%) | 27 (62.79%) | 16 (37.21%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched pairs = number of particle placement primes immediately followed by particle placement targets with the same VP PRT NP or VP NP PRT sequence as in the prime; # Unmatched pairs = number of particle placement primes followed by particle placement targets with a different verb-particle construction to the one in the prime; Same speaker = particle placement prime-target pairs produced by the same speaker; Different speaker = particle placement prime-target pairs produced by different speakers.

In the next section, I will discuss the results and highlight the similarities and the differences in the factors that influenced the use of verb-particle types the most in both the L1-L1 and L2-L2 data sets.

4.6 Discussion of the particle placement data

This chapter set out to investigate syntactic priming in L1-L1 and L2-L2 dialogue. Using conversations extracted from the GLBCC corpus, the analysis focused on particle placement priming, i.e. VP NP PRT vs. VP PRT NP, in the respective data sets. A number of predictor-variables, such as distance between prime and target pairs, and main verb lemma match, were coded for as well. GLM analyses were used to determine which of the independent variables, including the prime, are good predictors of the target.

To sum up, the null hypothesis that the verb-particle construction use is random and not related to the predictors included in the analysis was rejected. The main findings from this chapter are the lack of support for particle placement priming as a predictive factor of particle placement type in the L1-L1 and L2-L2 conversations. There is support, instead, for discourse related factors such as the

target's direct object syllable length, its complexity and news value for L1-L1 and syllable length, news value and definiteness of the direct object for the L2-L2 conversations. The L1-L1 prime-target pairs were separated by fewer AS-Units than the L2-L2 prime-target pairs. In both data sets, the prime-target pairs with the same verb-particle variant were separated by fewer AS-Units than the ones with different verb-particle variants. Finally, significant syntactic priming is observed for L2-L2 prime-target pairs when lemma match and direct object overlap are controlled for. Table 4.16 summarizes all particle placement predictive variable GLM results. Now, let us discuss and interpret these findings.

Table 4.16: Summary of the particle placement predictive variables results

| Variable | Prime | Distance | D.O. definiteness | Lemma match | D.O. complexity | Literalness | D.O. news value | D.O. Syllable length | Directionality |
|--------------|-------------------------------|----------|---------------------|-------------|-------------------------|-------------|---------------------|----------------------|-----------------------|
| L1-L1 | n.s. | n.s. | n.s. | n.s. | √ | n.s. | √ | √ | |
| L2-L2 | n.s. | n.s. | √ | n.s. | | n.s. | √ | √ | n.s. |
| Interactions | Prime * Prime target distance | | Prime * Lemma match | | Prime * Shared particle | | Prime * Shared D.O. | | Prime * Speaker match |
| L1-L1 | √ | | n.s. | | n.s. | | n.s. | | n.s. |
| L2-L2 | n.s. | | √ | | n.s. | | √ | | n.s. |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Distance = particle placement prime-target pair distance; D.O. = direct object; √ = significant predictor; n.s. = non-significant predictor; * = interaction; The presence of directional prepositional phrase following the verb-particle construction was not included as a predictor in the L1-L1 particle placement analysis; The complexity of the direct object was not included as a predictor in the L2-L2 particle placement analysis.

4.6.1 Construction preference

One of the main questions in this chapter and throughout the thesis is whether priming might be a factor that affects syntactic choices in L1-L1 and L2-L2 spoken interaction. The conditional probability analysis for particle placement prime-target

pair combinations can be taken as initial indication for particle placement priming (see Table 4.4). However, no support for particle placement priming, independent of the priming-related predictors, has been observed in either L1-L1 or L2-L2 data sets (see Table 4.5 and Table 4.7). That is, priming did not reach significance when all particle placement predictors were considered in a regression analysis. This means that the particle placement construction used in the targets was not contingent on the particle placement variant that was used in the prime. However, priming can be observed in the L2-L2 conversations when the main verb lemma match and the direct object overlap are factored in (see Table 4.9).

This is a rather interesting finding considering the vast number of experimental studies that found robust evidence for syntactic priming independent of the lexical boost effect (e.g., Bock, 1986; Pickering & Branigan, 1998; Branigan et al., 2000; Corley & Scheepers, 2002; Ferreira, 2003; Hartsuiker et al., 2008; Segaert et al., 2011; Wheeldon et al., 2011; Jaeger & Snider, 2013). The lack of support for priming in the present study, however, is consistent with some of the recent corpus-based studies that provided evidence against the robustness of priming in spoken L1 dialogue (Howes et al., 2010; Fernández & Grimm, 2014; Healey et al., 2014).

The lack of particle placement priming in the current study may be explained by the nature of the task itself, which was not designed to elicit verb-particle constructions per se. Unlike picture description or sentence completion tasks, the participants began the narration task with little or no memory of a recent input and they were not given any prompts that include any examples of the two particle placement variants. The Charlie Chaplin movie, i.e. the immigrant, was of course a silent film with no written or spoken input. What tends to happen in the experimental studies is that participants are presented with written, spoken and, sometimes, visual input, during and sometimes before the experiment, that include the structure to be

elicited. Therefore, one might expect a higher tendency to reproduce a target structure in picture description or sentence completion tasks, relative to a task based naturalistic dialogue, given the participants' recent exposure to the target structure, in the former setting, and the length of their exposure to it.

Secondly, the relatively high English proficiency of the advanced L2 speakers as well as the American participants, being native speakers of American English, might partially explain the lack of priming in both data sets. Although some of the German participants made some English grammatical mistakes during their narration of certain scenes of the movie, they have a relatively high English proficiency level, as they were English linguistics and English literature university students at the time the corpus was compiled. It is plausible that both groups have had enough experience with the verb-particle construction in English and so they do not have to rely on the repetition of verb-particle prime to create intelligible and successful communication with their interlocutors.

We see this clearly in the L2-L2 conversations, where some participants used a verb like 'wear' to express the notion of Charlie Chaplin 'putting on' clothing items, instead of using the verb-particle form, i.e. 'put up'. For example, early on in the German 41 transcript, speaker A used the simple past of the verb 'wear' (see Figure 4.7). Later on in the same conversation, we can see that speaker B also used the verb 'wear' instead of using the verb-particle form, i.e. 'put on', (see Figure 4.8). The L1 speakers, however, used the verb-particle form, i.e. 'put on' for the same context.

Figure 4.7: German transcript 41, Speaker A using the verb 'wear' as opposed to 'put on'

| | | |
|---|---|---|
| 6 | A | and Charlie Chaplin wore fine clothes and a tie |
| 7 | A | and so there was a difference between them |
| 8 | A | and he didn't seem to cope with the rolling of the ship |
| 9 | A | and himself moved to the left and to the right |

Figure 4.8: German transcript 41, Speaker B using the verb ‘wear’ as opposed to ‘put on’

| | | |
|----|---|--|
| 82 | B | and he couldn't understand |
| 83 | B | then the waiter was coming |
| 84 | B | and he was trying to explain him that he should not wear his hat |
| 85 | B | but Chaplin he didn't understand. |

Similarly, Figure 4.9 is an extract from the same conversation as Figure 4.8.

The same speaker describes a scene from the Charlie Chaplin movie where a group of waiters attacked a customer who did not have the money to pay for his meal. Instead of using the verb-particle form ‘beat up’, the same German speaker used the simple verb of ‘hit’. The L1 speakers, however, always used the verb-particle form ‘beat up’ in the same context.

Figure 4.9: German transcript 41, Speaker B using the verb ‘hit’ as opposed to ‘beat up’

| | | |
|-----|---|--|
| 151 | B | and all the waiters came together, |
| 152 | B | and yeah they hit him in a very bad way. |
| 153 | B | and I think he was hurt |
| 154 | B | they hurt him very much because he couldn't pay his bill |

While replacing the verb-particle construction with the single verb form can be seen as an indication for the L2 speakers’ ability of taking another pathway to communicate the same notion, it might also be taken as a sign of under-representation or even avoidance of the verb-particle construction by the L2 speakers (Dagut & Laufer, 1985; Liao & Fukuya, 2004). The suggestion that the L2-L2 conversations contain fewer verb-particle constructions due to their L1 is not plausible because the verb-particle construction occurs in most Germanic languages, including English and German (Dehe, 2005, p. 185) (see section 2.11.1). It seems that the verb-particle form is the more natural use in the contexts presented in Figure 4.8 and Figure 4.9. The L2 speakers’ use of the simple verbs ‘wear’ and ‘hit’ might be caused by their lack of awareness of the natural L1 use in those contexts.

Both the L1 and L2 participants greatly favoured the VP NP PRT, relative to the VP PRT NP variant even if the prime was a VP PRT NP (see Table 4.3). The preference for a noun phrase preceding the particle seems so strong in both groups that it may require factors that are very strong to influence target types. It was pointed out in section 2.11.1 that the German language does not allow a particle placement construction variant where the particle is placed in an immediate post-verbal position. It may well be, therefore, that the German speakers had their German particle placement procedures activated while performing their English dialogue task. Given that both English and German share the VP NP PRT sequence whereby the particle is placed at a final position, the high frequency of the VP NP PRT in German might be caused by cross-linguistic transfer whereby the German learner relied on their L1 to produce their L2 verb-particle constructions (Loebell & Bock, 2003).

The overall lower frequency of particle placement use in the L2-L2 conversations, relative to the L1-L1 conversations may be partially attributed to the observation that sometimes the German speakers failed to combine an appropriate particle to a main transitive verb. Figure 4.10 illustrates this observation.

Figure 4.10: German transcript 200, Speaker B using particles with the wrong verb

| | | |
|----|---|---|
| 68 | B | and then started a big fight in the restaurant, |
| 69 | B | there was a third person, |
| 70 | B | five or six waiters went fighting on him, hitting on him all the time |
| 71 | B | and then he was asking the waiter what happened, |
| 72 | B | and he said yeah he was ten cents short, |

Figure 4.10 shows a description of the same scene described in Figure 4.9 in another L2-L2 conversation. It appears that the same German speaker was attempting to use the verb-particle construction to communicate the noting of someone being hit. However, the speaker used ‘hitting on him’, which might not be what the speaker intended to express.

Let us now turn to the other predictors of particle placement use. The L1-L1 verb-particle constructions with more complex direct objects are seen to favour the VP PRT NP (Figure 4.4). This finding can probably be explained by the suggestion that complex phrases are delayed to the end of a sentence so speakers can have more time for ‘utterance planning’ (Wasow, 1997, p. 353). Verb-particle constructions that include direct objects that are long in syllables also show the same preference for VP PRT NP sequence in both datasets. This is not a surprising finding because long noun phrases are likely to be complex because they stand a higher chance of including embedded clauses than short ones. The syllable length of the direct object can effectively be considered an equivalent to the complexity predictor, where noun phrases that are long and complex are placed after the particle to allow more time for speakers to plan their utterance.

Discourse new direct objects tend to favour the VP PRT NP sequence in both data sets. It could be argued that new direct objects are meant to carry more weight because they are describing information that has not been introduced before in the conversations. That is, they often are not pronouns with preceding referents in the conversations. Therefore, it is conceivable that direct objects that are discourse new will be longer in syllables, and therefore, just as with the complexity and syllable length predictors, they may be positioned at the end of the sentence.

A link can also be made between the L2-L2 definiteness of direct object and news value of the direct object factors. Direct objects that are definite often refer to or describe events and objects that have been introduced before. The observed rise in the proportions of VP NP PRT sequence when the target has a definite direct object, (see Figure 4.5), can be explained by the understanding that definite direct objects tend to be shorter because they are not discourse new. Therefore, it might be that the L2 speakers preferred maintaining the short, definite direct objects before the particles but

delayed long ones to a final position following the particle in order to win some planning time for the longer constituent (see Wasow, 1997).

Another interesting finding of this chapter is the similarities in the L1-L1 and L2-L2 speakers in terms of their reproduction of one verb-particle type, relative to the other, following exposure to a verb-particle prime (see Table 4.3). The L1 speakers used either variant of the verb-particle significantly more frequently than the L2 speakers did. However, the difference in the proportion of target types following the verb-particle primes was not statistically significant. It could be argued, therefore, that both groups displayed similarities in terms of their reproduction of the verb-particle primes in subsequent AS-units.

The similarities in the L1-L1 and L2-L2 verb-particle reproduction strategies, therefore, can also be attributed to the fact that both data sets influenced by almost the same set of factors that determine the verb-particle type to be used (see Table 4.5, Table 4.6 Table 4.7 and Table 4.8). These similar tendencies confirm Costa et al.'s (2008, p. 551) suggestion that the mechanisms responsible for priming in L1-L1 and L2-L2 dialogues are very similar. Costa et al.'s (2008) suggestion about the similarity in the mechanisms underpinning priming between L1-L1 and L2-L2 interlocutors resonates with language processing research which suggests a considerable level of similarity in the mechanisms of L1 and L2 speech production (Kormos, 2011, p. 40).

Finally, it is important to highlight the similarity between both groups in terms of verb-particle priming behaviour. As section 4.5.2 and 4.5.3 showed, almost the same factors that influenced particle placement use in L1-L1 also influenced particle placement use in L2-L2 conversations. The similarity in priming behaviour may be attributed to the similarity between English and German being members of the Germanic family of languages. If the same movie narration task was used to elicit L2-

L2 conversations where the interlocutors are of an Arabic or Chinese L1, for example, one might perhaps expect more different verb-particle L2-L2 priming tendencies (Costa et al., 2008, pp. 549–550). That is because of the greater differences between the L1 and L2 linguistic systems, i.e. English vs. Arabic or Chinese. Therefore, investigating evidence for linguistic similarity on L2 priming, by including a different L1 linguistic system to English and German under the same study design circumstances could be an important asset for future research.

4.6.2 Prime-target pair distance

The overall greater prime-target pair distance in the L2 data may suggest that the L1 participants tend to repeat a verb-particle prime a little faster than the L2 participants (see Table 4.10). However, no evidence was found in the current L1 or L2 data to suggest that the verb-particle use of a VP NP PRT or a VP PRT NP can be explained by the prime-target distance as an individual, independent variable.

Interestingly, the prime-target distance' significance in L1-L1 conversation is much closer to the 0.05 threshold than some of the other priming-related predictors e.g., ($p = 0.950$) for main verb lemma match in L1-L1 or ($p = 0.696$) for main verb lemma match in L2-L2 (see Table 4.5 and Table 4.7). The near-significant prime-target pair distance predictor in the L1-L1 conversations could be explained by the higher frequency of verb-particle use by L1 participants. This translates to more exposure to the target construction, which therefore increases the likelihood of higher verb-particle use by L1 participants (Luka & Barsalou, 2005, p. 452), (see Table 4.1).

An important finding to point out is that the interaction of verb-particle prime and prime-target distance emerged statistically significant in predicting the verb-particle use in the L1-L1 conversations (see Table 4.9). That is, the distance in AS-Units separating prime-target pairs affects the size of verb-particle priming to make it

a statistically significant predictor of the target. It could be argued, therefore, that there is a verb-particle priming effect in the L1-L1 but only if the prime-target distance interaction with the prime is considered. Such an interaction could not be observed in the L2-L2 conversations (see Table 4.9). The lack of interaction between prime and prime-target pair distance in the L2-L2 conversations begs the question of whether the prime-target pair distance is at all relevant to strength of syntactic priming in L2-L2 production. I will return to the relevance of the prime-target pair distance to syntactic priming in the general discussion (see section 7.1).

Finally, the analysis did not detect any evidence for a conclusive threshold for a particular distance at which priming begins to decay. However, at least in the case of VP NP PRT primes, there seems to be a tendency for L1 speakers to repeat their verb-particle prime when the prime-target distance is less than 33 AS-Units (see Figure 4.6). It appears that the tendency to repeat the same prime verb-particle variants starts to diminish in both data sets with the increase in the prime-target distance as the speakers become more likely to change their verb-particle variant following a verb-particle prime.

4.6.3 Lexical boost

Another objective of this chapter is to assess the proposal that the similarity in the verb lemma between primes and targets increases the strength of the priming effect (see section 2.13). No evidence was found in the L1-L1 or L2-L2 data for a relation between the verb-particle variant in the targets and main verb lemma match as an independent variable. However, we can see a tendency in the L1-L1 and L2-L2 production whereby over 70% of the particle placement prime-target pairs that share the same main verb lemma identity are of the same verb-particle variants (see Table 4.13). Therefore, it might be that the matched prime-target pair main verb lemmas can

encourage the production of the same verb-particle variant in the prime to appear in the target (e.g., Gries, 2005). Similarly, the matched particle and the matched direct object between prime-target pairs seem to encourage the production of the same target that was used in the prime. This can also be taken as an indication for the relevance of the general similarity effect to the use of either particle placement variants.

Most importantly, the GLM analysis of the L2-L2 conversations provided evidence for the lexical boost effect where the prime-target main verb lemma match improves the strength of the priming effect (see Table 4.9). Such an interaction between particle placement primes and the prime-target main verb lemma match was not observed in the L1-L1 conversations (see Table 4.9). The lack of support for the lemma identity effect in the L1-L1 conversations is contrary to Gries (2005) and Szmrecsanyi (2005) who both did find lemma identity interaction with the particle placement primes in corpus-based analysis of L1-L1 spoken production.

Similarly, there was a significant interaction between the L2-L2 particle placement primes and the shared direct object between particle placement's prime-target pairs (see Table 4.9). Again, such an interaction was not observed for the L1-L1 conversations. The interaction between particle placement primes and the shared direct object in prime-target pairs is indicative of a general similarity effect on the use of particle placement construction. This finding is in line with Cleland and Pickering (2003) who found evidence for enhanced noun-phrase structure priming when prime-target pairs shared the same head noun (please see section 2.13.3). The lexical boost finding in the L2-L2 conversations can be interpreted in the light of the interactive alignment model where alignment on the lexical level, where the main verb lemma the direct object are repeated, encourages alignment at other levels, (e.g., the syntactic level in this case where verb-particle variants are also repeated), (Garrod & Pickering, 2004, p. 9).

Another interesting finding from the particle placement analysis is the lack of support for interaction between particle placement primes and the prime-target pairs' shared particles (please see Table 4.9). This finding is in harmony with most studies that looked into syntactic priming and did not find evidence in support for the role of function words in enhancing the priming effect (Bock, 1989; Ferreira, 2003; Fox Tree & Meijer, 1999; Pickering & Branigan, 1998). It may well be that the lexical boost of the content words variables, i.e. main verb lemma matched and the direct object overlap, are likely to encourage syntactic priming given that they typically have more influence on the persistence of syntactic structures relative to function words, (e.g., particles and prepositions), (Ferreira, 2003, p. 380).

Finally, it could be argued that the news value of the direct object can be thought of as a lexical effect that influences the use of a verb-particle variant over the other. It is different from the direct object overlap predictor in that it does not only look at whether the target's direct object overlaps with that of the immediately preceding verb-particle construction. Instead, the news value predictor records whether the target's direct object was mentioned anywhere in the preceding five AS-Units.

For example, if we take 'So he gives the money back to her' in Figure 4.11 as a verb-particle target, we can see that the direct object 'the money' was mentioned identically prior to the target within sentences that do not include verb-particle primes. Because the direct object in the target is not discourse new, there is a preference for the VP NP PRT variant (see Figure 4.2). Given the preceding direct object that is lexically identical to the one in the target, it is possible that there is some evidence for an indirect lexical effect on the verb-particle use where repeated direct objects show a preference for the VP NP PRT verb-particle sequence.

Figure 4.11: German transcript 200, Speaker A: news value of the direct object predictor

| | | |
|----|---|---|
| 31 | A | so Charlie feels sorry for her because of course he's won all that money |
| 32 | A | and I think that some of his partners on the gambling had stolen the money before |
| 33 | A | I didn't quite get that. |
| 34 | A | and so he gives the money back to her |
| 35 | A | but puts it in her pocket so that she does not see it |

4.6.4 Speaker identity

As we have seen in Table 4.9, the speaker identity did not affect the strength of the prime effect in either data set. That is, we do not see stronger verb-particle priming when the prime-target pairs were produced by the same speaker relative to when the targets for the verb-particle primes were produced by the other interlocutor. This outcome is in contrary to that of Gries (2005, p. 373-374) who found a marginally significant interaction where priming is slightly stronger if the prime and the target were produced by the same speaker. A possible explanation for the lack of prime-speaker interaction in the data sets at hand may be the nature of the corpus used in this study where all L1-L1 and L2-L2 participants performed the same movie narration task (see section 3.1.1). The corpus Gries (2005) used, however, includes a mix of written and spoken data with mixed genres (e.g., phone calls, interviews, unscripted speeches, debates, press editorials, etc.) (Davies, 2009).

As I pointed out in section 2.8, there is no consensus in the priming literature over the relevance of a speaker's identity to the magnitude of priming. The lack of speaker identity effect in this chapter suggests that it does not matter who produced the current or the previous particle placement variant. However, this suggestion is based on a particle placement analysis where no priming effect was obtained. I will therefore return to the speaker identity effect in the following two analysis chapters.

4.7 Summary and conclusion

This chapter has suggested a model for quantifying particle placement priming in L1-L1 and L2-L2 spoken corpora of running dialogues. The key strength of the GLM methodology for this analysis is the possibility of looking at particle placement priming in relation to more than only one or two of the most famously investigated lexical boost and prime-target distance predictors in some of the earlier experimental investigations of syntactic priming (Bock et al., 1989; Pickering & Branigan, 1998; Branigan et al., 1999). Its main objective was to find out whether exposure to a verb-particle prime causes L1 and L2 interlocutors to repeat the same prime in an immediately subsequent context.

The analysis showed no support for verb-particle prime as an independent predictor of L1-L1 or L2-L2 verb-particle construction use. This finding was clearly supported by Howes et al. (2010, p. 2009) where they concluded that "...the strength and ubiquity of structural priming ... may have been overstated". However, there is evidence for verb-particle priming in the L1-L1 conversations when the interaction with prime-target pair distance is considered. Moreover, the lexical boost effect associated with main verb lemma match and direct object overlap enhances L2-L2 verb-particle priming to make it a significant predictor of the verb-particle use in L2-L2 conversations.

The second major finding of this study is the reproduction tendencies of the verb-particle construction between L1-L1 and L2-L2 conversations. This may suggest that the mental processing of language between L1 and L2 users might be similar for this kind of structure. Therefore, the findings of this study confirmed Costa et al.'s (2008, p. 551) prediction that the basic mechanisms responsible for L1-L1 and L2-L2 are the same (Costa et al., 2008, p. 551).

The findings of the current chapter suggest that the magnitude of syntactic priming in spoken task-based naturalistic conversations might not be as large as experimental studies suggest. Some of the discourse-related variables, i.e. the news value and syllable length of the direct object news value, emerged significant and are largely responsible for the verb-particle construction use in both data sets. These independent discourse-related predictors outperformed the prime-target pair distance and main verb lemma match as independent predictors of the verb-particle use. The relevance of the discourse-related factors to the repetition and the priming of specific constructions may have been understated especially by Garrod and Pickering's (2004) interactive alignment model; a model that may have over-emphasised syntactic alignment as opposed to other discourse related predictors that can be equally or more important in explaining the reuse of constructions. Therefore, it will be interesting to investigate the priming of other constructions. The next two chapters will look into the priming of the dative alternation and the caused-motion constructions.

5 The Dative Construction

5.1 Introduction

This chapter presents the analysis carried out on dative alternation priming in the L1-L1 and L2-L2 conversations. In particular, I look at the factors that influence speakers' use of prepositional dative or double object following either variant in naturalistic spoken discourse. The chapter begins by defining the dative alternation's two variants in terms of their semantic meaning and syntactic structure. Section 5.3 and 5.4 lay out the extraction of dative alternation prime-target pairs and construction of an L1-L1 and an L2-L2 data sets showing the predictors that are particular to the analysis of the dative alternation priming. The L1-L1 and L2-L2 dative alternation results will then be reported in section 5.5, showing the descriptive statistics and the GLM results. These results will be interpreted and discussed in section 5.6 in the light of the central question in this thesis, i.e. whether or not exposure to a given construction primes the subsequent reuse of the same or an alternative construction in spoken dialogue.

5.2 Target structure

The dative construction can manifest itself in two variants; the double object construction and the prepositional dative construction. The basic meaning of the dative alternation construction generally implies the transfer of possession of an object from an agent to a recipient (Bernolet et al., 2014, p. 114). The transferred object is referred to as a 'theme' or as a 'direct object'. The recipient of the theme is understood to be an 'indirect object' (see example 45 and 46 below):

(45) Double object I gave my friend a gift.
 VP NP_{indirect} NP_{direct}

(46) Prepositional Dative I gave a gift to my friend.
 V P NP_{direct} to NP_{indirect}

Both example (45) and (46) show that ‘I’ is the agent, ‘a gift’ is the theme and the recipient is ‘my friend’. Where the two examples differ is in the order of sentence. In example (45), the theme is placed after the recipient without an intervening preposition in between. In example (46), the theme is placed before the recipient, and the recipient is preceded by the preposition ‘to’ which signals the act of transfer. The two examples have a ditransitive verb that takes two objects. Sentence (45) is a double object construction example and it signals a transfer of the direct object ‘gift’ from the agent, i.e. ‘the speaker’, to the recipient, i.e. ‘my friend’. Sentence (46) is a prepositional dative construction example, which also signals a transfer of the direct object. In both (45) and (46), ‘a gift’ is the direct object whose position was transferred from the speaker to the recipient, i.e. ‘my friend’. This transfer of an object communicates a change in the possession of an object from the agent to the recipient. It is accepted that, given the semantic equivalence between the two constructions, they could be studied for syntactic priming (Bock, 1986, 1989; Bock et al., 2000; Bock et al., 2007; Hartsuiker & Kolk, 1998). Seeing as the dative alternation construction has two variants, ‘dative construction’ will be used as a term that includes both variants, ‘double object construction’ will be used to refer to the VP NP NP sequence (example 45), and the ‘prepositional dative construction’ will be used to refer to the VP NP PP variant (example 46).

5.3 Data extraction

The methods used in this chapter are, largely, similar to the methods that were used in Chapter 4. For the purpose of the dative alternation analysis, all constructions

that included ditransitive verbs were retrieved and manually classified into prepositional dative and double object constructions. However, especially with the prepositional dative, it is possible to confuse it with constructions that have a similar constituent structure such as (47) and (48) with their respective grammatical representation.

(47) He found this coin on the floor.
VP VBD NP PP

(48) I gave this coin to Omar.
VP VBD NP PP

There is no difference in the constituent structure of both sentences, and therefore one might be led to count examples like (47) as prepositional dative, even though they are not ‘datives’, in particular, because automatic search for prepositional datives will retrieve them. In other words, in both cases, the immediate constituents of the verb phrase are V, NP and PP. Moreover, both verbs, i.e. *give* and *find*, can be ditransitive, and therefore coding for the ditransitivity of the main verb does not rule out all constructions that are structurally similar to a prepositional dative construction. The one feature that could be distinctive in example (47) and (48) is whether the prepositional phrase is an adjunct or a complement. A complement refers to what is specified by the structure of the verb and so it has to be there to fulfil the verb’s meaning. An adjunct, however, is something that adds optional and extra information, which could easily have been left out from the construction. In example (47), the prepositional phrase “on the floor” is only adding extra information. However, the prepositional phrase “to Omar” in example (48) is not extra information because Omar is an actual participant in the action of the verb. Those two structures are distinct in terms of the functional relationship between the prepositional phrase and the verb. In order to make the distinction between these two structures, noun phrases and prepositional phrases - which are complements - were manually identified and

distinguished from noun phrases and prepositional phrases as adjuncts. Consequently, it was possible to identify the strings that are prepositional dative constructions, as opposed to strings that are objects with adjuncts. At the end, for a prepositional dative, the automatic search extracted only ditransitive verb phrases followed by a noun phrase and a prepositional phrase that is a complement, with ‘to’ or ‘for’ as the preposition. The automatic search also extracted all examples of ditransitive verb phrases with two noun phrases that are not adjuncts.

While looking at the double object examples, it was important to recognize that the direct object can sometimes take the shape of free speech, and not just a noun phrase (see examples 49-51):

(49) He asked him what time it is.

(50) He asked him whether it was time yet.

(51) He asked one of the waiters, when he left, what was the problem.

The double object examples above show that it is possible for the direct object to be a sub-ordinate clause headed by a question word. All objects that are clauses were parsed and treated as an NP, an object for the ditransitive verb. Given the complex structure that a direct object can take within a double object construction, an automatic notepad++ search may not sufficiently capture all double object examples (see 3.2.3). In other words, as examples (49-51) above show, even after parsing a sentence containing a double object, it is possible that the two objects may not be adjacent within a given sentence.

The mere reliance on automatic search increases the risk of counting cases that do not qualify as double object constructions but have a fairly similar constituent structure.

For example:

(52) Was it money?
VP VBD NP NP

The grammatical annotation of the sentence above shows that it has a structure similar to the double object construction. Therefore, the automatic search will retrieve sentences like (52) even though they do not qualify as a double object construction.

As a result, it was necessary to manually go over all examples retrieved by the automatic search and take out those that are not prepositional datives or double objects.

5.4 Building a dative alternation data set

Having collected and identified all cases of prepositional dative and double object constructions, a data set for a deeper analysis was prepared to establish factors that might influence the occurrence of dative alternation prime-target pairs in the L1 and L2 data. The following steps were followed to build the data sets:

Step 1. The current dative alternation variant, i.e. VP NP NP for a double object, or VP NP PP for a prepositional dative, was taken as the dependent variable.

Step 2. In order to determine whether the L1 and L2 users matched their choice of either variant immediately after exposure to either of them, a binary variable was added to record the previous variant to current type as an independent variable.

Step 3. All Current types that were not preceded by a prime were excluded from the analysis because they occurred at the beginning of conversations when the participants had no prior exposure to either dative alternation variant. Consequently, all observations were counted as a prime and as a target except the first ones that were counted only as primes.

Step 4. Priming-related predictors and discourse-related predictors of current type were added as independent variables.

Two types of predictors have been suggested to affect the use of the dative construction (Bresnan et al., 2007). The first set of predictors is directly related in that it is the prime-target pair per se, and the distance that separates them. The second set of predictors is discourse related and directly concerned with the target construction itself, rather than the prime-target pair.

5.4.1 Priming related predictors

As with the particle placement analysis, the three factors prime-target pair distance, Main verb lemma identity and speaker identity were used as predictors of the dative alternation targets (see 4.4.1 for explanation). The rest of the dative alternation priming related predictors are as follows:

Shared theme and recipient: To aid our understanding of the general lexical boost effect on priming (see 2.13.3), two independent variables were included: one coding prime-target pairs that have a shared theme or its referent as ‘1’ and as ‘0’ otherwise. The other independent variable records prime-target pairs that have a shared recipient or its referent as ‘1’ and as ‘0’ otherwise.

Main verb semantic class match: The last lexical variable records the semantic class of the dative alternation construction, whether they can be interpreted as transfer (e.g., give someone chocolate), future transfer of possession (e.g., promise someone a gift), communication of information (e.g., tell someone a story), or another abstract meaning (e.g., give someone a suggestion) (Bresnan et al., 2007; Cuypere & Verbeke, 2013). Bresnan et al. (2007) and Cuypere and Verbeke (2013, p. 137) considered a fifth semantic class in their analysis, i.e. the prevention of possession semantic class

(e.g., deny food to someone). I will refrain from including this fifth semantic class because there is no literal or metaphorical transfer of possession involved in Z denying X to Y.

The prime-target pair distance and main verb lemma match were used as independent variables in the GLM analysis. The prime-target pair distance, main verb lemma match, main verb semantic class' match, theme match, recipient match and speaker identity were tested for interaction with the prime (see section 5.5.5).

5.4.2 *Discourse related factors*

In addition to the priming related predictors, it was necessary to find out whether discourse-related explanations might be more plausible for the choice the L1 and L2 users made between a dative and a double object construction. The following predictors that were included in the analysis are based on Cuypere and Verbeke (2013, p. 173-174).

Length difference between recipient and theme: This is a measure of the syntactic complexity of complements (Bresnan et al., 2007; Bresnan & Ford, 2010; Cuypere & Verbeke, 2013). For this purpose, the number of graphemic words that make up the recipient was subtracted from theme length. Bresnan et al. (2007, pp. 81–82) found that speakers favour the double object construction when the recipient is shorter than the theme. The example below shows that the speaker deferred the long recipient, i.e. the young lady, to a final position in the prepositional dative variant (see example 53):

(53) And Charlie Chaplin takes her money from the play and gives
it to the young lady. (German 56, speaker A).

Animacy of theme and recipient: Animacy is believed to be an important category that may influence the order of words within English sentences. Bresnan et al. (2007,

p. 87) found that inanimate recipients are five times more likely to occur in the prepositional dative than the double object variant. To account for animacy in dative construction priming, a binary variable was added taking human and animal themes and recipients as animates and all other objects as inanimate. Only the animacy of recipient predictor was included in the L2-L2 dative alternation analysis because the animacy of the theme in both L1-L1 and L2-L2 conversations as well as the animacy of the recipient in the L1-L1 dialogues did not generate enough data points to include them into the analysis (see section 3.3).

Concreteness of the theme: Another distinction that could be important is whether the theme is concrete or abstract because concrete themes are likely to occur with the prepositional dative variant (Cuypere & Verbeke, 2013, p. 173). The definition of concreteness relates to whether a theme is an object perceivable with the five senses, e.g., flower (Bresnan et al., 2010, p. 175). A binary variable was added coding for concrete themes as ‘1’ and abstract ones as ‘0’.

Definiteness of theme and recipient: It is possible that definiteness can affect the order of a sentence, and therefore might cause the shift from a prepositional dative to a double object or vice versa. Theijssen (2010) annotation criteria were adopted to define the definiteness of theme and recipient.

Definite themes and recipients include:

- Noun phrases that are preceded by a definite article

(54) so she recognized that he gave the money to her. (German 67,
27A)

the waiter brought the man his bill (English10, B129)

- Proper noun

(55) He loses all his money to Charlie Chaplin. (German 203, A34)

But he gave Charlie a couple of dollars. (English 22, B133).

- Personal pronoun

(56) Charlie Chaplin offered her his seat. (German 208, A15).

And he gave it to Charlie Chaplin. (German 31, B209).

- Possessive pronouns

(57) Charlie Chaplin stands up and he offered her his place.

And then when the waiter is coming and ask him for his money (German 201, B62)

- Reflexive pronouns

(58) He gets himself a cup of coffee. (German52, B97).

And Charlie Chaplin received that tip for himself and paid with this tip (German 60, B110)

That's right I was asking myself whether it was the same man who was pretending to be an artist afterwards (German 200, B162)

- Demonstratives

(59) he explains this to the steward, (German 75, A47)

- Reciprocal pronouns

No examples could be identified of reciprocal pronouns in the L1-L1 and L2-L2 interview transcripts. For the purpose of illustration, however, an example of this kind of pronouns would be:

(60) we brought each other so much joy over the years.

In addition to Theijssen's (2010) criteria, all objects that are subordinate clauses were counted as definite objects because they begin with a determiner, e.g., 'that' and 'this' in example (61).

(61) but the young woman said to the steward that Charlie does not take money from her (German 49, A20).

And like history tells us this trip wasn't always a light one
(German 66, 155B)

And subordinate clauses headed by a question word:

(62) and now? Well I ask you, did you like it? (German 66, 145B).

To account for this possible effect of theme and recipient definiteness, a binary variable was added for themes and recipients coding definite ones as '1'. Indefinite theme and recipients, the ones preceded by an indefinite article or by an indefinite pronoun, e.g., 'someone', were coded as '0'. The definiteness of the recipient predictor was coded for but not included in the analysis due to the scarcity consideration (see 3.3).

Pronominality of theme and recipient: This predictor refers to the type of nominal expressions that are used as themes or recipients. It is believed that the different types of nominal expressions may influence alternate constructions. The hypothesis is that, all other things being equal, pronominal recipients favour the double object construction, while pronominal themes reduce the chances of the dative construction

being realized in the prepositional dative form (Bresnan et al., 2007, p. 87). To investigate this possible effect, a binary variable was included coding for the pronominality of themes and recipients, '1' for pronouns, and '0' otherwise. The pronominality of themes was coded for but not included in the analysis of either data set because of the scarcity consideration (see 3.3).

Person of theme and recipient: This predictor categorizes themes and recipients into local and non-local categories. Local themes and recipients include first and second person singular or plural, while non-local ones include all singular and plural third person. Local nominal expressions were coded as '1' in binary variable, while non-local ones were coded as '0'. Nonlocal recipients have been found to favour prepositional dative constructions (Bresnan et al., 2007, p.81). The person of theme predictor was coded for but not included in the analysis of either data sets due to the scarcity consideration (see 3.3).

Number of theme and recipient: Plural recipients were found to favour the double object construction, while plural themes favoured the prepositional dative construction (Bresnan et al., 2007, p.87). Themes and recipients that are singular were coded as '1', while plural themes and recipients were coded as '0'. The number of theme predictor was coded for but not included in the dative alternation analysis of either data set due to the scarcity consideration (see 3.3). The number of recipient was excluded from the L1-L1 dative alternation analysis for the same reason.

Discourse accessibility of theme and recipient: Given that there are two objects in a dative construction, two binary variables were included coding discourse-new themes and recipient as '1', and '0' otherwise. The given recipients have been found to prefer the prepositional dative variant, while new themes favour the double object variant (Bresnan et al. 2007, p. 81). The recipient discourse accessibility variant was not

included in the L1-L1 GLM analysis due to the scarcity of targets that include recipients that are new to the discourse (see 3.3.2). The given themes were found to favour the prepositional dative variant, whereas the themes that are discourse-new were found to favour the double object variant (Bresnan et al., 2007, p. 81).

This discourse accessibility variable can be understood to be a semantic record of the lexical match of recipient and theme between the target and the prime within the same conversation. Repeated recipients and themes may therefore be indicative of lexical boost, possibly resulting in the reuse of the dative construction variant that was used earlier in the conversation with the same theme or recipient.

5.5 Results

This section begins with a presentation of the prime-target pair distribution and frequencies in the L1 and L2 data. An explanation will also be provided for the general trends that appear based on the quantitative investigation of the target construction.

5.5.1 Descriptive statistics: quantifying the observation

After the automatic and the manual investigation of the target construction, the search retrieved 151 dative constructions in the L1-L1 data and 265 in the L2-L2 distributed as follows:

Table 5.1: Distributional variation of the dative construction across the L1-L1 and L2-L2 conversations

| Targets | | | |
|---------|---------|----------------|----------------|
| Corpus | # Pairs | # VP NP NP (%) | # VP NP PP (%) |
| L1-L1 | 151 | 110 (72.85%) | 41 (27.15%) |
| L2-L2 | 265 | 153 (57.75%) | 112 (42.25%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Pairs = the number of dative alternation prime-target pairs; # VP NP NP = the number of targets with a VP NP NP sequence; # VP NP PP = the number of targets with a VP NP PP sequence

A two-sided Fisher's exact test establishes whether the differences between both groups are significant in terms of the frequency of either variant's use. The outcome indicates that the differences in terms of the dative construction variants use across both groups are significant ($p_{\text{Fisher exact}} = 0.002$).

Table 5.2: Proportion of matched and unmatched dative alternation prime-target pairs in the L1-L1 and L2-L2 conversations

| Prime-target pairs | | | |
|--------------------|---------|-----------------|-------------------|
| Corpus | # Pairs | # Matched pairs | # Unmatched pairs |
| L1-L1 | 51 | 101 (66.88%) | 50 (33.12%) |
| L2-L2 | 65 | 153 (57.73%) | 112 (42.27%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Pairs = number of dative alternation prime-target pairs; # Matched pairs = the number of primes that are immediately followed by targets that are of the same dative alternation variant; # Unmatched pairs = the number of primes that are immediately followed by targets that are the opposite dative alternation construction variant to the primes.

Almost two thirds of the prime-target pairs in the L1-L1 data were matched, while only one third of the primes were followed by a dative construction that is different to the prime variant. In the case of the L2-L2 sample, roughly 40% of the observations were targets that did not match their primes. A two-sided Fisher's exact

test suggests that the differences between the L1 and L2 samples in terms of prime-target agreement is approaching significance ($p_{\text{Fisher exact}} = 0.075$).

The dative construction, both in the L1 and L2 data, can manifest itself in the following four different prime-target pairs:

Previous type = VP NP NP, Current type = VP NP NP

Previous type = VP NP NP, Current type = VP NP PP

Previous type = VP NP PP, Current type = VP NP PP

Previous type = VP NP PP, Current type = VP NP NP

110 out of the 151 dative construction primes in the L1 conversations were VP NP NP primes, while only 41 were VP NP PP primes. In the L2-L2 conversations, 153 out of the 265 dative construction primes were VP NP NP primes, while the remaining 112 dative alternation primes were of the prepositional dative variant. In both groups, the double object construction was used more frequently than the prepositional dative variant.

Table 5.3: The L1-L1 and L2-L2 dative alternation target proportions following exposure to a VP NP NP double object, and VP NP PP prepositional dative primes

| Corpus | Targets following VP NP NP primes | | Targets following VP NP PP primes | |
|--------|-----------------------------------|----------------|-----------------------------------|----------------|
| | # VP NP NP (%) | # VP NP PP (%) | # VP NP NP (%) | # VP NP PP (%) |
| L1-L1 | 86 (78.18%) | 24(21.82%) | 26 (63.41%) | 15 (36.59%) |
| L2-L2 | 95 (62.10%) | 58 (37.90%) | 54 (48.21%) | 58 (51.79%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2 # VP NP NP = number of double object targets # VP NP PP = number of prepositional dative targets

Table 5.3 above shows that immediately following a double object prime, there is a high tendency in the L1 conversations of reusing the double object prime, but less so for L2 speakers. A two-sided Fisher's exact test shows significant

difference between L1 and L2 groups' immediate reuse of the double object primes ($p_{\text{Fisher exact}} = 0.006$).

Interestingly, in the L1-L1 data set, two thirds of the targets following a VP NP PP prime were the other variant, i.e. VP NP NP, while in the L2 data, the VP NP PP primes triggered almost as many VP NP PP and VP NP NP targets. Despite the discrepancy in the proportions of target variants following an VP NP PP prime between both groups, the differences between the L1-L1 and L2-L2 conversations in the proportion of targets following VP NP PP primes did not appear to be significant based on a two-sided Fisher's exact test ($p_{\text{Fisher exact}} = 0.100$). The dative alternation prime-target pairs in the L1-L1 and L2-L2 conversations are illustrated in Figure 5.1 below.

Figure 5.1: Dative alternation prime-target pairs in L1-L1 and L2-L2 conversations

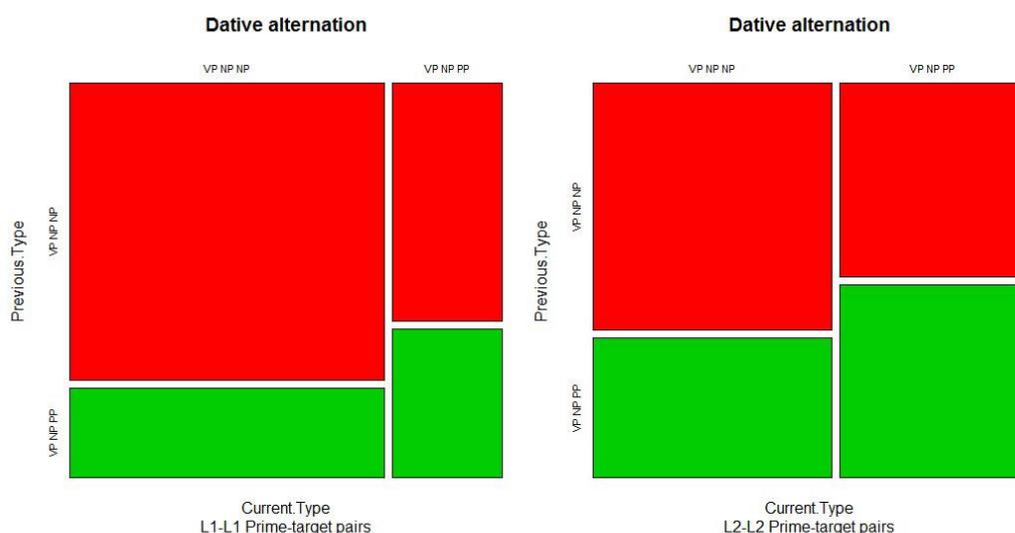


Figure 5.1 shows a summary of the dative alternation prime-target pairs in L1-L1 and L2-L2 conversations. The two alternates of the dative alternation primes, i.e. VP NP NP and VP NP PP, are presented in the X-axis. The Y-axis shows the two dative alternates as targets. The size of each bar is indicative of the frequency of dative alternates as targets following their respective primes. For VP NP NP primes, the

area occupied by VP NP PP targets along the Y-axis is larger than the one with VP NP PP targets in both data sets. Both L1 and L2 participants, therefore, seem to have the tendency of favouring VP NP PP targets following VP NP NP primes. For VP PP NP primes, the area occupied along the Y-axis for VP PP NP targets is larger than VP PP NP targets in the L1-L1 data set. The L2-L2 group, however, do not seem to greatly favour a certain dative construction variant following a VP PP NP prime as the area occupied by VP PP NP targets does not seem to be much larger than the one occupied by VP NP PP targets.

To further understand the dative alternation prime-target alternation in both data sets, let us consider the conditional probabilities for prime-target combinations (see section 3.3.1.1).

Table 5.4: Conditional probabilities of dative alternation prime-target pairs in the L1-L1 and L2-L2 conversations

| Constructional choices | | Targets | | Row totals |
|--|----------|-----------|-----------|------------|
| | | VP NP NP | VP NP PP | |
| L1-L1 prime | VP NP NP | .767 (86) | .233 (26) | 1 (112) |
| | VP NP PP | .615 (24) | .385 (15) | 1 (39) |
| L1-L1 overall construction probability | | 0.742 | .258 | 1 |
| L2-L2 prime | VP NP NP | .621 (95) | .379 (58) | 1 (153) |
| | VP NP PP | .481 (54) | .519 (58) | 112 |
| L2-L2 overall construction probability | | .562 | 0.438 | 1 |
| <i>Note.</i> L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Overall construction probability = the relative frequency of dative alternation targets; VP NP NP = the double object variant of the dative construction; VP NP PP = the prepositional dative variant of the dative construction. | | | | |

Table 5.4 shows that the conditional probability of the VP NP NP targets in the L1-L1 conversations is about 2.5% higher than the baseline following VP NP NP than

following VP NP PP primes. As for the VP NP PP targets, their conditional probability is 12.7% higher than the baseline following VP NP PP than following VP NP NP primes. For the L2-L2 conversations, the conditional probability of the VP NP NP targets is about 6% higher than the baseline following VP NP NP than following VP NP PP primes. Finally, in the L2-L2 conversations, the conditional probability of the VP NP PP targets is about 8% higher than the baseline after VP NP PP than after VP NP NP primes.

The next section reports on a GLM analysis and accounts for the variables that potentially are responsible for the participants' use of a dative construction variant over the other.

5.5.2 The L1-L1 GLM dative alternation results

Beginning with the L1-L1 conversations, Table 5.5 shows a summary of the GLM full model where individual predictors of the dative construction were included (please see section 3.3 for an explanation of GLM and section 5.4 for a summary of the predictors examined in this dative alternation current study).

Table 5.5: Summary of statistical analysis of the full model for the dative alternation predictor variables in the L1-L1 conversations

| | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-------------------------------|---------------------|-------|-------------|-----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| Independent variables | | | | | | | | |
| Previous type | 0.938 | 0.467 | 2.009 | 0.045* | 1.025 | 6.478 | 3.255 | 0.071 |
| Prime-target distance | 0.467 | 0.219 | 2.132 | 0.033* | 1.054 | 2.502 | 3.391 | 0.066 |
| Lemma match | -0.974 | 0.533 | -1.829 | 0.067 | 0.125 | 1.028 | 1.403 | 0.236 |
| Theme definiteness | 0.336 | 0.489 | 0.690 | 0.490 | 0.543 | 3.714 | 0.354 | 0.552 |
| Theme number | -0.307 | 0.718 | -0.427 | 0.690 | 0.183 | 3.181 | 0.244 | 0.621 |
| Theme discourse accessibility | -1.683 | 0.484 | -3.481 | <0.001*** | 0.069 | 0.468 | 14.917 | <0.001*** |
| Theme concreteness | 0.374 | 0.506 | 0.738 | 0.460 | 0.544 | 4.029 | 3.496 | 0.062 |
| Recipient pronominality | -0.339 | 0.513 | -0.660 | 0.509 | 0.262 | 1.995 | 3.255 | 0.071 |
| Recipient person | -2.132 | 1.268 | -1.681 | 0.093 | 0.005 | 1.002 | 2.106 | 0.147 |
| Length difference | 0.227 | 0.159 | 1.424 | 0.154 | 0.936 | 1.758 | 10.762 | 0.001*** |

Note. L1-L1 = dyadic interaction between participants with English as their L1; Coef. = Coefficients for the logistic regression model; S.E = Standard Errors; * = <0.05; *** = <0.001; Chi²-test p value tests for the significance of each independent variable individually against the null model in the L1-L1 conversations; Wald's test p-value tests for the significance of individual variables within the full model, i.e. where all individual L1-L1 dative alternation predictors are included; Conf. Interval = confidence intervals for the predictor variables; 2.5% = lower limit; 97.5% = upper limit.

L1-L1 full model's chi-square = 37.308, (p = <0.0001)

L1-L1 null model's AIC = 174.517

L1-L1 full model's AIC = 157.209

Two factors emerged as statistically significant predictors of the dative alternation in the L1-L1 conversation, i.e. the discourse accessibility of the theme and the theme-recipient length difference. Table 5.5 also shows that four factors emerged

as marginally significant predictors of the dative alternation in L1-L1 conversations, i.e. the type of the dative construction used immediately before the target, the dative alternation prime-target distance, the concreteness of the target's theme and the pronominality of the target's recipient.

Table 5.6 shows the best model that explains the use of dative construction in both its variants in the L1-L1 conversation following the backward elimination process (see section 3.3).

Table 5.6: Summary of statistical analysis of final model for the dative alternation predictor variables in the L1-L1 conversations

| Independent variables | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-------------------------------|---------------------|-------|-------------|-----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| Previous Type | 0.920 | 0.449 | 2.050 | 0.044* | 1.042 | 6.127 | 3.255 | 0.071 |
| Distance | 0.407 | 0.190 | 2.147 | 0.032* | 1.046 | 2.210 | 3.391 | 0.066 |
| Theme discourse accessibility | -1.547 | 0.450 | -3.437 | <0.001*** | 0.086 | 0.505 | 14.917 | <0.001*** |
| Length difference | 0.242 | 0.144 | 1.681 | 0.093 | 0.980 | 1.729 | 10.762 | <0.001*** |

Note. L1-L1 = dyadic interaction between participants with English as their L1; Coef. = Coefficients for the logistic regression model; S.E = Standard Errors; * = <0.05; *** = <0.001; Chi²-test p value tests for the significance of each independent variable individually against the null model in the L1-L1 conversations; Wald's test p-value tests for the significance of individual variables within the final model, i.e. where the best predictors of the L1-L1 dative alternation targets are included; Conf. Interval = confidence interval for the predictor variables; 2.5% = lower limit; 97.5% = upper limit.

L1-L1 final model's chi-square = 28.732, (p = <0.0001)

L1-L1 final model's AIC = 153.7846

As can be seen from Table 5.6, the dative alternation use in the L1-L1 conversations can best be explained by a mix of four dative alternation priming-related and discourse-related factors. The significant predictors in the final models that are specific to the prime are the type of the dative construction immediately preceding

the target and the distance that separates the targets from the primes. The remaining significant predictors within the final model, i.e. theme discourse accessibility and recipient-theme are all specific to the recipients and themes that were actually used in the dative alternation targets. All the other factors that were included in the dative alternation analysis were not significant predictors of the target. Therefore, there is no evidence to suggest that they determined, partially or fully, the use of a prepositional dative as opposed to a double object construction in the L1-L1 conversations.

5.5.3 The L2-L2 GLM dative alternation results

Turning now to the L2-L2 conversations, Table 5.7 shows a summary of GLM full model for the L1-L1 dative alternation predictor variables (Please see 3.3 for an explanation of GLM and 5.4 for a summary of the L2-L2 dative alternation predictors included in the current study).

Table 5.7: Summary of statistical analysis of the full model for the dative alternation predictor variables in the L2-L2 conversations

| Independent Variables | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-----------------------------------|---------------------|-------|-------------|-----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| Previous type | 0.451 | 0.311 | 1.449 | 0.147 | 0.853 | 2.898 | 5.060 | 0.024* |
| Prime-target Distance | 0.083 | 0.142 | 0.581 | 0.561 | 0.822 | 1.437 | 0.72 | 0.397 |
| Lemma match | -1.332 | 0.385 | -3.460 | <0.001*** | 0.121 | 0.551 | 8.269 | 0.004** |
| Recipient discourse accessibility | 0.494 | 0.448 | 1.105 | 0.269 | 0.683 | 3.984 | 28.224 | <0.001*** |
| Theme discourse accessibility | -0.070 | 0.361 | -0.195 | 0.846 | 0.458 | 1.891 | 2.819 | 0.093 |
| Recipient pronominality | -1.196 | 0.386 | -3.100 | 0.002** | 0.140 | 0.640 | 35.429 | <0.001*** |
| Recipient person | -1.858 | 1.080 | -1.720 | 0.086 | 0.008 | 0.885 | 15.426 | <0.001*** |
| Recipient number | -0.057 | 0.492 | -0.115 | 0.908 | 0.359 | 2.501 | 0.089 | 0.765 |
| Recipient animacy | -1.203 | 1.183 | -1.017 | 0.309 | 0.014 | 2.269 | 6.883 | 0.009** |
| Theme definiteness | -0.290 | 0.318 | -0.912 | 0.362 | 0.400 | 1.397 | 5.460 | 0.019* |
| Theme concreteness | 1.161 | 0.373 | 3.110 | 0.002** | 1.556 | 6.766 | 16.812 | <0.001*** |
| Length difference | 0.213 | 0.073 | 2.888 | 0.004** | 1.078 | 1.440 | 35.214 | <0.001*** |

Note. L2-L2 = dyadic interaction between participants with English as their L2; Coef. = Coefficients for the logistic regression model; S.E = Standard Errors; * = <0.05; ** = <0.01; *** = <0.001; Chi² test p value tests for the significance of each independent variable individually against the null model in the L2-L2 conversations; Wald's test p-value tests for the significance of individual variables within the full model, i.e. where all L2-L2 dative alternation predictors are included; Conf. Interval = confidence intervals for the predictor variable s; 2.5% = lower limit; 97.5% = upper limit.

L2-L2 full model's chi-square = 97.124, (p = <0.0001)

L2-L2 null model's AIC = 365.2479

L2-L2 full model's AIC = 292.1241

We can see from Table 5.8 that the priming predictor, i.e. previous type, as well as six factors emerged as significant predictors of the dative alternation use in the

L2-L2 conversations. The significant L2-L2 dative alternation priming-related predictors are the prime and the prime-target lemma match. All the other significant predictors of dative alternation use are discourse related predictors that are specific to the target, e.g., the target's recipient pronominality, the concreteness of the target's theme and its definiteness.

Table 5.8 shows the best model that explains the use of dative construction in both its variants in the L2-L2 conversation following the backward elimination process (see section 3.3).

Table 5.8: Summary of statistical analysis of final model for the dative alternation predictors in the L2-L2 conversations

| Independent Variables | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-------------------------|---------------------|-------|-------------|----------|----------------------|-------|-----------------------|-----------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| Previous type | 0.451 | 0.311 | 1.449 | 0.147 | 0.853 | 2.898 | 5.060 | 0.024* |
| Lemma match | -1.332 | 0.385 | -3.460 | 0.001*** | 0.121 | 0.551 | 8.269 | 0.004** |
| Recipient pronominality | -1.196 | 0.386 | -3.100 | 0.002** | 0.140 | 0.640 | 35.429 | <0.001*** |
| Recipient person | -1.858 | 1.080 | -1.720 | 0.086 | 0.008 | 0.885 | 15.426 | <0.001*** |
| Recipient animacy | -1.203 | 1.183 | -1.017 | 0.309 | 0.014 | 2.269 | 6.883 | 0.009** |
| Theme concreteness | 1.161 | 0.373 | 3.110 | 0.002** | 1.556 | 6.766 | 16.812 | <0.001*** |
| Length difference | 0.213 | 0.073 | 2.888 | 0.004** | 1.078 | 1.440 | 35.214 | <0.001*** |

Note. L2-L2 = dyadic interaction between participants with English as their L2; Coef. = Coefficients for the logistic regression model; S. E = Standard Errors; *** = <0.001; Chi²-test p value tests for the significance of each independent variable individually against the null model in the L2-L2 conversations; Wald's test p-value tests for the significance of individual variables within the final model, i.e. where the best predictors of the L1-L1 dative alternation targets are included; Conf. Interval = confidence intervals for the predictor variables; 2.5% = lower limit; 97.5% = upper limit.

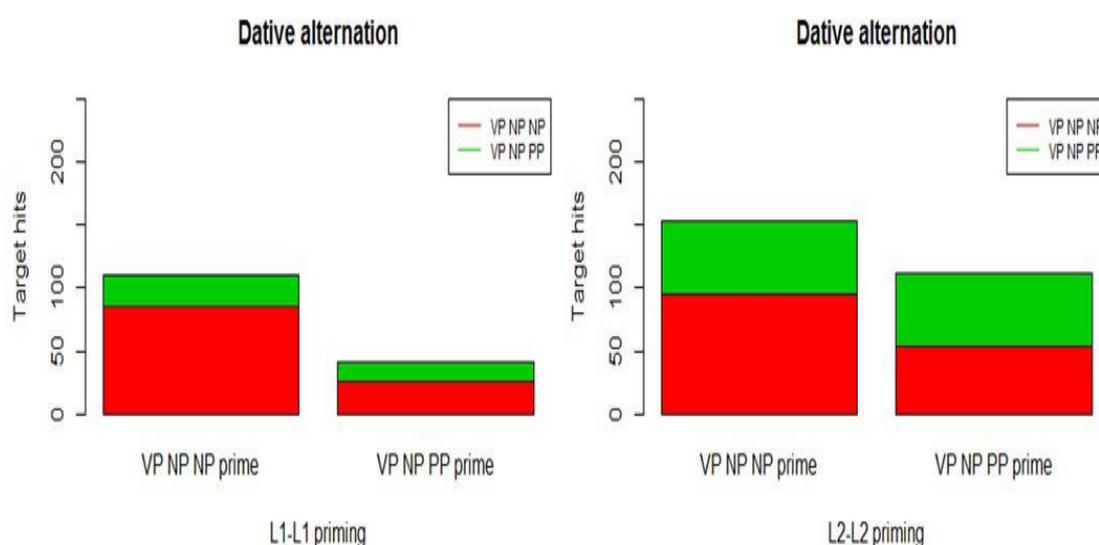
L2-L2 final model's chi-square = 94.359 ***, ($p = <0.001$)
L2-L2 final model's AIC = 284.8887

As we can see from Table 5.8, all the predictors that emerged statistically significant in the L2-L2 dative alternation full model were maintained in the final model except for the theme definiteness predictor. The best model explaining the dative alternation variants used in the L2-L2 conversations includes the prime, the prime target main verb lemma match, the pronominality, person and animacy of the target's recipient, the target's theme definiteness and the target's theme-recipient length difference.

5.5.4 Direction of L1-L1 and L2-L2 dative alternation predictive factors effects

This section outlines the direction of effects for the dative alternation variables that were statistically significant in both L1-L1 and L2-L2 data sets. It will then show the direction of the effect for the variables that emerged significant in either data set only. Figure 5.2 illustrates the direction of dative alternation prime effect on the target type used in L1-L1 and L2-L2 conversations.

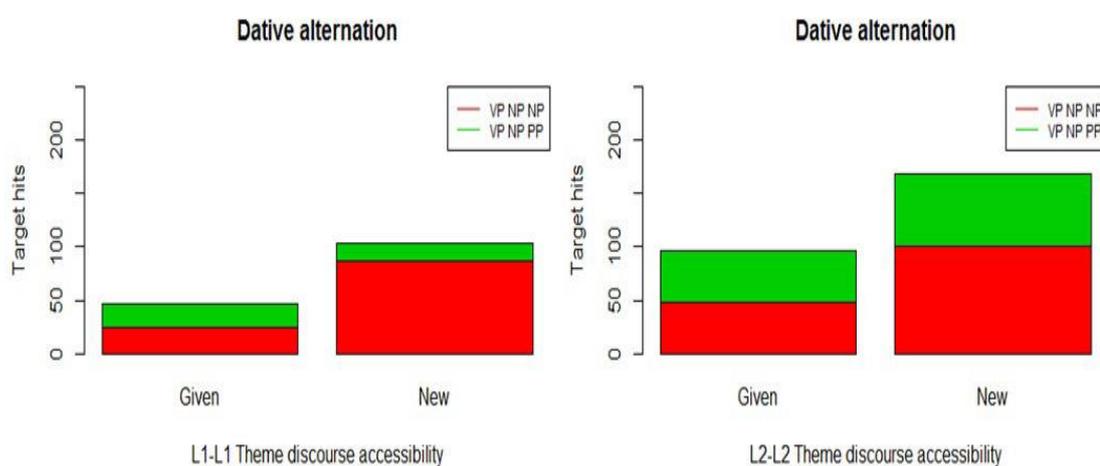
Figure 5.2: Direction of the dative alternation prime on the use of the dative construction in L1-L1 and L2-L2 conversations



The proportion of the VP NP PP sequence targets can be seen to increase when the preceding dative construction VP NP PP variant. This effect is shown for the L1-

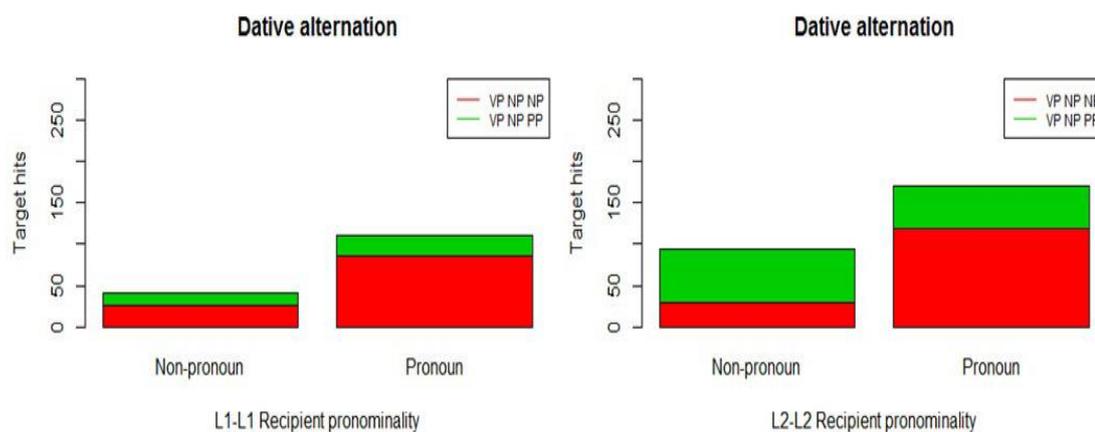
L1 as well as the L2-L2 conversations where the prior exposure to a VP NP PP prime is seen to encourage the production of a VP NP PP target. The proportion of double object targets is also seen to increase in both datasets following double object primes.

Figure 5.3: Direction of the theme discourse accessibility effect on the use of the dative construction in L1-L1 and L2-L2 conversations



As for the theme discourse accessibility predictor, Figure 5.3 shows that if the target's theme was mentioned earlier in the conversation, then L1-L1 and L2-L2 speakers are seen to exhibit the same behaviour of favouring a VP NP PP target relative to the double object variant. When the target's theme is discourse new, however, then the proportion of prepositional dative targets is seen to decline in both data sets.

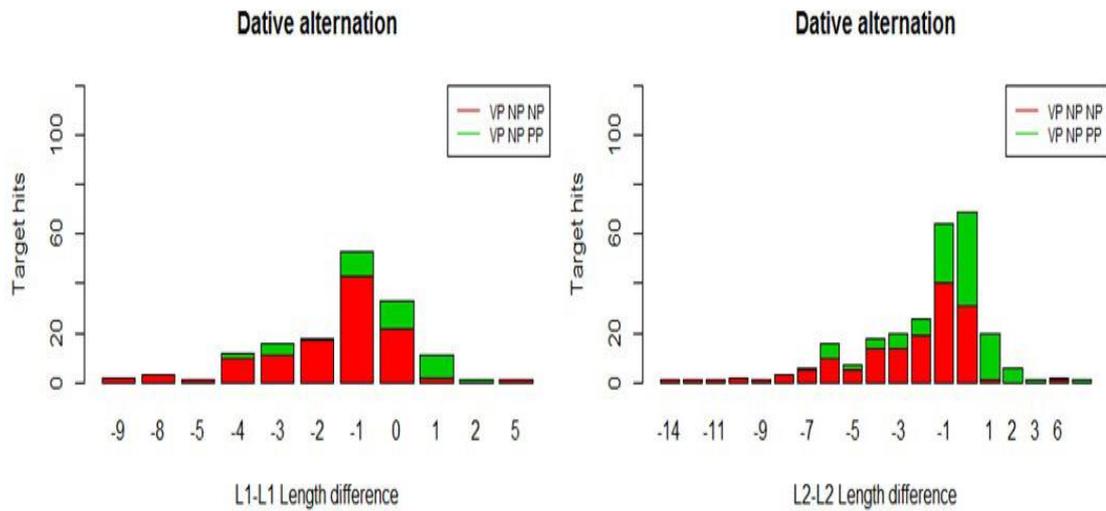
Figure 5.4: Direction of the recipient pronominality effect on the use of the dative construction in L1-L1 and L2-L2 conversations



The pronominality of recipients also emerged as a marginally significant predictor of the target in both the L1-L1 and L2-L2 data sets (see Table 5.5 and Table 5.7). Figure 5.4 shows a decline in the proportion of double object targets when the recipient is not a pronoun, relative to cases where the recipient is pronominal. When the recipient in the target is a pronoun however, the proportion of double object targets increases. This same factor was a significant predictor of the target in the L2-L2 conversations, showing the same effect of disavouring the prepositional dative targets when the recipient is a pronoun.

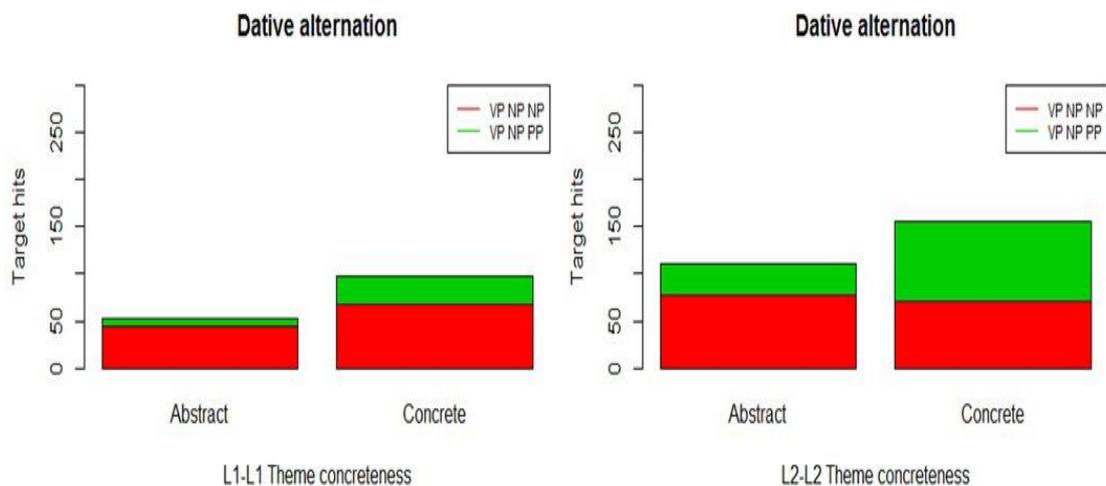
Another interesting finding is that the length difference between target's recipients and themes was an important predictor of the dative construction variant used in the target in both L1-L1 and L2-L2 conversations (see Table 5.6 and Table 5.8). Figure 5.5 shows that the longer the recipient is, relative to the theme, the more likely that the L1 and the L2 speakers will have a preference for the prepositional dative variant.

Figure 5.5: Direction of the recipient-theme's length difference effect on the use of the dative construction in L1-L1 and L2-L2 conversations



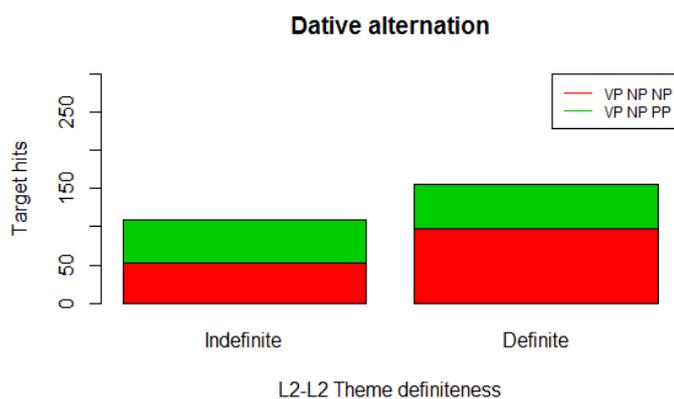
The concreteness of the theme emerged as a significant predictor of the targets in the L2-L2 conversations, but only marginally significant in the L1-L1 conversations (see Table 5.7, Table 5.8 and Table 5.5). Figure 5.6 shows that, in both data sets, the proportion of prepositional dative targets is seen to increase when the targets had a concrete theme. Abstract themes, however, are seen to favour the double object variant.

Figure 5.6: Direction of the theme concreteness effect on the use of the dative construction in L1-L1 and L2-L2 conversations



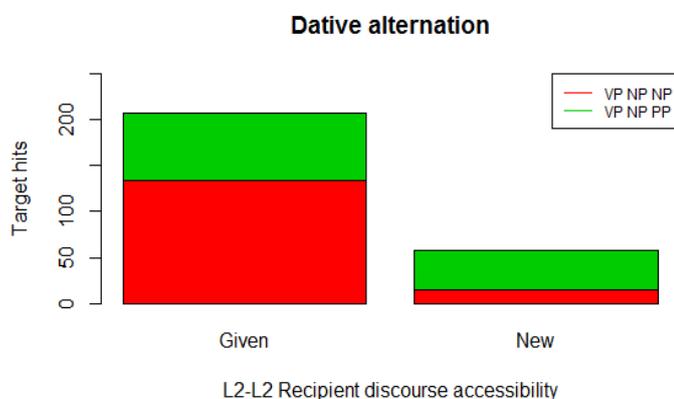
The definiteness of theme was a significant predictor of the dative alternation targets only in the L2-L2 conversations (see Table 5.5 and Table 5.7). Figure 5.7 shows that the double object is the favourable dative construction variant to use when the target has a definite theme.

Figure 5.7: Direction of the theme concreteness effect on the use of the dative construction in L2-L2 conversations



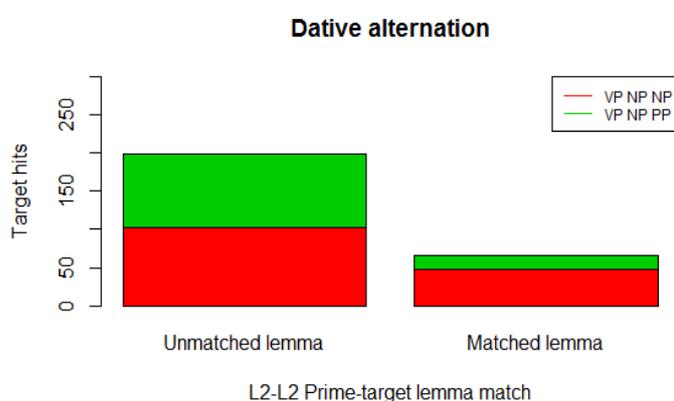
The recipient's discourse accessibility was included only in the L2-L2 GLM analysis (see section 5.4.2). Figure 5.8 shows that the L2-L2 dative constructions with given recipients are seen to favour double object variants. Dative constructions with discourse new recipients, however, are seen to favour the prepositional dative variant.

Figure 5.8: Direction of the recipient discourse accessibility effect on the use of the dative construction in L2-L2 conversations



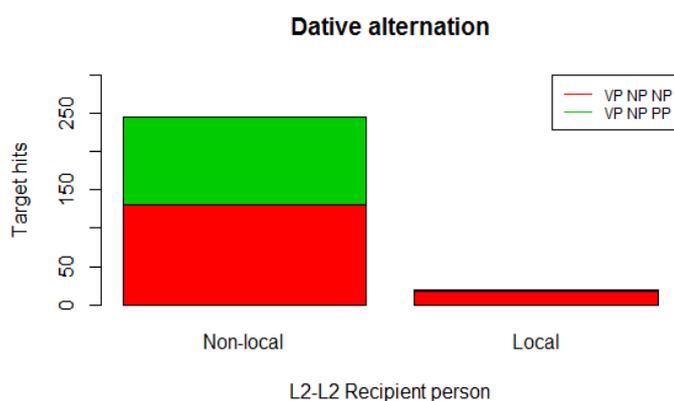
The identity of the dative alternation prime-target pair lemma emerged significant as an individual predictor of the target only in the L2-L2 conversations (see Table 5.7 and Table 5.8). The dative alternation prime-target pairs with an identical lemma can be seen to have a preference for double object targets (see Figure 5.9). The proportion of prepositional dative targets, however, is seen to increase when the dative alternation prime-target pairs do not share the same main verb lemma.

Figure 5.9: Direction of the main verb lemma match effect on the use of the dative construction in the L2-L2 conversations



Finally, person of recipient was found to be a statistically significant predictor of dative alternation targets only in the L2-L2 conversations (see Table 5.7). The proportion of prepositional dative construction variant is seen to decrease when the target's recipient used was first or second person singular or plural (see Figure 5.10).

Figure 5.10: Direction of the person of recipient effect on the use of the dative construction in the L2-L2 conversations



Having outlined how the individual predictors influence the use of the dative construction in L1-L1 and L2-L2 conversations, the next section will give an account of possible interaction of priming with prime-target pair distance, lexical boost and speaker identity (see 3.3).

5.5.5 The L1-L1 and L2-L2 dative alternation interaction models

In Table 5.9 we can see the GLM results for the interaction dative alternation priming with the prime-target pair distance, the lexical predictors (i.e. prime-target main verb lemma match, prime-target theme match and prime-target recipient match) and the prime-target speaker's identity.

Table 5.9: The outcome of the interaction models in L1-L1 and L2-L2 dative alternation priming

| Interactions | L1-L1 | | | L2-L2 | | |
|-------------------------------------|------------------|----------|--------|------------------|----------|--------|
| | Chi ² | <i>p</i> | AIC | Chi ² | <i>p</i> | AIC |
| Previous type * distance | 1.20 | 0.27 | 172.27 | 0.51 | 0.47 | 365.15 |
| Previous type * lemma match | 0.03 | 0.87 | 176.00 | 10.56 | <0.001** | 348.46 |
| Previous type * verb semantic class | 3.00 | 0.39 | 177.76 | 4.37 | 0.02* | 346.22 |
| Previous type * speaker match | 0.20 | 0.66 | 176.86 | 0.91 | 0.34 | 364.56 |
| Previous type * recipient match | 0.21 | 0.65 | 176.60 | 0.92 | 0.34 | 364.02 |
| Previous type * theme match | 0.00 | 0.98 | 177.23 | 0.16 | 0.68 | 365.07 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; * = <0.05; ** = <0.01; Chi²-test's p-value tests an interaction between the prime and the other predictors included in the table, individually.
L1-L1 null model's AIC = 174.52
L1-L1 independent priming predictor's AIC = 174.51
L2-L2 null model's AIC = 365.25
L2-L2 independent priming predictor's AIC = 362.18

We can see from Table 5.9 that none of the L1-L1 predictors that were tested for interaction with the prime affected the magnitude of the priming effect. In the L2-L2 conversations, however, we can see that the prime-target main verb lemma match did affect the magnitude of the dative alternation priming effect. These interactions will be further detailed in the next 5.5.5.1, 5.5.5.2 and 5.5.5.3 sections.

5.5.5.1 Prime-target pair distance

We can see from Table 5.9 that the interaction between prime-target pair distance and the prime does not improve the priming effect in either data set (*p* =

0.27) for the L1-L1 and ($p = 0.47$) for the L2-L2 conversations. Table 5.10 outlines the descriptive statistics for all dative alternation prime-target pairs' distance in the L1-L1 and L2-L2 conversations.

Table 5.10: Descriptive statistics of prime-target distance in L1-L1 and L2-L2 conversations

| Descriptive statistics | Prime-target pairs | |
|------------------------|--------------------|----------------|
| | L1-L1 distance | L2-L2 distance |
| Mean (SD) | 21.23 (31.42) | 18.25 (24.55) |
| Median | 10 | 10 |
| Mode | 1 | 1 |
| Maximum | 212 | 210 |
| Minimum | 0 | 0 |
| Lower bound | 16.19 | 15.28 |
| Upper bound | 26.29 | 21.22 |
| Confidence level (95%) | 5.05 | 2.97 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = dative alternation prime-target pair maximum distance in AS-Units; Minimum = dative alternation prime-target pair minimum distance in AS-Units.

Compared to L2-L2 conversations, the dative alternation prime-target pairs were separated by about three fewer AS-Units on average in L1-L1 conversation (see Table 5.10). Moreover, only one AS-Unit gap separated most of the dative alternation prime-target pairs in both data sets. Table 5.11 shows the descriptive statistics of prime-target pairs with matched and unmatched dative construction variants in both L1-L1 and L2-L2 data sets.

Table 5.11: Descriptive statistics of prime-target matched and unmatched distance in L1-L1 and L2-L2 conversations

| Descriptive statistics | L1-L1 prime-target pairs | | L2-L2 prime-target pairs | |
|------------------------|--------------------------|--------------------|--------------------------|--------------------|
| | Matched distance | Unmatched distance | Matched distance | Unmatched distance |
| Mean (SD) | 20.23 (33.40) | 23.26 (27.18) | 18.98 (27.37) | 17.38 (20.17) |
| Median | 9 | 16 | 9 | 11 |
| Mode | 2 | 1 | 1 | 12 |
| Maximum | 212 | 149 | 210 | 105 |
| Minimum | 0 | 0 | 0 | 0 |
| Upper bound | 26.83 | 30.98 | 23.27 | 21.16 |
| Lower bound | 13.64 | 15.53 | 14.52 | 13.60 |
| Confidence level (95%) | 6.59 | 7.72 | 4.37 | 3.77 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = prime-target pair maximum distance in AS-Units; Minimum = prime-target pair minimum distance in AS-Units; Matched distance = prime-target pair distance where the prime and target are of the same dative construction variant; Unmatched distance = prime-target pair distance where the dative construction variant in the prime is different from the one in the target.

In the L1-L1 conversations, the unmatched prime-target pairs' median is seen to be notably higher than the matched prime-target pairs' median. The difference between the median of the matched and unmatched prime-target pair distance is smaller for L2-L2 conversations, i.e. only 2 AS-Units. Table 5.11 also shows that the dative alternation matched prime-target pairs in the L1-L1 conversations were separated by an average of about one AS-Unit more than the L2-L2 matched prime-target pairs. Moreover, the dative alternation unmatched prime-target pairs in the L1-L1 conversations were separated by an average of about 6 AS-Units fewer than the L2-L2 unmatched prime-target pairs. These differences are visualised in Figure 5.11 using the VCD package in R studio, (Meyer et al., 2006).

Figure 5.11: Dative alternation priming interaction with prime-target distance in L1-L1 and L2-L2 conversations

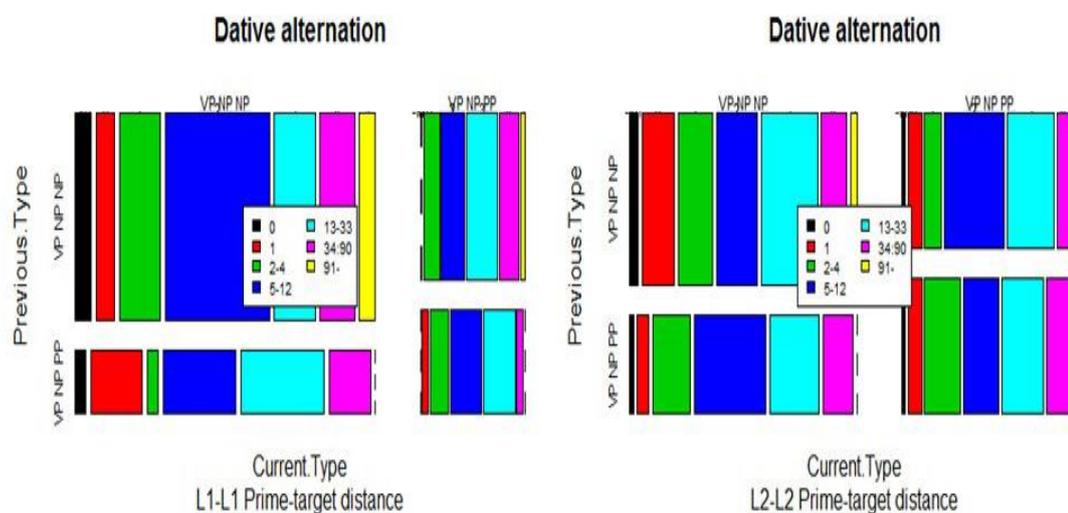


Figure 5.11 shows the prepositional dative and double object primes are shown along the Y-axis and the targets along the X-axis. Each bar represents the frequency of dative alternation targets within the respective prime-target distance range. For the L1-L1 VP NP NP primes, the targets were mostly the VP NP NP pattern, especially when the distance separating prime-target pairs was 12 AS-Units or fewer. The area in blue representing prime-target pairs that are between 5 and 12 AS-Units apart is particularly greater for double object targets relative to the prepositional dative targets following VP NP NP primes. The VP NP PP prepositional dative primes along the Y-axis, however, are seen to have been followed by more VP NP NP targets, relative to VP NP PP targets. That seems to be the case across all distances except for the green area where the primes were separated by 2-4 AS-Units from the targets.

As for the L2-L2 double object primes, a general trend of favouring the double object targets following double object primes can be observed. This is the case across all distances to the exception of the area in blue, i.e. prime-target pairs at 5-12 AS-Units distance, which is slightly larger for the prepositional dative targets following

double object primes. Similarly, we can see the same behaviour with prepositional dative prime-target pairs. A general tendency of producing more prepositional dative targets, relative to double object targets, can be observed across the different L2-L2 prime-target pair distances. Only the blue area, i.e. prime-target distance between 5 and 12 AS-Units, seems slightly greater for double object targets relative to prepositional dative targets following prepositional dative primes.

5.5.5.2 Lexical boost

Table 5.12 shows that just under one third of the dative alternation prime-target pairs had a matched main verb lemma in both the L1-L1 data set. Only one fourth of the L2-L2 dative alternation prime-target pairs had a matched main verb lemma. Close to one tenth of the L1-L1 and L2-L2 dative alternation prime-target pairs had a shared theme. Just over one fourth of the L1-L1 dative alternation prime-target pairs had a shared recipient. Finally, one fifths of the L2-L2 dative alternation prime-target pairs had a shared recipient. A two-sided Fisher's exact test proves that there are no significant differences in the proportions of L1-L1 and L2-L2 dative alternation prime-target pairs with matched and unmatched main verb lemma ($p_{\text{Fisher exact}} = 0.250$), matched and unmatched theme ($p_{\text{Fisher exact}} = 0.408$), and matched and unmatched recipient ($p_{\text{Fisher exact}} = 0.185$).

Table 5.12: Dative alternation prime-target pairs' matched and unmatched main verb lemmas, themes and recipients

| Corpus | # Matched lemma (%) | # Unmatched lemma (%) |
|--------|-------------------------|---------------------------|
| L1-L1 | 46 (30.46%) | 105 (69.54%) |
| L2-L2 | 66 (24.91%) | 199 (75.09%) |
| Corpus | # Matched theme (%) | # Unmatched theme (%) |
| L1-L1 | 13 (8.61%) | 138 (91.39%) |
| L2-L2 | 30 (11.32%) | 235 (88.68%) |
| Corpus | # Matched recipient (%) | # Unmatched recipient (%) |
| L1-L1 | 41 (27.15%) | 110 (72.85%) |
| L2-L2 | 56 (21.13%) | 209 (78.87%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched lemma = number of dative alternation prime-target pairs sharing the same main verb lemma; # Unmatched lemma = number of dative alternation prime-target pairs with different main verb lemmas; # Matched theme = number of dative alternation prime-target pairs sharing the same theme or its referent; # Unmatched theme = number of dative alternation prime-target pairs with different themes; # Matched recipients = number of dative alternation prime-target pairs sharing the same recipient or its referent; # Unmatched recipient = number of dative alternation prime-target pairs with different recipients.

Table 5.13 shows the proportions of dative alternation prime-target pairs in the case of matched and unmatched main verb lemmas.

Table 5.13: Matched and unmatched dative alternation prime-target pairs in the case of matched and unmatched main verb lemmas, themes and recipients

| | | Matched Lemma | | Unmatched lemma | |
|--------|---------------------|-----------------------|---------------------|-----------------------|--|
| Corpus | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) | |
| L1-L1 | 32 (69.57%) | 14 (30.43%) | 69 (65.71%) | 36 (34.29%) | |
| L2-L2 | 51 (77.27%) | 15 (22.63%) | 102 (51.26%) | 97 (48.74%) | |

| | | Matched theme | | Unmatched theme | |
|--------|---------------------|-----------------------|---------------------|-----------------------|--|
| Corpus | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) | |
| L1-L1 | 9 (69.23%) | 4 (30.77%) | 92 (66.66%) | 46 (33.34%) | |
| L2-L2 | 18 (60.00%) | 12 (20.00%) | 135 (57.45%) | 100 (42.55%) | |

| | | Matched recipient | | Unmatched recipient | |
|--------|---------------------|-----------------------|---------------------|-----------------------|--|
| Corpus | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) | |
| L1-L1 | 27 (65.85%) | 14 (34.15%) | 74 (67.27%) | 36 (32.73%) | |
| L2-L2 | 37 (66.07%) | 19 (33.93%) | 116 (55.50%) | 93 (45.50) | |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched pairs = number of dative alternation primes immediately followed by dative alternation targets with the same VP NP NP or VP NP PP sequence as in the prime; # Unmatched pairs = number of dative alternation primes followed by dative alternation targets with a different dative construction to the one in the prime; Matched lemma = dative alternation prime-target pairs sharing the same main verb lemma; Unmatched lemma = dative alternation prime-target pairs with different main verb lemmas; Matched theme = dative alternation prime-target pairs sharing the same theme or its referent; Unmatched theme = dative alternation prime-target pairs with different themes; Matched recipients = dative alternation prime-target pairs sharing the same recipient or its referent; Unmatched recipient = dative alternation prime-target pairs with different recipients.

Table 5.13 shows that over two thirds of the dative alternation prime-target pairs with matched main verb lemmas in the L1-L1 conversations has the same dative alternation variant in the prime and target. In the L2-L2 conversations, however, over three quarter of the dative alternation prime-target pairs with a matched main verb lemma had the same dative construction variant in the prime and target. When the main verb lemma of the target did not match the main verb lemma of the prime, slightly less than two thirds of the L1-L1 dative construction primes were repeated.

However, slightly higher of the dative alternation primes with different main verb lemmas to the target were repeated in the L2-L2 conversations.

Table 5.13 also shows that over two thirds of the L1-L1 dative alternation prime-target pairs with a matched theme had the same prime-target dative alternation variant. Three fifths of the L2-L2 dative alternation prime-target pairs with a matched theme had the same prime-target dative alternation variant. When the dative alternation target's theme was different from that of the prime, two thirds of the L1-L1 dative construction primes were repeated. When the L2-L2 dative alternation prime-target pairs had different themes, the same dative alternation variant was repeated in the target only under two thirds of the time. Finally, two thirds of the L1-L1 and L2-L2 dative alternation prime-target pairs with a matched recipient had the same prime-target dative alternation variant. When the dative alternation prime-target pairs had different recipients, two thirds of the dative alternation primes were repeated for L1-L1 conversations. L2-L2 dative alternation primes with recipients that are different to the targets' were repeated close to fifty five percent of the time.

5.5.5.3 Priming-speaker interaction

Table 5.14 shows the proportions of L1-L1 and L2-L2 dative alternation prime-target pairs where the primes and targets were produced by the same or a different speaker.

Table 5.14: Dative alternation prime-target pairs in the case of same and different speaker

| Corpus | # Same speaker (%) | # Different speaker (%) |
|--------|--------------------|-------------------------|
| L1-L1 | 126 (83.44%) | 25 (16.56%) |
| L2-L2 | 216 (81.51%) | 49 (18.49%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Same speaker = number of dative alternation prime-target pairs produced by the same speaker; # different speaker = number of dative alternation prime-target pairs produced by different speakers.

The dative alternation prime-target pairs were spoken by the same person almost eighty five percent of the time for the L1-L1 conversations and just over four fifths of the time for the L2-L2 conversations. A two-sided Fisher’s exact test confirms that the proportions of dative alternation prime-target pairs spoken by the same or a different person are not significantly different between the L1-L1 and L2-L2 conversations ($p_{\text{Fisher exact}} = 0.690$).

Table 5.15 details the proportions of prime-target pairs spoken by the same or a different person and consisting of the same or a different dative alternation variant.

Table 5.15: Matched and unmatched dative alternation prime-target pairs when they were produced by the same or different speakers

| | Same speaker | | Different speaker | |
|--------|---------------------|-----------------------|---------------------|-----------------------|
| Corpus | # Matched pairs (%) | # Unmatched pairs (%) | # Matched pairs (%) | # Unmatched pairs (%) |
| L1-L1 | 87 (69.05%) | 39 (30.95%) | 14 (56.00%) | 11 (44.00%) |
| L2-L2 | 128 (60.95%) | 88 (39.05%) | 25 (51.02%) | 24 (49.98%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched pairs = number of dative alternation primes immediately followed by dative alternation targets with the same VP NP NP or VP NP PP sequence as in the prime; # Unmatched pairs = number of dative alternation primes followed by dative alternation targets with a different dative construction to the one in the prime; Same speaker = dative alternation prime-target pairs produced by the same speaker; Different speaker = dative alternation prime-target pairs produced by different speakers.

As can be seen from the table above, just over two thirds of the dative alternation prime-target pairs produced by the same speaker were matched prime-target pairs in the L1-L1 conversations. In the L2-L2 conversations, almost three fifths of the dative alternation prime-target pairs spoken by the same speaker had the same prime-target variant. The prime-target pairs produced by a different speaker in the L1-L1 conversations had matched dative construction variants close to four sevenths of the time. Finally, almost half of the L2-L2 dative alternation prime-target pairs produced by a different speaker consisted of the same dative alternation variant.

To sum up, this results section has reported on the dative alternation predictors in the L1-L1 and L2-L2 conversations. It showed a marginally significant dative alternation priming effect in the L1-L1 conversations. The L2-L2 GLM analysis also showed evidence for significant dative alternation priming effect. In both data sets, the dative alternation variants used can also be explained by discourse-related factors, (e.g., theme discourse accessibility for the L1-L1 conversations and the theme-recipient syllable length difference for both the L1-L1 and L2-L2 conversations). Interestingly, the current study did not provide support for an interaction between prime-target pair distance and the prime or the speakers' identity with the prime in either data set. However, there is support for an interaction between main verb lemma match and the prime only in the L2-L2 conversations. Table 5.16 summarises all dative alternation predictive variable GLM results. These findings will be interpreted and discussed in the next discussion section.

Table 5.16: Summary of the dative alternation predictive variables results

| Variable | Prime | Distance | Lemma match | Theme definiteness | T. number | R. number | T. discourse accessibility | R. discourse accessibility | T. concreteness | R. Animacy | R. pronominality | R. person | Length difference |
|--------------|----------------------------------|----------|------------------------|--------------------------------|--------------------------|----------------------------|----------------------------|----------------------------|-----------------|------------|------------------|-----------|-------------------|
| L1-L1 | ~ | ~ | n.s. | n.s. | n.s. | | √ | | ~ | | ~ | n.s. | n.s. |
| L2-L2 | √ | n.s. | √ | √ | | n.s. | ~ | √ | √ | √ | √ | √ | √ |
| Interactions | Prime * Prime-target distance | | Prime * Lemma match | Prime * Verb semantic class | Prime * Speaker match | Prime * Recipient match | Prime * Theme match | | | | | | |
| L1-L1 | | | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |
| L2-L2 | | | n.s. | √ | √ | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Distance = dative alternation prime-target pair distance; T. = theme; R. = Recipient; √ = significant predictor; ~ = marginally significant predictor; n.s. = non-significant predictor; * = interaction; Recipient number, recipient animacy and recipient discourse accessibility were not included as predictors in the L1-L1 dative alternation analysis; Theme number was not included as a predictor in the L2-L2 dative alternation analysis.

5.6 Discussion of the dative alternation data

This discussion section will begin by addressing the individual predictive variables that influenced the dative alternation construction preference in both the L1-L1 and L2-L2 data sets. Subsequently, the prime-target distance predictor will be discussed as an individual predictor in its own right and with regards to its interaction with the dative alternation primes. The dative alternation lexical boost findings will be accounted for in Section 5.6.3. Finally, the role of speaker identity in the use of dative construction variants will be discussed in section 5.6.4.

5.6.1 Construction preference

Beginning with the question of dative alternation priming, the conditional probabilities for both dative alternation variants in both data sets presented in Table 5.4 can be taken as an indication for dative alternation priming. This evidence was confirmed by the GLM analysis, which showed that, overall, there is support for the proposal that the L1-L1 and L2-L2 dative alternation variants used in the targets were influenced by whether or not the participants had been exposed to that same dative alternation variant immediately before. The evidence for priming could be observed in both data sets even when the other explanatory factors for dative alternation were controlled for. This finding is in harmony with Bresnan et al. (2007) who found evidence for dative alternation priming when dative alternation predictors were considered.

However, it is important to point out that unlike the L2-L2 dative alternation priming effect, the L1-L1 dative alternation priming effect is only marginally significant (see Table 5.5). It is possible that priming served as a mechanism that the L1-L1 and the L2-L2 used as a means to create mutual understanding among themselves to facilitate the performance of the task at hand, i.e. each participant

narrating the part of the Charlie Chaplin movie that they watched to their interlocutor. This possible explanation fits into Pickering and Garrod (2004) interactive alignment model where interlocutors develop similar representations simultaneously at different linguistic levels in order to establish joint understanding among each other.

The fact that the dative alternation priming was stronger in the L2-L2 conversations can possibly be explained by the participants' prior exposure to the language. First, the L1 speakers tend to be more flexible and have more resources, besides priming, to resort to due to English being their L1. Despite the fact that the L2 speakers have a relatively high English proficiency (see section 3.1.2), they have less familiarity with English, relative to the L1 speakers who will have had more exposure to English as an L1. Given the cognitive burden associated with having to speak in a language some of them are not fluent in, to various degrees, it is possible that the L2 interlocutors mirrored each other's dative alternation use to facilitate the flow of conversation. This might, in part, explain the notably larger number of the dative construction in both its variants used in the L2-L2 conversations relative to the L1-L1 sample (see Table 5.1).

Crucially, dative alternation priming in L2-L2 conversations confirms Costa et al.'s (2008) prediction that because the L2 speakers with the same L1, i.e. German, they will produce their L2 in more similar ways than speakers with dissimilar L1s. And therefore, it is understandable that when an English L2 speaker with a German L1 opts for a double object construction, their German L1 interlocutor is likely to consequently use a double object construction as opposed to the prepositional dative variant. Although this study is specifically investigating the English production of American native speakers and German learners of English, the L2-L2 dative alternation priming is in line with Loebell and Bock's (2003) evidence for cross-linguistic transfer, i.e. English and German, dative alternation priming. Because the

same dative alternation type exists in the two languages, it is possible that the German speakers co-activated their German L1 and English L2 as they were using English to describe events of motion in the Charlie Chaplin movie.

Figure 5.12 illustrates the dative alternation priming predictor in L2-L2 conversations.

Figure 5.12: German transcript 52, Speaker A and B: L2-L2 dative alternation priming predictor

| | | |
|-----|---|--|
| 109 | B | and then he doesn't want to pay it any longer |
| 110 | B | and he pays his own bill and gives the waiter extra money |
| 111 | B | what the man gets away and pays his bill with the money, |
| 112 | B | then they get out of the restaurant, and get somehow engaged |
| 113 | B | I don't know, |
| 114 | B | and he asked the artist to lend him some dollars |
| 115 | B | and lends him the money, |
| 116 | B | and then go to get a marriage license. |
| 117 | A | and that was the happy ending? |
| 118 | B | that was the happy ending. |
| 119 | A | and what about the mother? Disappeared? |

Figure 5.12 shows an L2 speaker, i.e. speaker B, narrating a scene from the silent Charlie Chaplin movie to his L2 interlocutor, i.e. speaker A. First, speaker B uses the double object construction in describing Charlie Chaplin's action of paying the waiter extra money. Three AS-Units later, i.e. in sentence 114, speaker B opts for the double object construction again. In the next sentence, uses the dative construction for the third time. Therefore, one possible way of explaining this repetition of the double object variant is to attribute it to syntactic priming.

However, the repetition of the dative construction variants can be explained by other significant factors too. The target's theme discourse accessibility was a significant predictor of the dative alternation use in the L1-L1 conversations but only marginally significant in the L2-L2 data set. If the theme was mentioned earlier in the conversation, then the L1-L1 speakers are more likely to favour the VP NP PP

prepositional dative variant in the target as opposed to a VP NP NP double object variant. This finding also gives support to Bresnan et al. (2007) who found the same direction for the theme discourse accessibility effect in telephone conversations.

Figure 5.13 illustrates dative alternation priming in L1-L1 conversations

Figure 5.13: English transcript 10, Speaker B: L1-L1 theme discourse accessibility predictor

| | | |
|-----|---|---|
| 127 | B | and he didn't have any money. |
| 128 | B | then the man ended up pay |
| 129 | B | the waiter brought the man his bill |
| 130 | B | the man paid for his bill. |
| 131 | B | And he left a really large tip. |
| 132 | B | because they were all at the same table. |
| 133 | B | and he asked the waiter to bring his bill to him |
| 134 | B | They are at the table were Charlie Chaplin and the lady |

We can see from Figure 5.13 is that speaker B is narrating to his interlocutor a scene where a customer is making his payment to a waiter. The theme 'his bill' was used in the sentence (129) with a double object construction. The same theme appeared again but in a prepositional dative variant only after three AS-units of the double object prime, i.e. sentence (133). It could be argued, therefore, that given the fact that the theme was accessible to the speaker, they opted for the VP NP PP prepositional dative construction as opposed to the VP NP NP double object construction variant (see Figure 5.3).

The pronominality of recipient emerged as a marginally significant predictor of the dative construction variant used in the L1-L1 conversations and as a statistically significant predictor of the L2-L2 conversations (see Table 5.5 and Table 5.7). Figure 5.14 illustrates the recipient pronominality predictor in an L2-L2 conversation.

Figure 5.14: German transcript 67, Speaker A and B: L2-L2 recipient pronominality predictor

| | | |
|-----|---|---|
| 287 | B | it's not so many films have changed that way. |
| 288 | B | that's strange |
| 289 | B | and it was clear that he would offer her his seat |
| 290 | B | he would be all |
| 291 | A | but the first part of the film |

As we can see from Figure 5.14, the pronominal recipient 'her' is shorter than the theme, which includes a pronoun but is more complex than the recipient. Therefore, it could be argued that, given the complexity of the theme, relative to the recipient, the speaker B produced the pronominal recipient first and deferred the complex theme to a final position.

The definiteness of the theme was a significant predictor of the dative alternation use only in the L2-L2 conversations. The use of dative alternation in the L1-L1 conversation, therefore, cannot be attributed to the target's theme being definite or indefinite (see Table 5.5 and Table 5.7). If we stay with Figure 5.14 to illustrate this predictor, we can see that double object's theme was definite, i.e. his seat. The definiteness of the theme, therefore, can be thought of as another possible explanation for the use of the double object construction as opposed to the prepositional dative in Figure 5.14.

Moreover, the length difference between target's recipients and themes was an important predictor of the dative construction variant use in both the L1-L1 and L2-L2 conversations (see Table 5.6 and Table 5.8). Figure 5.15 illustrates this length difference predictor in an L1-L1 conversation:

Figure 5.15: English transcript 131, Speaker A and B: L2-L2 theme-recipient length difference predictor

| | | |
|-----|---|--|
| 139 | B | He like, I don't know stupid. |
| 140 | B | But anyways, so he orders something to eat |
| 141 | A | I'm just kidding |
| 142 | A | the waiter brings him a bowl o' beans, a coffee and a baguette |
| 143 | B | and so he's eating up. |

The recipient in the example above was a pronoun, but the theme was a noun phrase consisting of multiple words. The fact that the theme was longer than the recipient in the example above is one way of understanding the use of the double object by speaker A in sentence 142. Given the length and complexity of the theme in sentence (142), Speaker A produced the recipient 'him' before the theme perhaps to allow himself some time for utterance planning.

The concreteness of the theme emerged as a marginally significant predictor of the dative alternation use in the L1-L1 conversations and statistically significant in the L2-L2 data set (see Table 5.5 and Table 5.8). Figure 5.16 is an example on the concreteness of theme effect.

Figure 5.16: English transcript 47, speaker A: L1-L1 theme concreteness predictor

| | | |
|----|---|--|
| 34 | A | he sees her, |
| 35 | A | gives her the eye, |
| 36 | A | and he asks her whether she wants to sit down, |
| 37 | A | and he gets up, |
| 38 | A | and she sits down, |
| 39 | A | then he goes outside onto the main deck, |

The example in Figure 5.16 shows that the speaker used a double object construction with a concrete recipient, i.e. the pronoun 'her', and an abstract theme, i.e. 'the eye'. What the speaker meant it is not an eye in its concrete sense, but rather the abstract sense of looking or staring. Therefore, the abstractness of the theme in

sentence (35) can be thought of as a possible explanation for speaker A's use of double object variant.

Another significant predictor of the dative alternation was the recipient's person, but only in the L2-L2 conversations (see Table 5.8). Figure 5.17 is an illustration of this predictor.

Figure 5.17: German transcript 31, speaker A and B: L2-L2 person of the recipient predictor

| | | |
|-----|---|--|
| 260 | B | Because they just don't talk only the music some sentences are written |
| 261 | B | but you could get a lot of atmosphere |
| 262 | A | yeah you can |
| 263 | A | it is like with their behavior and their emotions or so |
| 264 | A | that they're speaking or telling you something. |

As we can see in Figure 5.17, Speaker (A) uses the ditransitive verb 'tell' followed by the second person singular pronoun 'you' in a double object construction. The person of the recipient predictor, therefore, can be thought of as a possible explanation of the double object construction variant preferred in the L2-L2 conversations.

Finally, main verb lemma match between dative alternation prime-target was a statistically significant predictor of the target in the L2-L2 but not in the L1-L1 conversations. Figure 5.18 is an illustration of the main verb lemma match predictor in an L1-L1 conversation.

Figure 5.18: German transcript 201, speaker A: L2-L2 recipient person predictor

| | | |
|----|---|---|
| 20 | A | and then he realizes she doesn't have any money |
| 21 | A | so he secretly <u>gives</u> her his money he just won |
| 22 | A | but this one guy is watching them |
| 23 | A | and he thinks that Charlie Chaplin is a pickpocket |
| 24 | A | and took the money away from that woman |
| 25 | A | so he stops him and calls the lady |
| 26 | A | and says hey that guy just stole your money |
| 27 | A | but she realizes that he just <u>gave</u> her money |
| 28 | A | so she's really happy |

Figure 5.18 above shows a dative construction prime produced by speaker A in sentence 21. The ditransitive verb ‘give’ was used in a double object construction, i.e. with a complement of two noun phrases, one as the recipient ‘her’, and another as the theme ‘his money he just won’. A few sentences later, the same speaker used the same ditransitive main verb lemma, i.e. give, again in a double object construction. It seems that some ditransitive verbs have an inherent preference for one dative alternation variant relative to the other. This finding can be explained by (Pickering & Branigan, 1998) whereby the initial use of the verb ‘give’ with a double object construction activates not only ‘give’ the lemma, but also the combinatorial nodes linking ‘give’ with a complement of two noun phrases, i.e. double object. Therefore, next time the speaker is to use a dative alternation variant, they are more likely to use the main verb lemma with a complement of two noun phrases, i.e. the double object, as opposed to the prepositional dative variant because the combinatorial nodes linking the verb with the double object have been activated.

5.6.2 Prime-target pair distance

The GLM analysis did not show evidence for significant interaction between priming and distance in predicting the dative alternation variants used in the L1-L1 and L2-L2 conversations (see Table 5.9). The dative alternation priming on its own

was a stronger predictor of the target when its interaction with the prime-target distance is disregarded. This finding is consistent with (Bock et al., 2007; Bock & Griffin, 2000) who did not find interaction between dative alternation priming and the prime-target pair evidence. The lack of interaction between prime-target pair distance and the dative alternation prime maybe indicative of an irrelevance for prime-target pair distance interaction with priming relative to lexical boost effect (see section 5.6.3 for a discussion of the lexical boost effect).

However, the L1-L1 prepositional dative primes were almost always immediately reused when they were in the same sentence as the target or one AS-unit apart (see Figure 5.11). We, therefore, have an indication for the L1-L1 sample's general inclination to follow the dative alternation the primes with targets of the same variant with minimum prime-target pair distance.

When the primes are the double object variants, the proportion of L1-L1 and L2-L2 unmatched prime-target pairs increases with greater prime-target pair distance. The same trend can be observed in the prepositional dative primes where greater prime-target pair's distance leads to more unmatched targets to the prepositional dative primes in both data sets (see Figure 5.11).

Moreover, Table 5.11 is important because it showed that the L1-L1 matched dative alternation prime-target pairs were separated by fewer AS-Units on average than unmatched ones. We, therefore, have an indication for a general inclination especially on the part of the L1-L1 participants, but less so for the L2-L2 participants, to reuse the same dative alternation primes with minimum prime-target pair distance. However, this tendency is not strong enough to statistically influence the strength of the dative alternation priming effect (see Table 5.9).

5.6.3 *Lexical boost*

The descriptive statistical analysis of lexical boost indicated that the shared main verb lemma between dative alternation prime-target pairs is likely to enhance the reproduction of the same construction variants used in the primes (see Table 5.13). Similarly, the shared theme and the shared recipient between prime-target pairs seem to also enhance the use of the same variants as in the primes.

The GLM analysis showed that the interaction of main verb lemma identity with the primes enhances the magnitude of dative alternation priming in the L2-L2 conversations, but not for L1-L1 conversations. That is, the L2-L2 interlocutors have a greater tendency of repeating the same double object or prepositional dative construction when the prime and target share the same main verb lemma (see Table 5.9). In the L1-L1 conversations, the interaction between dative alternation priming and main verb lemma match was not a stronger predictor of the target than priming itself. Therefore, there is no evidence for lexical boost in the L1-L1 conversation.

The lack of support for lexical boost in the L1-L1 conversations is an important finding because it confirms that priming can occur in the absence of a shared main verb lemma between a dative construction's prime and target (e.g., (Pickering & Branigan, 1998; first and second experiment). The L2-L2 lexical boost finding lends support to Branigan et al. (2000, p. B20)'s suggestion of enhanced priming when the ditransitive verb is the same in the prime and target. The support for dative alternation priming in both data sets confirms that priming occurs even when the aspect, number and tense of main verbs in prime-target pairs are not controlled for.

Besides the lexical boost effect caused by shared prime-target pair's main verb lemma in L2-L2 conversations, no evidence was found for an enhancement of the priming effect caused by use of the same recipient or theme in prime-target pairs in

either language group (see Table 5.9). Finally, the effect of the main verb semantic class of the target interaction with dative alternation priming was greater than priming as a predictor on its own only in the L1-L1 conversations (Table 5.9). Therefore, it is plausible that in the L2-L2 conversations, the lexical boost effect is associated not only with the individual main verbs per say, but also with their respective semantic class.

5.6.4 Speaker identity

Contrary to Gries' (2005) finding, the GLM analysis shows no evidence in both data sets for a stronger priming effect when the speaker identity of the prime and target was the same (see Table 5.9). As pointed out in section 4.6.4, Gries' (2005) findings of a significant speaker identity effect is only marginally significant. This thesis is a study that looks only at free dialogue comparing syntactic priming in L1-L1 and L2-L2 data that was elicited using the exact same task design. The task was about two participants watching different scenes of the same movie and narrating the part they watched to their partners, and then engage in a give and take conversation with them about certain aspects of the movie. Therefore, it is plausible that this study depicts the speakers' identity predictor more accurately than the earlier investigation of speaker identity interaction with syntactic priming (see section 2.8).

5.7 Summary and Conclusion

This chapter has looked at dative alternation priming in native and L1-German L2 users of English. It set out to disentangle possible dative alternation priming effects from factors that have been shown to affect the use of a dative construction variant as opposed to the other. The investigation of the data sets has shown evidence for a minor role of syntactic priming in deciding the dative construction variant to be used

in L1-L1 conversations, but more of a significant syntactic priming effect in L2-L2 conversations. More importantly, in both data sets, the analysis revealed some other discourse related factors that are important in the prediction of the dative construction target, e.g., the concreteness of the theme, its discourse accessibility and whether or not it is a pronoun.

The evidence from this analysis also suggests that enhanced dative alternation priming occurs when the prime and target share the same main verb lemma only in the L2-L2 conversations. Moreover, the analysis showed that the dative alternation prime-target pair distance does not affect the strength of priming. It is not possible, therefore, to make a conclusive, generalizable statement of a specific distance at which language users will stop repeating their primed constructions. With that said, it is also not possible to confidently side with either the implicit learning or the transient activation account of syntactic priming given the lack of support for interaction between priming and prime-target pair distance. However, the L1-L1 data showed that the L1 participants were more likely to repeat their dative construction primes when the prime-target pair distance was minimal. The L2 data did not exhibit any tendencies of using either dative variant depending on the prime-target distance.

This analysis enhances our understanding of syntactic priming in L1-L1 and L2-L2 conversations. Dative alternation priming is stronger in L2-L2 conversations perhaps due to the L2 speakers being less flexible and having more limited resources to rely on during their L2 conversations than the L1 speakers. The dative construction variants used in L1-L1 and L2-L2 conversations have largely been influenced by the same set of explanatory factors; an observation that nicely fits in with Kormos's (2011, p. 40) suggestion that: "Although a number of differences exist between first

and second language speech production, the basic psycholinguistic mechanisms involved in speech production seem to be very similar”.

6 The caused-motion construction

6.1 Introduction

This chapter looks at syntactic priming from a different angle. As mentioned in the introduction chapter (see section 1.6), priming research might benefit from looking at alternations that are less straightforward than the dative alternation. The constructions examined in this chapter are the caused-motion construction and prepositional dative, which share an identical syntactic representation, as shown in the example (63-64) below. It seeks to investigate whether priming is contingent on constituent structure alone, or whether it is the result of a combination of prime-target shared meaning and constituent structure factors.

(63) He_{AGENT} dips_{SV} the bread_{NP} in his coffee_{PP}.

(English8, speaker B)

(64) So he_{AGENT} orders_{SV} another coffee_{NP} for the lady_{PP}.

(English47, speaker B)

(65) And he_{AGENT} brought_V her_{NP} some beans or something_{NP}.

(English22, speaker B)

(63) is an example of a caused-motion construction, (64) is prepositional dative example and (65) is double object example. In each of the three examples, an agent responsible for an event can be observed. In example (63), there is a theme, i.e. the bread, which is being moved by the agent. The coffee cup is the goal of the movement, which the bread is being caused to move towards by the agent. In the (64) example, there is a theme, i.e. another coffee that is being ordered by an agent, i.e. he, and will be delivered to the lady, i.e. the prepositional phrase ‘for the lady’ is the goal

of the movement. The (65) example also includes a notion of transfer. That is, the agent, i.e. he, caused some beans or something to be brought to her.

Given the identical syntactic representation of the prepositional dative and the caused-motion construction, the VP NP PP structure is taken as the prime at each of two levels of analysis. At the first level, each instance of the VP NP PP prepositional dative or caused-motion construction is traced as one prime category. The targets are then identified, which are the first prepositional dative, double object or caused-motion construction following the VP NP PP prepositional dative or caused-motion primes.

At the second level of analysis, only the VP NP PP caused-motion construction is used as prime type. The targets that immediately follow the prime as a VP NP NP double object or VP NP PP prepositional dative or caused-motion constructions are traced. To signify the distinction between the prepositional dative and caused-motion construction in syntactic representation, a subscript _d will be attached to the end of the caused-motion syntactic representation; this signifies the directionality of the prepositional phrase and that it is a path for the motion of the patient argument in a caused-motion construction, i.e. VP NP PP_d. At the first level of analysis, however, the VP NP PP annotation will represent either construction as one category unless specified otherwise.

6.2 Data extraction

To retrieve the caused-motion construction instances, an automatic search was used to identify all examples of a main verb, followed by a noun phrase that is undergoing a motion, followed by a directional prepositional phrase specifying the path of the motion. Using the Notepad ++ software (see 3.2.3 for an explanation), this

pattern was identified throughout the corpus by searching for the following formula in regular expression language:

VP (TO VB|VB.?) NP PPd

The prepositional datives were identified using the same method using the VP (TO VB|VB.?) NP PP regular expression formula in Notepad++ (see 3.2.3).

Accordingly:

- a. Caused-motion constructions that were immediately followed by caused-motion constructions were always considered matched prime-target pairs.
- b. Caused-motion constructions that were immediately followed by double object constructions were always considered unmatched prime-target pairs.
- c. Prepositional datives that were followed by double objects were always considered unmatched prime-target pairs.

At the first level of analysis, prepositional datives followed by caused-motion constructions and caused-motion constructions followed by prepositional datives were considered prime-target pairs. At the second level of analysis, only caused-motion constructions were considered primes, but prepositional datives following them were considered matched targets due to their shared constituent structure. The double objects were not taken as primes in this particular analysis, because they have a different syntactic structure to the prepositional dative and caused-motion constructions.

6.3 Predictors

Besides the prime-target shared constituent structure predictor, two priming related predictors were also investigated in this chapter.

6.3.1 Distance

This predictor looks at the distance between the prime and the target. The distance is measured in AS-Units (please see 3.2.1 for a description). That is, the number of AS-Units separating the VP NP PP prime-target pairs is recorded for both L1-L1 and L2-L2 data sets.

6.3.2 Lexical boost

This predictor is a record of the main verb lemma of the prime-target pairs. In particular, a matched lemma within a prime-target pair occurs when the prime and the target share the same main verb lemma, irrespective of the verbs' number, aspect or tense. The lexical boost predictor was included only in the GLM analysis models of the first level of analysis, i.e. where the caused-motion and prepositional dative constructions are considered as one prime category. It was not possible to include the lexical boost predictor in the GLM models of the second level of analysis due to the scarcity consideration discussed in section 3.3.2. The identity of the prime was not considered as in the GLM models of the second level of analysis because it only examines the caused-motion construction as a prime category.

6.4 Building prime-target pairs data sets

Two data sets for each sample group were constructed: one for the first level of analysis, where the prime was either the caused-motion construction or the prepositional dative; and one for the second level, where the prime was only the caused-motion construction, i.e. the VP NP PP_d pattern. Both data sets have the double object construction, the prepositional dative construction and the caused-motion construction as possible targets. The data sets also include information about the distance separating the primes from targets in AS-Units, and whether the primes

and targets share the same main verb lemma. However, it was not possible to include priming as a predictor in the GLM analysis at the second level, because the only prime type is the caused-motion construction. Similarly, it was not possible to include the identity of the main verb lemma in the caused-motion only analysis because of the scarcity consideration (see 3.3).

6.5 Results

This section will start by describing the proportion of prime-target pairs when the prime is a VP NP PP that is either a prepositional dative or a caused-motion construction. The target proportions following caused-motion construction only primes will then be detailed in section 6.5.2. Section 6.5.3 will report on the L1-L1 and L2-L2 GLM test, showing the full and final prediction models for the prepositional dative and caused-motion construction as one VP NP PP category. Section 6.5.4 will then present the L1-L1 and L2-L2 GLM test results, showing the full and final prediction models for the caused-motion only construction analysis where the prime is the VP NP PP_d pattern. The direction of the predictive variable effects in both levels of analysis will be considered in section 6.5.5. Finally, the prime-target pair distance and lexical boost interaction results will be presented in sections 6.5.6 and 6.5.7, respectively.

6.5.1 Prepositional dative and caused-motion prime-target pairs

The search for the VP NP PP prepositional dative and caused-motion constructions sequences as one category retrieved a total of 110 primes in the L1-L1 data set and almost twice as many primes in the L2-L2 data set. Table 6.1 shows that just less than half of the VP NP PP primes were immediately followed by targets that are VP NP NP double object constructions in the L1-L1 sample. In the L2-L2 sample,

close to twice as many VP NP PP primes were matched with an immediately following VP NP PP targets, compared to VP NP NP sequence targets. However, a two-sided Fisher's exact test reveals that the difference between the L1-L1 and L2-L2 target proportions following VP NP PP primes is not significant ($p_{\text{Fisher exact}} = 0.189$). Therefore, the number of VP NP PP responses is not significantly greater than the VP NP NP responses following a VP NP PP prime in the L1-L1 and L2-L2 conversations.

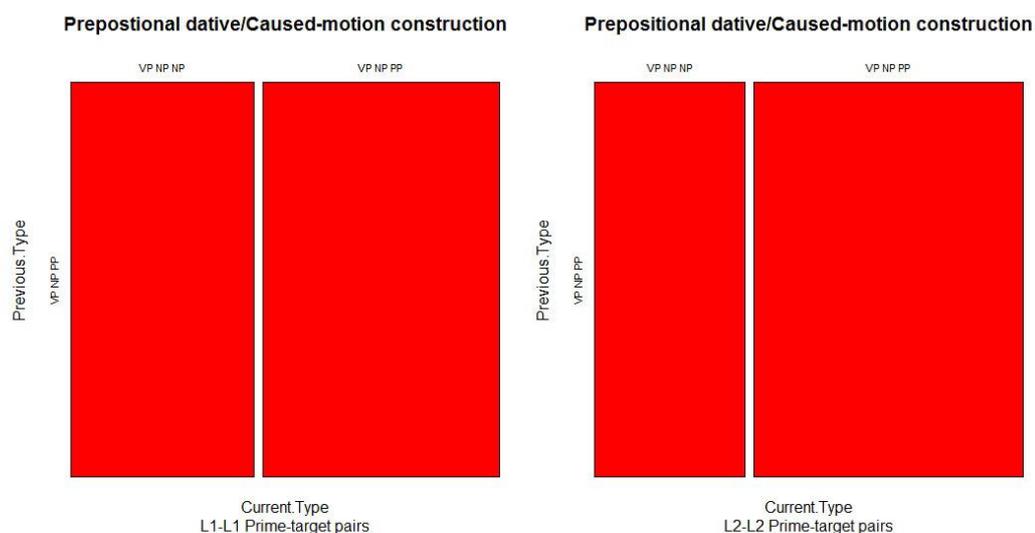
Table 6.1: Target proportions following exposure to VP NP PP primes

| Target constructions | | | |
|----------------------|----------------|---------------|-------|
| Corpus | # VP NP NP (%) | #VP NP PP (%) | Total |
| L1-L1 | 48 (43.64%) | 62 (56.36%) | 110 |
| L2-L2 | 81 (35.84%) | 145 (64.16%) | 226 |
| Total | 129 | 207 | |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # VP NP NP = number of double object targets following exposure to prepositional dative or caused-motion primes; # VP NP PP = number of prepositional dative or caused-motion targets after exposure to prepositional dative or caused-motion primes

The prime-target proportions when the prepositional datives and caused-motion constructions are taken as one category in the L1-L1 and L2-L2 primes and targets are illustrated in Figure 6.1 below.

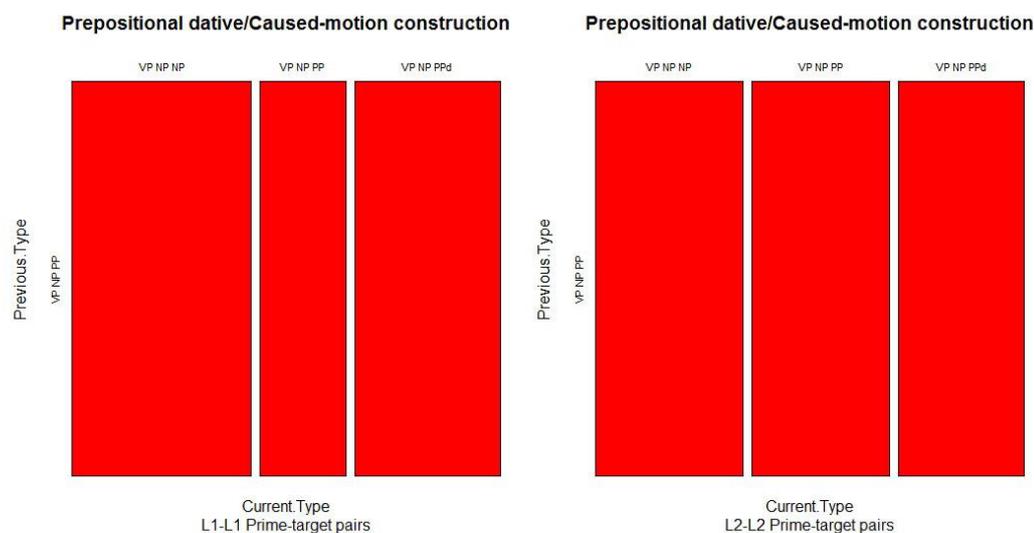
Figure 6.1: L1-L1 and L2-L2 Prime-target pairs when prepositional datives and caused-motion constructions are combined as one category in the primes and targets



The Y-axis in Figure 6.1 shows the primes consisting of prepositional dative and caused-motion constructions fused together as one structure. Along the X-axis, we can see the two possible targets, i.e. the VP NP NP double object construction, and the VP NP PP sequence in both its dative and caused-motion forms. In the two data sets, the red area occupied by the VP NP PP targets is greater than the one with VP NP NP double object targets. There is a tendency, therefore, for the VP NP PP primes in either its forms to be followed by VP NP PP prepositional dative or caused-motion construction targets, relative to the one alternative with a different structure, i.e. the double object construction.

Figure 6.2 below maintains the VP NP PP sequence in both its forms fused together as the prime, but breaks down the VP NP PP targets into prepositional dative and caused-motion construction targets.

Figure 6.2: L1-L1 and L2-L2 VP NP PP sequence primes with detailed targets



What Figure 6.2 shows is that when the VP NP PP targets are broken down to their two forms, it seems as though the double object is the preferred target type in the L1-L1 conversations. The L2 data shows a preference for double object targets, except that this preference is weaker than in the L1-L1 data.

When the L1-L1 VP NP PP primes were broken down into prepositional dative primes and caused-motion construction primes, 60.90% of the L1-L1 primes were caused-motion primes. Just over half of the primes that were retrieved in the L2-L2 conversations were caused-motion primes, (52.21%). The L1-L1 conversations had 43 primes that were identified as prepositional dative primes, while the L2-L2 conversations had almost two and a half times as many prepositional dative primes. A two-sided Fisher's exact test establishes that following VP NP PP prepositional dative primes, there are no significant differences between the target proportions in L1-L1 and L2-L2 conversations ($p_{\text{Fisher exact}} = 0.51$).

Table 6.2 details the target proportions following VP NP PP_d and VP NP PP primes for the two language groups. Following both prime variants, the most frequently occurring target was the double object construction in both the L1-L1 and

L2-L2 conversations. Following prepositional dative primes, the least frequently occurring target in both data sets was the caused-motion construction. A two-sided Fisher's exact test establishes that the difference in target proportions between L1-L1 and L2-L2 conversations following caused-motion primes is significant ($p_{\text{Fisher exact}} = 0.04$).

Table 6.2: Detailed target proportions following exposure to VP NP PP_d and VP NP PP primes

| | | Target constructions | | |
|------------------------------|-----------------------------|----------------------|----------------|--|
| L1-L1 | # VP NP PP _d (%) | # VP NP PP (%) | # VP NP NP (%) | |
| VP NP PP _d Primes | 27 (40.30%) | 12 (17.90%) | 28 (41.80%) | |
| VP NP PP Primes | 11 (25.58%) | 12 (27.90%) | 20 (46.52%) | |
| L2-L2 | # VP NP PP _d (%) | # VP NP PP (%) | # VP NP NP (%) | |
| VP NP PP _d primes | 35 (29.66%) | 41 (34.74%) | 42 (35.60%) | |
| VP NP PP primes | 34 (31.48%) | 35 (32.41%) | 39 (36.11%) | |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # VP NP PP_d = number of caused-motion targets following exposure to caused-motion primes; # VP NP PP = number of prepositional dative targets after exposure to caused-motion primes; # VP NP NP = number of double object targets following caused-motion primes.

Figure 6.3 illustrates the prime-target proportions when the prepositional dative and caused-motion constructions are separated.

Figure 6.3: Prepositional dative and caused-motion prime-target pairs in L1-L1 and L2-L2 conversations

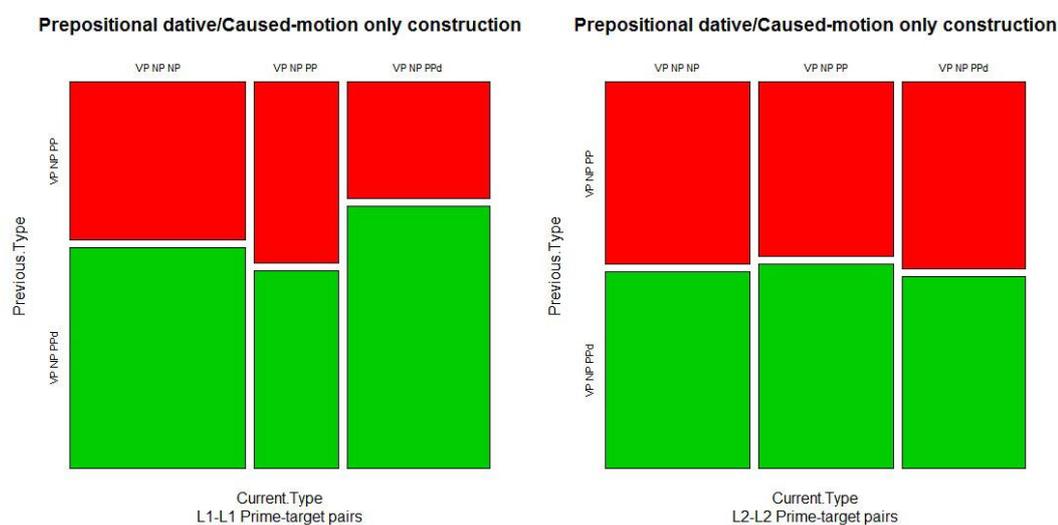


Figure 6.3 is an illustration of the caused-motion and prepositional dative prime-target pairs in L1-L1 and L2-L2 conversations. We can see the two prime variants, i.e. VP NP PP_d, and VP NP PP along the Y-axis. The constructions that appear along the X-axis are the three possible targets, i.e. the VP NP PP_d sequence, the VP NP PP sequence and the VP NP NP sequence, which differs in its structure but is semantically similar to the former two. For L1-L1 VP NP PP_d primes, we can see that the green areas representing the proportions of VP NP NP and VP NP PP_d targets are similar in size with a clear dispreference for the VP NP PP targets. However, for the L2-L2 VP NP PP_d primes, the green areas, along the X-axis that are occupied by all three targets seem to be of the same size in the L2-L2 data, with a slight dispreference for the VP NP PP_d sequence. The prepositional dative primes in the L1-L1 conversations seem to favour the VP NP NP targets, relative to VP NP PP_d and VP NP PP targets, which latter two types seem equal in size. In the L2-L2 data, however,

there does not seem to be a notable preference for any of the targets following the prepositional dative primes.

Table 6.3: Conditional probabilities of the caused-motion alternations in the L1-L1 and L2-L2 conversations

| Constructional choices | | Targets | | | Row totals |
|--|-----------------------|-----------------------|-----------|-----------|------------|
| | | VP NP PP _d | VP NP PP | VP NP NP | |
| L1-L1 prime | VP NP PP _d | .403 (27) | .179 (12) | .418 (28) | 1 (67) |
| | VP NP PP | .279 (12) | .256 (11) | .465 (20) | 1 (43) |
| Overall construction probability | | 0.355 (39) | .209 (23) | .436 (48) | 1 |
| L2-L2 prime | VP NP PP _d | .297 (35) | .347 (41) | .356 (42) | 1 (118) |
| | VP NP PP | .315 (34) | .324 (35) | .361 (39) | 1 (108) |
| Overall construction probability | | .305 (69) | .337 (76) | .358 (81) | 1 |
| <i>Note.</i> L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Overall construction probability = the relative frequency of targets; VP NP PP _d = the caused-motion variant; VP NP PP = the prepositional dative variant; VP NP NP = the double object variant. | | | | | |

Table 6.3 shows that in the L1-L1 conversations, the conditional probability for caused-motion targets is almost five percent higher than the baseline after caused-motion primes than after prepositional dative primes (see section 3.3.1.1). The conditional probability of the L1-L1 prepositional dative targets are also about five percent higher than the baseline after prepositional dative primes than caused-motion primes. Table 6.3 also shows that the L1-L1 double object targets are almost three percent higher than the baseline following prepositional dative primes than caused-motion primes.

For the L2-L2 conversations, Table 6.3 shows that the conditional probability of the caused-motion targets is almost one percent lower than the baseline after caused-motion primes than after prepositional dative primes. The conditional probability for prepositional dative targets is just over one percent lower than the

baseline after prepositional dative primes than caused-motion primes. Finally, the conditional probability of the double object targets after prepositional dative primes is almost equal to the conditional probability the double object targets after caused-motion construction primes. The next section will present the descriptive statistics results for the data sets where only the caused-motion constructions were taken as primes.

6.5.2 *Caused-motion only prime-target pairs*

The search for caused-motion constructions retrieved a total of sixty eight primes in the L1-L1 data and one hundred and fourteen primes in the L2-L2 data.

Table 6.4 shows the proportions of prime-target pairs when prepositional dative and caused-motion targets are taken as one category with the VP NP PP sequence.

Table 6.4: VP NP PP_d caused-motion construction prime-target pairs when prepositional datives and caused-motion targets are fused together as one category

| Corpus | Target constructions | |
|--------|----------------------|----------------|
| | # VP NP PP (%) | # VP NP NP (%) |
| L1-L1 | 40 (58.82%) | 28 (41.18%) |
| L2-L2 | 73 (64.04%) | 41 (35.96%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; #VP NP PP_d = number of caused-motion targets after exposure to caused-motion primes; # VP NP NP = number of double object targets following exposure to caused-motion primes; # VP NP PP = number of prepositional dative targets after exposure to caused-motion primes.

Table 6.4 shows that almost six out of each 10 L1-L1 caused-motion construction primes were followed by the VP NP PP dative and caused-motion sequences, relative to the double object targets. The L2-L2 participants showed a similar behavior with just fewer than 4 out of each 10 caused-motion construction primes were followed by double object targets. A two-sided Fisher's exact test shows

that the differences between L1-L1 and L2-L2 caused-motion only targets were not statistically significant ($p_{\text{Fisher exact}} = 0.529$). Figure 6.4 below illustrates the caused-motion construction prime-target pairs in both data sets.

Figure 6.4: Caused-motion only primes with VP NP PP_d and VP NP PP targets fused as one category

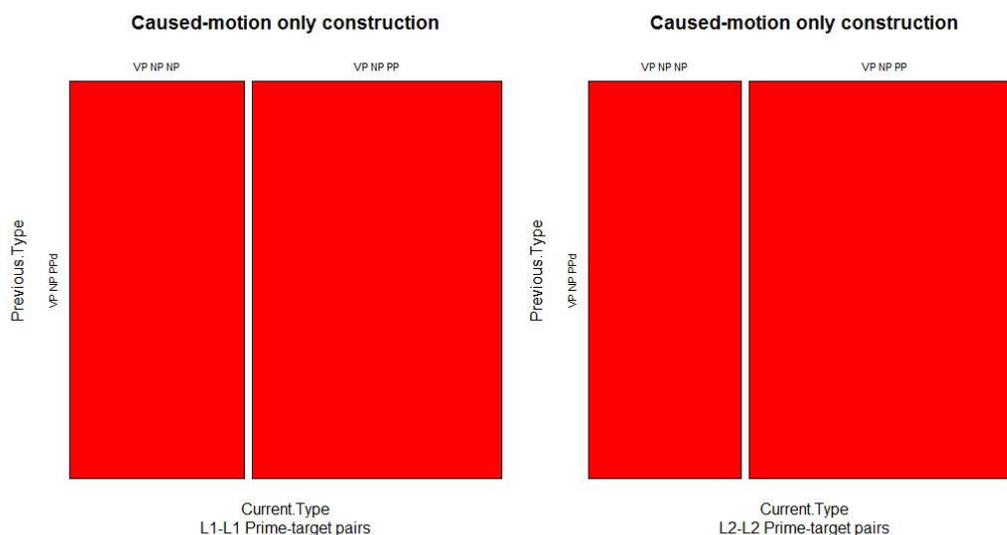


Figure 6.4 shows that in both data sets, the area occupied by VP NP PP targets is larger, relative to double object targets. However, the caused-motion prime-target pairs can be looked at differently when the VP NP PP targets are broken down. Table 6.5 shows the caused-motion construction prime-target pairs with the VP NP PP targets broken down.

Table 6.5: Target proportions following exposure to VP NP PP_d caused-motion only construction primes

| Corpus | Target constructions | | |
|--------|-----------------------------|----------------|----------------|
| | # VP NP PP _d (%) | # VP NP PP (%) | # VP NP NP (%) |
| L1-L1 | 27 (39.70%) | 13 (19.12%) | 28 (41.18%) |
| L2-L2 | 35 (30.71%) | 38 (33.33%) | 41 (35.96%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # VP NP PP_d = number of caused-motion targets after exposure to caused-motion primes; # VP NP NP = number of double object targets following exposure to caused-motion primes; # VP NP PP = number of prepositional dative targets after exposure to caused-motion primes.

The most frequently occurring target was the double object construction in both data sets. A two-sided Fisher's exact test reveals that there are no significant differences between L1-L1 and L2-L2 target proportions following caused-motion construction primes ($p_{\text{Fisher exact}} = 0.11$).

Figure 6.5: Caused-motion only primes with detailed VP NP PP_d and VP NP PP targets



Following L1-L1 caused-motion construction primes, the area occupied by prepositional dative targets along the X-axis seems to be the one with the smallest size. Figure 6.5 also shows that the target appearing least often following caused-motion construction primes was the caused-motion construction target, relative to the prepositional dative and double object targets.

To sum up, the descriptive statistics indicate a preference on the part of the L1 and L2 participants for a VP NP PP sequence target following VP NP PP primes, but only in the analysis where the prepositional dative and caused-motion constructions are added together as one category. Both L1 and L2 participants, however, are seen to

favour the double object targets when the VP NP PP primes and targets are broken down into prepositional datives and caused-motion constructions.

6.5.3 The L1-L1 and L2-L2 GLM caused-motion construction results

Table 6.6 shows a summary of the GLM L1-L1 and L2-L2 full model for the caused-motion construction, where all three priming related predictors are included and with the two types of VP NP PP primes and targets treated separately.

Table 6.6: Summary of statistical analysis of the full model for the caused-motion construction predictor variables in the L1-L1 and L2-L2 conversations

| | Parameter estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|---------------|---------------------|-------|-------------|-------|----------------------|-------|-----------------------|-------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| L1-L1 | | | | | | | | |
| Previous type | 0.217 | 0.406 | 0.534 | 0.593 | 0.559 | 2.768 | 0.237 | 0.626 |
| Distance | -0.215 | 0.182 | -1.181 | 0.238 | 0.559 | 1.149 | 0.680 | 0.102 |
| Lemma match | 1.042 | 0.565 | 1.846 | 0.065 | 0.989 | 9.415 | 5.175 | 0.023 |
| L2-L2 | | | | | | | | |
| Previous type | 0.004 | 0.282 | 0.014 | 0.989 | 0.577 | 1.744 | 0.007 | 0.935 |
| Distance | -0.0001 | 0.139 | -0.001 | 0.999 | 0.762 | 1.315 | 0.076 | 0.782 |
| Lemma match | 1.056 | 0.446 | 2.365 | 0.018 | 1.261 | 7.436 | 6.574 | 0.010 |

Note. S.E = Standard Errors; Chi²-test p-value tests for the significance of each independent variable individually against the null model in the L1 data; Wald's test p-value tests for the significance of individual variables within the final model, i.e. where only significant predictors are included

L1-L1 full model's Chi-square = 6.7813, ($p = 0.0792$)

L1-L1 null model's AIC = 152.7057

L1-L1 full model's AIC = 151.9244

L2-L2 full model's Chi-square = 6.5746, ($p = 0.08677$)

L2-L2 null model's AIC = 296.9283

L2-L2 full model's AIC = 296.3537

The L1-L1 and L2-L2 conversations are similar, in that the full model shows no support for priming as a predictor of use of the caused-motion construction in either data set. Similarly, the distance separating VP NP PP primes and targets does not seem to be relevant to which target construction is used in either L1-L1 or L2-L2

conversations. The identity of the main verb lemma, however, seems to be a good predictor of the target in both data sets.

Table 6.7: Summary of statistical analysis of final model for the caused-motion construction predictor variables in the L1-L1 and L2-L2 conversations

| | Parameter Estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|-------------|---------------------|-------|-------------|-------|----------------------|--------|-----------------------|-------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| L1-L1 | | | | | | | | |
| Lemma match | 1.178 | 0.552 | 2.136 | 0.033 | 1.169 | 10.582 | 5.175 | 0.023 |
| L2-L2 | | | | | | | | |
| Lemma match | 1.056 | 0.444 | 2.377 | 0.017 | 1.267 | 7.411 | 6.574 | 0.010 |

Note. S.E = Standard Errors; Chi²-test p-value tests for the significance of each independent variable individually against the null model in the L1 data; Wald's test p-value tests for the significance of individual variables within the final model, i.e. where only significant predictors are included

L1-L1 final model's Chi-square = 5.175, (p = 0.02291)

L1-L1 final model's AIC = 149.5307

L2-L2 final model's Chi-square = 6.5744 (p = 0.01035)

L2-L2 final model's AIC = 292.3539

In both L1-L1 and L2-L2 conversations then, the identity of the main verb lemma is the best predictive factor to explain the type of target following a VP NP PP dative or caused-motion construction.

6.5.4 The L1-L1 and L2-L2 GLM caused-motion only construction results

Table 6.8 shows a summary of the full and final caused-motion only construction GLM analysis in the L1-L1 and L2-L2 conversations.

Table 6.8: Summary of statistical analysis of the full and final models for the caused-motion only construction predictor variables in the L1-L1 and L2-L2 conversations

| | Parameter Estimates | | Wald's test | | [95% Conf. Interval] | | Chi ² test | |
|----------|---------------------|-------|-------------|-------|----------------------|-------|-----------------------|-------|
| | Coef. | S.E. | Z | p | 2.5% | 97.5% | Chi ² | p |
| L1-L1 | | | | | | | | |
| Distance | -0.596 | 0.239 | -2.490 | 0.013 | 0.333 | 0.861 | 7.007 | 0.008 |
| L2-L2 | | | | | | | | |
| Distance | -0.085 | 0.192 | -0.444 | 0.657 | 0.629 | 1.342 | 0.197 | 0.657 |

Note. S.E = Standard Errors; Chi²-test p-value tests for the significance of each independent variable individually against the null model in the L1 data; Wald's test p-value tests for the significance of individual variables within the final model, i.e. where only significant predictors are included
L1-L1 full and final model's Chi-square = 7.0071, (p = 0.008119)
L1-L1 null model's AIC = 94.13924
L1-L1 full and final model's AIC = 89.13215
L2-L2 full and final model's Chi-square = 0.19668, (p = 0.6574)
L2-L2 null model's AIC = 150.9333
L2-L2 final model's AIC = 152.7366

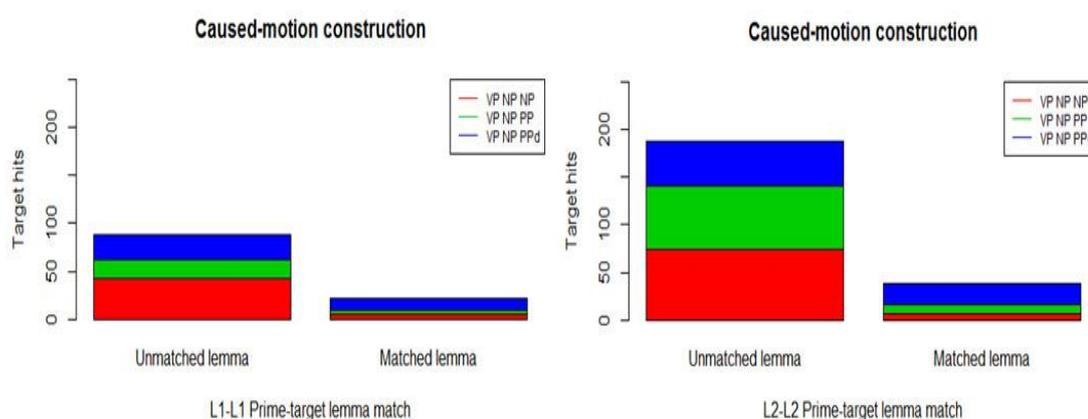
The results of the GLM analysis of caused-motion construction show that prime-target distance was statistically significant only in the L1-L1 data. The L2-L2 full and final model, however, does not show support for the prime-target distance being a good predictor of the caused-motion construction target.

6.5.5 Direction of L1-L1 and L2-L2 caused-motion predictive factors effects

Given the outcome of the GLM at the two levels of analysis, this section will discuss the main verb lemma factor, which emerged as a statistically significant predictor of the targets when the VP NP PP sequence representing prepositional datives and caused-motion constructions were considered as the primes. It will also discuss the direction of the L1-L1 prime-target distance, which was a statistically significant predictor of the target where the primes were caused-motion construction only.

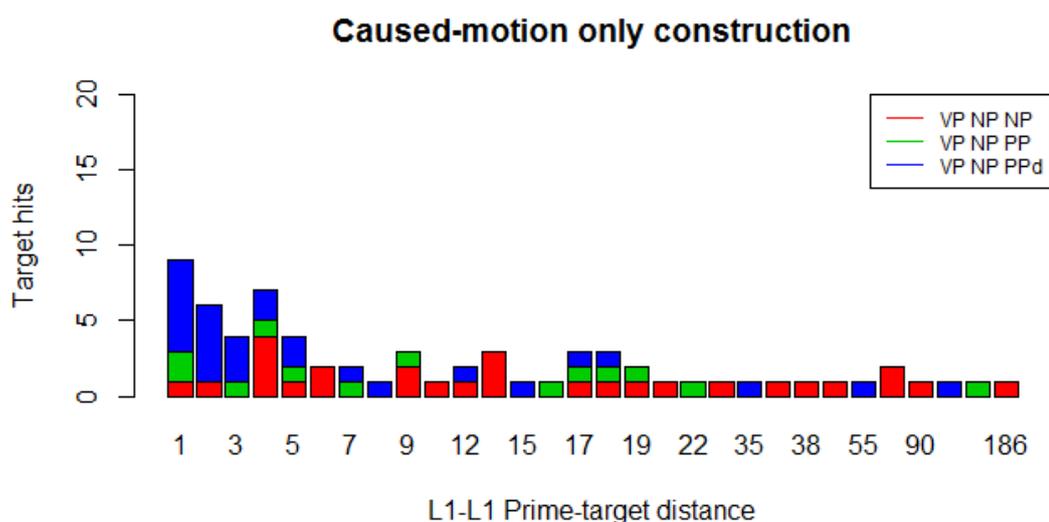
Beginning with the main verb lemma identity predictor, Figure 6.6 shows that the frequency of the double object target decreases in the L1-L1 conversations when the prime-target pairs have the same main verb lemma. The same effect can be observed in the L2-L2 data, where matched prime-target lemmas result in a decrease in the proportion of double object targets.

Figure 6.6: Direction of the prime-target lemma match effect in the L1-L1 and L2-L2 conversations



The prime-target distance was a significant predictor of the current target only in the L1-L1 conversations (see Table 6.8). The direction of the L1-L1 prime-target distance effect is represented in Figure 6.7. Each bar shows the frequency of the respective target types along with the distance separating them from the caused-motion primes in the L1-L1 conversations. Figure 6.7 shows an increase in the proportion of caused-motion construction targets when the distance separating the prime-target pairs is short. When the prime-target distance increases, however, we can observe an increase in the frequency of the double object targets, relative to the prepositional dative or the caused-motion targets.

Figure 6.7: The direction of the L1-L1 prime-target distance effect



The next section will present a detailed investigation into the prime-target distance at the two levels of analysis in L1-L1 and L2-L2 conversations.

6.5.6 Prime-target pair distance

This section introduces the results considering the prime-target distance as a factor when the primes are either prepositional datives or the caused-motion construction, combined as one category. Subsequently, the results for the prime-target distance when the primes are only caused-motion constructions will be presented.

6.5.6.1 VP NP PP prime-target pairs distance

Table 6.9 below shows the descriptive statistics of the prime-target pairs' distance in AS-units following VP NP PP primes. It shows that, overall, the L1-L1 participants seem to have more AS-units separating their VP NP PP primes-target pairs, compared to the L2-L2 participants.

Table 6.9: Descriptive statistics of prime-target distance in L1-L1 and L2-L2 conversations when the dative and caused-motion primes and targets are combined into one VP NP PP category

| Descriptive statistics | Prime-target pairs | |
|------------------------|--------------------|----------------|
| | L1-L1 distance | L2-L2 distance |
| Mean (SD) | 16.81 (28.88) | 13.91 (18.44) |
| Median | 7 | 7 |
| Mode | 1 | 1 |
| Maximum | 186 | 143 |
| Minimum | 0 | 0 |
| Upper bound | 22.27 | 16.32 |
| Lower bound | 11.35 | 11.49 |
| Confidence level (95%) | 5.46 | 2.42 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = prime-target pair maximum distance in AS-Units; Minimum = prime-target pair minimum distance in AS-Units.

Similarly, Table 6.10 below shows that, overall, the distance in AS-Units separating matched and unmatched prime-target pairs in L1-L1 conversations is relatively higher than in L2-L2 conversations following VP NP PP primes. There seems to be a greater prime-target distance in the unmatched pairs as opposed to the matched ones in the L1-L1 conversations. However, in the L2-L2 conversations, the matched and unmatched prime-target pairs are separated by relatively a similar number of AS-Units on average.

Table 6.10: Descriptive statistics of prime-target matched and unmatched distance in L1-L1 and L2-L2 conversations when the dative and caused-motion primes and targets are combined into one VP NP PP category

| Descriptive statistics | L1-L1 prime-target pairs | | L2-L2 prime-target pairs | |
|------------------------|--------------------------|--------------------|--------------------------|--------------------|
| | Matched distance | Unmatched distance | Matched distance | Unmatched distance |
| Mean (SD) | 16.91 (29) | 19.38 (30.49) | 14.00 (19.72) | 13.74 (20.17) |
| Median | 7 | 10 | 7 | 7 |
| Mode | 1 | 1 | 1 | 3 |
| Maximum | 186 | 186 | 143 | 75 |
| Minimum | 0 | 0 | 1 | 0 |
| Upper bound | 22.41 | 28.23 | 17.24 | 17.28 |
| Lower bound | 11.40 | 10.52 | 10.76 | 10.20 |
| Confidence level (95%) | 5.56 | 8.85 | 3.24 | 3.54 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = prime-target pair maximum distance in AS-Units; Minimum = prime-target pair minimum distance in AS-Units. Matched distance = prime-target pair distance where the prime and target are of the same variant; Unmatched distance = prime-target pair distance where the prime is a different variant from the target.

6.5.6.2 Caused-motion only prime-target pairs distance

In Table 6.11 below, the number of AS-Units separating the caused-motion construction prime-target pairs can be seen to be greater in L1-L1, relative to L2-L2 conversations.

Table 6.11: Descriptive statistics of prime-target distance in L1-L1 and L2-L2 conversations when the primes are VP NP PP_d caused-motion constructions only

| Descriptive statistics | Prime-target pairs | |
|--------------------------|--------------------|----------------|
| | L1-L1 distance | L2-L2 distance |
| Mean (SD) | 19.63 (34.16) | 15.21 (21.61) |
| Median | 7.5 | 7 |
| Mode | 1 | 1 |
| Maximum | 186 | 143 |
| Minimum | 1 | 1 |
| Upper bound | 27.90 | 19.22 |
| Lower bound | 11.36 | 11.20 |
| Confidence level (95.0%) | 8.27 | 4.01 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = prime-target pair maximum distance in AS-Units; Minimum = prime-target pair minimum distance in AS-Units.

Table 6.12 below also shows descriptive statistics for the matched and unmatched caused-motion construction prime-target pairs' distance in L1-L1 and L2-L2 conversations.

Table 6.12: Descriptive statistics of prime-target matched and unmatched distance in L1-L1 and L2-L2 conversations when the primes are VP NP PP_d caused-motion constructions

| Descriptive statistics | L1-L1 prime-target pairs | | L2-L2 prime-target pairs | |
|------------------------|--------------------------|--------------------|--------------------------|--------------------|
| | Matched distance | Unmatched distance | Matched distance | Unmatched distance |
| Mean (SD) | 15.00 (30.94) | 26.25 (37.90) | 15.34 (23.96) | 14.98 (16.91) |
| Median | 4.5 | 14 | 7 | 7 |
| Mode | 1 | 4 | 1 | 4 |
| Maximum | 173 | 186 | 143 | 66 |
| Minimum | 1 | 1 | 1 | 1 |
| Upper bound | 20.11 | 40.95 | 20.93 | 20.31 |
| Lower bound | 5.11 | 11.56 | 9.75 | 9.64 |
| Confidence level (95%) | 9.90 | 14.69 | 5.59 | 5.34 |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; SD = standard deviation; Maximum = prime-target pair maximum distance in AS-Units; Minimum = prime-target pair minimum distance in AS-Units; Matched distance = prime-target pair distance where the prime and target are of the same variant; Unmatched distance = prime-target pair distance where the prime is a different variant from the target.

When the caused-motion construction prime-target pairs are broken down into matched and unmatched pairs, the matched pairs in the L1-L1 conversations seem to be separated by fewer AS-Units than the unmatched ones. The L2-L2 matched and unmatched pairs, however, have overlapping confidence intervals, and seem to be separated by a similar number of AS-Units. A similar kind of result is observed in Table 6.10 for matched and unmatched prime-target pairs, where the prepositional datives and caused-motion primes were looked at as one category.

So far, the results from priming and prime-target distance analysis have been reported. The next section will present a detailed investigation into the lexical boost results.

6.5.7 Lexical boost

As with the caused-motion prime-target pair distance, the lexical boost effect was investigated at two levels of analysis. First, the lexical boost results where the primes were VP NP PP prepositional datives and caused-motion constructions will be reported. The following section will introduce the lexical boost results where the primes are only the caused-motion constructions. The last final sub section will look at whether the target type can be predicted by matched or unmatched prime-target main verb lemma.

6.5.7.1 Lexical boost of prepositional dative and caused-motion primes

Table 6.13 below shows that the prime-target pairs had the same main verb lemma close to 20% of the time in both L1-L1 and L2-L2 conversations following VP NP PP primes. A two-sided Fisher's exact test indicates that the differences in the number of L1-L1 and L2-L2 matched and unmatched lemmas are not significant ($p_{\text{Fisher exact}} = 0.76$).

Table 6.13 Prepositional dative and caused-motion construction matched and unmatched main verb lemmas

| Corpus | # Matched lemma (%) | # Unmatched lemma (%) |
|--------|---------------------|-----------------------|
| L1-L1 | 22 (20.00%) | 88 (80.00%) |
| L2-L2 | 38 (16.81%) | 188 (83.19%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched lemma = number of prime-target pairs sharing the same main verb lemma; # Unmatched lemma = number of prime-target pairs with different main verb lemmas.

The proportions of matched and unmatched lemmas for matched and unmatched prime-target pairs are shown in Table 6.14 below. In both L1-L1 and L2-L2 data, just over three quarters of the prime-target pairs sharing the same main verb lemma had the same VP NP PP structure. Half the pairs in the L1-L1 conversations with an unmatched main verb lemma were unmatched prime-target pairs. In the L2-L2 data, three fifths of the prime-target pairs were matched with pairs of the same constituent structure, and two fifths were matched with VP NP NP targets that did not match the primes. A two-sided Fisher's exact test shows that the differences in the proportions of matched and unmatched prime-target pairs with the same lemma are not significantly different between L1-L1 and L2-L2 data following VP NP PP primes ($p_{\text{Fisher exact}} = 0.74$). The proportions of matched and unmatched prime-target pairs with a different main verb lemma between L1-L1 and L2-L2 conversations are not significantly different either ($p_{\text{Fisher exact}} = 0.15$).

Table 6.14: Matched and unmatched prepositional dative and caused-motion constructions prime-target pairs in the case of matched and unmatched main verb lemma

| Corpus | Matched Lemma | | Unmatched lemma | |
|--------|------------------------------|--------------------------------|------------------------------|--------------------------------|
| | # Matched prime-target pairs | # Unmatched Prime-target pairs | # Matched prime-target pairs | # Unmatched prime-target pairs |
| L1-L1 | 17 (77.27%) | 5 (22.73%) | 45 (51.14%) | 43 (48.86%) |
| L2-L2 | 31 (81.58%) | 7 (18.42%) | 114 (60.64%) | 74 (39.36%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched prime-target pairs = number of prepositional datives or caused-motion primes immediately followed by prepositional datives or caused-motion targets; # Unmatched prime-target pairs = number of prepositional datives or caused-motion primes followed by double object targets.

6.5.7.2 Caused-motion construction lexical boost analysis

Table 6.15 below shows that the prime-target pairs had the same verb lemma less than one sixth of the time following caused-motion constructions primes in both the L1-L1 and L2-L2 data. A two-sided Fisher's exact test proves that the proportions

of matched and unmatched lemmas in both language groups are not significantly different, ($p = 0.84$).

Table 6.15: Caused-motion construction matched and unmatched lemma

| Corpus | # Matched lemma (%) | # Unmatched lemma (%) |
|--------|---------------------|-----------------------|
| L1-L1 | 10 (14.71%) | 58 (85.29%) |
| L2-L2 | 19 (16.66%) | 95 (83.34%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Matched lemma = number of prime-target pairs sharing the same main verb lemma; # unmatched lemma = number of prime-target pairs with different main verb lemmas.

The proportions of prime-target pairs with matched and unmatched main verb lemmas are presented in Table 6.16 below. In both data sets, when the prime and target shared the same main verb lemma, then they were matched in their constituent structure. That is, in none of the cases were the caused motion primes followed by the structurally different double object target type if the prime-target pair shared the same main verb lemma. Almost half of the prime-target pairs that shared the same main verb lemma were matched prime-target pairs in terms of their constituent structure in the L1-L1 data. In the L2-L2 data, the prime-target pairs with a shared main verb lemma were matched prime-target pairs in their structure slightly over half of the time. A two-sided Fisher's exact test shows no significant difference in proportions of matched and unmatched prime-target pairs with the same or a different main verb lemma between L1-L1 and L2-L2 conversations ($p_{\text{Fisher exact}} = 0.65$) and ($p_{\text{Fisher exact}} = 0.27$), respectively.

Table 6.16: Matched and unmatched caused-motion construction prime-target pairs in the case of matched and unmatched main verb

| Corpus | Matched Lemma | | Unmatched lemma | |
|--------|----------------------------------|------------------------------------|----------------------------------|------------------------------------|
| | # Matched prime-target pairs (%) | # Unmatched prime-target pairs (%) | # Matched prime-target pairs (%) | # Unmatched prime-target pairs (%) |
| L1-L1 | 10 (100.00%) | 0 (0.00%) | 30 (51.72%) | 28 (48.28%) |
| L2-L2 | 19 (100.00%) | 0 (0.00%) | 54 (56.84%) | 41 (43.16%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Matched lemma = prime-target pairs that share the same main verb lemma; Unmatched lemma = prime-target pairs that with different main verb lemmas; # Matched prime-target pairs = number of caused-motion primes followed by prepositional dative or caused-motion targets; # Unmatched prime-target pairs = number of caused-motion primes followed by double object targets.

6.5.7.3 Predicting target type through main verb lemma

This section looks at whether a prime-target shared main verb lemma encourages the production of a given target type, relative to the other possible target type constructions. The section will report the main verb lemma prediction results from the data sets where the primes are the prepositional datives and caused-motion constructions as one category. It will then present the results from the data sets where the primes were only caused-motion constructions.

6.5.7.3.1 VP NP PP lemma match target type prediction

In the L1-L1 conversations, Table 6.17 below shows that almost sixty percent of the prime-target pairs with a matched main verb lemma had caused-motion construction targets. All L1-L1 prime-target pairs with a matched lemma where the target was a caused-motion construction were preceded by caused-motion construction primes. The L1-L1 prime-target pairs with a matched main verb lemma had a double object construction as their target almost twenty three of the time. None of these L1-L1 double object targets with a matched main verb lemma were target to caused-motion construction primes; they were all targets for prepositional dative primes. The L1-L1 prime-target pairs with a matched main verb lemma were followed by a prepositional dative target just under twenty percent of the time. Seventy five

percent of these had a prepositional dative prime, while the rest were targets to caused-motion construction primes.

On the other hand, almost fifty eight percent of the L2-L2 prime-target pairs with a matched main verb lemma had cause-motion construction targets. Ninety five percent of those had caused-motion construction primes, while the rest had prepositional dative primes. Close to a quarter of the L2-L2 prime-target pairs with a matched main verb lemma had prepositional dative targets, all of which were immediately preceded by prepositional dative primes. All the remaining targets were double object targets for prepositional dative primes. Finally, none of the L2-L2 caused-motion construction primes with a matched main verb lemma were followed by a target that was not a caused-motion construction target.

Table 6.17: Distribution of targets following VP NP PP prepositional dative and caused-motion construction primes as one category with matched main verb lemma in L1-L1 conversations

| Primes | | Matched lemma targets (20%) | | |
|-----------------------|--|-------------------------------------|-------------|-------------|
| L1-L1 | | VP NP PP _d | VP NP PP | VP NP NP |
| # (%) | | 13 (59.10%) | 4 (18.18%) | 5 (22.73%) |
| VP NP PP _d | | 13 (100.00%) | 1 (25.00%) | 0 (0.00%) |
| VP NP PP | | 0 (0.00%) | 3 (75.00%) | 5 (100.00%) |
| Primes | | Targets with unmatched lemmas (80%) | | |
| L1-L1 | | VP NP PP _d | VP NP PP | VP NP NP |
| # (%) | | 26 (29.55%) | 19 (21.59%) | 43 (48.86%) |
| VP NP PP _d | | 14 (53.85%) | 11 (57.89%) | 28 (65.12%) |
| VP NP PP | | 12 (46.15%) | 8 (42.11%) | 15 (34.88%) |
| Primes | | Matched lemma targets (16.81%) | | |
| L2-L2 | | VP NP PP _d | VP NP PP | VP NP NP |
| # (%) | | 22 (57.90%) | 9 (23.68%) | 7 (18.42%) |
| VP NP PP _d | | 21 (95.45%) | 0 (0.00%) | 0 (0.00%) |
| VP NP PP | | 1 (4.55%) | 9 (100.00%) | 7 (100.00%) |
| Primes | | Unmatched lemma targets (83.19%) | | |
| L2-L2 | | VP NP PP _d | VP NP PP | VP NP NP |
| # (%) | | 47 (25.00%) | 67 (35.64%) | 74 (39.36%) |
| VP NP PP _d | | 14 (29.79%) | 41 (61.19%) | 42 (56.76%) |
| VP NP PP | | 33 (70.21%) | 26 (38.81%) | 32 (43.24%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Targets with matched lemmas = targets that are preceded by a prepositional dative or a caused-motion construction prime that has the same main verb lemma as the target; Target types = prepositional dative, caused-motion or double object constructions; Prime types = prepositional dative or caused-motion construction.

In the case of prime-target pairs with unmatched lemmas in the L1-L1 conversations, almost half of the primes had double object targets. Almost two thirds of those double objects were targets for caused-motion construction primes, while the remaining one third were targets for prepositional dative primes. Table 6.17 also

shows that almost thirty percent of the prime-target pairs with an unmatched main verb lemma had caused-motion construction targets. Just over half of these were targets to caused-motion construction, while the rest had prepositional dative primes. Finally, just over twenty percent of prime-targets with an unmatched main verb lemma had prepositional dative targets. Close to fifty eight percent of those were immediately preceded by a caused-motion prime while the rest were preceded by prepositional dative primes.

As for the L2-L2 prime-target pairs with unmatched main verb lemmas, almost forty percent of their targets were the structurally different double object construction. Close to fifty seven percent of these were preceded by caused-motion primes while the remaining targets had prepositional dative primes. Almost thirty six percent of the L2-L2 prime-target pairs with an unmatched lemma had prepositional dative targets. Just over sixty percent of those were targets for caused-motion construction primes. The remaining L2-L2 targets with unmatched lemmas were targets for prepositional dative primes. Finally, one quarter of the L2-L2 prime-target pairs with unmatched lemmas had caused-motion construction targets. Over two third of those were preceded by prepositional dative primes, while the remaining caused-motion targets were preceded by caused-motion primes.

6.5.7.3.2 Caused-motion only lemma match target type prediction

Turning now to the second level of analysis, at which only caused-motion construction were considered primes, Table 6.18 shows that all targets in both data sets where the prime-target pairs had the same main verb lemma were caused-motion construction targets.

Table 6.18: Distribution of targets following caused-motion only construction primes with matched and unmatched main verb lemma in L1-L1 and L2-L2 conversations

| Targets constructions | | | |
|-----------------------|-----------------------|-------------|-------------|
| L1-L1 | VP NP PP _d | VP NP PP | VP NP NP |
| Matched lemma # (%) | 10 (100.00%) | 0 (0.00%) | 0 (0.00%) |
| Unmatched lemma # (%) | 17 (29.31%) | 13 (22.41%) | 28 (48.28%) |
| L2-L2 | VP NP PP _d | VP NP PP | VP NP NP |
| Matched lemma # (%) | 19 (100.00%) | 0 (0.00%) | 0 (0.00%) |
| Unmatched lemma # (%) | 16 (16.84%) | 38 (40.00%) | 41 (43.61%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Matched lemmas = the distribution of targets that have the same main verb lemma as that of their caused-motion construction primes; Unmatched lemmas = the distribution of targets that do not share the same main verb lemma as that of their caused-motion construction primes.

L1-L1 and L2-L2 are different, however, in cases where the prime-target pairs did not share the same main verb lemma. In particular, almost half of the targets with an unmatched main verb lemma in the L1-L1 conversations were double object targets. One third of the targets with unmatched main verb lemmas were caused-motion targets, while just over twenty two percent of the targets with unmatched main verb lemmas were prepositional dative targets.

In L2-L2 prime-target pairs, however, the targets with unmatched main verb lemmas were the double object construction variants close to forty four percent of the time. Forty percent of the targets were prepositional dative targets. Finally, the caused-motion targets made up slightly less than seventeen percent of all target constructions with unmatched prime-target main verb lemmas.

6.5.8 Priming-speaker interaction

This section will first report on speaker identity interaction within the VP NP PP caused-motion and prepositional dative prime-target pairs data sets in 6.5.8.1. The

caused-motion only prime-target pairs' speaker identity results will be reported in 6.5.8.2.

6.5.8.1 VP NP PP prime-target pairs speaker identity

Table 6.19 shows that in the data sets with the caused-motion and the prepositional dative constructions are taken as one category, the L1-L1 and L2-L2 prime-target pairs were produced by the same speaker the majority of the time. A two-sided Fisher's exact test proves that the differences in the number of L1-L1 and L2-L2 prime-target pairs produced by the same or a different speaker are not significant ($p_{\text{Fisher exact}} = 0.876$).

Table 6.19: VP NP PP caused-motion and prepositional dative prime-target pairs produced by the same or different speakers when the caused-motion and prepositional dative constructions are taken as one category

| Corpus | # Same speaker (%) | # Different speaker (%) |
|--------|--------------------|-------------------------|
| L1-L1 | 93 (84.55%) | 17 (15.45%) |
| L2-L2 | 189 (83.63%) | 37 (16.37%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Same speaker = number of caused-motion prime-target pairs produced by the same speaker; # Different speaker = number of caused-motion prime-target pairs produced by different speakers.

Table 6.20 shows the proportions of matched and unmatched prime-target pairs when they were produced by the same or a different speaker in the data sets where the caused-motion and prepositional dative constructions are taken as one category.

Table 6.20: Matched and unmatched VP NP PP caused-motion and prepositional prime-target pairs when they were produced by the same or different speakers

| Corpus | Same speaker | | Different speaker | |
|--------|------------------------------|--------------------------------|------------------------------|--------------------------------|
| | # Matched prime-target pairs | # Unmatched Prime-target pairs | # Matched prime-target pairs | # Unmatched prime-target pairs |
| L1-L1 | 51 (54.84%) | 42 (45.16%) | 11 (64.71%) | 6 (35.29%) |
| L2-L2 | 122 (64.55%) | 67 (35.45%) | 23 (62.16%) | 14 (37.84%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Same speaker = caused-motion prime-target pairs produced by the same speaker; Different speaker = caused-motion prime-target pairs produced by different speakers; # Matched prime-target pairs = number of prepositional datives or caused-motion primes immediately followed by prepositional datives or caused-motion targets; # Unmatched prime-target pairs = number of prepositional datives or caused-motion primes followed by double object targets.

Table 6.20 shows that over half of the prime-target pairs produced by the same speaker were matched prime-target pairs in the L1-L1 conversations. In the L2-L2 conversations, just under four sixths of the prime-target pairs produced by the same speaker were matched prime-target pairs. Finally, the primes produced by different speakers were immediately followed by caused-motion or prepositional dative targets close to sixty four percent of the time in the L1-L1 and L2-L2 conversations. A two-sided Fisher's exact test proves that the differences between L1-L1 matched and unmatched prime-target pairs produced by the same speaker are not significant ($p_{\text{Fisher exact}} = 0.121$).

6.5.8.2 Caused motion only prime-target pairs speaker identity

Table 6.21 shows that just over nine tenths of the L1-L1 caused-motion only prime-target pairs were produced by the same speaker. In the L2-L2 data set, the caused-motion only prime-target pairs were produced by the same speaker six seventh of the time.

Table 6.21: The proportions of caused-motion only prime-target pairs produced by the same or different speakers

| Corpus | # Same speaker (%) | # Different speaker (%) |
|--------|--------------------|-------------------------|
| L1-L1 | 62 (91.18%) | 6 (8.82%) |
| L2-L2 | 98 (85.96%) | 16 (14.04%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; # Same speaker = number of caused-motion only prime-target pairs produced by the same speaker; # Different speaker = number of caused-motion only prime-target pairs produced by different speakers.

In Table 6.22 we can see the proportions of matched and unmatched caused-motion only prime-target pairs when they were produced by the same or a different speaker. When the L1-L1 caused-motion only prime-target pairs were produced by the same speaker, the target was the VP NP PP caused-motion or prepositional dative sequences almost sixty percent of the time. In the L2-L2 caused-motion data set, just over sixty three percent of the prime-target pairs produced by the same speaker had the VP NP PP caused-motion or prepositional dative construction as the targets. Only nine percent of the L1-L1 caused-motion prime-target pairs were produced by different speakers. Half of these had VP NP PP targets, while the other half had double object targets, which are different in form to the caused-motion primes. Finally, only fourteen percent of the L2-L2 caused-motion only prime-target pairs were produced by different speakers. The majority of these had VP NP PP caused-motion or prepositional dative targets, while the rest had double object targets. A two-sided Fisher's exact test reveals that the differences between the L1-L1 matched and unmatched caused-motion only prime-target pairs produced by the same or different speakers are not significant ($p_{\text{Fisher exact}} = 0.739$). Similarly, a two-sided Fisher's exact test reveals that the differences in the frequencies of matched and unmatched L2-L2 caused-motion only prime-target pairs for the same speaker or different speakers conditions are not significant ($p_{\text{Fisher exact}} = 0.624$).

Table 6.22: Matched and unmatched caused-motion only prime-target pairs when they were produced by the same or different speakers

| Corpus | Same speaker | | Different speaker | |
|--------|------------------------------|--------------------------------|------------------------------|--------------------------------|
| | # Matched prime-target pairs | # Unmatched Prime-target pairs | # Matched prime-target pairs | # Unmatched prime-target pairs |
| L1-L1 | 37 (59.68%) | 25 (40.32%) | 3 (50.00%) | 3 (50.00%) |
| L2-L2 | 62 (63.27%) | 36 (36.73%) | 11 (68.75%) | 5 (31.25%) |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Same speaker = caused-motion only prime-target pairs produced by the same speaker; Different speaker = caused-motion only prime-target pairs produced by different speakers; # Matched prime-target pairs = number of caused-motion primes immediately followed by prepositional datives or caused-motion targets; # Unmatched prime-target pairs = number of caused-motion primes followed by double object targets.

6.6 Discussion of the caused-motion construction data

The results in this chapter indicate that the prime type preceding the target construction cannot explain the target variant used. The VP NP PP primarily attracts a structurally similar VP NP PP targets. When these are teased apart, however, we can see that the structurally different double object targets outnumber the prepositional dative and caused-motion targets following a VP NP PP prime. In the VP NP PP L1-L1 and L2-L2 data sets, the prime-target pairs' main verb lemma identity seems to be the one factor that can predict the target type. In addition, distance seems to be a good explanation of the L1-L1 targets when the GLM analysis considers only the caused-motion constructions as primes. Finally, the results at the two data analysis levels did not show support for a stronger priming effect when the interaction with the speaker identity is considered.

Let us now consider the interpretation of these findings. This analysis was inspired by Hare and Goldberg's (1999) study, where they found more double object targets following a 'provide with' sentence, which has the same constituent structure as the prepositional dative, than when the primes are prepositional datives. The main analysis took the caused-motion construction as the primes, and looked at whether

they would be followed by more prepositional dative responses, which have the same constituent structure, relative to the double object construction responses, which are syntactically different. The other level of analysis widened the primes to include prepositional datives together with the caused motion constructions and looked at the kind of targets that the primes elicit. Lexical boost and the prime-target pair distance have also been investigated in this chapter.

6.6.1 Construction preference

One of the main concerns of this chapter is to understand whether in L1-L1 and L2-L2 conversations' speakers favour a VP NP PP prepositional dative or caused-motion construction, relative to double object targets following VP NP PP prepositional dative and caused-motion construction primes. With regard to this point, the fact that L1 and L2 speakers produced more double object targets following caused-motion primes than prepositional dative targets could be taken as an indication that the constituent structure of a prime alone does not explain the target responses (see Table 6.2). This finding is consistent with Hare and Goldberg (1999) who found more double object targets following 'provide with' primes, relative to prepositional dative targets despite the shared constituent structure of the latter with the prepositional dative with the provide-with primes. Contrary to Bock and Loebell (1990), this finding can be taken as an indication that the use of a target construction following a VP NP PP prime, is not only affected by the shared constituent structure of prime-target pairs, but also by the mapping of semantic features to the structure of the prime sentence.

This finding fits in with a similar finding in Table 6.2, where L1-L1 and L2-L2 speakers were seen to prefer VP NP NP targets, relative to VP NP PP or VP NP PP_d targets following VP NP PP prepositional dative primes. The dispreference for

L1-L1 prepositional dative responses was also observed when only the caused-motion constructions were taken as primes (see Table 6.5). The dispreference for prepositional dative responses should not be interpreted as an avoidance strategy of prepositional datives on the part of the native speakers per se. We have seen in Table 5.3 an indication that the prepositional dative is less preferred by the native speakers in our data, relative to double object targets, even following prepositional dative primes. The higher frequency of double objects following VP NP PP primes may well be indicative of overall preference for the VP NP NP structure relative to VP NP PP in the examined L1-L1 and L2-L2 conversations. However, this is not the case in Gries' (2007) investigation of the dative alternation priming where the prepositional dative variant was found to be the unmarked choice in the ICE-GB corpus Gries (2007) works with, which, as pointed out in section 2.14.1, includes mixed data of spoken and written production.

However, it is important to point out that, in both data sets, the GLM results did not show support for caused-motion priming in either data set when the primes comprised both prepositional dative and caused-motion constructions (see Table 6.6). The fact that it was not possible to predict the structure used in the target based on the structural similarity between prime-target pairs also shows an indication that perhaps the semantic features of the primes are at play. Taken together, these caused-motion construction preference findings suggest that the structural similarity explanation for responses to caused-motion primes may not be sufficient.

6.6.2 Distance

One consistent finding from this chapter on the prime-target distance question is that, overall, L1-L1 conversations allow for more AS-Units between prime-target pairs, relative to L2-L2 conversations (see Table 6.9 and Table 6.11). Both language

groups performed the exact same task in the creation of the corpus, and therefore, this difference could not be explained by a difference in task procedures or an outside factor, e.g., involuntary exposure of either language group to the target constructions in the Charlie Chaplin movie.

It could be argued that the reason why, overall, more intervening sentences can be observed between prime-target pairs in the L1-L1 conversations is that native speakers tend to be more resourceful and need less attention for processing than the L2 speakers (Kormos, 2006). Furthermore, they are likely to be able to use different ways to convey the same information (Costa et al., 2008, p. 551). Therefore, they do not need to rely on the repetition of syntactic constructions produced by their interlocutors in order for the conversation to flow. An alternative explanation for the longer intervening material between caused-motion prime-target pairs in the L1-L1 conversations may simply be that the average L1-L1 conversation was longer than the average L2-L2 conversation. The L2-L2 caused-motion prime-target pairs are likely to be separated by less intervening material given that they are shorter than the L2-L2 conversations. However, we also have to acknowledge that the longer a conversation is, the more opportunities are going to arise for primed constructions to be repeated.

Finally, it is not possible to tell whether there is an AS-Unit distance point at which the likelihood of L1-L1 caused-motion priming decreases. However, it can be inferred from Table 6.10 and Table 6.12 that, overall, matched prime-target pairs tend to have fewer AS-Units separating them. Furthermore, the findings from this chapter do not give us confidence in a specific L2-L2 distance after which the reproduction of the same construction variant will increase or decline. Given the overlapping confidence intervals of the L2-L2 distance separating matched and unmatched prime-target pairs (see Table 6.12), it is not possible to conclusively say either the matched or the unmatched prime-target pairs are separated by a greater AS-Units distance.

6.6.3 Lexical boost

On the question of lexical boost, this analysis found that a greater proportion of matched target responses to the primes are triggered when the prime-target pairs share the same main verb lemma. That is the case not only with L1-L1 but also with L2-L2 prime-target pairs (see

Table 6.16). There are at least two possible explanations for the matching prime-target responses that can be observed in Table 6.16. First, the main verb lemma has combinatorial information linked to it (Pickering & Branigan, 1998, p. 634). This information is activated when a speaker uses the caused-motion construction with a verb like ‘leave’ in a sentence like ‘he left a tip on the table’. The combinatorial information for a caused-motion construction includes a prepositional phrase that shows the direction of a motion the object being moved has to take. This information then remains activated and triggers main verbs such as ‘put’ that combine with a directional prepositional phrase, exactly as does ‘leave’.

Given that the caused-motion targets with matched main verb lemmas shown in Table 6.17 were, for the most part, responses to caused-motion primes, it is also possible to make the argument that it is structural similarity that may have triggered the matching of prime-target pairs, as well as the shared main verb lemmas. A combination of both these explanations can probably better account for the matched caused-motion prime-target pairs in L1-L1 and L2-L2 data than either explanation

alone. That is because the repetition of caused-motion only primes is seen to increase, in both data sets, when prime-target pairs have the same main verb lemma relative to when two different main verb lemmas are used in the caused-motion only prime target pairs (see Table 6.17). Therefore, it seems that both the constituent structure of the VP NP PP_d primes as well as the shared main verb lemma in matched caused-motion prime-target pairs might have contributed to the production of more VP NP PP_d targets, relative to prepositional dative or double object targets.

Another interesting finding is that in both data sets, the main verb lemma match triggers a greater proportion of caused-motion targets relative to the other possible target types (see Table 6.18). The lack of double object responses when the prime-target pairs have the same main verb lemma may be attributable to the design of this study, where double objects were not taken as primes. Particularly with the analysis that involves only caused-motion construction primes, it is unsurprising that the combinatorial nodes in the prime-target pairs with a matched lemma would trigger a greater proportion of caused-motion responses, relative to double object responses. That is because caused-motion constructions can occur with verbs of motion that do not typically take two NP objects, e.g., put, dip, stick and shove.

6.6.4 Priming-speaker interaction

No evidence was found indicating that caused-motion prime-target pairs are more likely to be of the same variant if they were produced by the same speaker. That is, the differences in the frequency of prime-target pairs between same speaker and different speaker conditions were not significant. This finding suggests that the identity of speakers may be irrelevant to the magnitude of syntactic priming in L1-L1 and L2-L2 dialogues. However, it is important to highlight that, in proportion, more

L2-L2 matched prime-target pairs were found when they were produced by two different L2 speakers, relative to pairs that were produced by the same speaker.

The high frequency in the ‘other priming’ condition suggests that speakers are perhaps more sensitive to their interlocutors’ linguistic behaviour than their own. A possible explanation for the lack of self-priming in this chapter is perhaps the nature of the task at hand, which is highly interactive. The high frequency of matched prime-target pairs in the different speakers condition may be taken as an indication that the L1 and L2 speakers benefited from using their interlocutors’ recently produced form which then reduces the computational load associated with their own processing and creation of new structures (Branigan et al., 2000, p. B15). If a speaker uses a caused-motion construction to describe a certain event of motion in a conversation, their listener is more likely to reuse that structure that was just used by their interlocutor, instead of coming up with a new form, or one that they themselves produced earlier in the course of the dialogue.

6.7 Summary and conclusion

This chapter was informed by the findings from Bock and Loebell (1990) and Hare and Goldberg (1999). It set out to investigate whether more prepositional dative and caused-motion responses, relative to double object responses, can be identified following prepositional dative and caused-motion primes in L1-L1 and L2-L2 dyadic naturalistic discourse.

In particular, this is the first study to establish that the caused-motion construction is amenable to priming in L1-L1 and L2-L2 spoken naturalistic dialogue. I have shown that investigating caused-motion priming is possible by looking at its structural similarity with the prepositional dative construction, and its semantic similarity with both the double object and the prepositional dative constructions. The

findings from this chapter indicate that syntactic priming on its own does not constitute a sufficient explanation for the target responses to the primes that were examined. It is more likely that semantic and lexical factors, in addition to prime-target pair structural similarity, also play a role in the use of the target constructions by L1 and L2 speakers. Specifically, this chapter has shown that in both L1-L1 and L2-L2 conversations, prime-target pairs that share the same main verb lemma are likely to be of the same type.

The prime-target distance results were not conclusive on whether there is a specific cut-off point after which priming begins to decay. However, there is some evidence that greater AS-Unit distance separating prime-target pairs minimizes the chances that they will be of the same type. Although this study is based on a small number of L1-L1 and L2-L2 speakers, it has shown that the main verb lemma identity is a strong explanatory factor of the caused-motion construction targets used in both the L1-L1 and L2-L2 conversations. Furthermore, this study demonstrated lack of support for the relevance of speaker identity to the magnitude of caused-motion priming. Taken together, the results in this chapter suggest that the similarity in syntactic structure is one important factor in predicting the target constructions. However, it is not independent of other semantic and lexical factors that are crucial in understanding and explaining priming.

7 General discussion

The main goal of this research was to investigate how L1-L1 and L2-L2 syntactic priming differ in natural dialogue. In doing so, I attempted to disentangle the priming effect from the variable predictors that can also predict the use of the constructions I looked at in Chapter 4 and Chapter 5, i.e. the particle placement and dative alternation. In Chapter 6, I replicated Hare and Goldberg's (1999) study using corpus-based methods, and widened the scope of their investigation by looking at the caused-motion construction as a whole, instead of only focusing on the provide-with structure as the prime. Besides syntactic priming, the descriptive and corpus analysis evaluated the prime-target pair distance effect, the lexical boost effect and the identity of the speaker role in predicting each of the target constructions examined in this thesis. In this chapter, I will summarise the main findings from the analysis chapters, reflect on the limitations of the study and offer implications for the domain of language teaching and directions for future investigations of syntactic priming.

7.1 *Main findings*

Before I begin discussing the findings of the three studies included in this thesis, Table 7.1 below provides a general view of these findings.

Table 7.1: An overview of the findings of the three studies.

| |
|---|
| <i>Summary of the particle placement predictive variables results</i> |
|---|

| Variable | Prime | Distance | D.O. definiteness | Lemma match | D.O. complexity | Literalness | D.O. news value | D.O. Syllable length | Directionality |
|--------------|----------------------------------|----------|------------------------|-------------|----------------------------|-------------|------------------------|----------------------|--------------------------|
| L1-L1 | n.s. | n.s. | n.s. | n.s. | √ | n.s. | √ | √ | |
| L2-L2 | n.s. | n.s. | √ | n.s. | | n.s. | √ | √ | n.s. |
| Interactions | Prime * Prime target distance | | Prime * Lemma match | | Prime * Shared particle | Shared | Prime * Shared D.O. | | Prime * Speaker match |
| L1-L1 | | √ | | n.s. | | n.s. | | n.s. | n.s. |
| L2-L2 | | n.s. | | √ | | n.s. | | √ | n.s. |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Distance = particle placement prime-target pair distance; D.O. = direct object; √ = significant predictor; n.s. = non-significant predictor, * = interaction; The presence of directional prepositional phrase following the verb-particle construction was not included as a predictor in the L1-L1 particle placement analysis; The complexity of the direct object was not included as a predictor in the L2-L2 particle placement analysis.

Summary of the dative alternation predictive variables results

| Variable | Prime | Distance | Lemma match | Theme definiteness | T. number | R. number | T. discourse accessibility | R. discourse accessibility | T. concreteness | R. Animacy | R. pronominality | R. person | Length difference |
|--------------|----------------------------------|----------|------------------------|--------------------|--------------------------------|--------------------------|----------------------------|----------------------------|-----------------|------------|------------------|-----------|-------------------|
| L1-L1 | ~ | ~ | n.s. | n.s. | n.s. | | √ | | ~ | | ~ | n.s. | n.s. |
| L2-L2 | √ | n.s. | √ | √ | | n.s. | ~ | √ | √ | √ | √ | √ | √ |
| Interactions | Prime * Prime-target distance | | Prime * Lemma match | | Prime * Verb semantic class | Prime * Speaker match | Prime * Recipient match | Prime * Theme match | | | | | |
| L1-L1 | | n.s. | | n.s. | | n.s. | | n.s. | | n.s. | | n.s. | |
| L2-L2 | | n.s. | | √ | | √ | | n.s. | | n.s. | | n.s. | |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Distance = dative alternation prime-target pair distance; T. = theme; R. = Recipient; √ = significant predictor; ~ = marginally significant predictor; n.s. = non-significant predictor; * = interaction; Recipient number, recipient animacy and recipient discourse accessibility were not included as predictors in the L1-L1 dative alternation analysis; Theme number was not included as a predictor in the L2-L2 dative alternation analysis.

Summary of prepositional dative and caused-motion prime-target pairs results

| Variable | Prime | Distance | Lemma match |
|----------|-------|----------|-------------|
| L1-L1 | | n.s. | √ |
| L2-L2 | | n.s. | √ |

Summary of the caused-motion only prime-target pairs results

| Variable | Prime | Distance | Lemma match |
|----------|-------|----------|-------------|
| L1-L1 | | √ | |
| L2-L2 | | n.s. | |

Note. L1-L1 = dyadic interaction between participants with English as their L1; L2-L2 = dyadic interaction between participants with English as their L2; Distance = caused motion construction prime-target pair distance; √ = significant predictor; n.s. = non-significant predictor, the prime and lemma match could not be included in the caused motion only prime-target pairs GLM analysis due to the scarcity consideration

Eight research questions were addressed in this thesis. The main findings for each question are summarized below.

7.1.1 How does verb-particle priming in L1-L1 spoken interaction differ from verb-particle priming in L2-L2 spoken interaction?

This question was investigated by quantifying matched and unmatched particle placement prime-target pairs, but also through performing a GLM regression analysis that teased apart the priming effect from the other possible predictors of particle placement use. The findings from Chapter 4 showed that the L1-L1 and L2-L2 participants exhibited very similar linguistic behaviour in their particle placement production. In particular, the factors with explanatory powers were almost the same for L1-L1 and L2-L2 conversations when all particle placement predictors were controlled for. Even more strikingly, the best model explaining particle placement use included the same factors in L1-L1 and L2-L2 conversations, i.e. the news value and the syllable length of the direct object.

Therefore, structural similarity between particle placement prime-target pairs does not explain particle placement use in either data set. This finding gives some support to earlier corpus-based investigations of particle placement priming such as Szmrecsanyi's (2005) who did find evidence for particle placement priming in spoken L1-L1 production, but also highlighted the importance of discourse-related factors in

explaining the use of alternating constructions such as particle placement. For example, in the current thesis, there was a tendency for direct objects with longer syllables to occur with the VP PRT NP construction, rather than the VP NP PRT construction. In both language groups, direct objects that were new to the discourse favoured the VP PRT NP construction because they tend to be longer than the direct objects that have already been introduced. It is apparent that delaying a long direct object to a final position in a particle placement construction is, in part, related to our tendency of producing less complex forms first to allow us time to process more complex forms (Wasow, 1997). We, therefore, see that the structural similarity between particle placement prime-target pairs can be outweighed by the strength of the news value and syllable length of the direct object predictors. It was, therefore, argued that the shared constituent structure between prime-target pairs does not explain the use of a particle placement variant over the other in the L1-L1 and L2-L2 dialogues.

7.1.2 How does dative alternation priming in L1-L1 spoken interaction differ from dative alternation priming in L2-L2 spoken interaction?

Chapter 5 showed that dative alternation priming in the L1-L1 and L2-L2 is similar in the sense that the structural similarity between prime-target pairs does have some explanatory value for the dative alternation variants used. This finding further strengthens (Bresnan et al., 2007) findings who found evidence for dative alternation priming in L1-L1 telephone conversations while controlling for the relevant dative alternation predictors.

There is priming involved based on the structural similarity between dative-dative prime-target pairs and double object-double object prime-target pairs in both the L1-L1 and the L2-L2 conversations. However, the GLM analysis revealed that,

unlike particle placement use, the dative alternation use in both language groups was largely influenced by two different sets of discourse related explanatory factors (see Table 5.16). In particular, the L1-L1 participants' use of the dative alternation variants seems to have been influenced by the shared prime-target constituent structure, the discourse accessibility of the theme and its concreteness, the pronominality of the recipient and the prime-target distance as an independent predictor. The L2-L2 participants' use of dative alternation variants was influenced by the prime-target pair shared constituent structure, the person, animacy and discourse accessibility of the recipient, the definiteness of the theme, the theme-recipient length difference and the shared main verb lemma as an independent predictor of the target.

The prime-target shared constituent structure alone, therefore, does not sufficiently explain the dative alternation variants used in the L1-L1 and L2-L2 dialogues. This finding highlights the importance of understanding syntactic priming not only in the context of prime-target pairs' structural similarity, but also in the context of the relevant semantic and discourse-related factors that have influence over the production of one dative alternation variant over the other in both the L1-L1 and L2-L2 conversations. These differences in the predictive factors of dative alternation use between the L1-L1 and L2-L2 conversations might be caused by the differences in the type and amount of the L1 and L2 speakers to the language and their language production strategies (Costa et al., 2008, p. 538–539). For example, the L2 speakers' production of the dative alternation construction seem to have been influenced by the main verb lemma used in the primes. It is possible, therefore, that the L2 participants relied on the main verbs used in the prime because they might have limited ditransitive verbs to choose from. That's unlikely to be the case for native speakers because they have more ditransitive verbs at their disposal to choose from.

7.1.3 Is the caused-motion construction amenable to priming?

The rationale for this research question is the absence of priming studies that investigated the priming of the caused-motion construction. The current study revealed that the caused-motion construction can be studied in a priming paradigm by assuming a construction grammar viewpoint. Under construction grammar, constructions have meanings, and the caused-motion construction is said to have a shared constituent structure with the prepositional dative construction, but shares the semantics of the double object and the prepositional dative constructions (Goldberg 1995, 2006) (see section 2.11.5).

The analysis focused on whether the shared constituent structure of the caused-motion construction and the prepositional dative construction, i.e. VP NP PP, can encourage the production of more VP NP PP targets or VP NP NP double object targets in the L1-L1 and L2-L2 conversations. The findings indicate that the participants' sensitivity to the structure of the caused-motion constructions can be primed to encourage the production of prepositional dative and caused-motion construction targets. This sensitivity to the VP NP PP constituent structure, however, may be outweighed by semantic factors, given that more double object targets followed caused-motion primes, relative to prepositional dative targets in both the L1-L1 and L2-L2 conversations. It is, therefore, possible to study caused-motion priming in corpus-based or experimental contexts whereby the focus is on the participants' sensitivity to the caused-motion's shared constituent structure, manifested through the reuse of the VP NP PP prepositional datives or the caused-motion construction, which have shared semantic features with both dative alternation variants.

7.1.4 How does caused-motion priming in L1-L1 spoken interaction differ from caused-motion priming in L2-L2 spoken interaction?

The L1-L1 and L2-L2 data sets exhibited similar tendencies in the production of the caused-motion construction in the two language groups. Despite the shared constituent structure between caused-motion and prepositional dative constructions, the caused-motion construction primes were immediately followed by more double object targets, relative to prepositional dative or prepositional dative targets. Moreover, the prepositional dative primes were followed by more double object targets, relative to prepositional dative or caused-motion construction targets in both the L1-L1 and the L2-L2 conversations. The findings from the caused-motion priming analysis, therefore, are in accord with Hare and Goldberg's (1999) findings which suggested that syntactic priming is not independent of meaning. Instead, the production of a target sentence is affected by the mapping of the semantic feature of the prime on its constituent structure. This study expands the former work by Hare and Goldberg's (1999) to suggest that syntactic priming in the L2 production of the L2-L2 interlocutors is not independent of meaning. That is because, just like the L1-L1 interlocutors, the L2-L2 interlocutors also showed the same tendency of favouring double objects targets following VP NP PP caused-motion primes despite the unmatched constituent structures between the double object and caused-motion construction.

7.1.5 How does prime-target pair distance affect verb-particle, dative alternation and caused-motion priming in L1-L1 and L2-L2 spoken interaction?

This research question was investigated by counting the number of AS-Units separating the primes from their immediately subsequent targets. The GLM interaction analysis measured whether controlling for the prime-target distance increases the size of the prime effect in predicting the target.

For L1-L1 spoken production, the evidence from Chapter 4 suggests a significant interaction between the particle placement prime and the prime-target pair distance in predicting particle placement use. For L2-L2 spoken production, no interaction was found between the prime and the prime-target pair distance in predicting the use of either particle placement variant. Chapter 4 also revealed that, on average, the L1-L1 particle placement prime-target pairs were separated by six fewer intervening AS-Units than in the L2-L2 conversations. More importantly, the matched L1-L1 particle placement prime-target pairs were, on average, separated by seven fewer AS-Units than the unmatched ones (see Table 4.11). Such an observation was not found for L2-L2 particle placement prime-target pair distance where the average number of intervening AS-Units was comparable; close to twenty two AS-Units separating matched prime-target pairs and nearly twenty four AS-Units separating unmatched prime-target pairs (see Table 4.11).

In chapter 5- the dative alternation investigation- no significant interaction was found between the prime and the prime-target distance for both language groups. Contrary to particle placement priming, a higher average of intervening twenty one AS-Units separated the L1-L1 dative alternation prime-target pairs, relative to the average distance that separated the L2-L2 prime-target pairs, i.e. close to eighteen AS-Units. However, for both language groups, there is no evidence that the matched prime-target pairs were separated by less AS-Units than the unmatched ones.

Finally, Chapter 6 showed that, on average, the L2-L2 prime-target pairs were separated by close to three fewer intervening AS-Units than the L1-L1 pairs following VP NP PP primes, i.e. when the caused-motion and prepositional dative constructions were considered one priming category. This was also the case in the analysis where only caused-motion constructions were taken as the primes. In the first level of analysis, the L1-L1 matched prime-target pairs seem to have been separated by an

average of seventeen AS-Units, i.e. two AS-Units fewer than the unmatched ones. There was no evidence to suggest that the L2-L2 matched prime-target pairs were separated by fewer AS-Units than the unmatched ones. The same tendencies were observed in the second analysis level where, unlike the L2-L2 prime-target pairs, the L1-L1 matched prime-target pairs were separated by an average of fifteen AS-Units, i.e. eleven AS-Units fewer than the unmatched ones.

Crucially, we have seen examples where both the matched and the unmatched prime-target pairs were separated by just about or over one hundred AS-Units in all the three analysis chapters. By the same token, there are examples of unmatched prime-target pairs when the intervening material was as little as one AS-Unit. Given these large differences in our prime-target distance findings across the target constructions and the two language groups, it is not possible to align this study with either the transient activation or implicit learning accounts of priming. That is because the repetition of the target constructions under study was not merely motivated by the prime-target pair shared constituent structure. Instead, the repetition of the target constructions was largely motivated by lexical and discourse-related factors (e.g., see Table 4.16 and Table 5.16). The findings from this study are, therefore, more compatible with the multi-factorial account of syntactic priming (e.g., Hartsuiker et al., 2008) (see section 2.4.3).

We have seen in the particle placement analysis that the prime-target shared constituent structure, as an independent predictor, was irrelevant to particle placement use in both language groups. It was other factors, such as the syllable length of the direct object and its news value, which motivated the use of the L1-L1 and L2-L2 particle placement variants. If we were to explain syntactic priming in terms of the transient activation or implicit learning accounts, then the prime-target distance would have to have some explanatory value for the target variant used. However, that is not

what our data revealed. With the exception of the L1-L1 particle placement analysis, the prime-target pair distance has very little, if any, influence over the size of the L1-L1 and L2-L2 syntactic priming effect and very little explanatory value for the target construction variant used.

The higher frequency of the particle placement construction in the L1-L1 conversations, relative to the L2-L2 conversations, is likely to have allowed for less intervening material between the L1-L1 particle placement prime-target pairs. In other words, it is possible that the L1-L1 participants produced more particle placement prime-target pairs because they might have been sensitive to the frequency of exposure to the verb-particle construction. If the L1-L1 speakers were aware of their frequent exposure to the verb-particle construction, then their awareness could have led them to repeat the most recent variant they were exposed to over shorter intervening material than in the L2-L2 conversations. However, the interactive alignment model predicts that priming can automatically arise from the alignment of situation models (Pickering & Garrod, 2004, p. 10). It would, therefore, have been useful if a post-test or interviews were conducted with the L1-L1 participants to ask whether they were aware of their frequent use of the particle placement construction over short intervening prime-target pair distances.

Indeed, this is not the first study where the interaction between a prime-target distance and the identity of the prime was found not to strengthen the magnitude of syntactic priming. The lack of interaction between prime and prime-target distance finding is in accord with experimental studies like Bock and Griffin (2000) and Bock et al. (2007) who found that the prime-target distance did not interact with dative or voice alternation priming in L1-L1 spoken production. It seems to me, therefore, that the prime-target pair distance has, perhaps, little relevance to the use of either target variant over the other.

The lack of support for explanatory value of the prime-target distance for the use of the target constructions under study may be attributable to the highly interactive nature of the corpus. We saw in section 2.4 that the experimental studies of syntactic priming typically manipulate the size of material intervening between prime-target pairs by inclusion of a specific number of filler sentences (e.g., Bock & Kroch, 1989; Wheeldon & Smith, 2003). In this study, no fillers or intervening materials between the target constructions were dictated on the participants. In other words, the L1-L1 and L2-L2 production of the target constructions occurred in a highly interactive manner in a free task-based dialogue. If a corpus was compiled using a communicative task which requires the participants to produce a set number of target constructions over a fixed number of intervening sentences, then we might find a different outcome for the explanatory value of the prime-target pair distance.

7.1.6 How does the lexical similarity between prime and target affect verb-particle, dative alternation and caused-motion priming?

This lexical boost refers to the phenomenon that syntactic priming is enhanced by shared lexical items between prime-target pairs (Pickering & Branigan, 1998). This lexical boost research question was investigated at two levels: the main verb lemma effect and the prime-target pairs' general similarity effect (see section 2.13). The particle placement analysis showed that the main verb lemma match strengthened the particle placement priming only in the L2-L2 conversations. Similarly, the dative alternation analysis found that the magnitude of dative alternation priming is boosted by matched prime-target main verb lemma only in the L2-L2 language group. Two explanations can be offered for this L2-L2 tendency. First, it is possible that the L2-L2 interlocutors relied on the repetition of their main verbs as a vehicle of achieving coherence in their communication. Second, by comparison to L2-L2 interactions, it is possible that native speakers of a language have a wider list of verbs to select from

that communicate different shared of meaning. L2 speakers of English, however, tend to overuse common verbs such as ‘get’ and ‘make’ (e.g., Ringbom, 1998). Therefore, the interaction between main verb repetitions and the primes in the L2-L2 conversations may be indicative of a coherence strategy, or a prototypical tendency in the language production of learners.

The caused-motion priming analysis indicated that the shared main verb lemma increases the subsequent reuse of the prime form in both language groups. Overall, the lexical boost effect associated with the main verb lemma prime-target pair match gives support to Pickering and Branigan' (1998) extension of Roelofs' (1993) model where they suggested that main verb lemmas are linked directly to combinatorial nodes that specify the phrases that these verbs can be linked with. In accord with Pickering and Branigan (1998), the L2-L2 dative alternation analysis showed that if a prepositional dative prime with the main verb lemma of ‘give’ is followed by a dative alternation construction with the verb ‘give’, chances are the target will be the same variants as the prime, i.e. prepositional dative, given the prior activation of the combinatorial node linking ‘give’ with a prepositional dative construction.

Support for the general similarity effect is manifested only by the finding that the prime-target direct object overlap strengthened the magnitude of particle placement priming in the L2-L2 conversations. Such an effect was not observed in the L1-L1 particle placement regression analysis. We have also seen that the shared prime-target pair particle did not boost the magnitude of particle placement priming in either the L1-L1 or the L2-L2 conversations. Furthermore, the matched themes or recipients did not boost the dative alternation priming effect in either data set. This allows the conclusion that there is a strong lexical boost effect across target structures and language groups. However, this seems to be merely driven by the shared head

verb between prime-target pairs. This study, therefore, does not give much support to Snider's (2009) finding of general similarity where dative alternation priming was also influenced by lexical overlap between other words, such as the recipient and the theme, within dative alternation prime-target pairs.

7.1.7 How does the prime-target pair's speaker identity affect verb-particle, dative alternation and caused-motion priming in L1-L1 and L2-L2 spoken interaction?

This research question was investigated by testing for interaction between the identity of the speaker and the construction variants used in the prime. The descriptive analysis looked at whether the speaker of a prime and its target are the same person. The evidence across all three constructions examined in this thesis suggests that the identity of prime-target speakers is irrelevant to the construction variants that were used by the L1-L1 and the L2-L2 speakers. This finding strengthens Gries' (2007) result where he found that the L1-L1 particle placement use was unaffected by the identity of the speaker.

Furthermore, this finding emphasises the nature of conversation being a joint process. In other words, conversations are a collaborative exercise where speakers do not only rely on their own previously produced constructions. Conversation partners are also hearers as they process and comprehend their interlocutors' input and use it as a source to generate their own utterances and constructions (Garrod & Pickering, 2004, p. 9). With that said, it would be very interesting to run the same kind of analysis outlined in this thesis on transcripts from the same corpus where one speaker narrated parts of the Charlie Chaplin movie in the form of a monologue. Such an investigation would enhance our understanding of the speaker identity effect in L1 and L2 spoken production.

7.1.8 How can corpus-linguistic methods be used to disentangle priming effects from other possible predictors of verb-particle and dative alternation in naturalistic discourse?

By devising an approach whereby the target constructions examined are carefully parsed, extracted and revised for potential automatic tagger errors. We have seen in this study that it is crucially important not to understand syntactic priming in terms of shared prime-target constituent structure only. That is, the occurrence of construction A following construction B, rather than construction C, where construction B has a more similar constituent structure to construction A, than does construction C, does not necessarily constitute syntactic priming. While the structural similarity between a prime and a target can contribute to the reproduction of the prime, there are other factors that can also play a significant role in encouraging the production of construction A over construction C, or the other way around.

We have seen in this study that corpus linguistics can do more than just generating hypotheses about language production, as Pickering and Branigan (1999, p. 136) critiqued. However, as Monaghan and Rowland (2016, p. 3) put it: "... taking into account actual corpora of language motivates an understanding of language in its natural habitat, rather than in elicitation studies in a laboratory". In particular, we have seen that the GLM regression analysis can reinforce our understanding of syntactic priming in free task-based dialogues through analysing the interlocutors' language production in the form of transcribed conversations. Thus, it is possible to disentangle priming from other relevant predictors. By taking the target as the dependent factor and other predictors as independent factors, a GLM logistic regression analysis can elicit the factors with explanatory power for the target variants examined. We then can rule out the factors that are not relevant to the production of a target construction and focus on the ones that actually influenced its reuse.

Now that we have summarized the findings of this study, let us turn to its theoretical and methodological contributions.

7.2 Theoretical contributions of the present study

Theoretically speaking, this study has given support to Howes et al. (2010) Fernández and Grimm (2014) and Healey et al. (2014) who suggested that the experimental studies of syntactic priming might have overstated its magnitude in L1-L1 spoken production. Given the lack of particle placement and caused-motion priming, we can infer that syntactic priming may be construction-specific. That is, the evidence for dative alternation priming alone in a given study or experiment does not warrant inferences for the robustness of syntactic priming spoken L1-L1 and L2-L2 language production.

Furthermore, the lack of support for particle placement priming between L2-L2 speakers is in contrary to Costa et al.'s (2008, p. 549) suggestion that priming is expected when two L2 interlocutors share a similar L1. All the L2 conversations comprised the L2 production of speakers who come from the same German L1 background. The findings from this study show support for L2-L2 priming only in the dative alternation investigation.

However, the similarity in the priming behaviour of L1-L1 and L2-L2 interlocutors gives some support to Costa et al.'s (2008, p. 549) hypothesis. English and German belong to the same Germanic family of languages and the constructions under study in this thesis exist in both languages. Given that the alternations examined in this thesis are shared in the two interlocutor groups' L1, it is possible that the similarities in priming behaviour between the two language groups may, in part, be attributable to the similarities between the two languages in terms of these features and alternations. No evidence for particle placement or caused-motion priming was

found in the production of either language group. However, the analysis of the dative alternation revealed evidence for priming in both language groups. These observations give support to Costa's prediction of interlocutors of similar priming behaviour in the production of interlocutors of similar L1 backgrounds, which, in this case, might have been encouraged by the similarities between English and German in terms of the target constructions under study.

Another crucial contribution of this study lies in the fact that it is the first to look at the particle placement, the dative alternation and the caused-motion construction together in one corpus. It is also the first study to investigate all the three constructions together in spoken L1-L1 and L2-L2 task-based free dialogue. The caused-motion construction priming was investigated through expanding Hare and Goldberg's (1999) study to include not just the provide-with structure as a prime, but rather the caused-motion construction as a whole. Consequently, it was possible to show that the caused-motion construction is amenable to priming while also inferring that syntactic priming is not purely syntactic, but is rather underpinned by the semantic and lexical features of a sentence in addition to its constituent structure.

7.3 Methodological contributions of the present study

This study goes beyond most of the experimental studies of syntactic priming in spoken production in two major ways. First, no primes were dictated on the participants to use for any of the target constructions investigated in this thesis. The participants were not given instructions or required to produce any particular structure, nor were they told to repeat a certain lexical item from a prime sentence or avoid the prime-target pair lexical repetition (Müller, 2005). The avoidance of such an experimental setting was important for corpus selection in the present study to eliminate the risk of too much extra input from experimenters. Second, instead of

focusing on just one predictor of construction use, this study looks at a large number of predictors, some of which proved to better explain the particle placement or dative alternation use than the prime itself. For example, the L1-L1 particle placement use was explained not by the identity of the prime, but rather, by the direct object's syllable length, complexity and news value.

The present study also goes beyond most corpus-based investigations of syntactic priming in two major ways. First, we investigated syntactic priming in the spoken production of three constructions using the same corpus data to study all three of them. If different corpora were used to study each target construction, then it would not be possible to make generalizations on the findings for the L1-L1 and the L2-L2 language groups due to differences in genre and corpus compilation procedures. Second, the target constructions were all investigated in task-based free dialogues of L1-L1 and L2-L2 interlocutors elicited in exactly the same manner for both language groups. This study, therefore, has an ecological validity as the corpus used for the syntactic priming investigation is reflective of an oral communication activity in English classrooms. We have seen that, being a silent movie with a wide variety of motion events, the Charlie Chaplin movie can encourage students to produce the constructions under study as they include a verb of motion. With that said, the Charlie Chaplin movie can be used in an L2 classroom as an oral communication task to encourage L2 students to practice event description in the form of free dialogue. The next section addresses the pedagogical implications of this thesis.

7.4 Pedagogical implications

We have seen that, given the opportunity, the L2 interlocutors are responsive to an L2 communicative situation that requires them to narrate a story even with no oral exposure to it. As with the L1 participants, the L2 participants were exposed to

the silent Charlie Chaplin movie and performed a communicative task where they narrated the events in English to each other. Such an interactive exercise is important in a second language classroom environment because it can boost the learners' confidence in their own L2 oral communication skills. These conversations can be thought of as contexts for *linguaging*, i.e. "...the process of making meaning and shaping knowledge and experience through language" (Swain, 2006, p. 98). The linguaging opportunities available in this movie description task provided the students with opportunities to construct the complex structures under study (i.e. the verb-particle, dative alternation and caused-motion constructions). On this basis, this study hypothesizes that working in pairs in a silent movie descriptive task might be more effective in an L2 grammar learning context than learning L2 grammar in a solitary task. That is because learners, as they perform an L2 collaborative task, can support each other in generating ideas and exchanging feedback about their own or their partners' language production (Storch & Wigglesworth, 2007, p. 172).

The high number of self-corrected forms that was observed in both data sets may be taken as an indication of a positive effect for peer interaction (see section 3.2.1). That is, the presence of the self-corrected forms, particularly in the L2-L2 conversations, may be reflective of the interlocutors being engaged in the dialogue and benefiting from each other's input. In correcting their own forms, the L2-L2 interlocutors might have drawn on their own or their interlocutors' earlier production of these L2 grammatical forms. It is therefore recommended that language teachers encourage learners' engagement in oral interaction tasks with their peers. That is because the context of L2-L2 spoken interactions creates opportunities where learners can benefit and learn from exposure to their interlocutors' constructions.

Moreover, the finding that the reproduction of constructions particularly in the L2 data is, in part, dependent on semantic factors emphasizes the importance of the learning the association between form and meaning in L2 acquisition. This finding is in accord with usage-based approaches to SLA, and it highlights the importance of having L2 users exposed to authentic native speaker communication. For example, in English classrooms, teachers are advised to prime their L2 students with the verb-particle form, rather than just teaching simple words that serve the same meaning as the verb-particle forms, but may constitute less natural spoken English use (e.g., ‘hit’ VS. ‘beat up’, and ‘wear’ VS. ‘put on’), see Figure 4.8 and Figure 4.9. L2 users are going to make errors in their own second language spoken production if they do not have access to spoken data that portrays how constructions are naturally used by L1 speakers. Second language teachers therefore are advised to use corpus-assisted techniques in their language teaching because corpora are rich with authentic input that shows the distributional properties of language. In this regard, Ellis (2002, p. 179) stated that it is the responsibility of educators to expose their students to a representative sample of authentic language experience.

Particularly in teaching L2 speaking, therefore, is important for second language teachers to move beyond what is possible in a language to how a language is used in particular communication contexts. The gap between what is possible and what is likely can be bridged by observing examples from a corpus and giving the learners access to these examples. For example, a second language teacher may ask their students to search for verbs like ‘pick’, ‘offer’ and ‘put’ in a corpus of native spoken English and sort the concordances to observe the kind of arguments preceding or following these verbs. The students can then study the concordances and observe examples where the verb ‘pick’ is immediately followed by the particle ‘up’ and where the particle ‘up’ is delayed after the theme argument of the main verb.

Furthermore, with teachers' guidance, the students can search for the verb 'offer' in a spoken corpus and get a sense of the differences in its frequency as it occurs in a prepositional dative or a double object construction. The use of a spoken corpus for teaching L2 communication may allow students to internalize the target constructions and the form-meaning mappings of these constructions as they are used in meaningful communication. Vyatkina (2016) found that such exploratory and inductive approaches were effective in teaching the German verb-preposition collocations. However, Vyatkina (2016) also found that students with low L2 proficiency can benefit more from paper-based explorations of L2 constructions. Teachers, therefore, should create paper-based inductive methods and use them in teaching L2 constructions for learners with a low L2 proficiency (see Vyatkina, 2016).

So far, we have summarized the findings of the study, its methodological and theoretical contributions and its pedagogical implications. Let us now turn to its limitations.

7.5 Limitations

Although a lot of thought has been given to researching and writing every chapter of this thesis, it does not come without limitations. Syntactic priming in this study was investigated using L1-L1 and L2-L2 transcribed conversations from the GLBC corpus that was created in 2005. It may have been helpful to conduct post-task interviews with the participants to investigate whether they were aware of certain strategies they used in their own production based on the language production of their interlocutors. However, 12 years on, such an investigation is not possible. Despite our inability to access to the participants, the corpus itself had information about the identity of the speakers of each sentence. Therefore, it was still possible to investigate the interaction between speaker identity and priming.

A second consideration to note is that the sub-corpus of extracted L1-L1 and L2-L2 conversations is small in size, i.e. only one hundred thousand words. The small size of the corpus meant that it was not possible to investigate some factors that could have influenced the target constructions' use, e.g., the animacy of the theme in the L1-L1 and L2-L2 dative alternation investigation, the presence of an L1-L1 directional prepositional phrase and the complexity of the direct object in the L2-L2 particle placement investigations, due to the scarcity consideration (see section 3.3.2 for an explanation). It is true that an experimental investigation of dative alternation priming could have elicited a large number of written or spoken sentences that include animate and inanimate themes. However, a major strength of this study is that it investigates priming in task-based free interaction rather than laboratory-based single sentence utterances. It does not require the participants to produce certain constructions or any specific verbs or lexical items through well thought-out and planned in advance prompts, nor does it only control for animacy as a possible predictor of dative alternation use. Instead, it traces back the examined constructions in the free dialogue task, which simulates naturalistic conversations while controlling for a large number of predictors. Thus, despite the small size of the corpus, it was possible to study constructions that have been investigated before, i.e. particle placement priming, dative alternation priming, but also conduct the first exploration of caused-motion construction priming in L1-L1 and L2-L2 free task-based dialogues. With that said, it is important that future investigations of syntactic priming continue to go beyond the obvious alternations such as voice and dative alternations to less straight forward alternations such as the caused-motion priming. Such investigations would further consolidate our understanding of the nature of syntactic priming. This effort will, of course, require some work towards searching for or building appropriate corpora

and/or experimental designs where other possible alternations can be observed in frequent numbers.

The current study used a corpus of L2 English conversations by a homogenous group of L1 German speakers. This ensured that L2 users were familiar with the target constructions based on their mother tongue. It would be interesting to look into L2 conversations of other L1 backgrounds. However, in the present study, it was important to take into consideration the L2 speakers' familiarity with the target constructions. The inclusion of L2 conversations where the two interlocutors come from a German L1 background enabled us to make inferences about the possibility for cross-linguistic transfer in our data (Loebell & Bock, 2003). Such inferences could not have been made if the L2-L2 interlocutors come from an L1 background where the examined target alternations do not exist.

Furthermore, given that the present study syntactic priming only in dyadic interactions, it is likely that the findings may not extend to group conversations where three or more interlocutors actively exchange turns. The methodology outlined in this thesis is compatible with this kind of research. Thus, it would be very interesting for future research to utilize this methodology in researching and comparing group interaction and monologues with dyadic interaction in terms of the strength of priming and its interaction with speakers' identity.

For example, a corpus or experimental design where multiple participants are asked to describe the main characters in a movie and relate them to each other in terms of personality or physical appearance can be compatible with a study that looks at the alternation between analytic vs. synthetic comparatives in group conversations. The challenge, however, is finding a corpus compatible with more than just the analytic vs.

synthetic comparatives because otherwise, the findings will hold less significance and generalizability power to the phenomenon of syntactic priming.

Language-wise, the scope of this study was limited to the interaction of L1-L1 American speakers, and L2-L2 with a German mother tongue. Another possible area for future research therefore would be to expand on this study by considering L1-L2 interactions or L2-L2 interactions with different L1 background. Indeed, the methodology proposed in this study is applicable to such research, which can help consolidate our understanding of priming in L2-L2 conversations.

7.6 Directions for future research

One of the main take-away lessons from this thesis is that in order to quantify syntactic priming effects, priming and the relevant predictors to the particular construction need to be teased apart. Future research of syntactic priming, corpus-based or otherwise, should consider the occurrence of a prime and its subsequent target, without losing sight of the semantic and discourse-related factors that can influence the occurrence of that construction or one that is related to it. Given the results summarized in Table 4.16 and Table 5.16, any particle placement or dative alternation investigations that only consider their occurrence and subsequent production, are at best incomplete. By the same token, focusing on one or two of the predictors, besides structural similarity, and failure to include other possible predictors fails to capture the whole syntactic priming picture.

The lexical boost part of the study comprised an analysis that focused on the shared main verb lemmas and other arguments within the sentence, as well as the main verb semantic class as predictive factors of the examined constructions in L1-L1 and L2-L2 conversations. Future investigations could replicate this analysis with a

particular focus on the inherent preferences of verbs towards a certain construction, relative to its alternative in the spoken genre. For a dative alternation investigation, for example, researchers can get a sense of ditransitive verbs' inherent preferences by retrieving all concordances of individual ditransitive verbs, e.g., offer, donate, send, hand, etc., in a spoken corpus such as the BNC. If the search retrieves a higher frequency of the ditransitive 'hand' with the prepositional dative construction, this can then be taken as an indication that the verb 'hand' prefers the prepositional dative over the double object construction in spoken English.

The methodology created to investigate syntactic priming in this thesis could be replicated in different contexts to investigate syntactic priming of other structures, in other language combinations, other tasks and other modalities. It would be interesting to compare syntactic priming in L1-L1 and L2-L2 with syntactic priming in dyadic interactions of L1-L2 spoken production for the same target constructions, preferably using the same dialogue task. It would also be very interesting to use this method and apply it to investigate syntactic priming in examiner-testee interaction. A further study could look into syntactic priming in other dialogue modalities such as text messaging, computer mediated chats or even tweets.

Another possible area of future research is to look at the sociolinguistic aspects of syntactic priming (e.g., Weatherholtz et al., 2014). Such an investigation would add a different flavour to syntactic priming research by considering speaker-speaker relations to further explore the speaker identity predictor (e.g., couples, friends or strangers). By taking a more a sociolinguistically oriented standpoint, it might be possible to investigate the effect of class relations on syntactic priming (e.g., employer-employee, professor-student, posh-working class, etc.).

7.7 Concluding remarks

I indicated in section 1.6 that one of the main goals of this study is to devise a methodology whereby syntactic priming can be disentangled from other relevant factors that influence the production of the target structures examined in this thesis. Descriptive and regression statistical measures were performed to understand syntactic priming in L1-L1 and L2-L2 task-based free dialogues. I also investigated the relevance of prime-target distance to the magnitude of syntactic priming in both the L1-L1 and the L2-L2 conversations.

In both language groups, it seems to me that predicting the use of target constructions variants based on the prime-target pair constituent structure similarity alone disregards other important factors. In fact, this study has shown that some of the relevant semantic and lexical factors seem to outweigh the constituent structure similarity predictor of constructions use. However, syntactic priming is not completely dependent on lexical and semantic factors.

Finally, the lack of support for the relevance of prime-target pair distance to the magnitude of syntactic priming suggests that the focus of syntactic priming research could be shifted from attempting to characterise the duration of the effect to further investigate and explain the factors that could motivate the reuse of constructions in written and spoken language production.

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