The Dative Alternation in English as a Second Language

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Contents

List of Tables

List of Figures

Chapter 1

Introduction

Understanding how learners acquire a second language has been of interest for thousands of years (Odlin 1989). The study of second language acquisition (SLA) has, however, only become a linguistic discipline in its own right in the past 50 years (Gass 2009). This is one of the reasons why there are still many linguistic phenomena which have only been well researched for (English) native speakers, but have not yet been in depth investigated for learners of English.

Among these phenomena are cases of so-called grammatical variation. The term grammatical variation refers to instances in which speakers have a choice between competing syntactic or morphosyntactic variants to express what is believed to be semantically equivalent. In English, there are various examples of grammatical variation, e.g. the genitive alternation in which speakers have the choice between the *s*-genitive and the *of*-genitive, the placement of particles (e.g. *put on the jacket* or *put the jacket on*), the choice between two different comparative constructions (e.g. *more happy* or *happier*) (see Gries 2002; Hinrichs and Szmrecsanyi 2007; Mondorf 2009; Rosenbach 2005), and for ditransitive verbs of transfer (e.g. *give*, *offer*) there are two competing object constructions (e.g. Bresnan et al. 2007). The latter type of syntactic variation is commonly referred to as *the dative alternation*. Speakers have a choice between the prepositional dative construction (PP dative) and the double object construction (DO dative), as exemplified in (1):

(1) The young man gave a diamond ring to his girlfriend. (PP dative)
The young man gave his girlfriend a diamond ring. (DO dative)

This thesis is concerned with the investigation of the use and the acquisition of the dative alternation in English as a second language (ESL).

The dative alternation in English as a first language (L1) has been extensively researched for several decades (Bresnan 2007; Bresnan et al. 2007; Bresnan and Hay 2008; Bresnan and Nikitina 2009; Bresnan and Ford 2010; Collins 1995; Emonds 1972, 1976;

Fillmore 1965; Jackendoff 1975; Jackendoff and Culicover 1971; Oehrle 1976; Pinker 1989 among many others). Studies in generative frameworks focus on the question which of the two structures is base-generated, thus representing the underlying structure, and which one is derived by movement or via transformation (Emonds 1972, 1976; Fillmore 1965; Jackendoff and Culicover 1971). The observation that some verbs only occur in one or the other dative construction, whereas others occur in both variants (see examples in (2)) leads to the question how the resulting verbal categories are represented in the lexicon (Jackendoff 1975; Oehrle 1976). Another topic of investigation is whether and to what extent there are semantic differences between the two variants (Krifka 2004; Pinker 1982).

(2) a. He explained the intricacies of the dative alternation to me.
*He explained me the intricacies of the dative alternation.

b. Meredith denied her son the second ice cream.
*Meredith denied the second ice cream to her son.

c. The squirrel brought seeds to her young.
The squirrel brought her young seeds.

There is a growing consensus in the literature that the two competing variants are semantically equivalent (Bresnan et al. 2007; Bresnan and Ford 2010; Bresnan and Nikitina 2009; Collins 1995) and that the alternation can neither be attributed to semantic differences nor to lexicalized verbal preferences. The influence of the verb itself on the choice of the dative construction is still undenied. The rigidity of the claim that certain verbs only license one or the other construction has to be attenuated, however, as it has been observed that allegedly ungrammatical constructions are actually being used. The verb's preferences can be overridden by the presence of certain linguistic factors. The verb *deny*, which has been reported to occur in the DO dative construction only, has been observed to be used in the PP dative construction (see example (3a)) when the theme is pronominal, in order to avoid the even worse alternative (3b)(Bresnan and Ford 2010).

(3) a. Ted gave Joey permission to march, but he denied it to Kim.

b. ...denied Kim it.

(example taken from Bresnan and Ford 2010, p. 171)

Recent research has convincingly shown that the dative alternation is a gradient (i.e., probabilistic) rather than a categorical phenomenon and that speakers' choices are governed by

a variety of linguistic factors. These linguistic factors (e.g. animacy, pronominality and length) have been used to statistically model and reliably predict which of the two competing structures a speaker will use in a certain linguistic environment (Bresnan 2007; Bresnan et al. 2007; Bresnan and Ford 2010). Thus, it has been shown that grammatical knowledge must have a probabilistic component.

When it comes to the dative alternation in English as a second language (a L2), there are far less studies available. Many of them have been conducted at a time when it was still believed that native speakers' use of the dative alternation was a result of lexicalized verbal preferences. As a result, most learner studies focused on the successful acquisition of the proposed verb classes (Davies 1994; R. Hawkins 1987; Inagaki 1997; Mazurkewich 1981, 1984, 1985). Another point of interest was the order of acquisition of the two constructions. Most researchers claim that the PP dative was acquired before the DO dative (R. Hawkins 1987; Inagaki 1997; Le Compagnon 1984; Mazurkewich 1981, 1984, 1985), as it is the allegedly less marked construction. It has, however, never been systematically investigated whether this preference is a result of structural transfer from the L1 or a preference which can be found irrespective of the native language.

Only very few studies explored whether the learners' use and judgments of the two variants are governed by the same linguistic factors which have been found to be predictive for English native speakers (Callies and Szczesniak 2008; Chang 2004; Marefat 2005; Tanaka 1987). These studies mostly tested the influence of only one linguistic factor and if they tested more than one factor, the results were still analyzed in a monofactorial way, i.e., one factor at a time. Studies which have been conducted with native speakers have, however, shown that monofactorial analyses do not do justice to the complexity of the problem (e.g. Bresnan et al. 2007). The exact nature of the influence of the individual linguistic factors can only be accounted for when acknowledging their simultaneous influence by using advanced statistic modeling techniques rather than merely descriptive statistics (see for example Gries and Deshors 2015 for discussion).

Some recent studies suggest that learners make probabilistic choices with respect to the two competing dative constructions which are based on similar linguistic factors as it is the case for native speakers in preference choices (Frishkoff et al. 2008) and also in production (Deshors 2014; Gries and Deshors 2015). For a variety of reasons to be laid out in Chapter 2, all three studies are not entirely conclusive as to which factors govern the learners' choices. This gap is to be closed by the present project.

This project presents the first systematic investigation of the influence of the, for native speakers well-explored linguistic factors on the judgment, use, and processing of dative constructions by learners of English. The aim of this project is to investigate whether the syntactic knowledge of learners has a probabilistic component or whether learners' syn-

tactic choices are rather categorical. In order to be able to account for the simultaneous influence of the multiple linguistic factors, the data in this project is analyzed by using linear mixed-effects models. These models cannot only handle unbalanced data sets and estimate the effect of one linguistic factor in the presence of others, but also allow to control for factors such as inter-speaker variation.

Apart from testing whether learners are sensitive to linguistic factors at all, I investigate whether the effects of these linguistic factors work in the same direction as it is the case for native speakers, and whether they play a role in the judgment and production of dative constructions. I further explore which of the factors is the most important one in predicting learners' choices and investigate their relative importance in comparison to those which have been found in studies which investigated native speakers.

The study of the second language (L2) acquisition of a specific grammatical phenomenon also raises questions concerning the role of the native language. While structural transfer from the native language, as proposed by the full transfer/full access hypothesis by Schwartz and Sprouse (1996), would predict learners to use the construction which is prevalent in their first language, processability-based (e.g. processability theory by Pienemann 1998) approaches to SLA would probably predict learners to first acquire the less marked construction, allegedly the PP dative, irrespective of the structures found in their L1. In this project, dative constructions uttered by learners of 16 different native languages are investigated to account for the influence of the learners' native language and, thus, to contribute to the ongoing discussion of the nature of the first language influence on SLA (see Ellis 2008; Odlin 2015 among many others).

The dative alternation is an excellent test case for exploring the influence of the native language. Callies and Szczesniak (2008) point out that advanced learners only rarely make serious grammatical mistakes. Grammatical phenomena in which only one correct target structure is to be acquired, the influence the learners' first language may have had becomes invisible as soon as the target structure has been acquired correctly. That means that even if a learner had been influenced by their L1 in early stages of L2 acquisition, this influence would not be detectable anymore in more advanced stages of L2 acquisition, in which learners have already erased serious errors from their L2. In cases in which the target language has two variants (e.g. the dative alternation) which are both grammatical, we would expect learners to overuse the variant which resembles the construction in their own native language, if structural transfer plays a role (Lado 1957; Wardhaugh 1970; Weinreich 1953). If, however, structures which are easier to process are preferred by learners, we would expect learners to overuse the less marked construction, in this case the PP dative, irrespective of the structures found in their L1.

Another aim of the present project is to make a first contribution to investigating the

on-line processing of dative constructions by learners of English. More specifically, it is tested whether learners' reading times reflect their knowledge of probabilistic syntactic patterns. I further investigate how the results of different types of studies can be triangulated, as this will give us important insights in how far the results of e.g. grammatical judgment tasks allow us to draw conclusions about on-line processing.

These questions are addressed in three studies: a split rating task, which is a special kind of grammatical judgment task, a continuous lexical decision task, which is a special type of reading-time study, and a corpus study. Both experimental studies are conducted with German learners of English and are replications of Bresnan and Ford (2010), who conducted the same experiments with Australian and American speakers of English. The corpus study includes learners of 16 different native languages. The data is extracted from the International Corpus of Learner English (ICLE, Granger et al. 2009). All studies are conducted with advanced learners, i.e., university students of English.

This thesis is structured as follows: Chapter 2[1] introduces the pertinent terminology and provides an overview of previous studies which investigate dative constructions in English as an L1, in English as an L2 and in German. German dative constructions are briefly considered as the participants in the experimental studies are German native speakers. On top of the linguistic factors which are relevant in the dative alternation in English as an L1, there are at least two more influential factors in ESL, namely: proficiency and the influence of the native language. These factors are discussed in Chapter 2.3. I will briefly summarize questions which have been left unanswered or unaddressed by previous research in Chapter 2.5.

Chapter 3 introduces the research questions which will be addressed in the present project in more detail and links them to the studies in which they are investigated (Chapter 3.1). This chapter also illustrates how the data is coded and discusses the advantages of linear mixed-effects models for the investigation of the dative alternation compared to monofactorial modeling techniques.

Chapter 4 presents a replication of Bresnan and Ford's (2010) split rating task. It was conducted with advanced German learners of English. A split rating task is designed to elicit more fine-grained grammatical judgments which can reflect the learners' intuitions about the naturalness of two competing variants in more detail. The study addresses the following questions: First, this study examines whether, in general, German learners of English prefer the PP over the DO dative, as has often been claimed in the literature. Second, it is investigated whether learners' grammatical judgments can be predicted on the basis of the same linguistic factors which are known to influence L1 speakers.

[1] Earlier version of parts of Chapter 2 (Chapter 2.1, 2.2 and 2.4), Chapter 3 (Chapter 3.2) and Chapter 4 have been previously published in Jäschke and Plag (2016) and were not or only minimally altered for the present doctoral dissertation. The pertinent chapters and sections will be identified by a footnote.

Chapter 5 presents a reading time study, more specifically a continuous lexical decision task. Bresnan and Ford (2010) conducted this experiment with native speakers of English, but the questions I address with this experiment are different ones. I investigate whether the presence of certain linguistic factors leads to shorter reading times and whether these shorter reading times in turn can lead to conclusions with respect to the representation of linguistic knowledge of second language learners. Further, it is tested whether the learners' ratings which are obtained in the split rating task are predictive of the learners' reading times.

Chapter 6 introduces a corpus study which was conducted with data extracted from the ICLE (Granger et al. 2009). The ICLE is a collection of essays written by advanced learners of English. I explore data of learners with 16 different L1 backgrounds. A sample of over 3000 dative constructions are analyzed to answer the question whether the learners' use of the two competing dative constructions are influenced by the same predictors that have been put forward in the L1 literature and whether these predictors work in the same direction. I will further investigate whether the learners' proficiency (measured in the duration of the exposure to the English language in different settings) and the learners' native languages influence the choice of the dative construction as well. I further investigate to what extent learners generally differ from native speakers. In order to do so, native speaker data which was sampled by Bresnan et al. (2007) and is publicly available is added to the data collected for this study. I evaluate whether the written production of dative constructions of learners and native speakers generally differs, to what extent learners of individual L1 backgrounds differ from English native speakers and whether the reason for those differences can be explained by the nature of the dative constructions in the learners' native language. For this purpose, a systematic comparison between the ditransitive constructions of the 16 different L1 backgrounds and the dative constructions in English is provided.

Chapter 7 gives an overall summary of the three studies and evaluates to what extent the results yielded in those studies can be triangulated. It will also discuss how these results relate to previous studies of the acquisition of the English dative alternation by learners of English. I will briefly evaluate whether the results can be implemented into existing theories of second language acquisition.

Chapter 2

The Dative Alternation

In this chapter I will give an overview of different approaches which have been employed to account for the dative alternation in English as a L1 and I will summarize the findings of previous studies which investigated the dative alternation in English as a L2. I will further introduce two factors which probably play a role in the acquisition of the dative alternation in English as a L2, but not in English as a L1, namely proficiency and the influence of the native language. I will further introduce German dative constructions as the participants in my experimental studies are German native speakers, and I will finally discuss which questions have been left unanswered in previous research on the acquisition of the dative alternation.

The examples in (4) illustrate the structures at issue, with the pertinent terminology.

(4) a. Prepositional dative (PP dative):
He brought [a pony]$_{\text{NP/theme}}$ [to my children]$_{\text{PP/recipient}}$.

b. Double object construction (NP/DO dative):
He brought [my children]$_{\text{NP/recipient}}$ [a pony]$_{\text{NP/theme}}$.

2.1 The Dative Alternation in English as a L1[1]

In the following I will give an overview of different approaches which have been employed to account for the dative alternation in English as a L1. These approaches are important in order to understand on which theoretical basis the early studies which dealt with the dative alternation in English as a L2 were carried out.

In the generative framework, transformational rules were used to account for the dative

[1] An earlier version of this section has been published in Jäschke and Plag (2016).

alternation (Emonds 1972, 1976; Fillmore 1965; Jackendoff and Culicover 1971). The PP structure was considered the base-generated structure, which could be transformed into the DO structure. In some approaches, the DO structure was considered to be base-generated. In contrast to this, Jackendoff (1975) and Oehrle (1976) proposed that the dative alternation is best accounted for by lexical redundancy rules, i.e., both dative structures can be base-generated with some verbs allowing both structures, some occurring only in the DO structure, others only in the PP structure. On these grounds, verbs were categorized in different classes, namely the alternating and non-alternating ones. The non-alternating ones were claimed to be stored in the lexicon containing the feature [NP NP] or [NP PP], respectively. Explanations on why and when the alternating verbs occur in different structures cannot be inferred from this theory, nor can any predictions on the probability of a particular construction to occur in a given context.

This theoretical gap was to be closed by the semantic approaches, such as the *meaning-to-structure mapping hypothesis*, which are centered around the idea that the dative constructions do not alternate but that each structure expresses a different meaning. Pinker (1989) proposed a syntactic differentiation between two semantic core meanings as shown in (5) below:

(5) a. X causes Y to go to Z (expressed as PP)
Ann pulled the car to Beth. / * Ann pulled Beth the car.

b. X causes Z to have Y (expressed as DO)
Ann denied Beth the ice-cream. / * Ann denied the ice-cream to Beth.

(see Krifka 2004)

While the prepositional dative construction is said to focus on the movement of the theme, as displayed in (5a), the double object construction emphasizes the change of possession (Krifka 2004). This assumption in turn entails the implication that we are not dealing with a real alternation, i.e. a choice between two semantically equivalent structures, but rather different semantic structures which surface as distinct syntactic constructions, thus determining the choice of the dative structure.

The semantic approach also implies that the following sentences in (6) have different meanings:

(6) a. [EVENT give [Ann Beth [STATE HAVE Beth the car]]]
Ann gives Beth the car.

b. [EVENT give [Ann the car [EVENT GO the car [PATH to [PLACE Beth]]]]]
Ann gives the car to Beth.

The DO construction, as in sentence (6a), is associated with a change of possession, whereas the PP constructions, as in (6b), is claimed to express a change of place. This distinction was termed 'broad-range rule' by Pinker (1989). As the 'broad-range rule' is not sufficient to explain all kinds of evidence found in actual language, Pinker proposed 'narrow-range rules' in which dative verbs are subdivided into as many as ten groups, each with certain semantic characteristics and also different preferences for one or the other dative construction. However, even ten groups of verbs where not sufficient to account for all instances of dative constructions found.

Recent work, however, has convincingly shown two things about the alternation. First, the dative alternation is not based on underlying semantic differences. Second, the dative alternation is not a categorical phenomenon but a gradient (i.e., probabilistic) one, which can be statistically modeled using a whole range of predictors (e.g. Bresnan et al. 2007; Bresnan and Nikitina 2009). For example, the categories of alternating and non-alternating verbs proposed in early approaches cannot be upheld because numerous counterexamples to the proposed classification have been found. Verbs such as *pull*, which have been traditionally classified as non-alternating verbs that permit the PP dative only, can be found in both constructions as shown in (7), taken from (Bresnan et al., 2007, p. 73).

(7) Nothing like heart burn food. "I have the tums." Nick joked. He **pulled himself a steaming piece of the pie**. "Thanks for being here."

In contrast to a categorical classification, in which each verb licenses only one constituent order, it has been shown that the dative verbs have a specific lexical bias. This lexical bias is the statistical tendency of each verb to occur in one or the other construction, all else being equal (see Bresnan and Ford 2010, p. 178 for biases of individual verbs). In addition to the verb bias, numerous other predictors have been shown to influence the dative alternation and have been successfully used to predict the occurrence of a particular construction in a certain context. These factors will be briefly discussed in what follows.

One of these factors is syntactic weight. In general, the relative weight (or length) of constituents has been shown to be influential in the choice of syntactic constructions (Arnold et al. 2000; J.A. Hawkins 1994). Speakers tend to place long and heavy constituents at the end of a sentence, an effect that is also known as the end-weight principle

(e.g., Behaghel 1909; Wasow 2002). This principle is standardly interpreted as having its origin in processing complexity (e.g., J. A. Hawkins 1994, 2014).

The end-weight principle is reported to have an effect on the dative alternation as well (e.g., Bresnan et al. 2007, Collins 1995). Thus, sentence (8a) is preferred over sentence (8b). In example (8b), nine words have to be processed before the second constituent is recognized; in sentence (8a), it is only three, which makes (8a) preferable to (8b) (see J. A. Hawkins 1994; Wasow 1997 for discussion).

(8) a. I gave [Sue] [the almost antique and very expensive watch].
1 2 3

b. I gave [the almost antique and very expensive watch] [to Sue].
1 2 3 4 5 6 7 8 9

Another factor that influences the choice of constructions is the type of NP (Aissen 1999; O'Connor et al. 2004; Silverstein 1976). Pronominal constituents precede nonpronominal ones in the dative alternation. Furthermore, definiteness and animacy are known to play a role in constituent ordering. Definite constituents occur before indefinite ones and animate constituents before inanimate ones (e.g., Bresnan et al. 2007; Bresnan and Ford 2010).

These factors can be summarized in the so-called harmonic alignment pattern, illustrated in (9) (adapted from Bresnan et al. 2007), which summarizes the effects found in their corpus studies.

(9)

animate	*before*	inanimate
definite	*before*	indefinite
pronoun	*before*	nonpronoun
less complex	*before*	more complex

Harmonic alignment was originally used in optimality theory "to preserve hierarchical structure between different prominence hierarchies of constraints" (Bresnan and Ford 2010, p. 183; for details see Aissen 1999; Prince and Smolensky 1993) but was adapted by Bresnan and Ford (2010, p. 183) to account for the quantitative patterns that can be observed in postverbal constituent ordering with respect to prominence on a linguistic scale of hierarchy. Less prominent constituents have a tendency to fill a less prominent slot in a sentence. For constituent ordering, this means that animate constituents (more prominent) occur before inanimate ones (less prominent), definite ones before indefinite ones, pronouns before nonpronouns, and less complex constituents before more complex ones.

This alignment pattern has consequences for the choice of the two dative constructions.

If the recipient is animate, definite, a pronoun, and less complex than the theme, the recipient will have a tendency to precede the theme. This is the order that can be realized with the DO dative, in which the recipient NP precedes the theme NP. If, however, the theme is animate, definite, a pronoun, and less complex than the recipient, the theme is more likely to occur before the recipient. For this order, the PP dative can be used, in which the theme NP precedes the recipient PP.

According to Bresnan and Ford (2010), the harmonic alignment pattern can possibly be explained by the principle of uniform information density proposed by Tily et al. (2009), which states that a sentence rises in information density towards the end. More predictable items are mentioned before less predictable ones. As pronominal, definite, and short constituents are more likely to have been mentioned in earlier discourse than nonpronominal, indefinite, and long ones (cf. Bresnan et al. 2007, for discussion), nonpronominal, indefinite, and long constituents are also more likely to be more informative.

This principle of uniform information density is in line with another factor that is known to influence the dative alternation: the accessibility of the constituent. The given-before-new principle, proposed, for example, by Smyth et al. (1979), states that constituents that have been mentioned in previous discourse occur before those that have not been mentioned. Thus, the harmonic alignment pattern can be extended by one more claim — namely, 'given before new.'

In addition to the aforementioned factors, other factors such as person and number of theme and recipient, concreteness of theme, and the previous occurrence of a PP dative have been shown to play a role in predicting the dative alternation and other types of syntactic variation. Noun phrases that refer to local persons (i.e., first and second person) have been observed to occur before nonlocal NPs (i.e., third person; Bresnan et al. 2001; Bresnan and Nikitina 2009, p. 27). The results of the corpus study by (Bresnan et al., 2007, p. 17) show that plural recipients trigger the double object construction, whereas plural themes trigger a PP dative. The DO dative is also more likely when the theme is not concrete. The effects of all these factors are robust across different varieties of English and also across different types of data and experimental paradigms such as corpus studies, grammaticality judgments, sentence completion tasks, and reading time studies (Bresnan et al. 2007; Bresnan and Ford 2010; Bresnan and Nikitina 2009; Collins 1995).

One problem is, however, that these factors are interdependent. Personal pronouns are always short and definite, usually their referent has been mentioned in previous discourse, and they are often animate. Indefinite constituents are often longer than definite ones because they have not been mentioned before (i.e., they are new) and, thus, need to be described more explicitly than definite ones. These problems are addressed (e.g., by Bresnan et al. 2007 or Bresnan and Ford 2010) by using statistical techniques such as

multiple logistic regression and linear mixed-effects models. This solves the problem in so far as the models allow us to look at the effect of one factor while keeping the others constant. However, sometimes a predictor may be inextricably related to another predictor. For example, pronominality inevitably combines the effects of length, definiteness, and accessibility. Such interdependence can cause suppression effects in the statistical models (e.g., Holling 1983). This problem will be discussed in more detail in Chpater 3.3.

In spite of the methodological problems multivariate approaches have faced, it has been established in recent studies that the dative alternation is subject to a variety of factors whose simultaneous presence results in a probabilistic rather than categorical choice between the two dative constructions.

2.2 The Dative Alternation in English as a L2[2]

Research on the dative alternation in ESL is more scarce and the studies which explore the dative alternation in English as a second language more often than not are based on L1 research. Thus, research on the acquisition of the dative alternation picked up the spirit of their time, i.e., the studies which were conducted in the 80s explored the acquisition of alternating versus non-alternating verbs, whereas studies which were conducted in the 90s already started exploring effects of syntactic weight and information structure. We will see in the following that the overdue step to explore the acquisition of the dative alternation in ESL towards using probabilistic models has not yet been taken.

In the following, I will first give an overview of the linguistic factors which have been tested and the obtained results and I will also briefly summarize the methodologies which were used in those studies.

Most studies focus on the acquisition of the verbal categories (i.e., the distinction between alternating and nonalternating verbs). There are a few studies that explore some of the linguistic factors that are influential in the dative alternation in L1 English. In the majority of these studies, grammatical judgment tasks were used, and the analyses were mostly monofactorial, even though some studies explored more than one variable. Further, some of these studies did not explicitly distinguish between themes and recipients but merely tested whether the predictor in question influences the speaker's choice, irrespective of thematic roles.

One major question that arises from existing work is whether learners have a preference for the PP construction, either in usage or in terms of sequence of acquisition. The

[2] An earlier version of this section has been published in Jäschke and Plag (2016).

evidence for these preferences, however, is not uncontroversial.

Chang (2004), who investigated Chinese learners, observed that intermediate learners have a general preference for the PP dative. She argues that this is possibly a result of the order of acquisition of the dative constructions or that the PP dative is cognitively less complex and thus preferred by learners. A forced-choice questionnaire study by Führer (2009), which was conducted to investigate the acquisition of the verb bias by advanced German learners, revealed a general preference for the PP dative in comparison to the L1 speaker control group as well.

With regard to the order of acquisition, it has been claimed many times that the PP dative is acquired before the DO dative (R. Hawkins 1987 ; Le Compagnon 1984; Mazurkewich 1981, 1984, 1985; Tanaka 1987). Mazurkewich (1984) used grammaticality judgment tasks to show that French and Inuit subjects acquired the PP dative before the DO dative. Le Compagnon (1984) observed the same sequence of acquisition in a case study and with grammatical judgment tasks with French subjects.

Tanaka (1987), who investigated Japanese subjects using translation and grammatical judgment tasks, observed that the DO and PP dative are used equally often with the verb *give* but that the PP dative is preferred in nonprototypical dative constructions, with the hypothesized prototype shown in (10).

(10) NP_i[+source, + human], NP_k[+theme, + alienable], NP_j[+goal, + human]. Mary gives a ball to Tom.

The term alienable is used to refer to themes (e.g., *a ball*) that can change the possessor, whereas inalienable themes cannot change their possessor (e.g., *heart attack*). What is coded as alienability by Tanaka (1987) corresponds to different verb semantics of the verb *give* as put forward in (Bresnan et al., 2007, p. 22). *Give someone a heart attack* is an abstract reading of the verb *give*, whereas *give someone a ball* denotes a transfer of possession. Tanaka also observed that the acceptance of the PP dative decreases with increasing proficiency. Chang (2004) and McDonough (2006) also report that learners preferably use the the PP dative in their studies. Chang (2004) conducted a question and answer echoing task and McDonough (2006) conducted a priming study.

Mazurkewich (1985) investigated learners' acquisition of the dative alternation in questions and passives, and R. Hawkins (1987) investigated passives. These studies confirm the previously mentioned sequence of acquisition. However, the results of these studies can neither be straightforwardly generalized to clauses in the active voice nor be used to argue that the PP structure is acquired earlier than the DO structure. The reason is that the observed preference of PP datives in passives and questions can also be explained in terms of well-known effects of cognitive complexity. Rohdenburg's (1996) complexity princi-

ple states that "explicitly marked phrases are preferred over zero-marked counterparts in cognitively complex environments" (Rohdenburg, 1996, p. 151). Thus, the explicitly marked structure (i.e., the PP dative) is expected to occur in interrogatives and passives more often because these structures are more complex than affirmatives (Aarts 2008).

Apart from the question of which structure is acquired first and preferred by learners, studies have looked at the influence of the verb (Callies and Szczesniak 2008, Davies 1994; R. Hawkins 1987; Inagaki 1997; Mazurkewich 1981, 1984, 1985; Wolk et al. 2011). Based on the assumption that there are alternating and non-alternating verbs, many studies investigated whether learners are aware of the fact that certain verbs only license one of the constituent orderings. Callies and Szczesniak (2008) conducted a corpus-based study and concluded that German and Polish learners acquire the difference between alternating and non-alternating verbs. Mazurkewich (1984) also claimed that learners acquire the verbal categories. Her study was, however, heavily criticized for methodological weaknesses, poor subject selection, and too small samples (see Kellerman 1985 for discussion).

A related issue was dealt with by Inagaki (1997) for Chinese and Japanese learners of English. He used verbs of four different classes the *whisper*, *tell*, *push*, and *throw* classes. *Throw* verbs and *tell* verbs constitute alternating verb classes, whereas the other two are said to not alternate. Inagaki used some nonce verbs of each type to test which of Pinker's (1982) rules had been acquired by the learners and found that learners were able to distinguish the verb classes in the *tell* and *whisper* classes but not in the *throw* and *push* classes. His results must be seriously questioned, as the test items contained an introductory text passage that already contained the structures to be judged by the subjects. Thus, his results are most likely a result of syntactic priming (McDonough 2006).

A more recent study by Wolk et al. (2011) tested whether German learners of English of different proficiency levels had acquired verb biases (what they call soft constraints). Wolk et al. (2011) showed, by means of eye-tracking experiments, that learners are sensitive to the verb bias in written and spoken language. Advanced learners are sensitive to verb biases in both directions, whereas intermediate learners are only sensitive to verbs with a bias toward the PP dative. Wolk et al. (2011) hypothesize that intermediate learners are not sensitive to the DO bias as the DO dative is the construction which occurs in German and thus German learners expect this construction. If this interpretation is correct, it indicates that German learners of English acquire the DO dative before the PP dative or at least expect the DO dative rather than the PP dative.

Definiteness and accessibility are also factors that have received attention in the SLA literature on the dative alternation. Obviously, both factors are intertwined, as accessible (i.e., discourse-given) factors are usually associated with definite NPs. Nevertheless, the present study distinguishes between those predictors. Definiteness refers to the status of

the NP only, whereas accessibility taps into whether NPs have been mentioned in earlier discourse or not.

Chang (2004) and Callies and Szczesniak (2008) investigated the effect of discourse accessibility, as previously defined, but no effects were found. Marefat (2005) tested the given-new distinction on Persian learners of English but instantiated this difference by means of definite and indefinite NPs so that the results are somewhat inconclusive with regard to the factor causing this effect. There was no effect for intermediate learners, but advanced learners showed a native-like preference to place definite constituents before indefinite ones. Tanaka (1987) also tested the effect of definiteness but did not find a major effect.

Finally, the effect of syntactic complexity was investigated by Tanaka (1987) and Callies and Szczesniak (2008). Both studies found that learners of English have a native-like tendency to place short constituents before long ones.

To the best of my knowledge, the effects of pronominality have never been explicitly tested on a large scale. However, Le Compagnon (1984) and R. Hawkins (1987) observed that the DO dative is used and accepted by not so advanced learners if the recipient is pronominal. Wolk et al. (2011) found that pronominal recipients were read faster than nonpronominal ones and that themes which follow pronominal recipients are also read faster than those that follow nonpronominal ones. This finding implies that for German learners of English pronouns are easier to process than nonpronouns.

On top of these studies there are some other studies which investigate the dative alternation in English as a L2 with respect to teachability, i.e., the influence of explicit instructions (Frishkoff et al. 2008), possible priming effects (McDonough 2006), and the transfer of L1 dative constructions (De Cuypere et al. 2014).

Frishkoff et al. (2008) tested whether the explicit teaching of cognitive principles (e.g. short constituents precede long ones) facilitates choosing the native-like continuation for dative constructions. They showed that sentences which have a very high probability to occur in one or the other construction are chosen more native-like than sentences whose probabilities to occur in one or the other construction are less pronounced. Training examples and explicit teaching of cognitive principles improved the participants' performance with respect to the native-likeness of their choices. It remains unclear, however, which cues the learners use to choose the best continuation (i.e., which of the linguistic factors influences their choices) even when they have been instructed, because the items contain several influential factors.

The effect of priming was investigated by McDonough (2006). The author elicited spoken data and found that there are only priming effects for PP datives, but not for DO datives. This finding further supports the hypothesis that the PP structure is less marked

and thus acquired before the DO dative by L2 learners of English. Most of McDonough's participants were L1 speakers of Chinese, but among the participants were also several speakers of other L1s[3] The participants were classified as advanced learners of English on the basis of TOEFL scores.

De Cuypere (2014) conducted a split rating task in order to test whether Russian native speakers transfer the word-order preferences of their native language to their second language, English. One group of participants received English items, while the other group rated the Russian translation of the English items. A correlation between the ratings could not be found which indicated that word order preferences are not transferred from the L1 to the L2.

There are two recent corpus studies by Deshors (2014) and Gries and Deshors (2015) worth discussing, even though they are not pure learner studies. Both studies investigated native speakers of British English, German and French learners of English and speakers of indigenous varieties of English (IV). These Englishes, also called post-colonial Englishes, are spoken in Hong-Kong, India and Singapore, for instance. Gries and Deshors (2015) found evidence that learners of English and speakers of post-colonial varieties should not be treated alike as they differ in their use of the dative alternation; thus the results of both of these studies cannot be treated as pure learner studies and will be presented separately.

Deshors (2014) conducted a corpus study with German and French learners of English, speakers of indigenous varieties of English and British native speakers. She looked at ditransitive constructions which contain the verb *give* and investigated the influence of several linguistic factors and found that learners are influenced by the factors length, accessibility, pronominality and animacy of theme and recipient,[4] respectively. With respect to accessibility, she found that German and French learners of English use more DO datives with new recipients and comparatively more PP datives with given recipients. First, note that these results stand out from previous research, as it has been shown many times that given recipients trigger the DO dative and new recipients trigger the PP dative. Secondly, Deshors is the first scholar to ever report on an effect for accessibility in learner language. She did, however, not control for the factor definiteness which is closely intertwined with the factor accessibility. Thus, it is likely that the effect she reports, is actually an an effect of the factor definiteness.

Another interesting finding is that, even though all tested varieties are sensitive to the weight of the constituents, each variety seems to have a different cut-off point. While

[3]McDonough (2006, p. 187) reports that 36 out of 50 participants were Chinese. The other participant's L1s were Korean (7), Farsi (1), Portuguese (1), Serbian (1), Sinhala (1), Spanish (1), Thai(1), and Turkish(1) in their first experiment. In their second experiment 32 out of 54 participants were native speakers of Chinese. The other native languages spoken were Korean (13), Portuguese (4), Spanish(2), Italian (1), Telegu (1), and Thai(1) (McDonough 2006, p. 195).

[4]Deshors (2014, p. 288) used different labels for her variables. I relabeled them for better readability.

French learners of English start using the PP dative almost exclusively for recipients that are 5 words long and already show a probability of over 50% to use the PP for recipients which are longer than 2 words, German learners display a 50% probability for PP datives for recipients which are longer than approximately 7 words. Native speakers have a 50% probability to produce PP datives for recipients which are longer than 10 words (see Deshors 2014, p. 297).

Deshors (2014) further found an effect for pronominal recipients in all varieties she tested. She reports no differences for that effect across the varieties, which indicates that speakers of all varieties prefer the DO dative with pronominal recipients to the same degree.

Methodologically highly interesting for the present project is the study of Gries and Deshors (2015) who utilize the dative alternation to address two different issues, a methodological and a theoretical one.

The methodological aim of their study is to draw attention to one common problem in the research of ESL and indigenous varieties (IV) of English. The data used in studies investigating ESL and IV mostly analyzed their data by using frequency counts instead of multifactorial analysis. Another problem Gries and Deshors mention is that the hierarchical structure of corpora is often disregarded in linguistic research. Hierarchically structured means that a corpus can contain different sub-parts, e.g. a written and spoken part, and it is necessary to account for this hierarchical structure in the statistical analyses. This means that differences in the data such as written vs. spoken should be accounted for by, for instance, using those factors as co-variates in a regression model.

On a theoretical level Gries and Deshors (2015) investigated whether the use of the dative alternation in post-colonial varieties of English pattern with the structures found in English as a L1 or a L2. Their findings thus contribute to the discussion whether speakers of post-colonial varieties of English should be regarded as L1 or L2 speakers of English.[5] Gries and Deshors (2015) tackled that problem by answering the question which structure a native speaker would have used in a certain linguistic environment and comparing that to the structure the learner or IV speaker actually used.

The study includes written and spoken data of learners of English whose L1s are French and German, indigenous varieties of English (see above) and British native speakers.

In a first step of their analysis they fitted a corpus model which included the factors accessibility, animacy, concreteness, pronominality of theme and recipient,[6] length dif-

[5] This result will also be of interest for the corpus study presented in this project, when it comes to the questions whether L1 speakers of Cantonese who grew up in Hong Kong should be included in the study or not.

[6] The labels of the factors used by Gries and Deshors (2015) are different ones. I relabeled them to the names I use in this study to avoid confusion.

ference and voice (active vs. passive), mode (spoken vs. written) together with some random effects, i.e., verb (each verb is one level of that factor), variety (the levels of that factors are the different varieties of English) and speaker (each speaker in each of the corpora is one level of that factor[7]) to determine the effect of each factor on the choice of DO or PP dative by the native speakers. In the next step they used the L1 corpus probabilities to predict which choice a native speaker would have made in a given situation for the learner and IV data and then compared whether the learner/ IV speaker made the same choice a native speaker would have made (see Gries and Deshors 2015, for details.)

They further tested which of the above mentioned linguistic factors are predictive of native-like choices and concluded that learners/ IV speakers make more native-like choices in actives than in passives. The PP dative is overused in passives. They also found that learners/IV speakers make more native-like choices when the length difference between theme and recipient is larger.[8] They also claim that learners/ IV speakers slightly overuse the PP dative when the theme is new. When the patient is given, learners heavily overuse the DO dative.

Although this study is very interesting and methodologically advanced, there are some problems in interpreting the results, which mainly arise due to insufficient documentation. Firstly, the authors unfortunately only presented the results of the linear mixed-effects model which predicts the native-likeness of the dative constructions, but no model in which the influence of the linguistic factors on the learners' and IV speakers' choices were investigated. The lack of the results of such a model makes it hard to correctly interpret the effects of the model the authors present. It is, for example, claimed that learners/ IV speakers "have mastered the [...]tendency given-before-new " (Gries and Deshors 2015, p. 148) and later that "learners/ IV speakers do not rely enough on/underestimate the strength of the cue 'given patient'for the outcome/constructional choice 'prepositional dative"'(ibid). As we, however, do not know whether the learners/ IV speakers are sensitive to the factor ACCESSIBILITY OF THEME at all, this interpretation of the data is not the only one thinkable.

Let us assume that learners are not sensitive to the factor ACCESSIBILITY OF THEME

[7]Gries and Deshors (2015) use a random effect for the corpus ID, i.e. the speaker. Whether this is really justified is unclear. As I will show in Chapter 6, dative constructions are rarely used in the International Corpus of Learner English (ICLE) which is one of the data sources used by Gries and Deshors. In my data, an individual speaker only uttered 1.6 datives on average which hardly justifies a random effect. Whether each speaker uttered an amount of dative constructions that justified to use the factor SPEAKER as a random effect in Gries and Deshors' data has not been documented.

[8]When the recipient is longer than the theme, the learners/ IV speaker correctly use the PP dative. When the recipient is considerably shorter than the theme they use the DO dative correctly. Learners/ IV speakers are more likely to make non-native-like choices with PP datives. In writing the length difference is more wide spread than in speaking. In speaking, learners/ IV speakers overuse the PP dative whereas they tend to overuse the DO dative in writing.

at all. An assumption which is not unlikely, as many previous studies have failed to find an effect of accessibility in learner language (Callies and Szczesniak 2008; Tanaka 1987). If the learners'/ IV speakers' production of the dative constructions is compared to L1 speakers, who are sensitive to the factor accessibility, the following will happen: If the theme is new, the native speakers will produce more DO datives, but the learners will not. Thus, the L1 speakers will produce more DO datives than the learners and in comparison the learners will thus produce 'too many' PP datives. For given themes, which trigger the PP dative, the L1 speakers will produce more PP datives, but the learners just produce the construction that they would have produced anyway. If we compare the L1 and L2 production, the learners will have produced too many DO datives compared to the L1 speaker. This distribution is exactly what Gries and Deshors (2015) found. As we just saw, the results presented by Gries and Deshors (2015) do not necessarily indicate that learners are influenced by the factor accessibility. It could as well mean that they are not sensitive to the factor accessibility at all and the impression that they are only arises through the comparison to the L1 speakers.

Another problem is the classification of the learners' and IV-speakers' produced datives in 'native-like'and 'non-native-like'. This classification in a way presupposes that the dative alternation is a categorical and not gradient phenomenon and that for a probability of 0.6 for the PP dative, there is only one possible choice for a native speaker, i.e. the PP dative. This is, however, not the case. Especially in the mid-range of probabilities there is a great deal of variation in native speaker data (see Bresnan and Ford 2010). Thus, it is somewhat questionable whether all dative constructions which receive the label 'non-native-like' are really that far away from the choice a native speaker would have made. While this is an unavoidable problem in this kind of analysis, it should not go unnoticed.

With respect to learner data or more specifically with respect to the factors which influence the learners' use of the dative alternation, Gries and Deshors' study is, however, not conclusive as the authors' research question was a different one. It is unclear which proportion of native-likeness or non-native-likeness is to be attributed to the learners and which proportion to the IV speakers. Gries and Deshors used the type of speaker, i.e. learner or IV speaker, as a random effect and showed that the intercept had to be adjusted differently for the two groups, but we do not know whether there is an interaction between certain predictors and the factor TYPE OF SPEAKER. It may well be that the IV speakers are influenced by the factor ACCESSIBILITY but the learners are not.

When turning to the methodologies which have been used when investigating the dative alternation in ESL, the studies by Deshors (2014) and Gries and Deshors (2015) are without a doubt the most advanced ones. They are are not conclusive when it comes to the acquisition of the dative alternation by L2 learners, however, as the data used in those

studies also contained dative constructions uttered by IV speakers, which according to Gries and Deshors (2015) behave different than L2 speakers.

The studies which dealt with learners of English only, are mostly less advanced when it comes to the statistical analysis of their data. Most researchers employed frequency counts. In some cases, the method of data elicitation also seems to be problematic. Especially, the studies by Mazurkewich (1984, 1985), Le Compagnon (1984) and R. Hawkins (1987) used a very simple grammatical judgment task to elicit their data. Participants were provided with a list of sentences and were then asked to put an X next to sentences which they found ungrammatical. This task has the clear disadvantage that it is impossible to know what speakers found ungrammatical about the sentences they rejected and results obtained are thus somewhat questionable. Kellerman (1985), who criticized Mazurkewich's (1984) article heavily for methodological weaknesses, tested post-hoc whether the results presented in Mazurkewich (1984) were significant and found that only very few contrasts reached the level of significance.

In conclusion, one can state that a variety of studies tested different predictors on learners of different L1s and different proficiency levels. Even though some of the studies tested more than one predictor, all analyses of the data were monofactorial (with the exception of Deshors 2014; Gries and Deshors 2015, and Wolk et al. 2011), which considerably weakens any conclusions based on these studies.

2.3 Additional Factors: Native Language and Proficiency

When considering learners and not native speakers, there are at least two additional factors which have to be discussed. These two factors are the learners' native languages and their proficiency in the L2.[9]

We will have a look at the influence of the native language first. In previous research on the dative alternation in English as a second language, the influence of the factor NATIVELANGUAGE has very often not been considered at all or only briefly been discussed (e.g. Davies 1994; Mazurkewich 1984, 1985). Cook (2015, p. 24), however, states that the

> axiom [that second language research is about second languages] is effectively ignored every time we treat second language acquisition without

[9]There are further factors that might have an effect such as a possible third language the learner speaks as Cook (2015) points out among many others. I will, however, limit myself to discussing the factors NATIVELANGUAGE and PROFICIENCY.

reference to the first language.

The idea that the native language of a learner has an influence on the acquisition of a second language is far from new (Gass 1996, p.317). Apart from anecdotal evidence for the influence of the native language on a second language, there is a whole body of research concerned with the question of the role of the native language in the acquisition of the second language. I will briefly outline different theories and ideas on the L1 influence that have been discussed in the literature. I will discuss the existing theories and ideas only superficially, however, as none of them offers any clear-cut and testable predictions when it comes to the acquisition of a rather complex grammatical phenomenon such as the dative alternation.

Early approaches to SLA ascribed a tremendous importance to the native language. It was assumed that difficulties in acquiring a second language can be predicted by a comparison (i.e. a contrastive analysis) of the learners' first and second language (see Lado 1957; Wardhaugh 1970; Weinreich 1953). Thus, the learners' syntactic errors can unmistakenly be traced back to the structure of the learners' L1 by providing a word-by-word translation. Closely connected to the idea that the difficulty in acquiring a second language lies in the overcoming of the differences between native and target language is the idea of transfer. According to Cook (2015, p. 25) the term transfer describes the relationship between L1 and L2 structure. This is, however, only one of a variety of definitions which have been used in SLA literature (compare Odlin 2015). When the L1 structure is identical to the L2 structure, the transfer is not visible and it is considered to be positive transfer. When the L1 and L2 structures differ, the usage of the L1 structure in the L2 is visible and results in an error and is thus labeled as negative transfer or interference (see among many others Cook 2015; Ellis 2008; Odlin 1989). It has, however, been shown that learners' errors can hardly be predicted or explained by comparing the L1 and the L2 structure (Ellis 2008). According to Ellis (2008, p. 379) CAH (contrastive analysis hypothesis) fails to predict the transferability of specific items and does not precisely claim how much is transferred. Thus, the idea of structural transfer has to be modified. These modifications come in the form of constraints on transfer (Odlin 2003). Those constrains include[10]:

- markedness
- language distance and psychotypology
- developmental factors

[10]Ellis (2008) also lists social factors and prototypicality. Those factors are not going to be relevant for the present study.

With respect to markedness, it was hypothesized that only structures which are less marked in the L1 than in the L2 are being transferred. If the target structure is, however, less marked than the corresponding structure in the L1, transfer will not occur (summarized in Ellis 2008). There are studies which found support for that hypothesis as well as some which did not (compare Ellis 2008, pp. 384f). The second constraint which is of importance is language distance or psychotypology. A study by Ringbom (1987) suggests that transfer rather takes place between when learners perceive the L1 and the L2 to be related to one another. This perceived similarity is called psychotypology whereas similarity which is rather objective than perceived is known as language distance.[11]

Other factors which have been proposed are developmental ones. The idea is that the influence of the L1 varies in different stages of L2 acquisition. The hypotheses, however, reach from " The L1 influence increases with increasing proficiency" to " The L1 influence decreases with increasing proficiency" (see Jarvis 2000, cited in Ellis 2008, pp. 392f). As the exact nature of the L1 influence is still unclear, these hypotheses are hardly testable.

Summarizing, it can be stated that for most of the above mentioned hypotheses and theories, we find supporting and contradicting studies.

This becomes evident when trying to apply these approaches to the acquisition of the dative alternation in order to infer some predictions. An approach of unconstrained structural transfer predicts that learners whose L1s have a structure which corresponds to the English PP dative will not have a problem to use the English PP dative. An example of such a L1 is French. Speakers whose L1 has a construction which is similar to the DO dative, such as German, will not have trouble to produce the DO dative. Although this prediction seems to be rather straightforward, it effectively ignores the fact that French as well as German have more than one dative construction. We would have to allow frequency to play a role (the prevalent structure in German is the DO dative) in order to reconcile this prediction with a plain structural transfer approach.[12]

If we enrich the idea of transfer by markedness, the predictions possibly differ. As the DO dative is allegedly more marked than the PP dative, it is not going to be transferred if the structure in the L2 is less marked. In that case, we would not expect German speakers to transfer the DO dative as the PP dative in English is less marked. This prediction, however, ignores the fact that English and German both use the less marked PP dative as well as the more marked DO dative. Thus, the inclusion of markedness does not lead to

[11] I am not aware whether there are any studies on that topic, but I assume that the perceived and actual language distance highly correlate.

[12] For a more detailed discussion of German dative constructions and the problems involved when attempting to make predictions on the basis of a structural transfer approach see the next section, i.e. Chapter 2.4)

a clear-cut hypothesis when it comes to the influence of the L1 on the acquisition of the dative alternation.

The inclusion of language distance and psychotypology seems more helpful at first glance. We can hypothesize that learners whose L1s are typologically related to each other, like German and English, will transfer structures from the L1 to the L2, whereas learners whose L1 is not typologically related to the L2, will not transfer structures from their native language to the language they are acquiring. This hypothesis, however, presupposes many things which have not been clearly outlined to the best of my knowledge, namely: how close to each other must two languages be in order to be perceived as similar? Is it enough if there is a similarity in the one feature which is to be acquired - Chinese, for instance, has dative constructions which are word order-wise identical to those in English - or must the languages correspond to one another in a variety of features?

When it comes to developmental influence on transfer, matters become even more complicated. As we are not able to make predictions when using the definitions of transfer at hand, it seems impossible to predict what kinds of developments take place when there is more or less transfer involved.

In sum, we are in a situation, in which existing theories make it hard to postulate testable hypotheses, especially when it comes to a complex phenomenon like the dative alternation. There is, as we will see, no language among the 16 languages I will look at that has only one possible word order for dative constructions and there are always two target word orders. The use of the target word orders is determined by several linguistic constraints. This is also true for the use of the dative constructions in the L1s (see Heine and König 2010 for an overview). It should be discussed and tested whether these factors (such as the end-weight principle) play a role in the context of transfer, i.e., whether constraints on word order are being transferred from a L1 to a L2, or not.

Another prominent theory on the study of SLA, which ascribes far less importance to the role of the native language, is Processability Theory (PT). The general hypothesis of PT is that learners can only use those structures in the L2 which they can process, i.e., for which they have already developed processing procedures (Pienemann 1998). More difficult structures, e.g., inversion, require more complex processing procedures than easier structures like SVO word order. PT predicts that we find the same sequence in the acquisition of morphosyntactic structures in all learners, irrespective of their L1 background (Pienemann 1998; Pienemann et al. 2005).

In contrast to the full transfer/ full access hypothesis put forward by Schwartz and Sprouse (1996), PT does not assume "[...] that the initial state of L2 acquisition is the final state of L1 acquisition" (Schwartz and Sprouse 1996, p. 40, cited in Pienemann et al. 2005, p. 87), but that learners can only use those forms in their second language for

which they have acquired the necessary processing procedures (Pienemann et al. 2005). Evidence for this assumption has been put forward by Håkansson et al. (2002). They investigated the word order which is used by Swedish learners of German. Swedish is, like German, a verb-second (V2) language. If the full transfer/ full access hypothesis (Schwartz and Sprouse 1996) was correct, we would expect Swedish learners to transfer their L1 word order to their L2 German and produce the V2 structure correctly. This was, however, not the result yielded by Håkansson et al. (2002). They found that Swedish learners start out by producing ADV-SVO sentences which are not grammatical in German (e.g. **Gestern ich kaufte ein Kleid.* 'Yesterday I bought a dress.'), but which are less marked than the target-like ADV-VSO structure. These findings provide evidence that the development of processing procedures rather than structural transfer may be the driving force in second language acquisition.

Although PT does not make any precise predictions for the dative alternation, we can infer that all learners should initially use the dative construction, which is easier to process (allegedly the PP dative), irrespective of their L1. As it has often been observed that learners seem to rate the PP dative better than the DO dative, this will presumably be the PP dative. Thus, we should find that all learners will use more PP datives than DO datives.

The second factor which should be considered when investigating L2 learners is proficiency. Previous studies which have dealt with the dative alternation have claimed that the proficiency level of the learners plays a role in so far that less proficient learners prefer the PP dative in grammatical judgment tasks (Le Compagnon 1984; R. Hawkins 1987; Mazurkewich 1981, 1984; Tanaka 1987). It has also been observed that early learners accept the DO dative when the recipient is pronominal (Le Compagnon 1984; R. Hawkins 1987). Tanaka (1987) claimed further that Japanese learners of English use DO datives mostly in prototypical dative constructions (see above) and use the PP dative for less prototypical cases. Wolk et al. (2011) found that less proficient German learners of English are only influenced by verbs which have a PP bias, whereas advanced learners are influenced by biases in both directions. Wolk et al. (2011) interpreted their findings in a way that less advanced learners are only influenced by the PP bias because those verbs direct them towards the PP dative, which is the unexpected construction for them, as the prevalent word order in German is similar to the DO dative.

In this project, I will focus on advanced learners in order to keep the influence of the factor proficiency to a minimum. It is, however, difficult to eliminate this factor entirely by finding participants which are at exactly the same stage of proficiency and thus one should keep in mind the possible effects the factor PROFICIENCY may have.

2.4 German Dative Constructions[13]

To be able to discuss the possibility of L1 transfer with respect to the dative alternation, German dative constructions have to be inspected. The constituents in the dative construction are case marked in German (subject = nominative case, direct object = accusative case, indirect object = dative case), and permutations of the constituents are allowed, as reported in Pechmann et al. (1994) and illustrated in (11):

(11) a. Dann wird [der Dirigent] [dem Geiger] [den Taktstock] geben.
Then will the.NOM conductor.NOM the.DAT violinist.DAT the.ACC baton.ACC give.
'Then the conductor will will give the violinist the baton.'

b. Dann wird der Dirigent [dem Geiger]$_{\text{recipient}}$ [den Taktstock]$_{\text{theme}}$ geben.

c. Dann wird der Dirigent [den Taktstock]$_{\text{theme}}$ [dem Geiger]$_{\text{recipient}}$ geben.

d. Dann wird [dem Geiger]$_{\text{recipient}}$ der Dirigent [den Taktstock]$_{\text{theme}}$ geben.

e. Dann wird [dem Geiger]$_{\text{recipient}}$ [den Taktstock]$_{\text{theme}}$ der Dirigent geben.

f. Dann wird [den Taktstock]$_{\text{theme}}$ der Dirigent [dem Geiger]$_{\text{recipient}}$ geben.

g. Dann wird [den Taktstock]$_{\text{theme}}$ [dem Geiger]$_{\text{recipient}}$ der Dirigent geben.

(examples taken from Pechmann et al. 1994, p. 8)

Pechmann et al. (1994, p. 8) claim that all of these sentences are grammatical but vary in their degree of acceptability. These authors show in numerous experiments that the word order displayed in (11a) is prevalent in German, in which the subject is followed by the recipient and the recipient by the theme.

Some verbs (e.g., *schicken* 'send ', *senden* 'dispatch', *überschreiben* 'sign over') allow for an additional permutation in which a directional preposition can be inserted, with the recipient as its complement, as shown in example (12). Thus, German also has a kind of PP dative, but the sequencing of NP and PP is not as restricted as in English.

[13] An earlier version of this section has been published in Jäschke and Plag (2016).

(12) a. Lotte hat den Brief an Monika geschickt.
Lotte has the letter to Monika sent.
'Lotte sent the letter to Monika.'

b. Lotte hat [Monika]$_{\text{NP recipient}}$ [den Brief]$_{\text{theme}}$ geschickt.

c. Lotte hat [den Brief]$_{\text{theme}}$ [Monika]$_{\text{NP recipient}}$ geschickt.

d. Lotte hat [den Brief]$_{\text{theme}}$ [an Monika]$_{\text{PP recipient}}$geschickt.

e. Lotte hat [an Monika]$_{\text{PP recipient}}$ [den Brief]$_{\text{theme}}$geschickt.

Various attempts to account for these word order alternations have been made in generative and nongenerative frameworks (see, e.g.,Büring 2001; Lenerz 1977; Røreng 2011). Røreng (2011) tests the influence of linguistic factors such as case, animacy, definiteness, and referential status in a corpus study. She finds effects for information structure (topic precedes comment), animacy (animate constituents precede inanimate ones), and case (accusative precedes dative). However, her method does not allow her to account for more than two influencing factors simultaneously, and the very important factor of syntactic complexity has not been considered at all. These are serious drawbacks, as it is hardly possible to model a complex phenomenon such as the dative alternation without a multifactorial analysis. Thus, it is unclear whether the effects found by Røreng (2011) hold when more factors are taken into account.

Animacy, however, has also been found to be influential in another type of word order variation in German (i.e., the order of subject and object; Bader and Häussler 2010). In Bader and Häussler's corpus-based study, a logistic regression analysis revealed that subject and object animacy, the length difference between subject and object, and subject definiteness alongside other linguistic factors influence the order of subject and object when both appear between finite and nonfinite verbs. In an earlier study, Lenerz (1977) observed, among other things, that definite NPs precede indefinite ones and that short NPs precede long ones, as it is the case in the English dative alternation. Büring (2001) also shows the effect of definiteness on the constituent ordering in German while controlling for other factors such as animacy and focus.

After having discussed German dative constructions, it is possible to address the the problems a structural transfer approach entails in more detail: Mapping German structures onto English structures straightforwardly, when considering additional lexically determined possibilities and preferences in both languages, seems not to be possible. To

complicate matters, the studies by Røreng (2011), Bader and Häussler (2010), Büring (2001), and Lenerz (1977) suggest that some of the factors that play a role in predicting the English dative alternation may also be influential factors in the German dative alternation.

Given the intricate picture of differences and similarities in the two languages, it seems problematic to come up with clear-cut predictions based on transfer. Given that the syntax of German employs both DO datives and PP datives, the categorical transfer approach would predict that both English constructions should be equally difficult to acquire. Under the assumption that frequency plays a role in the transfer of syntactic structures, DO constructions should have a privileged status in German-English interlanguage because DO datives are much more frequent in German.

Alternatively, the potential role of the general principles of alignment in SLA can be considered. If they are general, language-independent principles of alignment (similar in status to what, in some approaches, is called Universal Grammar), they should be available to any language user, including L2 learners. Additionally, it has been argued that the general way in which the described factors influence the choice of syntactic variants is not specific to English but reflects crosslinguistic regularities (Aissen 2003; Bresnan and Nikitina 2009; Bresnan et al. 2001; Heine and König 2010; Wolk et al. 2013). This view is supported for dative constructions by the (admittedly scarce) evidence from German. However, it seems that different languages show different degrees of grammaticalizing such principles (e.g., J. A. Hawkins 1994), so that learners still have to find out the extent to which the grammar is actually determined by such principles.

What is clear is that simplistic categorical approaches to transfer along the lines of the full transfer/full access hypothesis seem to be almost impossible to apply to probabilistic grammatical phenomena such as the dative alternation.

2.5 Unanswered Questions

Considering the studies presented above (Chapter 2.2), a number of questions have remained unanswered.

First, it is unclear to what extent learners are sensitive to the different factors when all known factors are taken into account at the same time. Second, previous studies have found evidence for a general tendency of L2 learners to prefer the less marked PP dative. However, these studies did not properly control the simultaneous influence of the many factors in their samples. Thus, any conclusions based on such samples rest on shaky foundations. Furthermore, little is known about the individual variation between

advanced speakers and their sensitivity toward the different factors.

Second, the question which role the L1 plays in the acquisition of the dative alternation has not been addressed very often and thus not been answered yet. It is unclear whether transfer effects play a role or whether learners overuse the PP dative, irrespective of their L1.

Another question that remains unanswered is in how far the influence of the linguistic factors differ in different types of studies. Are the same factors influential in the production and judgment of dative structures and can the effects we find really be linked to on-line processing? In the next chapter (Chapter 3) I will discuss which questions I will address and which types of studies I will use to this end.

Chapter 3

Research Questions and Methodology

As discussed in Chapter 2.5, there are still many unanswered questions when it comes to the acquisition of the dative alternation in English as a second language. In this chapter, I will present the project's research questions and briefly discuss which methodologies I will use. I will also illustrate how I code my data and introduce the statistical methods I use for analysis. There will be more details on the coding procedure and the statistical analysis in the chapters reporting on the individual studies (Chapter 4 to Chapter 6), but what is provided here, serves as the basis for all studies.

3.1 Research Questions and Methods

This project is mainly concerned with four different types of research questions in exploring the acquisition and use of the dative alternation in English as a second language. The different types of research questions cover the influence of linguistic factors on the dative alternation in ESL, the role of the learners' native language, the processing of dative constructions and the question whether advanced learners really rate the PP dative better than and produce it more often than the DO variant. The questions of the role of the native language and the preference for the PP dative are intertwined insofar, as the dative constructions in the learners' L1 may be responsible for the learners' preferences for one or the other construction. These different types of questions are addressed by three different studies, namely a split rating task, a self-paced reading study and a corpus study. In the following, I will outline and discuss my research questions and show which studies I use to address them. Each of the following subsections (i.e., 'Linguistic factors', 'The role of the native language and the PP preference', and 'Processing of dative constructions') concentrates on one type of research question.

3.1.1 Linguistic Factors

In Chapter 2.1, it has been shown that native speakers of English are influenced by a variety of linguistic factors when uttering, judging or processing dative constructions (among others Bresnan 2007; Bresnan et al. 2007; Bresnan and Ford 2010; Bresnan and Hay 2008; Bresnan and Nikitina 2009; Collins 1995). These factors include RELATIVE SYNTACTIC COMPLEXITY, ANIMACY, PRONOMINALITY, DEFINITENESS, and ACCESSABILITY OF THEME and RECIPIENT, respectively. In natural speech, all of these factors are influential at the same time. The simultaneous presence of these multiple factors can be used in statistical modeling to predict whether a native speaker will use a PP or DO dative in a specific linguistic environment, i.e., in the presence of certain linguistic factors. The simultaneous presence and varying importance of the linguistic factors on the speakers' choices make the dative alternation a gradient phenomenon, i.e., there is no 'right' or 'wrong' when picking one or the other construction, but a higher or lower probability for the PP or the DO dative.

Whether learners are influenced by the same linguistic factors when judging or producing dative constructions is unclear. Although previous studies tested individual factors which are influential in English as a L1, e.g. DEFINITENESS, hardly any of these studies looked at more than one factor at a time, and when they did, they did not use statistical modeling to look at these factors simultaneously in their analysis, but merely analyzed each factor individually.

The study by Frishkoff et al. (2008) (see Chapter 2.2) showed that learners were more likely to choose a certain construction when the bias for this construction was stronger than for items which only had a small bias towards this construction. These results indicate that learners are probably influenced by the same or at least some of the factors which are influential in English as a L1.

The questions not answered by Frishkoff et al. (2008) and the other existing studies on that topic are whether (I) learners are influenced by exactly the same factors as native speakers, whether (II) the effects of the factors work in the same direction, and (III) which of the factors is most influential in predicting learners' choices and ratings. This gap is to be closed by the studies presented here. I further investigate whether the influence of these factors differs between grammatical judgments and written production. Another aim of this project is to compare the results which I obtain for L2 speakers of English to the results which have been obtained for English native speakers. These questions and aims are approached in two studies in this project, a split rating task (Chapter 4) and a corpus study (Chapter 6).

The split rating task is a replication of an experiment conducted by Bresnan and Ford (2010) with native speakers of Australian and American English. I use Bresnan and Ford's

items on advanced German learners of English. Using the same items Bresnan and Ford used for natives enables me to compare my results to those of the study conducted by Bresnan and Ford (2010).

A split rating task is a special kind of grammatical judgment task. In this project, a PP and a DO dative are presented as possible continuations of dialogues. The participants have to decide which construction they consider more natural as a discourse continuation and express their rating by distributing 100 points over the two constructions. This type of judgment task enables participants to express that they consider only one structure grammatical by assigning 100 points to this construction and 0 points to the other one, while they can also express that both structures are equally fine by assigning 50 points to each construction. Any other distribution of points is also possible, allowing the participants to express their intuitions about the usage of the competing construction in detail.

The participants in this study are advanced learners of English whose native language is German. The learners have to be advanced because Bresnan and Ford's items were sampled from the Switchboard Corpus (Godfrey et al. 1992), which is a collection of recorded telephone conversations. Thus, Bresnan and Ford's experiment can only be replicated with advanced learners of English as beginners or intermediate learners are probably not able to understand the experimental items. Bresnan and Ford (2010) sampled the experimental items in a way that they covered the whole range of PP probabilities, which means that there are some items in which the PP dative is very likely to be chosen, in some items the probability for the PP dative to be chosen is very low and all of the probabilities in between those two extreme cases are covered as well. The learners are asked to rate the items on a gradient scale from 0 to 100 points as described above, so it is possible to see whether the learners participating in the experiment make categorical choices and strictly choose either the PP dative or the DO dative or whether they have already learned that the dative alternation is a gradual phenomenon. If they are aware of the gradualness of the dative alternation, their ratings should express that there is more than one possibility to realize a dative construction, but that one construction is more natural, i.e., better, while the 'less good' construction is still acceptable. As the items cover a wide range of the linguistic factors known to be influential for English native speakers, it is possible to see which factors govern the learners' choices, which of the linguistic factors influences them most and whether the effects of these factors go into the same direction as for native speakers.

Related questions to be answered in the corpus study are whether the learners' production of dative constructions is governed by the same linguistic factors as for L1 speakers, whether the effects go in the same direction and which factors are the most important ones predicting the learners' usage of dative construction. Approaching the same question with

two types of studies has the advantage that it is possible to investigate whether the results obtained in one study can really be linked to the results of the other study. In this specific case, it is possible to compare whether the judgment and usage of dative constructions is governed by the same factors. I expect the outcomes of both studies to be similar as comparable studies for native speakers have shown that corpus probabilities are reflected in speakers' grammaticality judgments (Bresnan and Ford 2010). When dealing with learners, however, the fact that a construction is judged acceptable or even better than another structure, does not necessarily entail that they can also actively use these constructions. Thus, it is necessary to look at data which is produced by learners to gain a more complete picture. Therefore, a corpus study is conducted, allowing us to look at data obtained from more speakers from different L1 backgrounds. I used data from the International Corpus of Learner English (ICLE, Granger et al. 2009). The ICLE is a collection of essays written by advanced learners of English with 16 different L1 backgrounds. A study which includes as many different L1 backgrounds would be very difficult to conduct in an experimental setting as such a high number of participants from such a variety of backgrounds would be very hard to find and employ for such a project.

A previous corpus study, which investigated the dative constructions in learner language (Callies and Szczesniak 2008), found that German and Polish learners of English applied the end-weight principle, i.e., they placed long constituents after shorter ones, and they were influenced by the verb bias. There was, however, only very little evidence that discourse-related factors, i.e., DISCOURSE ACCESSIBILITY, play a role in learners' constituent ordering (Callies and Szczesniak 2008, p. 181). This result is in line with other studies investigating this factor (Chang 2004). Thus, I do not investigate the factor ACCESSIBILITY in my corpus study as the chance to gain results seems comparatively small compared to the efforts of coding for the pertinent factor. I investigate more than 3000 dative constructions. In order to code the factor ACCESSIBILITY the whole learner essay, or at least a specified part of it, has to be read. The efforts it takes to code the factor ACCESSIBILITY for such an amount of dative constructions compared to the prospects of yielding significant results seem disproportional, especially considering the results of existing studies.[1]

In summary, I test the influence of the well-known linguistic factors on learners' judg-

[1] It has to be considered that the studies which investigated the factor ACCESSIBILITY in learner language analyzed their data monofactorially. A factor which reaches the level of significance in a monofactorial analysis often turns out to be insignificant when other factors are controlled for (Gries 2002 and see also Chapter 4 of this project), especially so when the factor in question is intertwined with other factors. The factor ACCESSIBILITY is closely intertwined with the factors DEFINITENESS and PRONOMINALITY. Thus, the chances of finding a significant effect for this factor in a multifactorial analysis which has not been found in monofactorial analyses are rather small. The one study which reported to have found an effect for the factor ACCESSIBILITY, i.e., Deshors (2014), did not control for the factor DEFINITENESS, which possibly explains her findings.

ments and use of English dative constructions by means of two different studies, i.e., a split rating task and a corpus study.

3.1.2 The Role of the Native Language and the PP Preference

As already discussed in the previous chapter, there are additional factors which play a role when investigating learners, namely proficiency and the learners' native language. The influence of the learners' native language has, however, been mostly disregarded or only been slightly touched upon in previous studies. It turns out to be difficult to infer clear predictions from existing theories of SLA, as they fail to account for the exact nature of the L1 influence on the acquisition of a second language (Odlin 2015). Disregarding these problems, the only prediction which seems testable with respect to structural transfer is that learners will transfer the dative construction which is prevalently or exclusively used in their native language to their L2, English. If this is the case, we expect to find better grammatical judgments for that construction and we also expect learners to produce this construction more often than the competing one.

It has, however, been argued in many previous studies that the PP dative is the less marked structure and thus acquired before the DO dative, irrespective of the native language. These studies found that the PP dative is rated better by learners of English. Many of these studies were conducted with French learners of English (Le Compagnon 1984; R. Hawkins 1987; Mazurkewich 1981, 1984, 1985), but French has a dative construction which is very similar to the PP dative. To this end, the effect that French speakers prefer and, according to Le Compagnon (1984), use the PP dative before the DO dative is possibly a result of L1 transfer. There are studies which find that the PP dative is preferred over the DO dative for learners of other L1s as well. These languages include Inuktitut (Mazurkewich 1984), Chinese and Japanese (Inagaki 1997) and Persian (Marefat 2005). Among these languages, there is no language which prevalently uses a structure that resembles the English DO dative.[2] There are only two studies (Führer 2009 and Wolk et al.

[2]See Chapter 6 for a review of the dative constructions in Chinese and Japanese, and Dehghani et al. (2015) for Persian dative constructions. Mazurkewich (1984, p. 100) makes the following comment on Inuktitut dative constructions:

> Inuktitut is a polysynthetic language in which the functions of nouns are indicated by case marking suffixes, in which there are no prepositions, and in which word order is relatively more free than it is in English. It also has an alternation involving dative nouns, but the constraints operating on it are quite different to those found in English. In lnuktitut the alternation appears only with ergative constructions so that either the direct object loses its morphological case marker and ends with a zero morpheme, or the indirect object loses its case ending and takes on the zero morpheme. In both instances, the subject carries the ergative case suffix. The constraint governing the loss of case endings in these constructions has not yet been worked out, but it does not appear to involve the kind of semantic constraint operating in English.

2011) which investigate German learners of English and thus learners in whose L1 a structure that resembles the English DO dative is prevalently used. These two studies, however, reach contradicting conclusions when it comes to structural transfer. Wolk et al. (2011) interpret their results, obtained by means of eye-tracking studies (see Chapter 2.2), in a way which suggests that German learners transfer their DO preference to their L2. Führer (2009) conducted a grammatical judgment task in which German learners of English rated the PP dative much better than the native speaker control group. As Führer (2009) was interested in the acquisition of the verb bias, she controlled for several linguistic factors. Themes and recipients were matched for length (three words), definiteness (indefinite), number (singular) and person (third person). All agents were human, themes were inanimate and recipients animate. It seems uncontroversial that German learners of English rated the PP dative better than the native speaker control group in this specific linguistic environment. It is possible that German learners prefer the PP dative for this specific constellation of linguistic factors, but that a different picture emerges once the linguistic factors are altered. A factor which may have added to this very clear preference for the PP dative in Führer's study is the binary rating scale. The participants had to decide whether they preferred the PP or the DO construction for a given item. As participants did not have the option to indicate that they considered both structures equally acceptable, or one construction only slightly better than the other one, a slight PP preference can already cause overall results which suggest a very robust PP preference.

Thus, the results obtained by Wolk et al. (2011) and Führer (2009) cannot conclusively answer the questions whether German learners have a preference for one or the other construction (or acquire one earlier than the other). Yet, German speakers are an excellent test case for exploring whether learners generally judge the PP dative better than the DO dative or whether the construction which is prevalently used in the learners' L1 receives better judgments. Compared to the study conducted by Führer, the study presented in this project differs not only with respect to the gradient rating scale but also in terms of the linguistic environments which are tested (see section 3.1.1). If German learners show a preference for one or the other construction compared to L1 speakers while keeping linguistic factors and individual preferences under control, it is possible to claim that learners really have a preference in one or the other direction. As this study uses the items of Bresnan and Ford (2010), it is possible to compare the learners' ratings to native speakers' ratings.

The question which role the native language plays in the production of dative constructions in English as a second language is dealt with in the corpus study as well. It includes data of learners with 16 different L1 backgrounds. I investigate whether the native language is a significant factor when predicting the usage of the dative constructions and if

and how learners from different L1 backgrounds differ from each other. I further include corpus data from English native speakers (these data have been sampled by Bresnan et al. (2007) and are publicly available via the software 'R') to investigate whether learners of English generally differ from English native speakers. I also test if and in how far learners of certain L1 backgrounds differ more or less from native speakers than others. In order to explore possible reasons for differences between the learners of different L1 backgrounds I compare the dative constructions in the learners' L1s to the English dative constructions. This enables me to provide supporting or contradicting evidence for either the theory of structural transfer or for a processing-based approach to SLA.

Another advantage of the corpus study is that grammatical judgment tasks are somewhat inconclusive with respect to the acquisition of the structures in question, unless grammatically inadequate structures are presented in contrast to grammatical ones. If this is not the case, there is no way of knowing whether a learner has acquired the structures at all, as they can only choose between two grammatical options. The split rating task is nevertheless important as it makes the results of the present study comparable to results the of many previous studies which elicited their data using grammatical judgment tasks and to the native speakers tested by Bresnan and Ford (2010).

3.1.3 Processing of Dative Constructions

The aim of the split rating task and the corpus study is to investigate *if* learners order their constituents as predicted by the harmonic alignment pattern. The aim of the self-paced reading task is to tap into the question *why* learners may order constituents in that way.

The question why speakers order constituents in a certain way, e.g. short, animate, pronominal, definite, and given constituents are placed before long, inanimate, nonpronominal, indefinite, and new ones, has been discussed for native speakers. Arnold et al. (2000) provide evidence that short and discourse accessible constituents require less processing effort when they are produced by a speaker and are also easier to comprehend by a listener. Gries (2002) also argues the facilitation of processing is the driving force behind constituent ordering. Supporting this assumption is the finding that sentences which contain more accessible NPs (on an accessibility hierarchy: pronoun < name < definite < indefinite) are read faster than sentences which contain less accessible NPs (summarized in Jaeger and Tily 2010). Apart from the idea that NPs with certain linguistic features lead to more or less processing effort, it has also been argued that the readers'/ listeners' expectations play a substantial role in sentence processing (Levy 2008; Tily et al. 2008), in that expected constituents are processed faster than unexpected ones (Levy 2008).

When it comes to the processing of dative constructions by English native speakers,

there are studies which provide evidence that both harmonic alignment (i.e., the minimization of processing effort) of constituents and speakers', listeners' and readers' expectations are reflected in pronunciation in spontaneous speech, eye-movements, and reading-times (Bresnan and Ford 2010; Tily et al. 2008, 2009).

For learners, studies which tap into the on-line processing of dative constructions are almost entirely missing. To the best of my knowledge, there is only one study which addresses this issue, i.e., Wolk et al. (2011). The experiments conducted by Wolk et al. (2011) indicate that the eye-movements of German learners can be predicted on the basis of their expectations evoked by the verb bias. Wolk et al. (2011) also found that pronominal NPs are read faster than full NPs. Although these findings provide evidence that learners' expectations play a role in syntactic processing and that pronouns are easier to process than nonpronouns, further studies are needed to understand how dative constructions are processed by learners.

If the assumption that constituents are ordered in a certain way to facilitate processing is also correct for learners, we should find that they order their constituents as predicted by harmonic alignment (in the corpus study). We should also find that certain types of e.g. short or definite NPs are easier to process than, e.g., long or indefinite NPs. Further, if learners have probabilistic syntactic knowledge and use this knowledge during sentence processing, we should also find that these expectations are reflected in reading times. An example of constituents which may generate certain expectations are animate NPs. Recipients are more often animate than themes. If learners know about this distribution, they will assign the thematic role recipient more readily to an animate NP than to an inanimate one. Depending on the syntactic position of the NP which is anticipated to be the recipient, a certain expectation regarding the syntactic construction being read may be evoked. A confirmation as well as a disappointment of these expectations should be reflected in reading times.

We will see in Chapter 5 that both approaches, i.e., the minimization of processing efforts and the expectation-based approach, lead to conflicting hypotheses with regard to the reading times we find in dative constructions. Needless to say, one study investigating the L2 processing of the dative alternation will not be able to conclusively answer how dative constructions are processed by L2 learners. In sum, we are in a situation, in which there are hardly any studies available which tell us anything about the on-line processing of dative constructions of ESL learners. Nevertheless, researchers have claimed for about 30 years that learners use the PP dative and not the DO dative, because the latter one is more marked and thus the less marked PP dative which is easier to process, is acquired first. So, it is necessary to shed some light on the on-line processing of dative constructions by learners to substantiate the claims that are being made and better understand the

processing of dative constructions by learners of English in general.

I conduct a self-paced reading study, i.e., more specifically, a continuous lexical decision task (Ford 1983), to provide a first contribution to this research area, i.e., the on-line processing of dative constructions by learners of English. A continuous lexical decision tasks is a special type of self-paced reading experiment. In this type of experiment, participants have to read sentences which are presented word by word. For each word, participants have to decide whether the word they are reading is a word in their language or not, which prevents them from 'clicking through' the sentences without actually reading them (Ford 1983). This way it is possible to obtain reading times for each word in a sentence and draw conclusion about sentence processing which is reflected in latencies at certain points of the sentence. It has been shown that reading times are a good indicator for processing effort (Libben 2009). That means that longer latencies at a certain position in a sentence indicate a higher processing effort.

The questions I seek to answer in this study are whether (I) short, definite, animate, pronominal, and given constituents are easier to process than long, definite, inanimate, nonpronominal, and new ones, whether (II) learners' expectations, which are based on syntactic probabilities, are reflected in reading times, and further (III) whether the ratings obtained in the questionnaire study are reflected in the learners' reading times. If this (III) is the case, we have better reasons to believe that the results we obtain in grammatical judgment tasks can really be linked to the processing of the judged structures in that constructions which are preferred in off-line ratings are the structures which are easier to process in on-line tasks.

3.2 Coding[3]

In order to approach all of the research questions above, the first step necessary is coding the data, which I will describe in the following. As I replicate two studies by Bresnan and Ford (2010) (Chapters 4 and 5) and include a part of the L1 data set which has been used by Bresnan et al. (2007) in my corpus study (Chapter 6) and I want my results to be comparable to the L1 studies by Bresnan et al. (2007) and Bresnan and Ford (2010), my coding categories are strongly based on theirs.[4]

[3] An earlier version of this section has been published in Jäschke and Plag (2016).

[4] As the split rating task and the continuous lexical decision task only contain 30 items which have to be coded, the coding procedure described below is sufficient to be able to code all the items. In the corpus study things are more complicated, which is why there will be more details on the coding procedure in Chapter 6.

- VERB: Each verb is one level for this factor. Thus, each verb such as `give` is one value of this factor.

- VERB SENSE: This factor encodes the semantics of the respective verb. If something which can be owned is moved from A to B, the verb denotes a transfer and thus the value for the factor is `transfer`. The factor level `futuretransfer` denotes a transfer as described above that will take place in the future (e.g. *owe someone money*). Events which are related to sharing information or teaching in the broadest sense (e.g. *teach someone Spanish*, *tell someone a story* or *show her a picture*), are summarized in the factor level `communication`. The factor level `abstract` refers to situations in which neither a concrete object nor any kind of information is being or will be passed on from A to B (e.g. *pay attention to a teacher*, *give him a job* or *give birth to a baby*)[5] (Bresnan et al. 2007; Bresnan and Ford 2010).

- LENGTH OF THEME and RECIPIENT: The length of theme and recipient, respectively, was coded by counting the number of orthographic words, i.e., words preceded and followed by a blank or another punctuation mark are counted as one word. The measure is chosen as it has been shown to highly correlate with other measures of syntactic complexity such as the number of syllables (Grafmiller and Shih 2011).

- LENGTH DIFFERENCE: The length of theme in words is subtracted from the length of recipient in words. It is generally also possible to form the ratio of both values. This option was neglected for three reasons. Firstly, comparable studies (Bresnan et al. 2007; Bresnan and Ford 2010) used the difference of the two values and my results should be comparable to those studies. Secondly, using the ratio of the two values would result in a highly skewed distribution. Assume that we divide LENGTH OF THEME by LENGTH OF RECIPIENT. This would result in a distribution in which all instances in which the theme is longer than the recipient receive a value higher than 1 whereas in all instances in which the recipient is longer than the theme receive a value between 0 and 1. Thirdly, the basic idea of the factor LENGTH DIFFERENCE is to capture how many words, more or less, have to be processed in order to have accessed all constituent nodes (J.A. Hawkins 1994) of a given construction,

[5] Bresnan and Ford (2010) list more verb senses, but there is no application for them in my studies due to a smaller number of verbs.

depending on the relative order of these constituents. This idea would be totally neglected in using the ratio as a measure. Assume we have two sentences. One has constituents of 2 and 1 word(s), respectively, the other one of 6 and 3 words, respectively. The constituent ratio is the same in both sentences. When considering how many words a speaker has to store in short term memory to access all syntactic nodes, in case that the longer constituent is placed before the shorter one, it is 1 word in the former case compared to 3 words in the latter. Treating these two cases alike would result in a coding which does not capture what is to be measured by this factor.

- Closely related to the factor LENGTH DIFFERENCE is the factor LOG LENGTH DIFFERENCE in which the logarithmized theme length in words is subtracted from the logarithmized recipient length in words, which results in the relative length of recipient and theme. By means of logarithmizing, extreme values are compressed (see Bresnan and Ford 2010).

- PRONOMINALITY OF THEME and RECIPIENT: Recipient and theme are coded for pronominality. Pronouns include personal, reflexive, and demonstrative pronouns. All other NPs are considered nonpronouns.

- DEFINITENESS OF THEME and RECIPIENT: As described in Bresnan and Ford (2010), pronouns are coded as definite, as were NPs containing a definite article and proper names.

- ANIMACY OF THEME and RECIPIENT: The data is coded for being either animate (including humans and animals) or inanimate (for all others). Although there are more categories which can be considered when we look at the animacy hierarchy, it does not make sense statistically to split the level `animate` up into smaller categories, i.e., `human` vs. `animal` vs. `collective`. In the experimental items there are only two instances of themes or recipients that are animals, and animals are also underrepresented in the corpus study. The same holds true for collectives.

- ACCESSIBILITY OF THEME and RECIPIENT: A NP was considered given if the NP or its referent was mentioned previously in the text passage. In all other instances, the NP was considered not given. In the literature, we find far more fine grained

distinctions between `given` and `new` (compare e.g. Prince 1981). I used the binary coding as described in Bresnan and Ford, because I wanted my data as similar as possible to theirs for reasons of comparability.

- NUMBER AND PERSON OF RECIPIENT and THEME: Following Bresnan and Ford (2010), PERSON was coded as `local` (first and second person) or `nonlocal` (third person). NUMBER was coded as `singular` or `plural`.

- CONCRETENESS OF THEME: Bresnan and Ford (2010) coded the theme for concreteness in their corpus study to make up for the simplified animacy variable. As recipients are mostly animate, Bresnan and Ford did not code the recipient for concreteness. It was coded whether themes referred to a concrete object, which is defined as a noun that can be perceived with one of the five senses (Theijssen et al. 2012). All other nouns are considered ABSTRACT.

- PREVIOUS PP DATIVE: This variable encodes whether a PP dative occurs in the context preceding the dative construction which is investigated.

The coding procedure for the corpus data is more complex than it is the case for the experimental data. The problems that occur with respect to the data coding and the decisions made will be outlined in Chapter 6, as they are not relevant for the experimental studies.

3.3 Mixed Models and the Dative Alternation

In this project, I use mutlifactorial modeling, mainly linear mixed-effects regression models and generalized linear mixed-effects models[6] (henceforth: mixed models) to analyze my data. These types of analysis allow us to better understand a complex phenomenon such as the dative alternation and to properly account for the influence of the various factors involved in the usage of dative constructions. In this section, I want to briefly

[6]Depending on the type of dependent variables either linear mixed regression models or generalized linear mixed models have to be used. Continuous dependent variables require the use of linear mixed regression models whereas binary dependent variables (e.g. PP dative vs DO dative) require the usage of generalized linear mixed models. As the R-code and the output for both models is very similar, I will treat them alike in this summary. Nevertheless, it has to be acknowledged that the two models do mathematically differ from each other (see Baayen 2008 and Crawley 2007 for a detailed discussion).

describe why multifactorial statistics are much better suited to understand the dative alternation compared to the monofactorial or descriptive analyses which have been employed in many of the existing studies on that topic. I will then briefly introduce mixed models.

As already mentioned, previous research on the dative alternation in English as a L2 mostly relied on monofactorial analyses and descriptive statistics to investigate the factors which are influential in the learners' judgments and usage of dative constructions in English as a L2. This type of analysis does, however, not do justice to the complexity of the problem illustrated by the examples given in (13).

(13) a. Lisa gave it to a good friend.

b. Thomas showed his girl-friend an absolutely amazing photo of the grand canyon.

c. I took the cat to a vet.

If we were only interested in the influence of the factor DEFINITENESS and considered the data in (13), the findings strongly suggest that definite constituents precede indefinite ones, and if we had a larger sample, a chi-squared test would probably confirm our assumption. Thus, we would be able to confirm that definite constituents are placed before indefinite ones in learner language.

We know, however, that there are other factors which influence constituent ordering as well. Pronouns are preferably placed before nonpronouns, short constituents before long ones and ditransitive verbs have a bias for the PP or the DO dative and thus also influence the order of objects. If we only consider one factor at a time, e.g. DEFINITENESS, there is no way of knowing whether the recipient precedes the theme in (13a) because it is definite or because it is pronominal. A similar problem can be found in (13b). It is hardly possible to tell whether the recipient precedes the theme because it is definite or because it is much shorter than the theme. In (13c), the theme possibly precedes the recipient not because it is definite but because the verb *take* has a really strong PP bias. These problems cannot be resolved by using monofactorial statistics. This is why it is important to employ statistical techniques which are able to estimate the effect of one factor in the presence of other factors (Baayen 2008; Crawley 2007; Gries 2013), as this enables us to ensure that the predictor we are interested in really has an effect in its own right and that we do not find the effect due to the coincidental simultaneous presence of other factors.

Another major advantage of linear mixed-effects models is the fact that they can handle unevenly distributed data (Tagliamonte and Baayen 2012), which is very useful in the case of the dative alternation. Themes are, for instance, significantly more often inani-

mate than animate, to name only one example of an unevenly distributed factor. It has to be noted, however, that there are limitations to how uneven the distribution can be. Empty cells, i.e., missing data for one factor level of one predictor variable, cannot even be handled by mixed models.

There are various types of analysis which are suitable for multifactorial modeling, e.g. regressions, ANOVAs (Analysis of variance), ANCOVAs (Analysis of Covariance), and logistic regression.[7] These models allow for the inclusion of various predictor variables and estimate their effect on the dependent variable in the presence of the other variables.

There are, however, other factors that influence the data we are investigating apart from those we are interested in. In experimental data, for instance, there is the influence of the participants, which cannot be neglected. In reading time studies, different subjects will read at a different pace and in judgment tasks, there will be differences in ratings which cannot be explained by linguistic factors, but by personal preferences of the individual participants or their rating behaviors.

Linear mixed-effects models allow for the inclusion of two different effect types, namely fixed and random effects. These different types of effects allow us to account for the different types of influences of the dependent variable (Baayen 2008; Crawley 2007; Gries 2013).

Fixed effects are used for factors such as RELATIVE LENGTH DIFFERENCE, ANIMACY, DEFINITESS or PRONOMINALTY. They are characterized by having "informative factor levels"(Crawley 2007, p. 627), i.e., `pronominal` vs `nonpronominal`, and are thus repeatable (Baayen 2008, p. 241). It can be assumed that the levels of this factor are exhausted in the data set (Tagliamonte and Baayen 2012).

Random effects, on the other hand, are sampled from a large population, i.e., participants in an experiment. They neither have informative factor levels (Participant A vs. Participant B) nor are they repeatable (Baayen 2008, p. 241). The factor levels cannot be expected to be exhausted in the sample (Tagliamonte and Baayen 2012), i.e., if ditransitive verbs are sampled, we do not sample all ditransitive verbs there are. Nevertheless, variation in the verb biases will affect the data. In order to get the best fit, it is advisable to not ignore the individual differences but include these factors as random effects in the model (Tagliamonte and Baayen 2012). If these factors were included as fixed effects, the results would only be valid for that very subset, i.e., only for the participants which took part in that very study (Tagliamonte and Baayen 2012).

[7] Depending on the type of explanatory variables and response variable, the appropriate statistical method has to be selected. In case that the response variable is continuous, a regression is used for continuous predictors, whereas an ANOVA has to be used for categorical variables. When there are categorical and continuous predictor variabels an ANCOVA has to be used. For binary response variables a binary logistic regression has to be used. (see Crawley 2007, p. 323).

Thus, it is necessary to keep apart these two types of factors statistically. The influence of the fixed effects on the dependent variable is estimated by contrasting their factor levels (Baayen 2008, p. 242), e.g., it can be tested whether pronouns are read faster than nonpronouns in a reading time study. The effect of random effects is modeled by assuming that the mean of that factor is zero and the individual differences are adjusted to that mean, i.e., in a reading time study, participants will read at different speeds. The model adjusts the speed of the slow and fast readers to the average speed across all participants (Baayen 2008, p. 242), which ensures that the individual differences do not influence the estimate of the dependent variable, but that the mean influence of the sample (which is assumed to represent the mean influence of the entire population) is modeled (Crawley 2007, p. 628).

There is, however, one problem not entirely solved by employing multifactorial statistical methods, which is highly present in the modeling of the dative alternation: collinearity. Collinearity describes the fact that the independent variables do not only correlate with the dependent variable, but also correlate with each other (Belsley et al. 1980).

When employing mixed models, we want to estimate the influence of the independent variables on the dependent variables. If there is more than one independent variable, the model assumes that the independent variables are independent from one another. If the influence of the factors LENGTH OF RECIPIENT, DEFINITENESS OF RECIPIENT, and PRONOMINALITY OF RECIPIENT on the choice of construction type (PP dative vs DP dative) are to be modeled, the model will assume that there is no correlation between these three independent factors. This is, however, not true. LENGTH correlates with both other factors in that pronouns are always only one word long and that definite NPs are usually shorter than indefinite ones. PRONOMONALITY and DEFINITENESS also correlate, because pronouns, in the way they are coded in this project, are always definite (see Bresnan and Ford 2010 and Bresnan et al. 2007). Collinearity is problematic for several reasons.

First, it severely weakens the predictive power of the model. If we go back to the example in (13), we find an effect for DEFINITENESS OF RECIPIENT, but we cannot be sure how much of the effect is really to be traced back to this factor and how much of the effect is to be attributed to the factor LENGTH OF RECIPIENT. This makes it difficult to tease apart the explanatory effect of the individual factors (Baayen 2008, p. 181f).

Second, the interdependencies of independent variables can lead to severe statistical problems, such as suppression effects (Belsley et al. 1980). A suppression effect can occur when two correlated predictors have an effect that influences the dependent variable in the same direction, e.g., both a pronominal and short themes increase the probability for PP datives. In some cases, the model may not be able to tell apart the influences of both effects, which can lead to an overestimation of one effect on the dependent variable

and causes the effect of the other factor to be underestimated or even be predicted to go in the opposite direction, which then becomes evident in the estimate changing its algebraic sign (Friedman and Wall 2005).

As the factors which are influential in predicting the dative alternation are naturally interrelated, the problem of collinearity cannot be taken care of *a priori* by only selecting combinations of factors which are potentially not problematic. It is, however, necessary to carefully examine the interrelatedness of the predicting variables and take steps to monitor potential problems caused by collinearity. If problems which can be traced back to collinearity have been found, there are several ways to address them. In some cases, it can be necessary to exclude one or more factors from the analysis. In other cases, residualization can be a solution. Residualizing factors means that a separate regression model is fitted, containing the interrelated factors. One of them is used as an independent factor, the other as the dependent one. The model's residuals, which represent that part of the dependent factor which cannot be predicted by the independent one, are extracted from the model and used for further analysis. Residualization itself can be potentially harmful to an analysis as well for several reasons discussed in detail in Wurm and Fisicaro (2014).

Let us now have a brief look at the steps which are to be taken when conducting an analysis by using mixed models. In order to fit a linear mixed model, all fixed and random effects that are of interest are included in the first model - the Maximal Model (Crawley 2007, p. 324ff.). The number of factors can, however, not be indefinite and must not be disproportional to the number of observations.

This first model will usually contain predictors which are not significant and do not contribute to strengthening the explanatory power of the model. A model should, however, be as simple as possible in that it only contains factors which are necessary, i.e., a model should be "*minimal[ly] adequate*" (Crawley 2007, p. 325). In order to simplify the model in a way that it only contains significant factors, the least significant terms[8] are removed one by one until only significant predictors remain. When having fitted the final model, it is important to run post-modeling diagnostics, i.e., model criticism, to be sure that the model does not over-fit the data, to identify how much of the variation is being correctly predicted by the model, and to ensure that collinearity does not harm the model (Crawley 2007, p. 339ff; Baayen 2008, p. 256ff).

For statistical modeling in the entire project, the software 'R 2.15.2' (R Core Team 2011) was used. The package lme4 (Bates et al. 2015) was used for the linear mixed-effects models.

[8]Terms are removed in a special order. First, non-significant interactions are removed, followed by non-significant quadratic or non-linear terms, followed non-significant explanatory variables (see Crawley 2007, p. 326f for a detailed discussion).

3.4 Summary

This chapter has presented the research questions of the present project and the types of studies which are used to address these questions. It has further provided an overview of the data coding and the statistical methods which are employed in this project. In the following chapters, the individual studies will be presented. Chapter 4 and 5 report on the experimental studies. These chapters will also provide detailed hypotheses which are to be tested. The corpus study is presented in Chapter 6.

Chapter 4

Split Rating Task[1]

4.1 Methodology

The aim of the present study is to systematically test the predictors that are known to be influential of the dative alternation in English as a L1 on German learners of English. Bresnan and Ford (2010) used a sentence rating task in their study, and they kindly provided their experimental stimuli. The test items were specifically chosen to ensure that all relevant factors could be tested. The same sentence rating task was used in the present study.

4.1.1 Materials and Participants

The sentence rating task developed by Bresnan and Ford (2010) was presented to 24 advanced learners of English, all of them native speakers of German. All participants were university students of English who were between 20 and 25 years old. The participants' proficiency was not tested, but as English is an obligatory subject in German school curricula, all participants had received a minimum of 8 years of formal instruction, and they could therefore be safely assumed to have successfully acquired both variants of the dative construction. Eight participants had stayed in an English-speaking country for more than 3 months. None of the participants had ever taken a syntax course.

Participation was voluntary and subjects did not receive credits or payment for their participation. The questionnaire was completed, using paper and pencil, during a regular session of a morphology seminar. Completion of the questionnaire was not timed. The instructions were given in German. The participants were told that the researchers were interested in how people choose between two different ways of saying the same thing. Participants were asked to rate which of the alternatives sounded better (i.e., more natu-

[1] An earlier version of this chapter has been published in Jäschke and Plag (2016).

ral) to them (see Appendix A for the full instructions).

The questionnaire consisted of 30 items, each of which contained a short text passage followed by two dative structures as possible continuations for the text passage, optionally followed by some context. The items were randomly sampled from the Switchboard Corpus (Godfrey et al. 1992). As Bresnan and Ford (2010) wanted items that cover the full range of PP probabilities, they selected items from their corpus study whose modeled probabilities covered the full range of log odds and formed a linear distribution (see Bresnan and Ford 2010, pp. 184-185, for a detailed description). The items were presented to the participants in pseudorandomized order, adjusted to avoid apparent patterns. Examples (14) through (16) show three items.

(14) Speaker:

About twenty-five, twenty-six years ago, my brother-in-law showed up in front of my yard pulling a trailer. And in this trailer he had a pony, which I didn't know he was bringing. And so over the weekend I had to go out and find some wood and put up some kind of a structure to house that pony,

a. because he brought the pony to my children.
b. because he brought my children the pony.

(15) Speaker A:
I really use my computer a lot at home. I am an accountant but I work from home. So I use it for that quite often. We have, you know, used some of it for personal things. We keep track of personal budgets and things like that on it. Since it's tax season, I'm doing a lot of taxes, so I do a lot of work on it as well.
Speaker B:

a. I was amazed when I took our taxes to our tax person
b. I was amazed when I took our tax person our taxes

and she works out of her home also. The software that does the taxes is just incredible.

(16) Speaker:
I'm in college, and I'm only twenty-one but I had a speech class last semester, and there was a girl in my class who did a speech on home care of the elderly. And I was so surprised to hear how many people, you know, the older people, are like, fastened to their beds so they can't get out just because, you know, they wander the halls. And they get the wrong medicine, just because, you know,

a. the aides or whoever just give the wrong medicine to them.
b. the aides or whoever just give them the wrong medicine.

The participants were asked to rate which of the alternatives sounded better (i.e., more natural) to them and to distribute 100 points to express their ratings. If they thought continuation (14a) was perfectly fine, but continuation (14b) was not proper English, they could express this by giving 100 points to continuation (14a) and 0 points to continuation (14b). If they thought that both continuations were equally fine, they could distribute 50 points to each continuation. Any other splits of points like 23-77 were also possible. The presentation of the items in this way has the advantage that one can be sure which structure the participants judge, as both continuations only differ in one feature. The gradient rating allows for fine-grained results as subjects can express not only the preference for one structure over the other but also the equal acceptance of both of them as well as any fine-grained difference between those three major options. Participants were told that there were no wrong answers and that they should express whichever variant sounded better to them.

The items were coded for several predictor variables that had been shown to influence the dative alternation in L1 English. The coding, which emulated that of Bresnan and Ford (2010), has been introduced in Chapter 3.2. The distribution of the values across the predictors are summarized in Table 4.1.

Table 4.1: Data distribution in the split-rating task

Categorical predictors:	Levels					
VERB	give: 16, take: 2, bring: 2, pay: 2, sell: 2 teach: 2, owe: 1, show: 1, tell: 1					
ANIMACY OF THEME	animate:	4	inanimate:	26		
ANIMACY OF RECIPIENT	animate:	24	inanimate:	6		
PRONOMINALITY OF THEME	pronoun:	3	nonpronoun:	27		
PRONOMINALITY OF RECIPIENT	pronoun:	14	nonpronoun:	16		
DEFINITENESS OF THEME	definite:	17	indefinite:	13		
DEFINITENESS OF RECIPIENT	definite:	28	indefinite:	2		
ACCESSIBILITY OF THEME	given:	13	new:	17		
ACCESSIBILITY OF RECIPIENT	given:	18	new:	12		
NUMBER OF THEME	singular:	25	plural:	5		
NUMBER OF RECIPIENT	singular:	16	plural:	14		
PERSON OF THEME	local:	0	not local:	30		
PERSON OF RECIPIENT	local:	8	not local:	22		
CONCRETENESS OF THEME	concrete:	20	abstract:	10		
PREVIOUS PP DATIVE	yes:	4	no:	26		
Numerical predictors	Mean		Median		St. Dev.	Min	Max
LENGTH OF THEME	2.1		2.0		1.68	1.00	10.00
LENGTH OF RECIPIENT	2.0		2.0		1.53	1.00	7.00
LOG LENGTH DIFFERENCE	-0.06		0.00		0.99	-2.30	1.95

Example (17), which is an item from the actual experiment, illustrates how the aforementioned predictors influence the choice of dative structure.

(17) Speaker:

The problem I have is, in the past at least, the Israelis were very strategically important to us. But I think that's diminished a lot lately too. Especially with the relationship we've started to develop with Saudi Arabia after the Gulf War and all. And I don't know, maybe we could use that to our advantage.

a. at least if we are going to be giving [all this money]$_{\text{theme}}$ to [them]$_{\text{recipient}}$,

b. at least if we are going to be giving [them]$_{\text{recipient}}$ [all this money]$_{\text{theme}}$,
then at least, you know, we should get some cooperation or whatever in return.

As the theme is longer than the recipient (three orthographic words compared to one orthographic word), the recipient should occur prior to the theme given that it is shorter (i.e., sentence (17b) should be preferred). Animate constituents should occur before inanimate ones, which is true in sentence (17b). I further expect definite constituents to precede indefinite ones and pronouns to precede nonpronouns, which is also realized in sentence (17b). Finally, constituents that are discourse accessible are mentioned before constituents that have not been mentioned in previous discourse, which should also make (17b) preferable.

Even though the DO dative in this example seems the only possible choice, two things should be kept two in mind: first, that the verb itself also plays a major role in dative sentences and can work against the other factors and, second, that these are only statistical preferences and by no means categorical decisions. This is why sentence (17a) will also be accepted by speakers.

In the following two sections, answers to the two main research questions are provided. Section 4.1.3 presents the analysis of the general preferences and the differences between individual speakers, as they emerge from the two experiments.

4.2 Results

4.2.1 General Preference and Individual Variation

After removal of missing answers, the data set comprised 719 observations that entered further analysis. The mean of the ratings was 53.02, with a standard deviation of 36.6. Given the complexity of the many influences at work, it is impossible and meaningless to compute any absolute measure of preference without taking the properties of the language sample into account. For example, a sample with a preponderance of pronominal themes will show a greater preference for the PP dative than a sample in which pronominal themes are rare (all other things being equal). As a consequence, if I want to say anything about potential preferences of L2 learners, I would have to take the same sample of pertinent sentences and then compare the preferences of L1 speakers versus that of L2 speakers. In this case, it would be ideal to compare for each item the rating of the native speakers from Bresnan and Ford's study with that of the learners in my experiment. Unfortunately, this comparison is not possible as it was not possible to obtain Bresnan and Ford's original data set.

There is, however, an indirect way of comparing the natives' choices with those of the nonnatives. Bresnan and Ford (2010) investigate the relationship between the experimental choices of their subjects and the choices as found in the Switchboard Corpus. To measure the sensitivity of the speakers to the various factors, Bresnan and Ford first devised a regression model that predicted the choice of the dative construction for the datives in the Switchboard Corpus. They then regressed the mean ratings of their subjects for each item on the predicted log odds of the corpus model (i.e., on the predicted tendency to choose a particular construction). The correlation between the corpus probabilities for a given experimental item and the observed experimental ratings by the experimental subjects is depicted in Figure 4.1, with the solid regression line representing the Australian speakers and the dotted line representing the U.S. speakers. One can see that there is a strong correlation between the two measures and that the regression line has an intercept of about 50 for both varieties. For the highest value of the corpus log odds ratio (about 7.4), the regression line shows an estimated rating of about 90.

The corresponding graph for the L2 speakers looks very similar (see Figure 4.2). There is also a strong relationship between the corpus log odds and the ratings (adjusted R^2 =.697; Bresnan and Ford do not give the R^2 values of the regression models that underlie their regression lines). The regression line of the learners is, however, slightly higher than that of the native speakers (the intercept is 54.7) and seems to have a slightly steeper slope, as the highest corpus log odds corresponds to an observed mean estimate of 98.2. Both differences tell us that the ESL speakers tend a bit more towards the PP dative, but

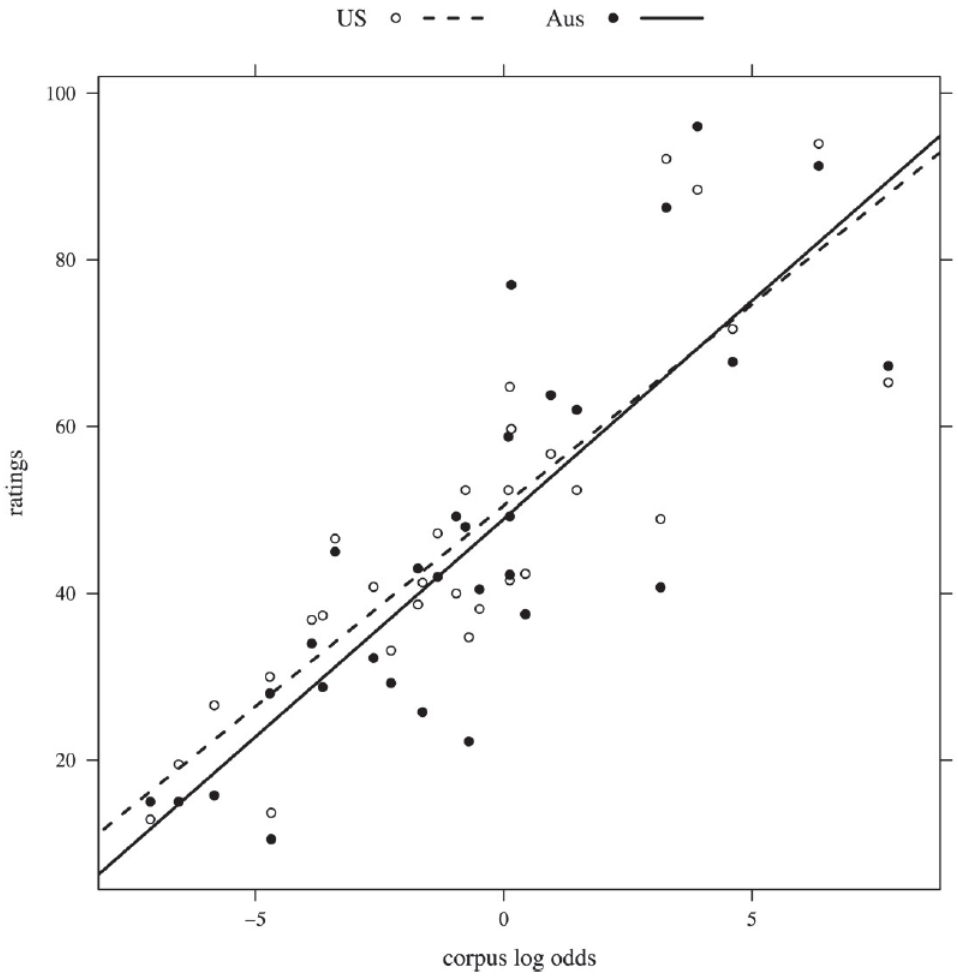

Figure 4.1: Mean ratings of U.S. and Australian participants for each item by corpus log odds. Regression lines show ratings increasing with log odds for both groups. (Reproduced from Bresnan and Ford (2010, p. 186))

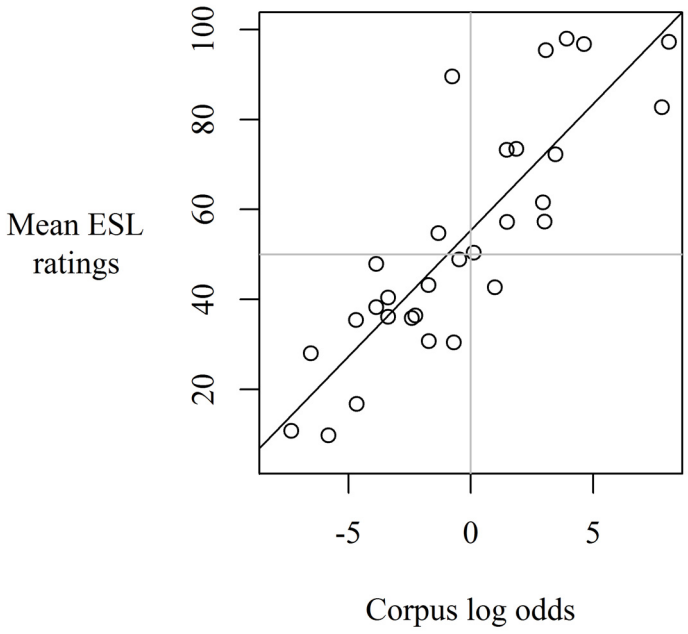

Figure 4.2: Mean ratings of ESL participants for each item by corpus log odds. The regression line shows ratings increasing with log odds.

this tendency is very small.

Figure 4.2 cannot tell us anything about the patterning of the data for individual learners. The relationship between the learners' individual ratings and the corpus log odds is shown in Figure 4.3. Each scatterplot shows the individual ratings of each learner. The items' corpus log odds are plotted on the x-axis and the PP ratings are plotted on the y-axis. A value of 100 on the y-axis corresponds to a categorical preference for a PP dative, and a value of 0 corresponds to a categorical preference for a DO dative.

The different shapes of the nonparametric regression lines allow us to classify the learners into different types.

There is a subset of learners who show a fairly linear relationship between the two variables (participants 5, 8, 9, 10, 11, 12, 14, and 20), similar to what Bresnan and Ford (2010, p. 187) show for their native speakers. Within this subset of ESL speakers, some participants show a stronger relationship (e.g., participants 5 and 14), whereas others do not show very clear preferences, even when the corpus log odds are extreme (e.g., participants 11 and 20). Participants of this subset also differ in their baselines (i.e., in their scores at the left margin of the plots). For example, participants 8 and 20 start out with higher ratings (i.e., have a greater tendency towards the PP dative) than participants 5 and 10.

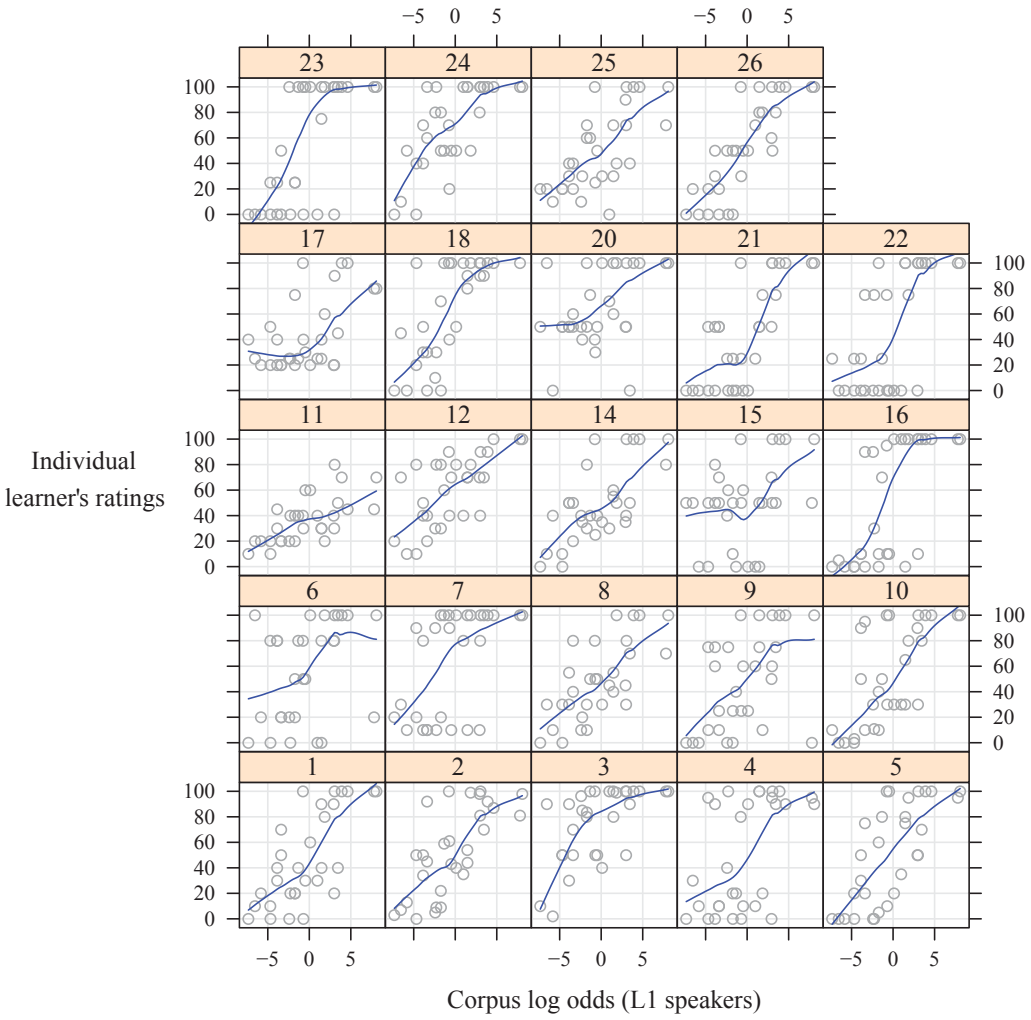

Figure 4.3: Individual ratings of individual ESL participants for each item by corpus log odds. The lines show a nonparametric scatterplot smoother fit through the data (Cleveland 1979)

For the other large subset of participants, the relationship between the corpus log odds and the ratings does not seem to be linear and, thus, qualitatively different from that of the L1 speakers. In this group, ceiling effects can already be observed in the middle of the log odds range. For example, participants 3, 7, 10, 16, 18, 23, and 26 strongly prefer the PP dative for items for which the corpus log odds are still rather low. For some learners, this effect is at the DO dative end of the rating scale (e.g., participants 4, 15, and 17). Some participants even show a regression line that levels off at both ends, approximating an S curve (e.g., participants 4 and 22). The distributions in this subset of learners suggest that there are certain cut offs at which the influence of the different factors is categorical and no longer probabilistic and gradient.

To summarize, I find that, overall, advanced learners are sensitive to the distributions of dative variants in native English, with meaningful individual variation concerning the general preferences and the question of gradient versus categorical choices. In the next section the determinants of these choices are investigated in more detail.

4.2.2 Determinants of the Dative Alternation in German-English Interlanguage

If learners are influenced by the same factors as native speakers, and if those factors work in the same direction, we should find that the harmonic alignment pattern will influence the learners' choices. This will manifest itself in the following hypotheses:

1. LENGTH
   The PP dative is more likely the longer the recipient is, as compared to the theme.

2. ANIMACY
   a. The PP dative is more likely if the recipient is inanimate.
   b. The PP dative is more likely if the theme is animate.

3. DEFINITENESS
   a. The PP dative is more likely if the recipient is indefinite.
   b. The PP dative is more likely if the theme is definite.

4. PRONOMINALITY
   a. The PP dative is more likely if the recipient is not a pronoun.
   b. The PP dative is more likely if the theme is a pronoun.

5. ACCESSIBILITY
   a. The PP dative is more likely if the recipient is new.
   b. The PP dative is more likely if the theme is given.

4.2.3 Statistical Analysis

To test the simultaneous effects of the different predictors I used linear mixed effect regression models. Multiple regression models allow us to consider the influence of one variable while keeping the others constant (Baayen 2008). Mixed-effects regression has the advantage that it brings the variation of random effects such as subject or item under statistical control and can deal with unbalanced data sets. Dealing with unbalanced data sets is especially welcome because not all combinations of all values of the different predictors are represented in the stimuli with equal frequency.

I used verb and subject as random effects. As subjects may have personal preferences for one or the other construction, it is advisable to keep their influence under control. The same holds true for the influence of the verb. It was also tested whether the inclusion of a random contrast for verbs by subject was justified, but log-likelihood tests [2] showed that it was not. Prepositional object rating was used as the dependent variable. It consisted of the score each item received for the PP dative sentence (which is complementary to the rating of the DO dative). Positive coefficients in the models work in the direction of the PP dative, whereas negative ones work in the direction of the DO dative.

In the first step, linear mixed effect models were fitted with only one predictor variable at a time as a fixed effect. These monofactorial models were devised for two reasons. First, the monofactorial models give us a first impression of the effect each predictor has in isolation and thus enable us to compare the effect to the findings of earlier studies that only investigated one predictor. The second reason is that all predictor variables are highly interrelated. This so-called collinearity is potentially harmful in regression analysis (e.g. Belsley et al. 1980 and see Chapter 3.3) because the coefficient estimates of individual predictors may change erratically in response to small changes in the model (e.g., after removal of a predictor). For example, highly interrelated predictors can lead to

[2] Log-likelihood "[...] is an important measure of goodness of fit"(Baayen 2008, p.253). Log-likelihood tests allow for comparing the goodness of fit of different models with different degrees of freedom to each other and show whether a more complex model has a higher predictive power than a simpler one.

a coefficient estimate changing its algebraic sign and thus making false predictions (i.e., suppression; Friedman and Wall 2005). By means of comparing the algebraic sign of each predictor in its monofactorial model to the predictor's algebraic sign in the multifactorial model, suppression effects can be detected. Having modeled the predictors in isolation makes it possible to keep track of them in the full model, which contains all predictor variables as fixed effects in the multifactorial analysis.

The fixed effects in my analyses were LOG LENGTH DIFFERENCE, ANIMACY OF THEME, ANIMACY OF RECIPIENT, PRONOMINALITY OF THEME and PRONOMINALITY OF RECIPIENT, ACCESSIBILITY OF THEME and ACCESSIBILITY OF RECIPIENT, DEFINITENESS OF THEME and DEFINITENESS OF RECIPIENT, CONCRETENESS OF THEME, NUMBER OF THEME and NUMBER OF RECIPIENT, PERSON OF RECIPIENT and PREVIOUS PP STRUCTURE. Person of theme had to be excluded as it turned out to have only one value – namely, not local.

For statistical modeling, the software R (R Core Team 2011) was used. The package lme4 (Bates et al. 2015) was used for the linear mixed-effects models. The results are presented in the following section.

4.2.4 Monofactorial Analyses

The monofactorial linear models showed effects for the majority of the predictors tested. Every single predictor was tested in an individual linear mixed regression model. The models are summarized in Table 4.2. A positive estimate is associated with a higher rating for the PP construction. The harmonic alignment column states whether the result is in line with the predictions made by the harmonic alignment pattern.

The models show that many, but not all, of the predictors that are relevant for predicting dative alternation for L1 speakers are also predictive for L2 speakers. Concreteness does not play a role for the ESL speakers. Whether the theme is accessible or animate also does not influence the choice for learners. The results of these models are comparable to those of previous studies in which monofactorial analyses were used (Callies and Szczesniak 2008; Chang 2004; Le Compagnon 1984; R. Hawkins 1987; Tanaka 1987). In the next section, it will be shown that not all of the significant predictors from the monofactorial analysis remain significant in a multifactorial model.

Table 4.2: Results of monofactorial analysis

Predictor	Estimate	*p* value	Harmonic alignment
LOG LENGTH DIFFERENCE	15.74	< .001	+
PRONOMINALITY OF THEME = `pronoun`	42.38	< .001	+
PRONOMINALITY OF RECIPIENT = `pronoun`	–19.43	< .001	+
ANIMACY OF RECIPIENT = `animate`	35.21	< .001	+
DEFINITENESS OF THEME = `indefinite`	–5.11	.069	+
DEFINITENESS OF RECIPIENT = `indefinite`	9.04	.085	m.s./+
ACCESSIBILITY OF RECIPIENT = `new`	13.77	< .001	+
PERSON OF RECIPIENT = `not local`	27.43	< .001	n.a.
NUMBER OF RECIPIENT = `singular`	8.62	.003	n.a.
PREVIOUS PP = `yes`	15.28	< .001	n.a.
NUMBER OF THEME = `singular`	–6.44	.070	m.s./n.a.
ANIMACY OF THEME = `inanimate`	6.91	.160	n.s.
ACCESSIBILITY OF THEME = `new`	0.31	.904	n.s.
CONCRETENESS OF THEME = `concrete`	–3.76	.260	n.s./n.a.

4.2.5 Multifactorial Analysis

Initially, a model with all predictor variables as described in Section 4.1.1 was fitted. A suppression effect was detected for the predictor PRONOMINALITY OF RECIPIENT. This effect is due to the fact that this predictor is closely related to LOG LENGTH DIFFERENCE. To alleviate this problem, I opted for residualization. In a separate regression model PRONOMINALITY OF RECIPIENT was used to predict LOG LENGTH DIFFERENCE. The residuals of this model leave us with exactly that part of LOG LENGTH DIFFERENCE that cannot be predicted by PRONOMINALITY OF RECIPIENT. Then the variable LOG LENGTH DIFFERENCE was used in the mixed models and the model was fitted again with all predictors. This full model is documented in Table 4.3. We can see that eight predictors have no significant effect: PRONOMINALITY OF RECIPIENT; DEFINITENESS, ANIMACY, and CONCRETENESS OF THEME; ACCESSIBILITY OF THEME and RECIPIENT; and NUMBER OF THEME and RECIPIENT. Compared with the results of the monofactorial models, we see that PRONOMINALITY OF RECIPIENT, DEFINITENESS OF THEME, ACCESSIBILITY OF RECIPIENT, NUMBER OF RECIPIENT, and PREVIOUS PP were significant in the monofactorial models but not in the multifactorial analysis.

The initial model shows significant effects for the following predictors: RESIDUALIZED LOG LENGTH DIFFERENCE, PRONOMINALITY OF THEME, DEFINITENESS OF RECIPIENT, ANIMACY OF RECIPIENT, and PERSON OF RECIPIENT. These effects remain in the final model after the stepwise exclusion of nonsignificant predictors. The final model

Table 4.3: Fixed-effect coefficients in the initial mixed-effects model

Parameters	Estimate	*p* value
Intercept	39.79	.003
RESIDUALIZED LOG LENGTH DIFFERENCE	13.34	.002
PRONOMINALITY OF THEME = `pronoun`	19.01	.011
ANIMACY OF RECIPIENT = `inanimate`	33.11	< .001
PERSON OF RECIPIENT = `not local`	10.56	.023
DEFINITENESS OF RECIPIENT = `indefinite`	9.55	.186
PRONOMINALITY OF RECIPIENT = `pronoun`	–7.77	.087
DEFINITENESS OF THEME = `indefinite`	–6.06	.254
ANIMACY OF THEME = `inanimate`	–1.59	.786
ACCESSIBILITY OF RECIPIENT = `new`	–3.56	.449
ACCESSIBILITY OF THEME = `new`	3.02	.353
NUMBER OF RECIPIENT = `singular`	–4.51	.283
NUMBER OF THEME = `singular`	5.32	.236
PREVIOUS PP = `yes`	–10.82	.062
CONCRETENESS OF THEME = `not concrete`	6.49	.163

Table 4.4: Fixed-effect coefficients in the final mixed-effects model

Parameters	Estimate	*p* value
Intercept	30.88	< .001
RESIDUALIZED LOG LENGTH DIFFERENCE	9.43	< .001
PRONOMINALITY OF THEME = `pronoun`	25.21	< .001
DEFINITENESS OF RECIPIENT = `indefinite`	15.35	.001
ANIMACY OF RECIPIENT = `inanimate`	28.18	< .001
PERSON OF RECIPIENT = `not local`	15.82	< .001

is documented in Table 4.4. All effects are in accordance with harmonic alignment.The final model accounts for over 50% of the variation observed (R^2 = .518), with the random effects explaining over 30% of the variation (R^2 = .306; VERB alone: R^2 = .259).

For a better understanding, the effects of the predictors are illustrated in Figure 4.4. In the upper left panel, we see the effect of relative length. The longer the recipient becomes compared to the theme, the higher the rating in favor of the PP dative. This result is perfectly in line with the predictions made by the end-weight principle.

In the upper right panel, we see the effect of the factor PRONOMINALITY OF THEME. If the theme is represented by a pronoun, the chances of selecting the PP dative increase (Hypothesis 4b). Indefinite recipients increase the PP rating (Hypothesis 3a), too, as shown in the left panel of the second row of Figure 4.4. The effect for ANIMACY OF

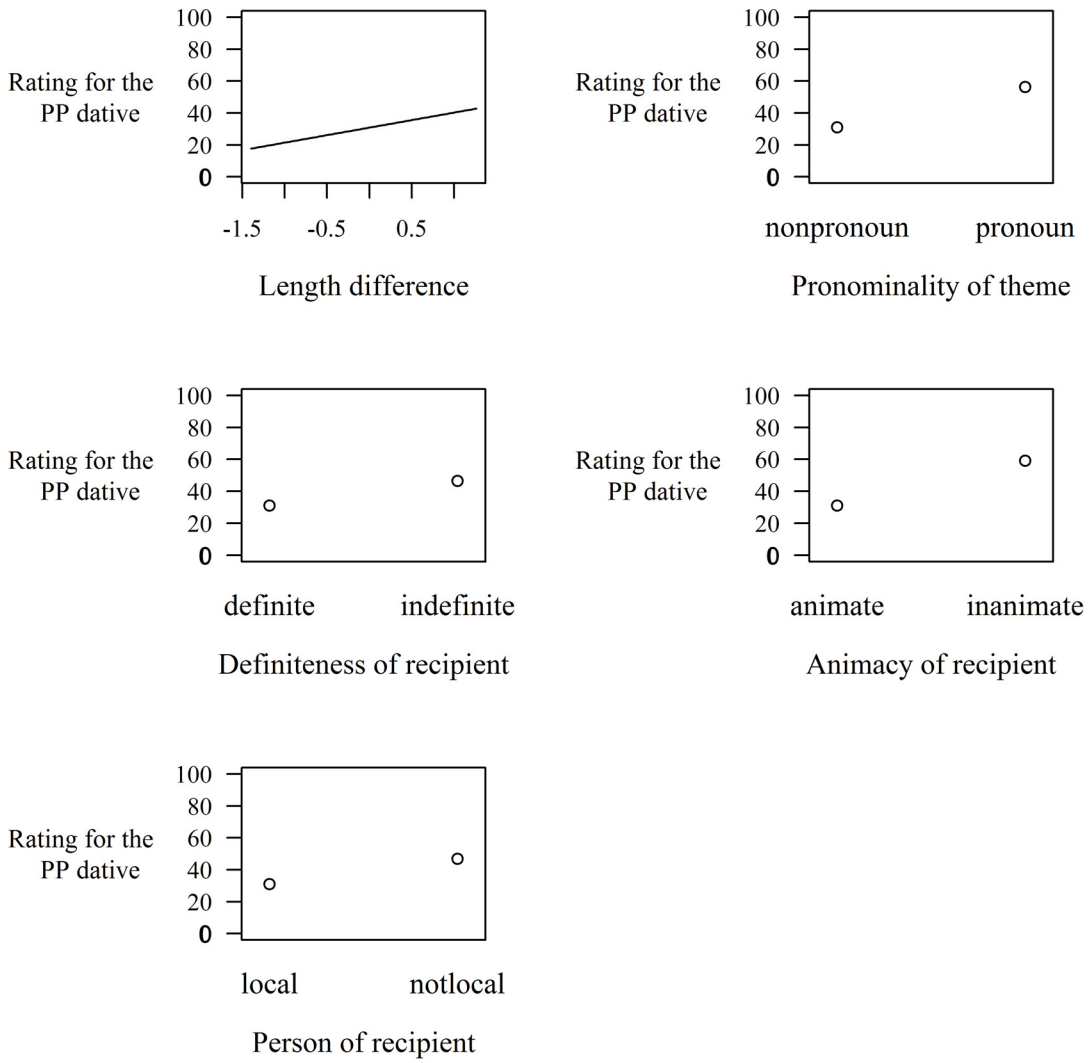

Figure 4.4: Partial effects of the final model

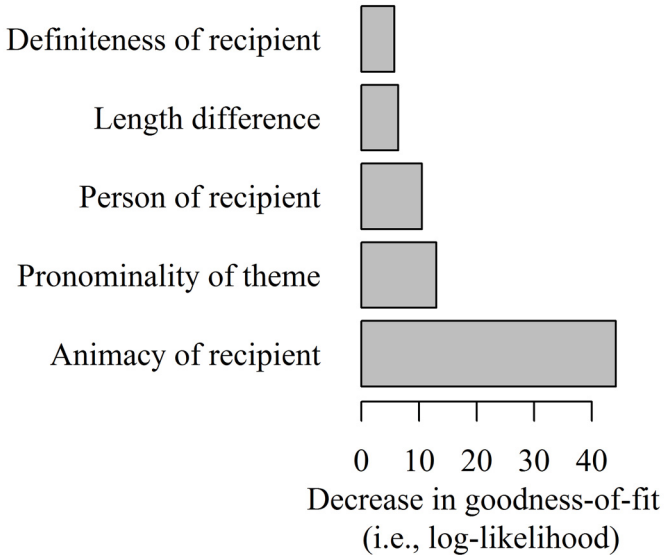

Figure 4.5: Effect sizes of the final model

RECIPIENT can be seen in the right panel of the second row of Figure 4.4. The rating in favor of the PP dative increases if the recipient is inanimate (Hypothesis 2a). Finally, we get a higher PP rating if the recipient is not local. All effects are in the direction predicted by Hypotheses 1 through 5.

I also computed effect sizes with the help of log-likelihood tests. Figure 4.5 shows the effect sizes for the five predictors with the bars representing the decrease in log-likelihood when the pertinent predictor is removed from the model (all comparisons yielded very highly significant differences). We see that ANIMACY OF RECIPIENT has the strongest effect and DEFINITENESS OF RECIPIENT the weakest.

I now compare my results with the patterning of the native speaker data in the Bresnan and Ford (2010) experiment. Table 4.5 summarizes the effects across the two groups.

We can see that the L1 speakers are influenced by more predictors than the L2 learners in my study. In the L1 model, PREVIOUS PP, PRONOMINALITY OF RECIPIENT, DEFINITENESS OF THEME, and NUMBER OF THEME are significant, but these factors do not play a role for German learners of English. The reverse holds for PERSON OF RECIPIENT, which was significant in the learner data but not for the native speakers. Apart from PERSON OF RECIPIENT, all factors that are not influential for the L1 speakers are also not influential for the learners.

Table 4.5: Comparison of significant effects across L1 and L2 speakers

Group	Variable	L1	L2
1	LOG LENGTH DIFFERENCE	yes	yes
	PRONOMINALITY OF THEME	yes	yes
	DEFINITENESS OF RECIPIENT	yes	yes
	ANIMACY OF RECIPIENT	yes	yes
2	PRONOMINALITY OF RECIPIENT	yes	no
	DEFINITENESS OF THEME	yes	no
	NUMBER OF THEME	yes	no
	PREVIOUS PP	yes	no
3	PERSON OF RECIPIENT	no	yes
4	ANIMACY OF THEME	no	no
	ACCESSIBILITY OF RECIPIENT	no	no
	ACCESSIBILITY OF THEME	no	no
	NUMBER OF RECIPIENT	no	no
	CONCRETENESS OF THEME	no	no

With regard to the effect sizes, learners and natives pattern rather similarly. In both groups, ANIMACY OF RECIPIENT and LOG LENGTH DIFFERENCE are the extremes, with PRONOMINALITY OF THEME and DEFINITENESS OF RECIPIENT in the between.

An interesting difference is evident in the overall sensitivity of the learners to the native language constraints. The degree to which the rating of a given speaker for a given item would approximate the corpus log odds can be taken as a proxy for this speaker's overall sensitivity to the native language constraints (as manifested in the corpus log odds). These individual differences in sensitivity to the corpus log odds can be included in a mixed-effects regression model in the form of random slopes. In the modeling of the experimental data, Bresnan and Ford (2010) implemented the corpus log odds as a random slope by speaker, and this random effect improved their model significantly. I also included random slopes for corpus log odds by subject (in addition to random intercepts by subject, see above), but the inclusion of these random slopes did not significantly improve the model (log-likelihood test, $\chi^2[2] = 3.80$, $p = .150$).

4.3 Summary and Discussion

4.3.1 Summary of Results

The main aim of this study was to investigate whether the different factors influencing the dative alternation in L1 English are also instrumental in determining the distribution of

the two constructions (i.e., the PP and the DO dative) in German-English interlanguage.

It has often been claimed that learners prefer the PP dative over the DO dative. The present study lends only little support to this claim because the advanced learners in my study on average show only a slightly higher tendency towards the PP dative as compared to the L1 speakers. In fact, the median of all ratings is 50, and 11 of the 24 learners have a mean of less than 50 (i.e., indicating that they show an overall preference for the DO dative).

What is perhaps more interesting than the overall tendency is the variation between subjects. Some advanced learners are highly sensitive to the distributions of dative variants in native English and show a gradient distribution of preferences very similar to that of native speakers. Other learners show rather categorical preferences, which indicates that preference is not influenced by probabilistic constraints for these learners.

With regard to the influence of different factors potentially determining the selection of variants, it has to be distinguished between the univariate and the multivariate analyses. In the monofactorial analysis of these determinants, seven out of nine factors participating in the harmonic alignment hierarchy (and 10 out of all 14 factors under investigation) turned out to be significant. All of the former effects are fully in line with the harmonic alignment pattern and support the findings of earlier studies (e.g., that definite constituents occur before indefinite ones; Marefat 2005; Tanaka 1987). The multifactorial analysis revealed, however, that many of the predictors that were significant in the monofactorial analysis were not significant in a multifactorial model. This shows that monofactorial analyses may lead to false conclusions as important covariates are not controlled.

As previously mentioned, most of the variables were strongly interrelated (i.e., pronouns were short, definite, and usually given, long NPs were usually new, etc.). This interrelatedness can lead to epiphenomenal findings in monofactorial analysis. For example, the effect of PRONOMINALITY OF RECIPIENT disappears in the multifactorial analysis. This can be interpreted in such a way that the pronominality effect found in the monofactorial analysis can be subsumed under the effect of DEFINITENESS. This finding once more illustrates the necessity of multifactorial analysis when addressing problems involving multiple influential factors.

The effects that remained significant in the multifactorial analysis are LOG LENGTH DIFFERENCE, PRONOMINALITY OF THEME, ANIMACY OF RECIPIENT, DEFINITENESS OF RECIPIENT, and PERSON OF RECIPIENT. All of these effects work into the predicted direction (i.e., they follow the harmonic alignment pattern). This means that, in principle, the same kinds of influence hold for advanced German learners of English as for English native speakers. Furthermore, for both groups, the choices can almost be predicted equally well on the basis of these predictors (compare the R^2 values of the two models:

learner model R^2 = .518, Bresnan and Ford's [2010] native speaker model R^2 = .529). There are some notable differences between the groups, however, the most important of which is that the ESL speakers are influenced by fewer variables. Only ANIMACY OF RECIPIENT, LOG LENGTH DIFFERENCE, PRONOMINALITY OF THEME, and DEFINITENESS OF RECIPIENT are influences that are shared by the two groups, and this set of factors does not seem to be arbitrary. It includes all four parameters of harmonic alignment, as shown in example (9) (Chapter 2.1).

Variables associated with context, such as PREVIOUS PP STRUCTURE and ACCESSIBILITY OF RECIPIENT and THEME, were not significant for my learners, and most of them were not even significant when tested in the monofactorial analysis. One explanation for this may be the difficulty of the items themselves, but, interestingly, my results are in line with earlier studies (Callies and Szczesniak 2008; Chang 2004) that found that context-related variables are not influential for learners.

Another interesting fact is that the recipient seems to be more influential than the theme in predicting learners' choices. Is the recipient more important than the theme in learner language? Wolk et al. (2011) found that the recipients have longer fixation times in eye-tracking experiments than do themes. There are two possible explanations for the prominence of recipients. One is that the recipient is usually animate and, thus, more interesting. The other is that the recipient precedes the theme in the canonical German word order and is thus more important for German speakers. This leads us to the question of transfer and the theoretical implications of this study for theories of L2 acquisition.

4.3.2 Theoretical Implications

The study of L2 syntax has focused very much on the acquisition of syntactic patterns and constructions. The phenomenon of grammatical variation and its acquisition has received little attention. Thus, we find quite a few studies that have investigated the acquisition of the two variants of dative constructions but very few devoted to the acquisition of the determinants of the choice between the two variants.

This study investigates what determines the dative choice of advanced German learners of English. At the theoretical level, the results of this investigation may shed some new light on the question of transfer and processing factors in L2 acquisition. Now, I will return to the hypotheses developed previously and evaluate them in the light of the evidence.

The traditional, categorical transfer approach does not make any predictions as to what may govern the choice of the two dative constructions once the two constructions are acquired. If frequency is allowed to play a role in transfer, the prediction is that German

learners of English will prefer the DO construction in English, as this is the preferred order of constituents in German. In my data set, 11 of the advanced learners show some preference for the DO dative, whereas 13 show some preference for the PP dative. Previous studies have found a robust PP preference for early learners, which suggests that the learners in my study that prefer the PP dative may be the less advanced ones. Assuming that the PP dative is easier to process, a preference for the PP dative would be expected from a processing-based perspective.

When considering the potential transfer of influential factors from the L1, different hypotheses can be entertained. According to the full transfer/full access hypothesis, the dative choices would be largely influenced by the constellation of pertinent factors as those being active in the L1. Unfortunately, the picture for German is not very clear. Alignment constraints do play a role in German syntax but their exact influence with regard to the dative alternation has not been properly investigated.

Another hypothesis could state that, initially, the learners would disregard the alignment factors in spite of their potential role in their L1, and the learners would only later and gradually acquire a sensitivity toward alignment factors. My results seem to point in this direction. Given that earlier studies of not advanced speakers showed a preference for the PP dative, my results can be interpreted in such a way that an earlier PP bias gives way to the more complex influence of alignment factors that was seen with many of the advanced learners in this study. Some additional support for such an interpretation comes from the inspection of the behavior of individual subjects. A number of subjects (i.e., the less advanced ones) provided ratings whose distribution could be interpreted in such a way that their interlanguage combines elements of categorical choices and of probabilistic choices under the influence of the different determinants of the dative alternation.

To further test the validity of this assumption, additional studies are needed. The present study was limited to advanced learners, and longitudinal or cross-sectional studies are certainly called for that look more closely at the development of probabilistic constraints in interlanguage. The question of whether principles of alignment can be transferred needs to be addressed by a different study. Comparing learners with a L1 in which probabilistic constraints influence word order (like English) to learners whose L1 does not have a flexible word order and thus does not allow inverting object to follow e.g. the end-weight principle. Learners whose L1 is sensitive to probabilistic constrains more readily use these principles in their L1 if it is the case that probabilistic constraints can be transferred.

Chapter 5

Continuous Lexical Decision Task

This chapter presents a reading time study, more specifically a lexical decision task, which is a replication of a study by Bresnan and Ford (2010) with German learners of English. Bresnan and Ford show that differences with respect to acceptance of long theme NPs in the PP dative in two groups of speakers (US and Australian speakers of English) can also be observed in an on-line task.

I use the same experimental design and their experimental items to address other research questions. I intend to provide evidence from an on-line task that the order of constituents that is generally found in dative constructions, i.e. the harmonic alignment of constituents (also in learner language as will be shown in Chapter 6), really facilitates processing of dative constructions. It has been claimed on the basis of corpus studies that a certain order of constituents is preferred because the early NPs are easier to process (compare Arnold et al. 2000). In order to come to this conclusion, one step is missing, namely proof, that early NPs, that possess the features that are said to be easier to process, are in fact easier to process. It is commonly assumed that shorter reading times are associated with less processing effort. Thus, short, animate, definite, pronominal and given themes should be easier to process and hence lead to shorter reading times than long, inanimate, indefinite, nonpronominal and new themes.

When it comes to on-line processing there are other factors which have to be considered as well, namely, the anticipation of the reader. It has been shown that readers attach upcoming words to NP nodes as soon as possible in order to make sense of the sentence they are reading, this is known as early closure (Underwood and Batt 1996). We know this effect from garden path sentences. They are misunderstood because the reader's first interpretation is usually the one in which all upcoming words are assigned to syntactic nodes which have already been parsed. When the reader thinks that they have understood the sentence, but there are still words which have to be parsed, the assumed sentence structure has to be revised (Underwood and Batt 1996).

When readers encounter a ditransitive verb they expect a direct and an indirect object

to occur. If the first NP that comes up is animate, readers will probably expect it to be the recipient of the construction, because recipients are more often animate than themes. Thus, an animate NP following a ditransitive verb should lead a reader into thinking that they are just reading a DO dative. If this is the case, an effect of surprise, i.e. a longer reading time (Underwood and Batt 1996), should be observed when the reader realizes that they are actually reading a PP dative and this will happen when readers encounter the preposition *to*.

In order to find this effect of surprise there are two preconditions to be fulfilled. Readers, in this experiment learners, have to attach the word to the syntactic nodes as they encounter them and they have to have probabilistic knowledge of the distribution of linguistic features (animacy and also definiteness, as I will show later) across themes and recipients and apply that knowledge while reading a sentence. To test whether these assumptions are borne out by the facts is another aim of the reading time study presented here.

In the following I will first outline the hypotheses and then present the materials and participants of this study followed by the results.

5.1 Methodology

5.1.1 Hypotheses

Understanding the experimental setup is crucial for understanding the predictions which are made by the hypotheses.

The experiment is set up as follows: All items are presented in the PP dative so they all contain the preposition *to*, which is used as the main measuring point of the reading times. The reading times on the other words are recorded as well. There are two reasons for using *to* as a measuring point. First, there is a big advantage of using the same word as a measuring point in all items. It is known that more frequent words lead to shorter reading times than infrequent ones or that complex words are processed in a different way than simplex words, which can lead to differences in reading times (Libben 2009). These differences in reading times can cause problems for the analysis. When using the same word as a measuring point in all sentences, there is no need to control for length, frequency, or complexity of the measuring point. Thus, problems that can be caused by differences in the properties of the word which is used as a measuring point can be avoided. Second, the preposition *to* can be seen as a point of disambiguation in terms of sentence structure. This point will be clarified in example (18).

(18) He gives the cat a. ... to the old lady.
b. ... a new cat toy.

Up to the word *cat* both continuations of the sentence are possible. The NP *the cat* could either have the role of a recipient or a theme. The sentence structure is disambiguated when the reader encounters the preposition *to*, because at this point it becomes clear that the sentence is a PP dative and that the cat thus must be the theme, and not the recipient, as the preposition *to* is preceded by the theme in the PP dative.

Because all items were presented in the PP dative, only predictors related to the theme can be relevant for the reading time on *to* as the readers have not encountered the recipient when reading the preposition *to*. This is why all hypotheses refer to theme-related factors only.

The hypotheses which I will outline in the following refer to different types of expectations. The first set of hypotheses will cover the predictions made by the harmonic alignment pattern and information density (Arnold et al. 2000; Gries 2002; Tily et al. 2009). The second set of hypotheses will be based on the assumption that themes and recipients differ in their linguistic properties and learners know about this distribution. This knowledge will lead to different expectations with respect to the sentence structure when encountering the theme and thus lead to differences in reading times. The third set of hypotheses will make predictions for the reading times on the basis of the ratings obtained in the split rating task.

Hypotheses I: Harmonic alignment

Native speakers of English have been shown to align constituents in the following way: short, animate, definite, pronominal and given constituents precede long, inanimate, indefinite and new constituents.[1]

This ordering has been argued to reflect ease of processing (Arnold et al. 2000; J.A. Hawkins 1994; Gries 2002; Wasow 1997). If this assumption is correct, the processing effort on short, indefinite, pronominal, animate and given constituents should be lower than on long, inanimate, pronominal, inanimate and new constituents. This can be inferred from the Uniform Information Density Principle put forward by Tily et al. (2009), who argue that sentences are ordered in a way that makes them rise in information density. Lower processing effort (i.e higher predictability) of the theme should therefore lead to shorter reading times for the words to follow, i.e. *to*. These expectations are captured by

[1] As we will see in Chapter 6, this is also true for learners of English.

the following hypotheses:

Hypotheses I: Harmonic Alignment

1. The longer the theme, the longer the reading time on *to*.
2. If the theme is animate, the reading time on *to* will be shorter than for inanimate themes.
3. If the theme is definite, the reading time on *to* will be shorter than for indefinite themes.
4. If the theme is pronominal, the reading time on *to* will be shorter than for non-pronominal NPs.
5. If the theme is given, the reading time on *to* will be shorter than for new themes.

Hypothesis II: Linguistic factors of theme and recipient

Another perspective is also thinkable. When the reader encounters the dative verb, there is a high probability of a ditransitive structure and thus two objects are expected. When encountering the first NP the reader will try to assign a thematic role to it, i.e. theme or recipient, and thus will at the same time expect an NP or PP dative.

Themes are more likely to be inanimate than recipients. It is conceivable that themes and recipients systematically differ in other properties as well, e.g. with respect to definiteness, length or pronominality. If learners have knowledge of that probabilistic distribution of properties among themes and recipients, they may assign a role to the first NP they encounter on the basis of this distribution of properties. Tily et al. (2008) have shown that anticipatory eye-movements can be predicted on the basis of the verb bias in ditransitive constructions and Levy (2008) shows that words that are less surprising (i.e. more expected) are easier to process. Depending on the role the participants assigned to the first NP, they anticipate to encounter the corresponding either a PP or DO dative. The readers' expectations are either confirmed or not confirmed when encountering the preposition *to*. A confirmation of the readers' expectations should lead to shorter reading times. Based on the assumption that themes and recipients systematically differ in their linguistic properties, we can set up the following hypothesis:

Hypothesis II: Linguistic factors

The higher the probability for the NP following the ditransitive verb to be a theme, the shorter the reading time on *to*.

In order to be able to outline this hypothesis in more detail and make it testable, it is necessary to examine whether NPs that fill the position of themes systematically differ in their properties from recipient NPs. Plainly speaking: We know that recipients are more often animate than themes. Are there any other systematic differences between themes and recipients with respect to definiteness, pronominality or length?

In order to answer these questions, I used the data set 'dative' which is available in the package 'languageR' via the statistical software 'R' (R Core Team 2011). This data set was used in a study by Bresnan (2007) and is publicly available. It consists of 3263 dative constructions, 2414 of which are DO datives and 849 PP datives. The data set contains spoken as well as written data. I used only the spoken part of the data, because my experimental items are based on spoken data. The spoken part of the data set comprises 2360 dative constructions which were extracted from the 3-million words Switchboard Corpus (Godfrey et al. 1992). The corpus consists of recorded telephone conversations.

The dataset 'dative' is coded for different factors and factor values which are shown in Table 5.1. The majority of the codings is identical to the codings in my data sets (see Chapter 3) as my studies are largely based on Bresnan and Ford (2010) and Bresnan et al. (2007)).

I restructured the data to create a new variable which enables me to test whether themes and recipients systematically differ in their properties. This new variable, TYPE OF NP, encodes whether the NP in question represents a theme or recipient. This information can be taken from other variables in the data set. This data set now contained 4720 observations as each dative construction has one theme and one recipient and contained the factors shown in Table 5.2.

The factor REALIZATION OF RECIPIENT encodes whether the recipient of the dative construction is realized as a PP (prepositional phrase) or an NP (noun phrase). If it is realized as a PP, the dative construction is a prepositional dative (PP dative) and if the recipient is realized as an NP, the dative construction is a double object construction (DO dative). The type of construction the NP comes from will probably be predictive of the features a theme or recipient has: If a theme comes from a DO construction and thus followed the recipient, the theme will be more likely to be longer than themes which were used in a PP dative. A theme which is used in a DO dative will also be more likely to be indefinite, nonpronominal, inanimate and new compared to themes which are used in a

Table 5.1: Predictors in the L1 data set 'dative'

Predictors	Values
VERB	Each verb is a value of that factor
SEMANTIC CLASS	`t` (transfer), `a` (abstract), `c` (communication), `f` (futuretransfer), `p` (prevention of possession)
LENGTH OF THEME	counted in words
LENGTH OF RECIPIENT	counted in words
ANIMACY OF THEME	`animate`, `inanimate`
ANIMACY OF RECIPIENT	`animate`, `inanimate`
DEFINITENESS OF THEME	`definite`, `indefinite`
DEFINITENESS OF RECIPIENT	`definite`, `indefinite`
PRONOMINALITY OF THEME	`pronoun`, `nonpronoun`
PRONOMINALITY OF RECIPIENT	`pronoun`, `nonpronoun`
ACCESSIBILITY OF THEME	`given`, `accessible`, `new`
ACCESSIBILITY OF RECIPIENT	`given`, `accessible`, `new`
REALIZATION OF RECIPIENT	`NP`, `PP`

PP dative, as we know from previous research (among many others Bresnan 2007).

This data set was used to examine whether an NP is more likely to be a theme or recipient, depending on its linguistic properties.

In order to do so, I fitted a logistic regression model in which TYPE OF NP was the dependent variable and PRONOMINALITY, DEFINITENESS, LENGTH (logarithmized), ANIMACY, and REALIZATION OF RECIPIENT were the independent variables. Interactions between the factor REALIZATION OF RECIPIENT and each of the other predicting variables were also included in the model. I did not include the factor ACCESSIBILITY as I coded this factor with the two levels `given` and `new`, following Bresnan and Ford (2010), while the available data set differentiates three levels, i.e. `new, given` and `accessible` (as described in Bresnan et al. 2007). Thus, the native speakers' data and my data are not comparable with respect to the factor ACCESSIBILITY. The model is presented in Table 5.3. The predictive power of the model is very high (C = 0.979, R^2 = 0.873). The model shows that themes and recipients significantly differ in their properties, but that these differences strongly interact with the construction type the theme or recipient is used in.

Table 5.2: Restructured L1 data

Predictors	Values
TYPE OF NP	theme, recipient
ANIMACY OF NP	animate, inanimate
PRONOMINALITY OF NP	pronoun, nonpronoun
DEFINITENESS OF NP	definite, indefinite
ACCESSIBILITY OF NP	given, accessible, new
LENGTH OF NP	counted in words
VERB	Each verb is a value of that factor
SEMANTIC CLASS	t (transfer), a (abstract), c (communication), f (futuretransfer), p (prevention of possession)
REALIZATION OF RECIPIENT	NP, PP

Table 5.3: Effects in the logistic regression model - L1 data ('dative')

Predictor	Estimate	*p* value
(Intercept)	- 5.18	<.001
LOG LENGTH OF NP	1.80	<.001
REALIZATION OF RECIPIENT = PP	2.22	<.001
ANIMACY = inanimate	7.56	<.001
DEFINITENESSS = indefinite	2.81	<.001
PRONOMINALITY = pronominal	-2.72	<.001
LOG LENGTH OF NP * REALIZATION OF RECIPIENT = PP	-1.91	<.001
ANIMACY = inanimate * REALIZATION OF RECIPIENT = PP	-3.5	<.001
DEFINITENESSS= indefinite * REALIZATION OF RECIPIENT = PP	-2.13	<.001
PRONOMINALITY = pronominal * REALIZATION OF RECIPIENT = PP	3.94	<.001

In order to gain more insights in the nature of the effects, I fitted two separate logistic regression models for subsets of the data. One subset contains all the NPs which come from DO datives and another one all the NPs which come from PP datives. TYPE OF NP was used as the dependent variable and PRONOMINALITY, DEFINITENESS, LENGTH (logarithmized), and ANIMACY are the predicting variables. The results of these models are summarized in Table 5.4.

Table 5.4: Effects in the general linear models for NPs which come from DO datives.

Predictor	Estimate	*p* value
(Intercept)	- 5.18	<.001
LOG LENGTH OF NP	1.80	<.001
ANIMACY = `inanimate`	7.56	<.001
DEFINITENESSS = `indefinite`	2.81	<.001
PRONOMINALITY = `pronominal`	-2.72	<.001

Table 5.5: General Linear models for NPs which come from PP datives.

Predictor	Estimate	*p* value
(Intercept)	-2.96	<.001
LOG LENGTH OF NP	-0.11	.498
ANIMACY = `inanimate`	4.07	<.001
DEFINITENESSS = `indefinite`	0.68	.003
PRONOMINALITY = `pronominal`	1.22	<.001

The model which is presented in Table 5.3 is split up in two models: One model contains the NPs which come from a DO dative (Table 5.4) and one which contains the NPs which come from a PP dative (Table 5.5). The model was split up to make the interactions (see model in Table 5.3) interpretable. The model presented in Table 5.4 shows that NPs which occur in DO datives are more likely to be themes when they are longer, inanimate, indefinite and nonpronomial. Shorter, animate and definite and pronominal NPs are more likely to be recipients.

The model in Table 5.5 shows that NPs which come from a PP dative are more likely to be themes when they are pronominal, indefinite, inanimate and shorter.

In sum we can say that NPs which are inanimate and indefinite are more likely to be themes, independent of the construction they come from. PRONOMINALITY and LENGTH do not seem to be predictive across construction but rather an epiphenomenon of the harmonic alignment of constituents. The interactions are illustrated in Figure 5.1.

The upper two panels show the effects for DEFINITENESS and ANIMACY. The plots show that NPs that are indefinite and inanimate are more likely to be themes, irrespective of whether they have been used in a PP or an NP dative. The lower panels show the interactions for PRONOMINALITY and LENGTH OF NP with TYPE OF NP. We can see that the effects for both factors reverse themselves depending on the construction type they were used in. Pronominal NPs are more likely to be themes when they were used in a PP dative. When pronominal NPs are used in a DO dative, they are more likely to be

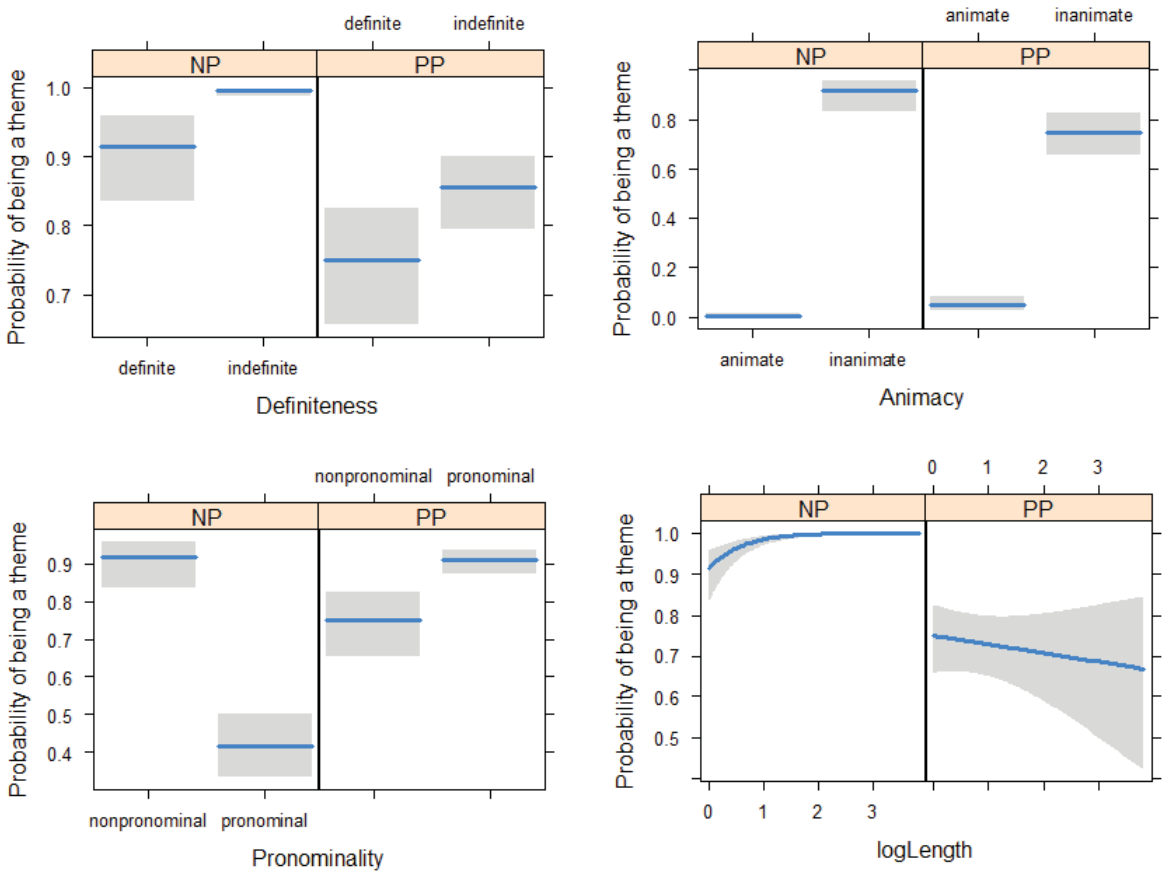

Figure 5.1: Interaction of DEFINITENESS, ANIMACY, PRONOMINALITY and LOG LENGTH with TYPE OF NP

recipients. The effects for LENGTH OF NP interact with the construction type they come from in the following way: If an NP occurs in a PP dative, the length of the NP does not influence its probability of being a theme (See Table 5.5: The effect for LENGTH OF NP is not significant). For DO datives, however, the probability for an NP being a theme significantly increases with increasing length.

The results show that inanimate and indefinite NPs are more likely to be themes than recipients. Under the assumption that learners are aware of this distribution, we can set up the following sub-hypotheses:

Hypotheses II: Linguistic Factors

1. ANIMACY

   If the NP is animate, the reading times on *to* will be slower than for inanimate NPs (i.e. themes).

2. DEFINITENESS
   If the NP is definite, the reading times on *to* will be slower than for indefinite NPs (i.e. themes).

Note that these hypotheses predict the opposite of the hypotheses in (I). The hypotheses can be motivated in the following way. As themes are mostly inanimate and recipients animate, an animate NP will probably be misinterpreted as being a recipient and thus a DO dative will be expected. When encountering the word *to* the sentence structure has to be reinterpreted and thus this will be reflected in the longer RT at that point.

Hypothesis III: Learner Ratings

Another possibility which suggests itself is the prediction of the reading times on *to* by the mean ratings which were obtained in the split rating task. As those ratings indicate the acceptance of the PP or DO dative respectively, it can be assumed that the sentences whose mean PP rating was very high are at the same time those sentences which are expected to occur in the PP dative. This expectation should manifest itself in the reading times on *to*. When expecting the PP dative the reading times on *to* should be shorter than for contexts in which the NP dative is expected. This expectation can be captured in the following hypothesis:

Hypothesis III: Mean PP Ratings

The higher the mean PP Ratings in the split rating task for a given item, the shorter the reading time on *to* for that item.

In the following I will describe the set up of the experiment, including materials and participants.

5.1.2 Participants

The participants were 24 undergraduate students of English at the University of Kassel whose native language was German. All of them were participants of the lecture course "Introduction to Linguistics", a first year course at the university. It can thus be assumed that all subjects had only basic knowledge in linguistics.

The participants were between 19 and 25 years old, 17 of them female and 7 male. One

participant had spent 11 months in Ireland and one 10 months in England. None of the others had spent more than 3 months in an English-speaking country. The majority of the subjects had been enrolled for two semesters, some of them for longer. As English is an obligatory subject in German high schools, all participants had received a minimum of 8 years of formal instructions in English and can safely be assumed to be advanced learners. Their proficiency levels were not measured. None of them had participated in the questionnaire study described in Chapter 4. The majority of the subjects were right-handed, only two of them were left-handed.

Subjects were compensated for their participation. They could choose obtaining credits ('competence' credits[2]) or the option to skip a mandatory test in the lecture.

5.1.3 Materials

The items for the continuous lexical decision task were constructed on the basis of the items which have been used in the split rating task described in Chapter 4 (Bresnan and Ford 2010). On the basis of the learners' ratings obtained in the split rating task, I determined which of the originally 30 questionnaire items were suitable experimental items for the continuous lexical decision task. For a better understanding of the experiment presented here, I will briefly recap the setup of the split rating task which was described in Chapter 4:

The questionnaire items contained a short text passage, followed by two dative structures as possible continuations for this passage, followed by context in some cases. The items were extracted from the Switchboard Corpus (Godfrey et al. 1992) by Bresnan and Ford (2010). The items covered the full range of PP probabilities (see Chapter 4 and Bresnan and Ford 2010, pp. 184-185 for a detailed description). That means that the statistical probability for some of the items to occur in the PP dative is very low, for others it is very high, and the full range of intermediate probabilities is covered as well.

In the questionnaire study, subjects were asked to rate two competing dative structures and express their rating by distributing 100 points between the two constructions, e.g. 50 points each when they considered the PP and the DO variant equally acceptable, or 80 points for the DO dative and 20 for the PP dative if they found the DO constructions much better than the PP dative.

The set of items for the continuous lexical decision task comprised those items which received the highest and lowest mean ratings for the PP dative by the learners in the split rating task (Chapter 4). The lower mean ratings for the PP dative reach from 9.42 to 39.42 and the higher ratings from 58.23 to 98.15.

[2]These are credit points which students at the university of Kassel need to collect during the course of their studies, e.g., for giving presentations, participating in an experiment etc.

The remaining 6 items were used as fillers. They had received rather neutral ratings, i.e. learners considered them to be equally acceptable in the NP and the PP variant.

The stimuli used in this experiment comprised 23 items[3] and 6 fillers. The structure of the items looked as follows: First, there was an introductory text passage. This was followed by a continuation ,i.e., the dative construction which was read word by word. In some cases the items ended with another passage of text ('Ending'). In all cases the items were followed by a comprehension question. The questions sometimes referred to the information which was given in the continuation and sometimes to the information which was given in the introductory passage. Examples are given in (19) and (20):

(19) **Text passage**[4]:
Speaker:
Well, see the problem is, if someone would have come up to me and said, It's going to cost you five hundred dollars to keep your dog alive, What do you want to do? I probably would have had second thoughts. But what they do is, they say, Well it's going to cost, you know, twenty dollars for tests and forty dollars for this and you know, and it creeps up on you. You really don't know what it's going to until it's all over. To give you an example. My mom had an elderly cat who,–someone evidently got hold of it and the cat got sick. So
Continuation:
she took the cat to the vet
Ending:
and she had the cat there for two days and then the cat died. So the doctor had called her up and said, Your cat died and you owe me this bill, and oh, by the way, do you want me to bury the cat?
Comprehension question:
Did the cat die?

(20) **Text passage**:
Speaker:
It was interesting. There were quite a few people in this area that had contributed to Duke's campaign, and I'm in upstate New York, and this is kind of a redneck area, but the local newspapers somehow got a list of all of Duke's contributors and they printed a list in the newspaper of everybody

[3]Originally, there were 24 experimental items but due to an error in the experiment one of them could not enter the analysis.
[4]Orthography and punctuation were taken from the original items (Bresnan and Ford 2010) and remained unchanged.

Continuation:
that gave money to that drircez.
Comprehension question:
Is upstate New York a redneck area?

In a continuous lexical decision task (Ford 1983), sentences are presented word by word to the participants. The participants have to make a lexical decision for each word they read, i.e. they have to decide whether the word they have just read is a word in a certain language or not. In order to make the decision a real decision, nonce words had to be included in the items.

The text passage (see examples (19) and (20)) was presented as a whole, i.e., normally, and the continuation was read word by word. The continuation always started with the word before the dative verb and was presented in the PP dative. The fillers as well as the items contained nonce words. All words up to the preposition *to* were, however, real words in the items (see Bresnan and Ford 2010). For illustration, example item (19) contains only real words, whereas one word in item (20) has been replaced by a nonce word.

Bresnan and Ford (2010) do not describe the nature of the nonce words in their study and how the nonce words were created. For the learners' experiment I used nonce words in a way that made them impossible words of English in a very obvious way, i.e. they contained illegal consonant clusters or no vowels at all (e.g. mfi, kryb, kqleem). That type of nonce-word was chosen to make sure that the participants as learners of English can easily identify them. It was important that they were able to decide whether a word was a real word in English or not. As the items come from a corpus of natural, spoken language (i.e. the Switchboard Corpus), they contain words which learners may not have encountered and they might have wondered whether these words are words they just have not encountered before or if they are no words of English. Phonotactically possible nonce words would have increased the difficulty of the decision. Subjects might have become insecure if the lexical decision would have been too difficult, so I decided to make it as easy as possible.

The comprehension questions were used to ensure that subjects made an effort to understand what they were reading and to have some measure whether they, in fact, did understand what they had read. This in turn ensured that subjects had to process what they read and did not just click through the sentences.

The theme of the items was coded for LENGTH (in words), PRONOMINALITY, DEFINITENESS, ANIMACY, NUMBER, PERSON, CONCRETENESS, ACCESSIBILITY using the criteria described in Chapter 3.2. It was also coded whether the introductory text passage contained a dative structure and whether it was a PP or DO dative as this could lead to

Table 5.6: Predictors in the continuous lexical decision task

Predictor	Values
RTONTO	the RT measured on the preposition *to* in milliseconds ms
RTPRETO	the RT measured on the word preceding preposition *to* in milliseconds (ms)
LENGTH OF THEME	length of theme counted in words
PRONOMINALITY OF THEME	`pronoun, nonpronoun`
ANIMACY OF THEME	`animate, inanimate`
DEFINITENESS OF THEME	`definite, indefinite`
ACCESSIBILITY OF THEME	`given, new`
NUMBER OF THEME	`singular, plural`
PERSON OF THEME	`local, not local`
PREVIOUS STRUCTURE	`PP, NP, none`
MEAN PP RATING	mean rating an item received in the split rating task for the PP dative
TRIAL	encodes the order in which the items are presented

syntactic priming (PREVIOUS PP)[5]. The mean rating each item received in the split rating task from the L2 speakers (MEAN PP RATING) was included in the data set, as was the factor TRIAL. The factor TRIAL encodes the order in which the items were presented to the subjects. The order of presentation was the same for all subjects, but it is nevertheless possible that subject get faster (training effect) or slower (fatigue) during the experiment.

The recipient of the items is not of interest and thus not coded. In this experiment all the items were presented in the PP dative, because the measuring point for the reading times was the preposition *to* and thus the recipient was read after encountering the measuring point. Table 5.6 summarizes all predictors and their levels.

The values of the factors were not evenly distributed across the items. The theme length ranged from 1 to 10 words, the mean length was 2.17 words (median: 2 words). The distribution of the other factors is summarized in Table 5.7.

[5]Notice that this coding diverges from what has been described in Chapter 3.2. Here, it was only coded whether the text passage contains a PP dative. DO datives were not considered.

Table 5.7: Distribution of values

PREDICTORS	LEVELS					
ANIMACY OF THEME	animate:	3	inanimate:	20		
DEFINITENESS OF THEME	definite:	14	indefinite:	9		
PRONOMINALITY OF THEME	pronoun:	3	nonpronoun:	20		
ACCESSIBILITY OF THEME	given:	10	new:	13		
NUMBER OF THEME	singular:	18	plural:	5		
PERSON OF THEME	local:	0	not local:	23		
PREVIOUS PP	none:	14	DO:	6	PP:	3

5.1.4 Procedure

The experiment was set up using the software E- Prime Professional Version 2.0 and inputs were made via a response box. Participants wore sound-proof headphones to prevent distractions. Each participant took the experiment individually in the language lab of the linguistic department of the University of Kassel. The instructions were given in German to make sure that every participant understood what they had to do (see Appendix). Participants were instructed to take fast and intuitive decisions. They were also ensured that the lexical decisions would be easy to make and that there would not be any tricks, i.e., that it would be obvious if a word was a real word or not.

Before the actual experiment there were three trial runs. After those the participant had the chance to ask the experimenter questions about the procedure. After the trial runs the experimenter left the lab. Every participant had to read the text passage (see examples (19) and (20) above) on a computer screen, as shown in Figure 5.2.[6] The continuation was presented as a line of dashes which covered the words. Every letter of each word was represented by one dash. When a button was pressed, the first word appeared and the participant had to decide whether the word which had appeared was a real word or not and press the 'yes'- or 'no' button to indicate their decision. After they had pressed the button, the next word appeared and the previous one turned into dashes again. The last word of the continuation was followed by a comprehension question. In some cases, this question was preceded by an optional ending. Participants had to answer the question by pressing the 'yes' or 'no' button and were instructed to press 'no' if the text they had just read did not clearly indicate that the answer was 'yes'.

The reading times (RTs) for every word of the continuous lexical decision process was recorded. In the data analysis I, however, only made use of two of the recorded measuring points, i.e., the RT on the preposition *to* and the RT on the word preceding *to*.

[6]Special thanks go to my husband Stefan for making this cool screen for me.

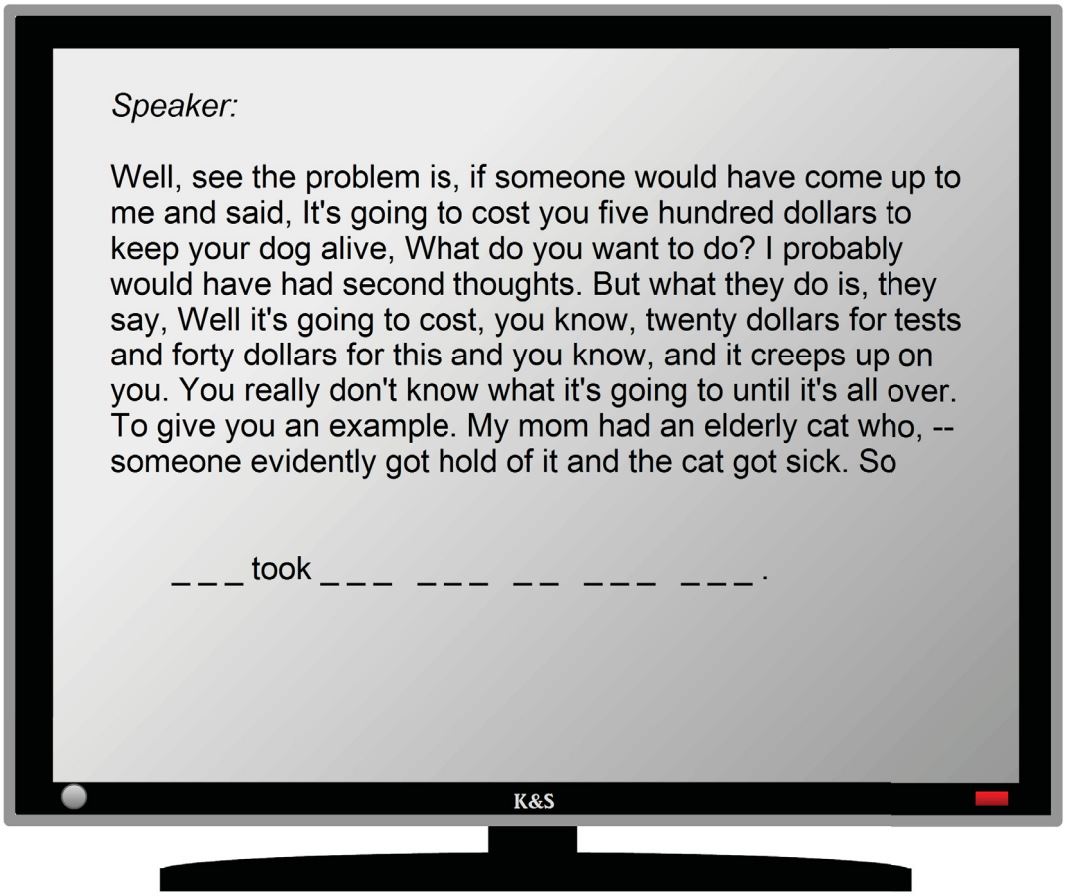

Figure 5.2: Exemplified screen of the experiment as the participants saw it. The continuation which is covered by the dashes reads: *she took the cat to the vet.*

5.1.5 Differences between this Study and the Original by Bresnan and Ford (2010)

I would like to point out that my experiment differs in several points from the one conducted by Bresnan and Ford (2010), both in terms of materials and experimental procedure and in terms of the statistical analysis. The materials differ in respect to the items themselves, the fillers, the nonce words and the comprehension questions. The basis for Bresnan and Ford's as well as for my experimental items were the 30 items which were used in the split rating task. The criteria for selecting the experimental items were different. I chose my items on the basis of the ratings obtained by ESL learners in my questionnaire study. Bresnan and Ford (2010) used their corpus data, from which the 30 items had been extracted and calculated partial probabilities for each item.

In Bresnan and Ford's study, partial probabilities refer to the likelihood of each item to

occur in the PP dative (or DO dative) predicted by factors which are related only to the theme but not to the recipient. Bresnan and Ford (2010) used their corpus data to fit a model with predicting variables that relate only to the theme. The estimates of that model were used to calculate the probability of each item to occur in the PP dative when only taking theme-related factors into account.

As my selection criteria were different ones and I do not know which items were selected by Bresnan and Ford, it is very likely that we have not selected an identical set of items.

I also did not have access to Bresnan and Ford's comprehension questions and nonce words, so I construed my own questions and nonce words as described in section 4.1.2.

In contrast to Bresnan and Ford, I only used the 6 filler items which were available to me. They construed 10 additional ones which I did not have access to, so I decided not to implement further changes and stuck to the fillers I had. Due to an error which I only saw after data collection, I presented the fillers in the PP dative and not in the DO dative. Bresnan and Ford had used fillers in which the DO dative was used. This should, however, not do any harm to the validity of the experimental data as the introductory text passages contain DO datives and thus control for this factor.

In terms of statistical analysis, there are many differences as well. Bresnan and Ford were interested in finding differences between two groups of speakers, i.e. Australian and American speakers. I am interested in the learners' acquisition of the English dative alternation and the questions which factors influence the learners' processing of dative constructions. Thus, the hypotheses and research questions of our two studies differed, which lead to different analyses.

5.2 Statistical Analysis and Results

5.2.1 Overview

Reading times are a measure which is very sensitive to interferences (Baayen and Milin 2010). This is why it is necessary to carefully examine the obtained data before entering them into statistical analysis.

A total of 23 experimental items was read by 24 subjects which makes a total of 552 observations. On average, subjects answered 19 out of 23 questions correctly, which is 82.6% of all questions per subject. This means that the comprehension of the items was good. In comparison, the native speakers in Bresnan and Ford's study answered 20.5 out of 24 questions correctly on average, which corresponds to 85.4%. Like Bresnan and

Ford, I used all items for my analysis, irrespective of the comprehension questions having been answered correctly or not.

As Baayen and Milin (2010) show that aggressive trimming, i.e., the exclusion of outliers, of reading time data before analysis does not necessarily lead to better results, the data were only trimmed moderately. A summary of the distribution of the RTs is given in Table 5.8.

Table 5.8: Distribution of reading times on *to* and reading times on the word preceding *to*.

	Min.	1st Quartile	Median	Mean	3rd Quartile	Max	SD Dev
RTsOnTo	254.0	405.2	463.5	531.9	570.0	2695.0	245.4
RTsPreTo	245.0	378.0	436.0	496.6	545.2	4756.0	252.7

The shortest RTs of 254 ms and 245 ms did not seem to be unnaturally short so they were of no concern in the trimming procedure. The longest RTs of 2695 ms and 4756 ms are too long to be natural RTs for one word. Another indication for outliers is the fact that the mean and the median differ from each other for both factors. The mean is more sensitive to outliers than the median and since the mean is higher than the median we have to check for outliers.

Figure 5.3 shows the raw RTsOnTo (left panel) and the logarithmized RTsOnTo in the right panel. The panels show lines that indicate at which points the RTs are starting to trail off. These lines correspond to 1500 ms for RTsOnTo and 7.37 (i.e. log(1500)). All RTs which were higher than 1500 ms were removed from the dataset. For the RTsPreTo only one data point was removed (i.e 4756 ms) as it was much longer than the rest of the RTs, which were well below 1300ms.

The trimming resulted in a loss of only little more than 1% of the data and leaves us with a total number of 545 observations. The RTsOnTo and RTsPreTo were logarithmized for further analysis. A Shapiro test for normality revealed that, after trimming the dataset, the RTs of more than half of the subjects are normally distributed. There are, however, nine subjects ("A13" "A19" "A2" "A21" "A3" "A30" "A6" "A7" "A8" "A9") whose RTs depart from normality. For some of the subjects, clear outliers are visible in Figure 5.4. Outliers in a boxplot are data points which are further than 1.5 inter quartile ranges away from the 1st or 3rd quartile in a data set. Thus, I excluded the visible outliers for those subjects whose RTs depart from normality according to the Shapiro test. Another Shapiro test showed that for the new data set only the RTs of subjects A3 and A8 depart from normality. This is, however, not due to outliers. The RTs for subjects A3 and A8 show a bimodal distribution. Their RTs enter the analysis unchanged. The final data

set comprises 531 data points. Compared to the initial set there is a loss of 4% of the data.

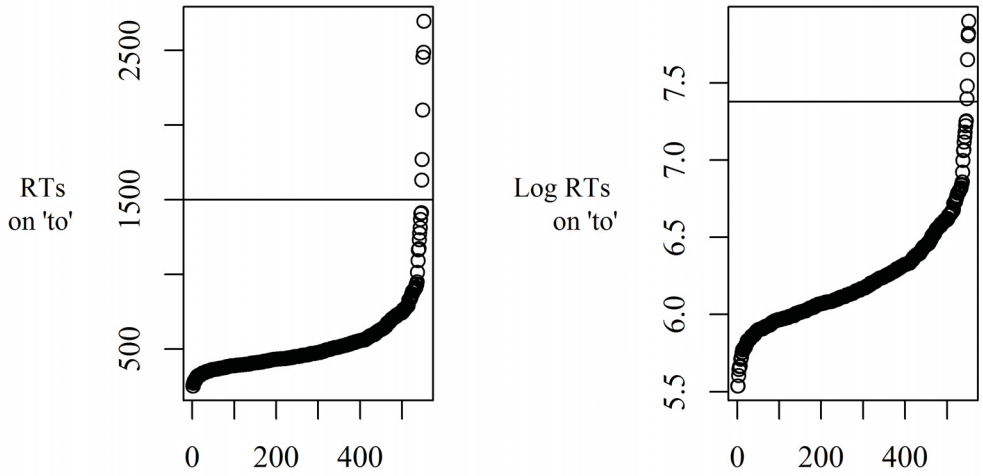

Figure 5.3: Sorted RTsOnTo and sorted RTsPreTo

5.2.2 Testing Hypotheses I and II - Analysis and Results

The prediction of Hypothesis I is that harmonic alignment is reflected in the reading times on *to*. If this is true, we should find shorter RTsOnTo for animate, definite, pronominal, given and shorter themes compared to inanimate, indefinite, nonpronominal and new themes. Hypothesis II, in contrast, predicts shorter reading times on *to* for inanimate and indefinite NPs.

In order to test these hypotheses, a linear mixed-effects model was fitted. The factors Verb and Subject were used as random effects. Some of the subjects might have read at a different speed than others or have generally faster or slower reaction times. Their influence must be controlled for. The influence of the verb must be controlled for as well, as we know that dative verbs have different biases for one or the other dative construction and we also know that learners acquire this bias (Callies and Szczesniak 2008; Wolk et al. 2011).

Log RtOnTo (henceforth: RtOnTo) was used as the dependent variable. The factors of interest were used as fixed effects, namely Log LengthOfTheme (i.e. logarithmized

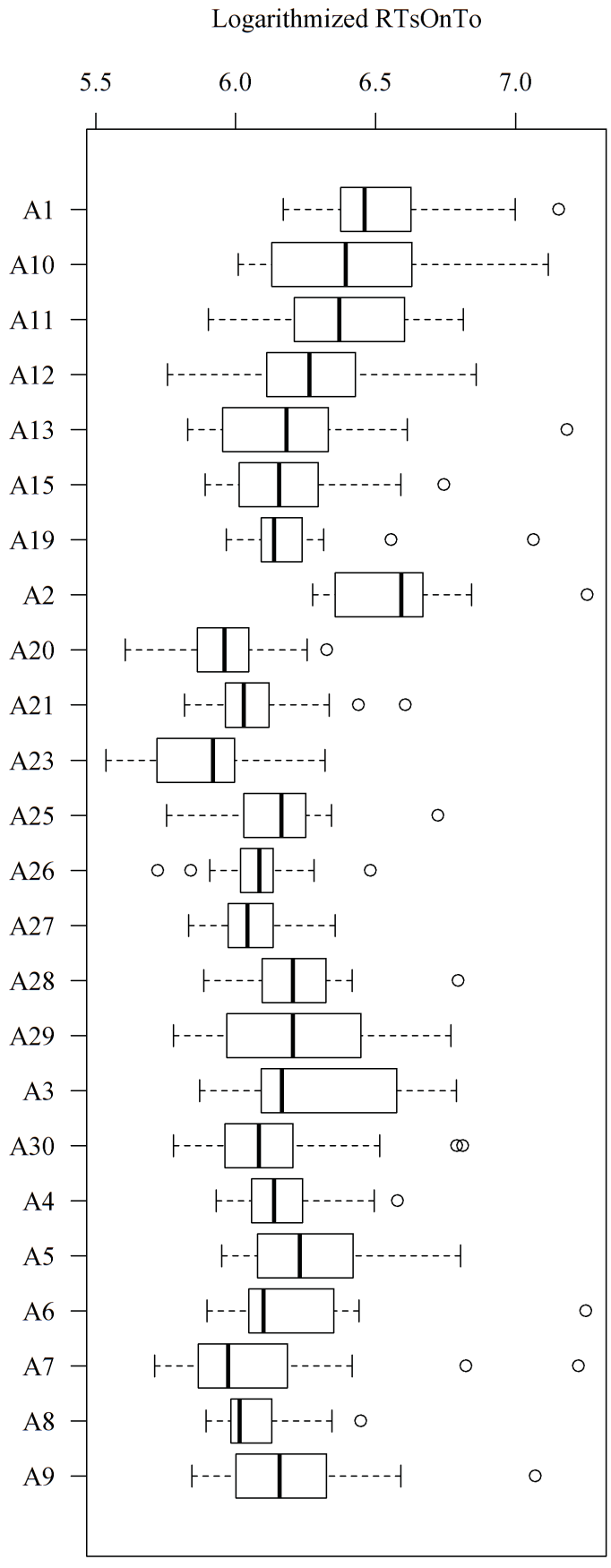

Figure 5.4: Distribution of Log RTsOnTo per subject

LOG LENGTHOFTHEME, henceforth: LENGTH), ANIMACY(of theme), PRONOMINALITY(of theme), ACCESSIBILITY(of theme), and DEFINITENESS(of theme). The factor LOG RTPRETO (henceforth: RTPRETO) was used as a covariate. According to previous studies, the best predictor of a reading time of a certain word is the reading time of the word it is preceded by (see Bresnan and Ford 2010, p. 196). Further covariates were CONCRETENESS (of theme), NUMBER (of theme) and TRIAL. Those predictors have shown to influence the dative alternation in other types of data (Bresnan et al. 2007 and Bresnan and Ford 2010) and should be kept controlled for.

It was not possible to use the factor PREVIOUS STRUCTURE as a covariate as it has an unfavorable, but probably coincidental distribution across the items. All items which have an introductory text passage in which a PP dative was used also have short theme, i.e. one word. All items in which an NP dative was used in the introductory text passage have longer themes with a median of three words. This constellation is very disadvantageous as we expect faster RTSONTO for items which have a short theme and also for items in which a PP dative occurred in the introductory text passage. The reverse is true for longer themes and text passages containing a DO dative. Statistical problems are inevitable for such constellations. The natural solution is to exclude one of the predictors from the analysis. The question arises, however, whether this exclusion is detrimental for the analysis. Earlier studies showed that learners are not sensitive to context-related variables (among others Callies and Szczesniak 2008). Therefore, the factor PREVIOUS STRUCTURE can be safely removed.

Table 5.9: Fixed-effect coefficients in the initial mixed-effects model. Non-significant predictors are placed in the bottom part of the table, separated from the significant predictors by a horizontal line.

Predictor	Estimate	*p* value
(Intercept)	4.05	.000
LOG LENGTH OF THEME	0.07	.008
DEFINITENESS OF THEME = `indefinite`	0.07	.004
LOG RTPRETO	0.33	.000
ANIMACY OF THEME = `inanimate`	-0.07	.036
TRIAL	0.002	.077
ACCESSIBILITY OF THEME = `new`	0.034	.230
CONCRETENESS OF THEME= `inconcrete`	0.005	.853
NUMBER OF THEME =`singular`	0.023	.44
PRONOMINALITY OF THEME = `pronoun`	0.035	.369

The full model including all predictors is reported in Table 5.9. The predictors LENGTH, DEFINITENESS, ANIMACY and RTPRETO turned out to be significant in predicting the reading time on *to*. The predictor TRIAL reaches marginal significance. All other predictors did not reach the level of significance.

The full model (Table 5.9) was simplified using the standard procedure described in Chapter 3.3. The simplified model is reported in Table 5.10. The predictors which were significant in the full model remained significant in the simplified model as well.

Table 5.10: Fixed-effect coefficients in the final mixed-effects model

Predictor	Estimate	*p* value
(Intercept)	4.03	.000
LOG LENGTH OF THEME	0.05	.005
ANIMACY OF THEME = `inanimate`	-0.06	.028
DEFINITENESS OF THEME = `indefinite`	0.08	>.001
LOG RTPRETO	0.34	.000
TRIAL	0.000	.025

Post-modeling diagnostics revealed, however, that the model fails in predicting longer reactions times. The distribution of the residuals showed larger values at the upper end. To reach a better fit, data points with absolute standardized residuals exceeding 2.5 standard deviations were removed from the model as described in Baayen and Milin (2010, p. 10). The set of significant predictors, however, had to be adjusted when using the trimmed data set. The factor TRIAL failed to reach significance and the predictor ANIMACY is only marginally significant in the improved model. These adjustments resulted in a satisfactory distribution of the residuals. The loss of data compared to the data set before post-fitting is less than 3%.

The final model (after post-fitting, see Table 5.11) accounts for 58% (R^2 = 0.576) of the variation, 45% (R^2 = 0.452) of which are explained by the random effects. The fixed effects, thus, account for 13% of the variation.

We will go through the significant predictors one by one. The columns HYP I and HYP II state whether the effect supports the respective hypothesis (indicated by a '+') or not (indicated by a '-'). If neither of the two hypotheses is applicable 'n.a' is entered in the respective cells.

The factors LENGTH and DEFINITENESS behave in line with the predictions made in Hypothesis I. The longer the theme, the longer the reading time on *to*. When the theme is definite, the reading times on *to* are shorter than for indefinite themes. The factor ANIMACY, even though only marginally significant, predicts shorter reading times on *to* for

Table 5.11: Fixed-effect coefficients in the final mixed-effects model after post-fitting

Predictor	Estimate	*p* value	HYP I	HYP II
(Intercept)	3.66	.000	n.a	n.a
LOG LENGTH OF THEME	0.05	.001	+	n.a
DEFINITENESS OF THEME = `indefinite`	0.07	.000	+	-
ANIMACY OF THEME = `inanimate`	-0.046	.07	-	+
LOG RTPRETO	0.404	.000	n.a	n.a

animate themes. This is in line with Hypothesis II and against what has been predicted in Hypothesis I. The covariate RTPRETO also influenced RTSONTO as expected. The slower the word preceding *to* is read, the slower the reading times on *to*. The effects of all predictors are visualized in Figure 5.5.

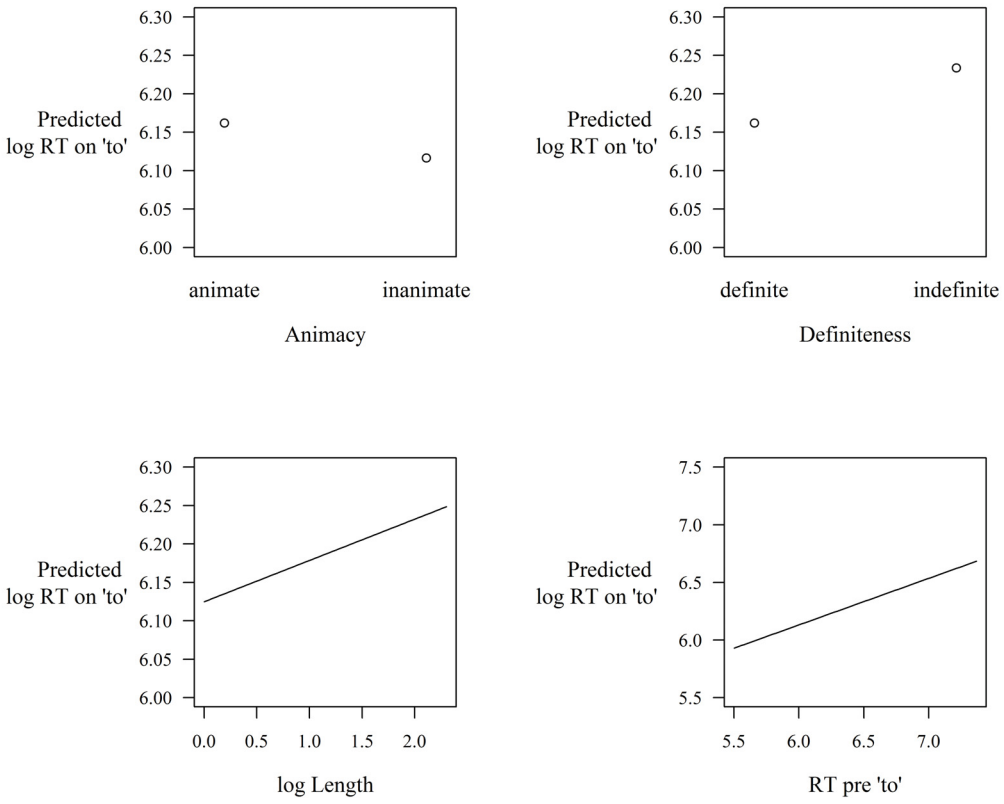

Figure 5.5: Partial effects of the final model

The significant predictors are of different importance to the model. Figure 5.6 displays the decrease in goodness-of-fit when removing one of the predictors from the full

model. The strongest predictor is RTPRETO, followed by DEFINITENESS, LENGTH and ANIMACY.

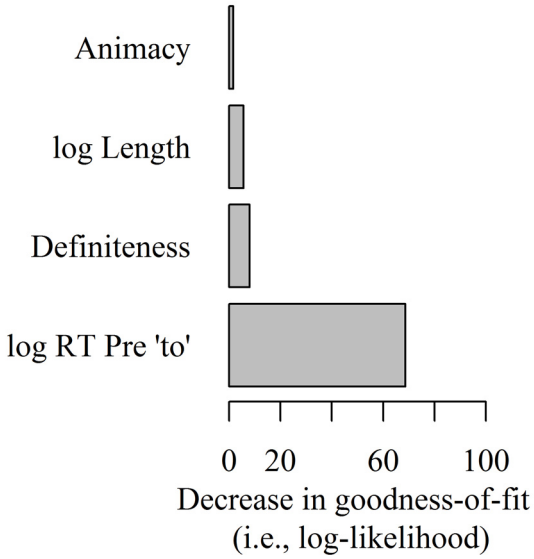

Figure 5.6: Decrease in goodness-of-fit (i.e., log-likelihood) when removing significant predictors from the final model.

The results obtained in this study are comparable to the results of the experiment by Bresnan and Ford (2010). The final model for the learners contains partly the same significant predictors. Bresnan and Ford's model, however, includes the additional factor VARIETY as they were interested in the differences between American and Australian speakers. Their final model also includes a significant effect for ITEM ORDER which corresponds to my predictor TRIAL. In Bresnan and Ford's study, the factor ANIMACY did not reach significance.[7]

Another difference is that the learners seem to be more heavily influenced by DEFINITENESS than by LENGTH compared to the native speakers. Bresnan and Ford's native speakers' model predicts about 57% of the variation (R^2 = 0.5668), which is comparable to the learners' model (R^2 = 0.576). The variation which is explained by the L2 model is even slightly higher. The variation which is explained by the random effect in the L1 model is 46% (R^2 =0.4643) and 45% (R^2 = 0.452) in the L2 model. Thus, the fixed effects

[7]It is, however, unclear whether they listed factors which only reached marginal significance or whether this factor failed to reach significance at all in their data set.

for the native speakers account for roughly 10% of the variation whereas the fixed effects of the L2 model account for even 13% of the variation.

5.2.3 Testing Hypothesis III: Mean PP Ratings Predict the RTs

Hypothesis III predicted that the mean PP ratings obtained in the split rating task are predictive for the reading times on *to*.

This hypothesis reflects the idea that constructions which are more acceptable are also read faster, because they are easier to process - which makes them more acceptable in the first place. As the reading time experiment only covers half of the construction, while the judgments were made based on the properties of theme and recipient, the match between on-line and off-line task is far from ideal, but it is nevertheless worth exploring whether some kind of correlation can be found.

A linear mixed-effects regression model was used to test whether the ratings of learners are reflected in on-line processing. The dependent variable was RTONTO. As in the previous model SUBJECT and VERB were used as random effects to control for the individual differences as well as the verb bias. The logarithmized MEAN PP RATING (henceforth: MEAN PP RATING) was the predictor of interest and was thus used as fixed effect. The predictor RTPRETO was used as a covariate. Both fixed effects were significant. Post-fitting diagnostic, however, revealed an unsatisfactory distribution of the residuals. To reach a better fit, all residuals exceeding 2.5 standard deviations were removed (as described in Baayen and Milin 2010), resulting in the model which is reported in Table 5.12.

Table 5.12: Fixed-effect coefficients in the mixed-effects model predicting the influence of the PP-Rating

Predictor	Estimate	*p* value
(Intercept)	3.71	.000
LOG MEAN PP RATING	-0.06	.001
LOG RTPRETO	0.43	.000

The factor MEAN PP RATING significantly accounts for some variation which is observed for RTSONTO. The higher the MEAN PP RATINGS for a certain item the shorter the reading time on *to*. This trend is visualized in Figure 5.7.

The model explains almost 58% of the variation (R^2 = 0.578), which is comparable to the model in the previous section. The random effects account for almost 45% of the

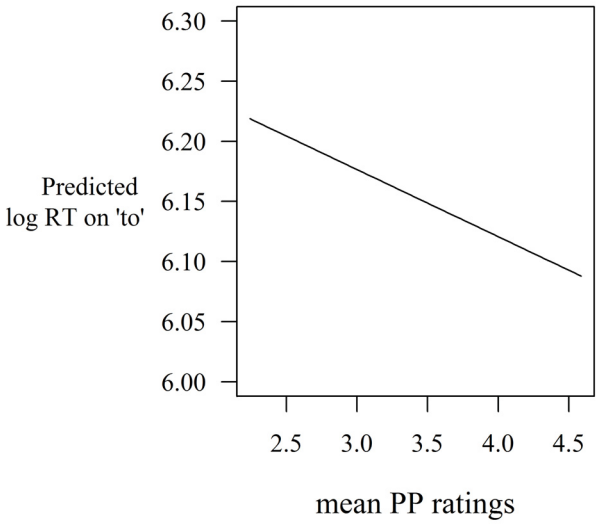

Figure 5.7: Effect of the mean PP Ratings

variation. Thus the fixed effects account for 13% of the variation. A model containing only the random effects and the factor RTPRETO explains over 56% of the variation (R^2 = 0.564), thus, the variation explained by the mean PP ratings is relatively small. It accounts for only about 1% of the variation.

5.3 Summary and Discussion

The aim of the study presented here was to test whether factors that are said to facilitate processing are, in fact, reflected in reading times of second language learners. This experiment is the first step in that direction as the question of the on-line processing of dative constructions by L2 learners has been hitherto unaddressed.

In this study, I tested various hypotheses and at the same time replicated results of an experiment that has been conducted with L1 speakers by Bresnan and Ford (2010) for L2 speakers.

The results of my experiment are similar to Bresnan and Ford's results. As for L1 speakers, LENGTH, DEFINITENESS and the READING TIME ON THE WORD PRECEDING *to* are significant predictors in a model that is trying to account for the variation in the reading times on the preposition *to* for ESL learners. For learners, we also find a marginally significant effect for the factor ANIMACY.

The first set of hypotheses was formulated to test whether the harmonic alignment pattern plays a role in ESL reading times. I wanted to test whether short, definite, animate,

given and pronominal NPs are processed faster compared to long, indefinite, inanimate, new and nonpronominal NPs by learners of English. The reading times on *to*, i.e., the first word of the next constituent, is assumed to reflect the degree of processing effort of the preceding constituent. The results show that the preposition *to* is read faster when following short or definite themes. This finding is in line with the predictions. Counter the expectations, we find a decrease in reading time on *to* for animate constituents. This marginally significant effect possibly indicates that animate constituents are more difficult to process than inanimate ones.

The effect which was found for the factor ANIMACY is, however, in line with Hypothesis IIa. The set of hypotheses under II predict that learners are aware of a certain distribution of linguistic factors. It was shown that themes are significantly more often inanimate and indefinite than recipients. If learners knew about this distribution and assigned thematic roles to constituents as they encounter them, we expect them to more readily interpret animate and definite NPs as recipients than as themes. The assignment of thematic roles is expected to generate expectations with respect to the upcoming syntactic structure. On encountering the preposition *to*, participants realize whether their expectations were correct. For animate and definite NPs participants assign the thematic role recipient and thus expect a DO dative. When they encounter the preposition *to*, they realize that they have to reanalyze their earlier interpretation of the sentential structure. This effect is what we have apparently found for animate NPs. The effect for DEFINITENESS, however, goes in the opposite direction.

It thus seems to be the case that short and definite NPs are indeed easier to process, which is reflected in the reading times on *to*. Whether animate constituents are easier to process than inanimate ones is questionable in the light of the results obtained in this study. The effect could have, however, been overruled by the falsely assigned thematic role and the resulting reanalysis of the sentence structure when encountering the preposition *to*. The results indicate that learners assign thematic roles while they read a sentence. Otherwise, the effect found for the factor ANIMACY can not be explained. The factor ANIMACY only reached marginal significance. This can probably be attributed to the fact that the data was not distributed very well and there were only two animate themes in the 23 test items. A future study should use a sample which is evenly distributed to be able to account for the effect of the factor ANIMACY more reliably.

The other linguistic factors, i.e., PRONOMINALITY, ACCESSIBILITY, CONCRETENESS and NUMBER failed to reach significance. The best predictor for the reading times on *to* is the reading time of the word preceding *to*. This effect was expected and has multiple explanations, i.e., the reading time on the word preceding *to* reflects the general speed at which a subject reads. Another factor is the so called spill-over effect, i.e., if the word

preceding *to* has, for instance, a low frequency and is thus read very slowly, this effect will spill over, i.e., be reflected, in the following word (Libben 2009).

The model accounts for over 58% of the variation. A model which only contains the verb accounts for 4% of the variation. The subject variation explains 41% of the variation. The fixed effects account for 13% of the variation. The model criticism showed that it is difficult to explain longer reaction times with the factors that were included in the model so there must be other factors which cause long reading times. As reading times are very sensitive to any kind of distractions, it is not clear whether these effects are necessarily of a linguistic nature.

The third hypothesis which was tested here is whether the ratings obtained in the questionnaire study by learners (Chapter 3) would be reflected in the RTs. The factor proved to be significant but only explained about 2% of the variation. This shows that the ratings which we obtain in grammatical judgment tasks are really reflected in reading times and that the facilitation of processing is a possible explanation for the learners' judgments or that structures which are easier to process, receive better judgments.

The fact that the questionnaire probabilities only account for a small part of the variation was expected, as the ratings can be explained with multiple factors, most of them were linked to the recipient, not to the theme (cf. Chapter 3).

Nevertheless, the results give us reason to believe that grammatical judgments can be linked to on-line processing. The exact nature of the relationship between effects found in grammatical judgment tasks and those obtained from on-line processing tasks must be researched in more detail, to be able to better link the effects found in these two paradigms and, thus, get a more detailed picture on the acquisition of syntactic structure.

All in all it can be stated that the results of L1 and L2 speakers are comparable, in terms of the influential predictors as well as in terms of predictive power of the model. The fixed effects in the L1 study accounted for 10 percent of the variation, the L2 study even for 12 percent.

Even though there were some small flaws in my design with respect to the selection of the fillers it apparently did not do too much harm. If the design had in any way outmaneuvered natural processing, the effects of the reading times on the word preceding *to* should have revealed this.

5.4 Conclusion

The experiment by Bresnan and Ford (2010) was replicated to make a first contribution to the field of on-line experimental studies in the acquisition of the dative alternation by L2

speakers and to test various hypotheses. Hypothesis I was that the harmonic alignment is reflected in the reading times. This hypothesis was partly confirmed for the factors LENGTH and DEFINITENESS.

The second hypothesis was that themes and recipients systematically differ in their linguistic properties and that these differences can be used to predict the probability of a given NP to be a theme or a recipient. Further, it was hypothesized that the linguistic features of a given NP to be a theme can be used to predict the RTSONTO. This hypothesis can only partly be supported.

The third hypothesis was that the grammatical judgments of the learners which were obtained by the split rating task (Chapter 3) are predictive of the reading times on *to*. This hypothesis could be confirmed even though the predictive power of the factor is really low.

This experiment was a first step in analyzing the on-line processing of dative constructions by L2 speakers. Thus a lot more research will be necessary to conclusively explore the factors which play a role in leaners' on-line processing of the dative alternation.

Chapter 6

Corpus Study

6.1 Methodology

This chapter presents a corpus study which investigated dative constructions uttered by upper intermediate to advanced learners of English from 16 different L1 backgrounds. The data was extracted from the International Corpus of Learner English (ICLE, Granger et al. 2009). I investigated whether learners have a preference for one or the other dative construction, and whether and to what extent learners use English dative constructions differently from L1 speakers. I further tested whether the learners' native languages are significant factors in predicting the way in which dative constructions are being used, and finally whether the dative constructions in the learners' L1s can be employed to explain differences found in the individual interlanguages.

6.2 Learner Data

6.2.1 ICLE-International Corpus of Learner English

The International Corpus of Learner English (ICLE) is a collection of essays written by English learners of 16 different L1 backgrounds and consists of 3.7 million words (Granger et al. 2009). The corpus also includes details about the learners who wrote the essays. The following variables are coded: age, gender, native language, the language(s) the learner speaks at home, their home country, possible L3s and L4s, length of English instruction at school and university and the time spent in an English-speaking country. Details on the conditions under which the essays were written are also available, i.e. whether it was an examination and whether students had access to a reference tool (a dictionary) while writing the essay.

6.2.2 Data Collection and Cleaning

The ICLE was searched for fifteen different ditransitive verbs which are shown in (21). The verb and all of its word forms were searched without any restrictions (search syntax: <allow>).

(21) allow, bring, do, give, leave, offer, owe, pay, read, sell, show, teach, tell, wish, write

The intentions in selecting the verbs shown above were twofold. Firstly, I wanted the verbs to be frequent enough to be part of the active lexicon of an average intermediate to advanced learner of English. Here, I relied on my intuition and did not verify my selection with any external source (e.g. frequency count in a corpus), but took the fact that I found instanced in which the verbs were used in the ICLE as a verification of my assumption.

Secondly, the verbs I selected were meant to cover biases towards the PP and DO dative. The verbs *bring, leave, offer, read, sell*, and *write* have a PP bias while *allow, do, owe, show, teach, tell*, and *wish* have a DO bias. The strength of the bias may differ depending on the semantic interpretation. The verb *leave* is claimed to have a weaker PP bias when denoting an event of transfer in the future (e.g. *leave him a large amount of money*) than in cases denoting an act of communication (e.g. *leave him a message*). The verbs *give* and *pay* were special in that respect as their bias towards one of the constructions changes depending on their interpretation. The verb *pay* in its *transfer*-reading (e.g. *pay him the book*) has a clear bias towards the DO dative while the abstract reading of *pay* (e.g. *pay attention to the teacher*) has a very strong PP bias (See Bresnan and Ford 2010, p. 178 for all verb biases mentioned in this paragraph.).

The corpus was searched for speakers of 16 different L1 backgrounds which are listed in (22).

(22) Bulgarian, Chinese, Czech, Dutch, Finnish, French, German, Italian, Japanese, Norwegian, Polish, Russian, Spanish, Swedish, Tswana, Turkish

I did not include Chinese-Cantonese speakers, as the majority of them lives in Hong Kong. In Chapter 2 it has been argued that there are indications that speakers of English who live in Hong Kong and learners of English differ substantially in their use of the dative alternation (see Gries and Deshors 2015 for discussion). Thus, the exclusion of this group of speakers seemed a natural choice.

I further excluded Tswana speakers who live in South Africa, as their exposure to English in their daily lives cannot be determined clearly. Granger et al. (2009, p. 198) state that "English is not only the native language of a sizable minority of South Africa, though, but the most widely used language of general communication in the country." Granger et al. (2009) also claim that the learners who volunteered data for the ICLE corpus do

not regularly communicate with native speakers of English. I will, nevertheless, exclude Tswana speakers who live in South Africa as I am not sure whether the exposure to the English language can really be controlled for, in an environment in which English is used that frequently (e.g. TV, newspapers). I will, however, include Tswana speakers who live in Botswana. English is an official language in Botswana as well, so the data of the Tswana speakers has to be considered while keeping that in mind.

The corpus search with the above-mentioned parameters resulted in 46,321 hits. Those hits naturally included lots of data which could not be used for the analysis.

Firstly, many sentences did not contain a dative construction. This includes about 24,000 sentences in which the verb *do* is used as an auxiliary verb and further sentences which contain no ditransitive construction (e.g. *He gives up.* or *She teaches the children.*).

Secondly, ditransitive constructions in which the PP denotes a spatial goal and not a recipient were excluded. An example is given in (23)

(23) Rockets bring men to the moon and even further. (ICLE-DB-KVH-0023.3)

Thirdly, ditransitive constructions which cannot alternate were also excluded. There were only very few instances in which an alternation was not possible, because the verbs which were selected for this study are all known to allow for both constructions (compare Bresnan and Ford 2010, p. 178). An example of an non-alternating sentences is displayed in (24).

(24) a. People are already trying to bring their traditions to life again. (ICLE-FR-UCL-0038.1 – original word order)

b. *People are already trying to bring life their traditions again.

Idiomatic expressions with ditransitive verbs in which either the theme or the recipient constitutes a fixed element, i.e. is part of an idiomatic expression, are assumed to be restricted to one of the two variants (Rappaport Hovav and Levin 2008). Rappaport Hovav and Levin (2008), however, find that there are differences depending on which of the constituents, theme or recipient, is part of the idiomatic expression. Callies and Szczesniak (2008, p. 166) point out that expressions which contain fixed themes (e.g. *give someone advice/ a headache/ the creeps*) are more flexible than those that contain fixed recipients.[1](e.g. *bring to life/ to an end, send someone to the devil*). Thus, following the line

[1]Callies and Szczesniak (2008) refer to fixed goals and not fixed recipients. They, however, use the terms goal to refer to the prepositional phrase in a PP dative and the term recipient for the NP in the corresponding DO dative (compare Callies and Szczesniak 2008, p. 165).

of argumentation presented in Callies and Szczesniak (2008) and Rappaport Hovav and Levin (2008), fixed theme expressions like *give birth* were not excluded from my data, but expressions which contain a fixed recipient, as shown in (24), were removed.

Thirdly, there were dative constructions in which the relative word order of theme and recipient deviated from [V NP_{theme} $PP_{recipient}$] or [V $NP_{recipient}$ NP_{theme}]. I am, however, only interested in constructions with exactly these word orders. Thus several ditransitive constructions had to be excluded from the analysis. Among those were passives as the relative order of verb, theme and recipient is not the one which is specified above (e.g. *[The books]$_{theme}$ were given [to him]$_{recipient}$*).

Further sentences which contain intervening material, such as adverbials, were excluded. Comrie et al. (2010) state that adverbs of manner can only precede a prepositional object, as displayed in (25).

(25) a. I gave (*quickly) John (*quickly) a book.

b. I gave a book quickly to John.

(example taken from Comrie et al. 2010, p. 67)

These restrictions on the placement of adverbs probably influence the dative alternation. Since controlling for that influence exceeds the scope of this study, sentences containing any intervening material were excluded.

Instances in which either theme or recipient are realized as a clause, as shown in (26), were also excluded.

(26) a. nobody teaches the students [how to use the pottery wheel and how to whet on it] (ICLE-BG-SUN-0143.1)

b. who are so kind even to tell the locals [who they are] (ICLE-GE-AUG-0071.3)

Constructions which would possibly allow for three permutations of constituents were not used for the analysis (see examples in (27)). These instances were excluded to avoid additional factors which can influence the alternation and which cannot be controlled for in this study to intrude.

(27) a. [...] religion gives you both strength to overcome bad times and hope for a better future (ICLE-GE-SAL-0006.3 – original word order)

b. [...] religion gives both to you strength to overcome bad times and hope for a better future

c. [...] religion gives both strength to overcome bad times and hope for a better future to you

Constructions in which one of the constituents contained a comparative phrase as a complement were excluded as Huddleston and Pullum (2002, p. 1105) show that comparative constituents can be found in various positions. The influence of the comparative phrase cannot be controlled for in the present study, and the flexible positioning of comparative phrases may lead to further alternations (28). This is why all instances in which either theme or recipient contain a comparative governor (Huddleston and Pullum 2002, p. 1104), i.e. items which license comparative complements, for instance *such as*, *than* or *like*, were removed.

(28) a. Feminists have done more harm to the cause of women than good. (ICLE-FR-ULB-0004.1 - original word order)

b. Feminists have done more harm than good to the cause of women.

c. Feminists have done the cause of women more harm than good.

Dative structures which contain particle verbs like *bring back*, *give back*, *tell about* were excluded. Constructions which contain particle verbs are themselves subject to alternations which are governed by similar factors as the dative alternation (see Gries 2002). To avoid any uncontrollable interaction between the two alternations, all items which contained phrasal verbs were removed from the data set. The problem is illustrated below in (29).

(29) a. He **gives** her the schoolbooks **back**.

b. He **gives** her **back** the schoolbooks.

c. He **gives** the schoolbooks **back** to her.

d. He **gives back** the schoolbooks to her.

Dative constructions which contain a coordinated PP, as exemplified below (30), were removed from the data set.

(30) Many people gave old clothes [to the refugees] and [to the salvation army].

All other permutations of constituents as in (31) were also excluded.

(31) a. Peter gives [to Mary][a book].

b. [To the salvation army] people give [their old clothes].

There were also quite a number of unclear cases, most of which can be attributed to PP attachment problems, i.e., cases in which it was not possible to determine whether a given PP was a complement of either theme or recipient or a sentence adverbial. Consider example (32) for an illustration of this problem. It is not clear whether *in Europe* is an adverbial phrase which modifies the entire sentence or whether the theme of the sentence can be considered to be *a new migration wave in Europe*. Both interpretations are syntactically and semantically possible.

(32) a. The fall of the Eastern bloc gave rise to [a new migration wave] [in Europe]. (ICLE-SW-LND-0006.2)

b. The fall of the Eastern bloc gave rise to [a new migration wave in Europe]. (ICLE-SW-LND-0006.2)

Cases in which it is not possible to determine the status of the PP were removed.

If I had, for instance, decided that those phrases were categorically considered to be a part of either theme or recipient, this would have had an effect on my length variables. If I had decided to categorically interpret them as sentence adverbials, this would have had a similar effect. To this end, the most reasonable decision was not to include those cases at all.

In case of NPs which are headed by nouns which license a PP phrase, i.e., *inspiration for*, *advise on*, *hope for*, the PP was considered to attach to the head noun instead of interpreting it as an sentence adverbial. In these cases, the direct attachment to the head noun is not only grounded in the syntactic analysis but also strongly suggests itself in terms of semantic interpretablity (compare (33)).

Table 6.1: L1 speakers and country of residence

Native Language	Country
Bulgarian	Bulgaria
Chinese	China-Mainland
Czech	Czech Republic
Dutch	The Netherlands
Finnish	Finland
French	Belgium
German	Germany
Italian	Italy
Norwegian	Norway
Polish	Poland
Spanish	Spain
Swedish	Sweden
Tswana	Botswana
Turkish	Turkey

(33) a. ...give them inspiration for painting.

b. ...give them hope for the future.

Lastly, some unclear cases included sentences containing a sequence like *him /her*. They were excluded, as it was unclear whether the slash represents the word *or* or was intended to provide a choice between the two pronouns.

Incomplete sentences and sentences which are faulty beyond comprehensibility, and thus not codable, were excluded. In general, however, erroneous data was not excluded as it is a natural part of learner language.

Finally, I added one additional restriction. In order to investigate groups of learners which are as homogeneous as possible, I only considered speakers from one country per L1. When there was a choice between two groups of speakers of the same L1 who lived in different countries, I always opted for the largest available group. This resulted in the combinations of L1s and countries of residence which are summarized in Table 6.1.

Coding

The ICLE corpus includes information on the speakers, which I extracted together with the data. The factors and their values are listed in Table 6.2. The left column lists the factors, the right column briefly explains the factors.

Table 6.2: Factors which were coded in the ICLE

Factor	Explanation(Values)
FILE NAME	Speaker ID in ICLE
NATIVELANGUAGE	Every L1 is one value of that factor
YEARSENGSCHOOL	Years of English instruction received at school.
YEARSENGUNI	Years of English instruction received at university.
MONTHSENGSPCOUNTRY	Months spent in an English-speaking country.

On top of the information that is listed in the ICLE, the extracted dative constructions were coded for the factors which are summarized in Table 6.3.
The factors and their coding listed in Table 6.3 have already been discussed in Chapter 3.2. I will add some more details on the coding procedure of the corpus study as this procedure was more complex, due to more variation in the dative constructions.

VERBANDSENSE. This factor was coded as described in Chapter 3.2 (based on the coding described in Bresnan et al. 2007). VERBANDSENSE encodes the semantics of the transfer taking place. The value `transfer` refers to instances in which a concrete object like *clothes*, *food* or *money*[2] is being passed on.
The category `abstract` is by far the largest one, as the transfer of all non-concrete objects like *jobs*, *headaches*, and *harm* are treated as abstract readings.

The value `futuretransfer` is used when a concrete object will be passed on in the future (e.g. *I offered him my car*). In cases in which it was, due to a missing context or other reasons, impossible to determine the exact meaning of the sentence and thus not make out the verb sense 'NA' was used as exemplified in (34) .

(34) [...] he will be angry if I dare to offer it to him. (ICLE-AUG-00613)

[2]Whether *money* indeed refers to a concrete object is probably debatable in times of credit cards and bank transfers. This is, however, a question which I am not mainly concerned with. As it is impossible to know whether *money* in the text refers to actual bank notes and coins or a bank transfer, I decided to treat *money* as a concrete object in all cases.

Table 6.3: Coded Factors

Factor	Values
DATIVE	PP, DO
VERB	allow, bring, do, give, leave, offer, owe, pay, read, sell, show, teach, tell, wish, write
SEMANTIC CLASS	abstract, communication, future transfer, transfer
VERBANDSENSE	Every verb including its semantic reading is one level of that factor, e.g. give.transfer
LENGTHOFTHEME	length of theme counted in words
LENGTHOFRECIPIENT	length of recipient counted in words
LOGLENGTHDIFFERENCE	log(length of theme) minus log(length of recipient)
PRONOMINALITYOFTHEME	pronoun, nonpronoun
PRONOMINALITYOFRECIPIENT	pronoun, nonpronoun
ANIMACYOFTHEME	animate, inanimate
ANIMACYOFRECIPIENT	animate, inanimate
DEFINITENESSOFTHEME	definite, indefinite
DEFINITENESSOFRECIPIENT	definite, indefinite
NUMBEROFTHEME	singular, plural
NUMBEROFRECIPIENT	singular, plural
PERSONOFTHEME	local, not local
PERSONOFRECIPIENT	local, not local
LANGUAGEFAMILY	Germanic, Slavic, Romance, Other
STAYABROAD	short, long
LENGTHUNI	short, long

The factors LENGTH OF THEME and LENGTH OF RECIPIENT were coded by counting the number of orthographic words the pertinent constituent contained. A word is defined as being preceded and followed by a blank space or followed by a punctuation mark. To code PRONOMINALITY was rather unproblematic. Definite personal, demonstrative and reflexive pronouns were coded as pronominal NPs, following Bresnan et al. (2007).

The factor ANIMACY was used as a binary factor, i.e. `animate` and `inanimate`, even though there are many more subclassifications available from the animacy hierarchies put forward in literature (e.g. Zaenen et al. 2004). An attempt to add an additional level to the factor to reach more fine-grained levels, i.e. collective, was dismissed, as there were only very few instances of that value and those patterned with animate NPs.

To that end collectives such as *society*, *the Japanese* or *gay couples* were coded as animate NPs. In cases in which it was unclear whether a constituent referred to an animate or an inanimate instance 'NA' was used. This was only rarely the case, for instance, when the available context did not provide information on the referent of *them*, which can refer both to animates and inanimates.

The factor DEFINITENESS was coded as described in Chapter 3.2. In cases where it was unclear whether the writer intended to use a definite or indefinite NP, the items received the coding 'NA'. An example of such a case is given in the example (35) below.

(35) It is unfair for people and government has to give money to **Royal Family** in order to they have more comfortable life. (ICLE-CN-UK-0033.2)

It was mostly uncontroversial how to code the factor NUMBER. On top of the two levels mentioned in Chapter 3.2, the level `unclear` had to be added, as it was not always determinable whether the pronoun *you* was used to address a single person, more than one person or was used generically.

In case of an incongruity in number within the NP like *this cats*, 'NA' was used. Listings (e.g. *psychology, mathematics and history*) and coordinated NPs (e.g. *Mary and Tom*) received the value `plural`.

The factors PERSON OF RECIPIENT and THEME were coded as `local` and `not local`, `local` referring to first and second person and `not local` to third person NPs. In the case of the NP *each other* 'NA', was used, as this expression can include the speaker, an interlocutor as well as a third party.

The factor LANGUAGEFAMILY coded which language family the native languages of the learners belong to. The values of that factor are `Germanic` including the languages Dutch, German, Swedish, Norwegian, `Romance` which includes the languages Spanish, Italian and French and `Slavic` which includes the languages Bulgarian, Czech, Russian and Polish. A fourth category which comprised those languages who were the only members of their respective language families, namely Finnish, Japanese, Tswana, Turkish and Chinese, received the value `Other`. During the analysis it turned out that learners of certain L1s seemed to behave more similar to learners whose L1s is part of the same language family. To test whether this observation can be verified, the factor LANGUAGEFAMILY was included.

In the vast majority of cases, the coding decisions were straightforward. For less than 1% of the sentences, there was one out of the fourteen variables to be coded which involved a potentially controversial decision. For example the NP *dead people on the floor*

poses a problem for the category ANIMACY. In order to not lose too many observations,[3] individual decisions were taken for that part of the data. Overall, this only concerned less than 0.001% of all data points.

The variables YEARSENGSCHOOL, YEARSENGUNI and especially MONTHSENGSPCOUNTRY were highly scattered, i.e. there were many different values for each factor and only very few observations for each value. A trial run to fit a mixed model showed that these factors were far from reaching significance. As this might have been an effect of the unfavorable distribution of these factors, I tried to reduce the scatteredness of these factors. Conditional inference trees were used to explore whether the data can be split in significantly different categories. When transforming a continuous variable into a categorical one, a numerical value to split the data in the respective categories must be selected. In order not to randomly choose this value, conditional inference trees were used to systematically determine at which point the data is split up.[4]

The dependent variable in the tree is DATIVE,i.e., the dative construction used, the predicting factors are YEARSENGSCHOOL, YEARSENGUNI and MONTHSENGSPCOUNTRY, respectively.

The conditional inference tree which was fitted for the factor YEARSENGSCHOOL did not indicate a significant split, so this factor remained unaltered. The trees which were fitted for YEARSENGUNI and MONTHSENGSPCOUNTRY indicated one significant split of the data. For the years of English instruction received at the university, the split was at 1.5 years, as shown in Figure 6.1. In case of the time spent in an English-speaking country, the data splits in two significantly different subsets at 2.25 months, see Figure 6.2.

The results of the conditional inference trees were used to create two categorical variables, namely STAYABROAD2 and LENGTHUNI. The factor LENGTHUNI has the values `long` and `short`, `long` encoding that the learner received more than 1.5 years of English instruction at a university, `short` encodes that the learner received 1.5 years of instruction or less. The factor STAYABROAD2 also has the values `long` and `short`, `long` encoding that the learner spent more than 6 months in an English-speaking country and `short` that the person stayed 6 months or less abroad.

[3] Observations which contain a factor which is coded 'NA', are automatically excluded when fitting mixed models in 'R'.

[4] The conditional inference trees were used as a method to transform a continuous variable into a categorical one. The results of the conditional inference trees should, however, not be used to draw conclusions about the influence of the time a learner received English instruction at a university or the time they spent in an English-speaking country on their use and acquisition of the dative alternation as all other influencing factors are not controlled for.

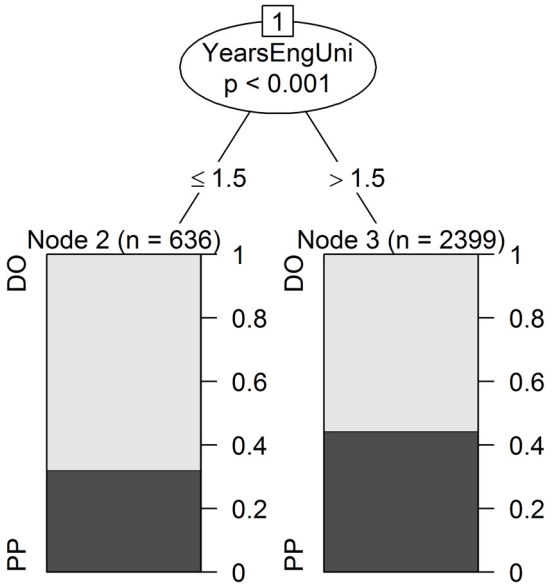

Figure 6.1: Conditional inference tree – YEARSENGUNI

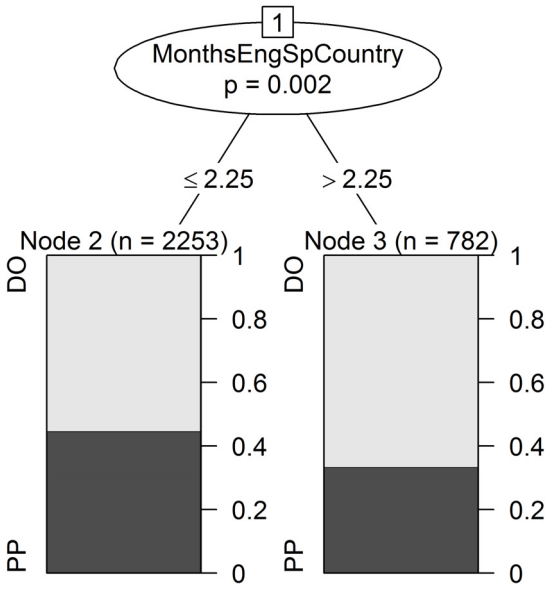

Figure 6.2: Regression tree – MONTHSENGSPCOUNTRY

L1 Data Set – Treebank Wall Street Journal Collection

The L1 data set I used was originally compiled by Bresnan et al. (2007). They extracted dative constructions from the Switchboard Corpus (Godfrey et al. 1992) and the Treebank Wall Street Journal collection (Marcus et al. 1993) and coded the data set for the pertinent factors for predicting the dative alternation. The data set is publicly available via the software R (package 'languageR', data set 'dative').

As my L2 data set consists of written data only, I only used the data which come from the Treebank Wall Street Journal collection, i.e., the written part of the original data set. The Treebank Wall Street Journal collection corpus is a collection of news from financial reportage (Bresnan et al. 2007: 25). This sample comprises 903[5] dative constructions and a coding for the following factors is available:[6]

- DATIVE
- VERB
- VERBSENSE
- LENGTH OF RECIPIENT
- ANIMACY OF RECIPIENT
- DEFINITENESS OF RECIPIENT
- PRONOMINALITY OF RECIPIENT
- LENGTH OF THEME
- ANIMACY OF THEME
- DEFINITENESS OF THEME
- PRONOMINALITY OF THEME

[5] Bresnan et al. (2007, p. 26) speak of 905 items. The nature of this discrepancy is unclear.

[6] In the original data set the factors have the following labels: VERB, SEMANTICCLASS, LENGTHOFRECIPIENT, ANIMACYOFREC, DEFINOFREC, PRONOMOFREC, LENGTHOFTHEME, ANIMACYOFTHEME, DEFINOFTHEME, PRONOMOFTHEME, REALIZATIONOFRECIPIENT, ACCESSOFREC, ACCESSOFTHEME. For convenience, I will stick to the usual labels in the running text. The data set was, as we can see, also coded for ACCESSIBILITY OF RECIPIENT and ACCESSIBILITY OF THEME. As I did not code these factors in my data, I did not list accessibility-related factors in the text to avoid confusion.

As the data set does not include the dative constructions themselves, it is not possible to code any additional factors.

I used only those dative constructions which featured the same verbs as those in my ICLE sample (*n*=699). This ensured that the verb bias was controllable across the two data sets. The L1 and L2 data sets were merged into one data set. This data set included only those factors that were available for both data sets, as listed above. It was further coded whether the speakers' native language was English or whether they were learners. The native language of each speaker was also coded, as well as the language family the languages belong to. The factor LANGUAGE FAMILY was only coded for L2 speakers, as this variable has the purpose of investigating whether learners of certain language family backgrounds differ from L1 speakers of English.

6.3 Statistical Analysis and Results

6.3.1 Overview

Overview L2 Data Set

The final data set comprised 3035 dative constructions which were realized as 1768 DO datives (58%) and 1267 PP datives (42%). Table 6.4 provides a detailed overview of the data distribution.

The data is not evenly distributed, as expected. Animate themes are less frequent than animate recipients, and this is reflected in the learners' production. It can also be observed that there are less pronominal themes than recipients and more indefinite themes than recipients and hardly any pronominal or local themes.

As already mentioned above, the ICLE was searched for 15 different verbs, which were then coded for the semantic class they belong to. The instances of the verb *give* found in the corpus, to name one example, belong to three different semantic classes, i.e. `transfer` (e.g. *give s.o. a book*), `abstract` (e.g. *give s.o. a heart attack*) and `communication` (e.g. *give s.o. advice*). After coding the semantic classes, the verbs in the corpus can be classified with respect to their biases according to the list provided in Bresnan and Ford (2010, p. 178) which is based on their data set. The verbs of my data set are classified in Table 6.5.

There are two additional verb senses (`offer.communication` and `sell.abstract`) in my data set which were not listed in Bresnan and Ford (2010), so I cannot categorize them into either having a PP or DO bias. The number of verbs which have a PP and DO bias is almost balanced. Bresnan and Ford (2010) computed the values in the following

Table 6.4: Data Distribution ICLE Data

Numerical predictors	Mean	Median	St. Dev.	Min	Max
LENGTH OF THEME	3.87	2.00	3.62	1.00	41.00
LENGTH OF RECIPIENT	1.99	1.00	2.11	1.00	42.00
LOGLENGTHDIFFERENCE	-0.58	-0.68	1.15	-3.71	3.00

Categorical predictors:	Levels							
ANIMACY OF THEME	animate:	40	inanimate:	2992	NA:	3		
ANIMACY OF RECIPIENT	animate:	2244	inanimate:	744	NA:	47		
PRONOMINALITY OF THEME	pronoun:	68	nonpronoun:	2967				
PRONOMINALITY OF RECIPIENT	pronoun:	1321	nonpronoun:	1714				
DEFINITENESS OF THEME	definite:	727	indefinite:	2307	NA:	1		
DEFINITENESS OF RECIPIENT	definite:	2132	indefinite:	898	NA:	5		
NUMBER OF THEME	singular:	2344	plural:	665	NA:	26		
NUMBER OF RECIPIENT	singular:	185	plural:	1741	unclear:	185	NA:	10
PERSON OF THEME	local:	2	not local:	3033				
PERSON OF RECIPIENT	local:	741	not local:	2275	NA :	19		

Table 6.5: Verb biases

PP bias	DO bias
bring.abstract	allow.abstract
bring.transfer	do.abstract
give.communication	give.abstract
leave.abstract	give.transfer
leave.communication	owe.abstract
leave.futuretransfer	pay.transfer
offer.abstract	show.communication
offer.futuretransfer	teach.communication
pay.abstract	tell.communication
read.communication	wish.abstract
sell.transfer	
write.transfer	

way: A linear mixed effect model for their corpus data was fitted. The dependent variable was the dative construction used (PP or DO), the fixed effects were the well-known linguistic factors and the random effect was among others the factor VERB SENSE. The value by which the intercept of each verb sense was corrected by the model was extracted. The algebraic sign of the random intercepts show in which direction the intercept had to be adjusted to be on a par with the average verb bias. Thus, it can be determined whether the verb has a PP bias or DO bias compared to the average of all verbs in this set.

The dative constructions in my set were produced by learners of 16 different L1 backgrounds, namely: Bulgarian, Czech, Chinese, Dutch, Finnish, French, German, Italian, Japanese, Norwegian, Polish, Russian, Spanish, Swedish, Tswana and Turkish.

On average there are 190 observations for each L1. The distribution of the data across the different L1 backgrounds is listed in Table 6.6. This also includes the number of constructions which are realized as a PP and a DO dative, respectively.

The learners did not only differ in their mother tongue but also in other characteristics, such as the time they had spent abroad. There were learners who had spent no time at all in an English-speaking country and some who had lived in an English-speaking country for more than a decade. The distribution can be seen in the following two tables. The first table (Table 6.7) distinguishes between those learners who have not spent any time abroad and those who have been abroad and be it for only as little time as one week. The second table (Table 6.8) subsets the groups differently. The group `short` are those learners who have either not spent any time in an English-speaking country or stayed in one for up to 2.25 months. Data on the times of English instruction and time spent abroad is not available for all speakers. These cases can be found in the column labeled 'NA'.

Table 6.6: Dative constructions per L1

Native Language	DO	PP	Total
Bulgarian	133 (59%)	93(41%)	226
Chinese	75 (48%)	82 (52%)	157
Czech	116 (69%)	51 (31%)	167
Dutch	88 (64%)	49 (36%)	137
Finnish	121 (65%)	65 (35%)	186
French	83 (48%)	90 (52%)	173
German	127 (73%)	46 (27%)	173
Italian	62 (36%)	69 (64%)	171
Japanese	137 (64%)	76 (36%)	213
Norwegian	176 (74%)	63 (26%)	239
Polish	125 (61%)	80 (39%)	205
Russian	139 (50%)	139 (50%)	278
Spanish	118 (54%)	100 (46%)	218
Swedish	123 (68%)	57 (32%)	180
Tswana	57 (65%)	31 (35%)	88
Turkish	88 (33%)	176 (67%)	264

Table 6.7: Observations per L1: learners who have been or have not spent time in an English-speaking country

Native Language	No	Yes	NA
Bulgarian	208	18	0
Chinese	0	107	50
Czech	68	99	0
Dutch	64	73	0
Finnish	70	116	0
French	58	115	0
German	55	118	0
Italian	29	102	0
Japanese	0	109	104
Norwegian	129	107	3
Polish	101	104	0
Russian	207	71	0
Spanish	95	123	0
Swedish	66	114	0
Tswana	2	2	84
Turkish	259	5	0

Table 6.8: Observations per L1: learners who have spent no time or up to 2.25 months (`short`) or longer time (`long`) in an English-speaking country

Native Language	short	long	NA
Bulgarian	215	11	0
Chinese	68	39	50
Czech	103	64	0
Dutch	96	41	0
Finnish	103	83	0
French	159	14	0
German	76	97	0
Italian	98	33	0
Japanese	16	93	104
Norwegian	152	84	3
Polish	163	42	0
Russian	261	17	0
Spanish	144	74	0
Swedish	97	83	0
Tswana	2	2	84
Turkish	259	5	0

Overview L1 Data Set

The L1 data set consisted of 699 dative constructions of which 443 (64%) are DO datives and 256 (34%) PP datives. The data distribution is shown in Table 6.9.

The L1 data is, like the L2 data, unevenly distributed. Especially the factor ANIMACY OF THEME is heavily imbalanced, with only 4 animate and 695 inanimate themes. The reverse picture holds true for the factor ANIMACY OF RECIPIENT. The distribution of the factor PRONOMINALITY OF THEME is also quite skewed. Only 16 out of 699 themes are pronominal. The L1 and the L2 data will be compared in section 6.4.1.

6.3.2 Statistical Analysis and Results – L2 Data

The overall distribution has already shown that the L2 data set contains more DO than PP datives. This distribution of DO and PP datives is, however, not reflected in the data of learners from all L1 backgrounds. Table 6.6 shows how many dative constructions of each variant (i.e., PP or DO dative) were produced by the learners from the respective L1 backgrounds and how they are distributed across PP and DO datives. Figure 6.3 shows the ratio of DO to PP datives in percentages per L1 to give an impression of the differences

Table 6.9: L1 data distribution (Treebank Wall Street Journal collection)

Numerical predictors	Mean	Median	St. Dev.	Min	Max
LENGTH OF THEME	6.56	5.00	5.77	1.00	38.00
LENGTH OF RECIPIENT	3.01	2.00	3.20	1.00	31.00
LOGLENGTHDIFFERENCE	-0.78	-0.69	1.19	-3.52	3.14
Categorical predictors:	**Levels**				
ANIMACY OF THEME	animate:	4	inanimate:	695	
ANIMACY OF RECIPIENT	animate:	632	inanimate:	67	
PRONOMINALITY OF THEME	pronoun:	16	nonpronoun:	683	
PRONOMINALITY OF RECIPIENT	pronoun:	123	nonpronoun:	576	
DEFINITENESS OF THEME	definite:	174	indefinite:	525	
DEFINITENESS OF RECIPIENT	definite:	473	indefinite:	226	

in distribution across the different interlanguages.

We can infer from Figure 6.3 that the tendency to produce more DO than PP datives is reflected in the distribution of learners of many L1 backgrounds. Learners whose L1 is Turkish clearly break the pattern in that they produce more than twice as many PP than DO datives. Learners whose L1s are Chinese, French, Russian and Spanish also produce more PP than DO datives, but the ratio is not as high as for Turkish learners. Learners from some backgrounds produce more than twice as many DO datives as PP datives e.g. Finnish and German. For some L1 backgrounds this tendency is, however, not very pronounced, i.e., Bulgarian and Italian learners. The exact distribution of PP and DO datives per L1 background can be seen in Table 6.6 (Section 6.2.1).

We now have an impression of the general usage of the dative construction by learners from different L1 backgrounds. The distribution we find indicates that learners from different L1 backgrounds differ in their production of the two competing dative constructions. At this point it is not clear, however, whether these differences are statistically significant and whether they are robust when other factors (e.g. linguistic factors) are controlled for. The observed differences could, for all we know, be incidental. Turkish learners could, for instance, have received essay topics which trigger the use of more PP-prone verbs. They could also have used more nonpronominal recipients than speakers of other L1s (for whatever reason), which would probably also result in a higher usage of PP datives. So it is unclear whether these different distributions in fact reflect preferences to produce the one or other structure and can be linked to the respective L1 backgrounds or whether these differences are induced by the coincidental presence of other factors.

In order to find out whether the different usage of PP and DO datives for the speakers of the different L1 backgrounds are robust or only induced by circumstantial factors, I fitted linear mixed-effects regression models. If there are significant differences between

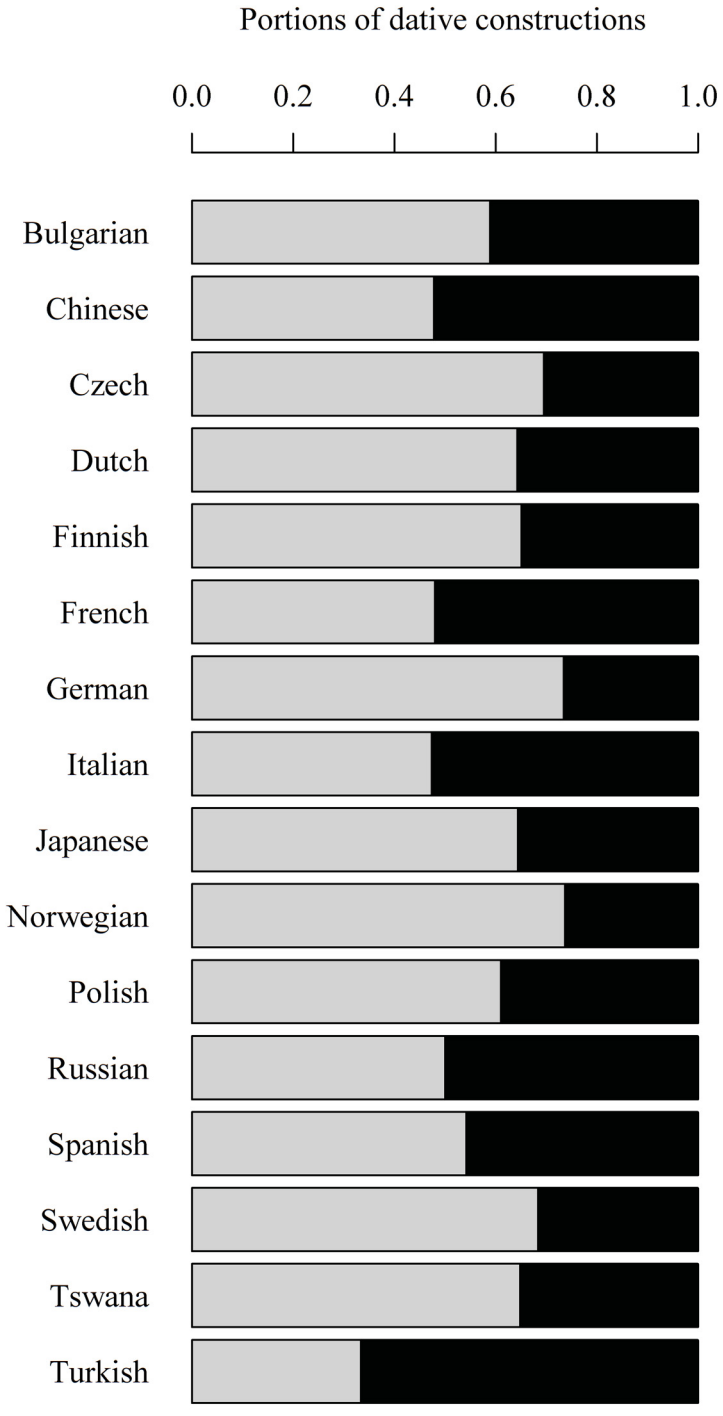

Figure 6.3: Ratio of PP datives (black) and DO datives (grey) per L1 background

the speakers of different L1s in these models, we can assume that the observed difference in the PP to DO ratio (see Table 6.6) is a robust difference between the different groups of learners that can be interpreted as a different preference to produce for one or the other construction. At the same time, we can test whether learners are sensitive to the harmonic alignment pattern (see Chapter 2.1).

I fitted a linear mixed regression model in which the factor DATIVE is the dependent variable. The linguistic factors LENGTH DIFFERENCE, ANIMACY OF THEME and ANIMACY OF RECIPIENT, PRONOMINALITY OF THEME and PRONOMINALITY OF RECIPIENT and DEFINITENESS OF THEME and DEFINITENESS OF RECIPIENT were used as fixed effects along with NUMBER OF THEME and NUMBER OF RECIPIENT and PERSON OF THEME as covariates. The learners' NATIVE LANGUAGE was a fixed effect as well. In order to control for the learners' proficiency and to test whether this has an influence, three factors that possibly account for the proficiency level, namely YEARSENGSCHOOL, LENGTHUNI and STAYABROAD were used as fixed effects. The factor VERBANDSENSE was used as a random effect to control for the verb biases. The factor BATCH, which encodes the speaker IDs, was not used as a random effect as more than half of all speakers only produced one dative construction. The highest number of datives produced by one speaker was 9 ($n = 2$), followed by one speaker who produced 8 and one speaker who produced 7 datives. The average production was 1.6 (median = 1) dative constructions per speaker which precludes using the speaker ID as a random effect. The full model is reported in Table 6.10.

Table 6.10: Fixed-effect coefficients in the initial mixed-effects model – L2 Data (ICLE)

Predictor	Estimate	*p* value
(Intercept)	0.89	.375
LOGLENGTHDIFFERENCE	1.87	<.001
ANIMACYOFRECIPIENT = `inanimate`	1.51	<.001
PRONOMINALITYOFTHEME = `pronoun`	3.44	<.001
PRONOMINALITYOFRECIPIENT = `pronoun`	-1.89	<.001
DEFINITENESSOFRECIPIENT = `indefinite`	0.88	<.001
PERSONOFRECIPIENT = `notlocal`	1.34	.001
NATIVELANGUAGE = Chinese	0.25	.616
NATIVELANGUAGE = Czech	-0.04	.937
NATIVELANGUAGE = Dutch	-1.51	.001
NATIVELANGUAGE = Finnish	-0.50	.288
NATIVELANGUAGE = French	0.12	.798
NATIVELANGUAGE = German	-0.46	.361
NATIVELANGUAGE = Italian	0.44	.362
NATIVELANGUAGE = Japanese	0.39	.450
NATIVELANGUAGE = Norwegian	-1.27	.013
NATIVELANGUAGE = Polish	-0.29	.475
NATIVELANGUAGE = Russian	-0.02	.964
NATIVELANGUAGE = Spanish	0.40	.326
NATIVELANGUAGE = Swedish	-0.96	.062
NATIVELANGUAGE = Tswana	1.61	.600
NATIVELANGUAGE = Turkish	1.70	<.001
NUMBEROFTHEME = `singular`	-0.36	.057
ANIMACYOFTHEME = `inanimate`	-0.60	.398
DEFINITENESSOFTHEME = `indefinite`	-0.15	.457
NUMBEROFRECIPIENT = `singular`	0.07	.698
NUMBEROFRECIPIENT = `unclear`	-0.33	.678
YEARSENGSCHOOL	-0.00	.966
LENGTHUNI = `long`	-0.15	.611
STAYABROAD = `long`	0.03	.864

The baselines for the categorical variables of this model are the following:

- RECIPIENT: `animate, nonpronoun, definite, plural, local`
- THEME: `animate, nonpronoun, definite, plural`
- NATIVE LANGUAGE: `Bulgarian`
- STAY ABROAD: `short`
- STAY UNI: `long`

The model was simplified using standard procedures as described in Chapter 3.3 (see Crawley 2007) until only significant predictors remained. The simplified model is shown in Table 6.11.

Table 6.11: Fixed-effect coefficients in the final mixed-effects model – L2 Data (ICLE)

Predictor	Estimate	*p* value
(Intercept)	0.010	.99
LOGLENGTHDIFF	1.85	<.001
ANIMACYOFRECIPIENT = `inanimate`	1.55	<.001
PRONOMINALITYOFTHEME = `pronoun`	2.79	<.001
PRONOMINALITYOFRECIPIENT = `pronoun`	-1.56	<.001
DEFINITENESSOFTHEME = `indefinite`	-0.31	.084
DEFINITENESSOFRECIPIENT = `indefinite`	0.90	<.001
NUMBEROFTHEME = `singular`	-0.32	.061
PERSONOFRECIPIENT = `notlocal`	1.51	<.001
NATIVELANGUAGE = Chinese	0.26	.551
NATIVELANGUAGE = Czech	-0.07	.868
NATIVELANGUAGE = Dutch	-1.48	.001
NATIVELANGUAGE = Finnish	-0.27	.500
NATIVELANGUAGE = French	0.08	.851
NATIVELANGUAGE = German	-0.42	.376
NATIVELANGUAGE = Italian	0.43	.337
NATIVELANGUAGE = Japanese	0.34	.389
NATIVELANGUAGE = Norwegian	-1.09	.006
NATIVELANGUAGE = Polish	-0.24	.529
NATIVELANGUAGE = Russian	-0.00	.996
NATIVELANGUAGE = Spanish	0.41	.293
NATIVELANGUAGE = Swedish	-0.54	.194
NATIVELANGUAGE = Tswana	-1.10	.034
NATIVELANGUAGE = Turkish	1.61	<.001

The final model has a high predictive power (C-value= .97). All VIFs were well below 3, thus collinearity is not of concern in this model. We will go through the model in three steps. In what follows, I will first discuss the linguistic factors, followed by proficiency and eventually the influence of the different L1s.

The upper part of the model shows that most linguistic factors related to harmonic alignment are significant or marginally significant in predicting the L2 learners' choices. These factors work in the predicted direction. Compared to the initial model, all factors that measure the exposure to the English language have been lost, i.e, YEARSENGSCHOOL, LENGTHUNI and STAYABROAD, and the factors ANIMACY OF THEME and

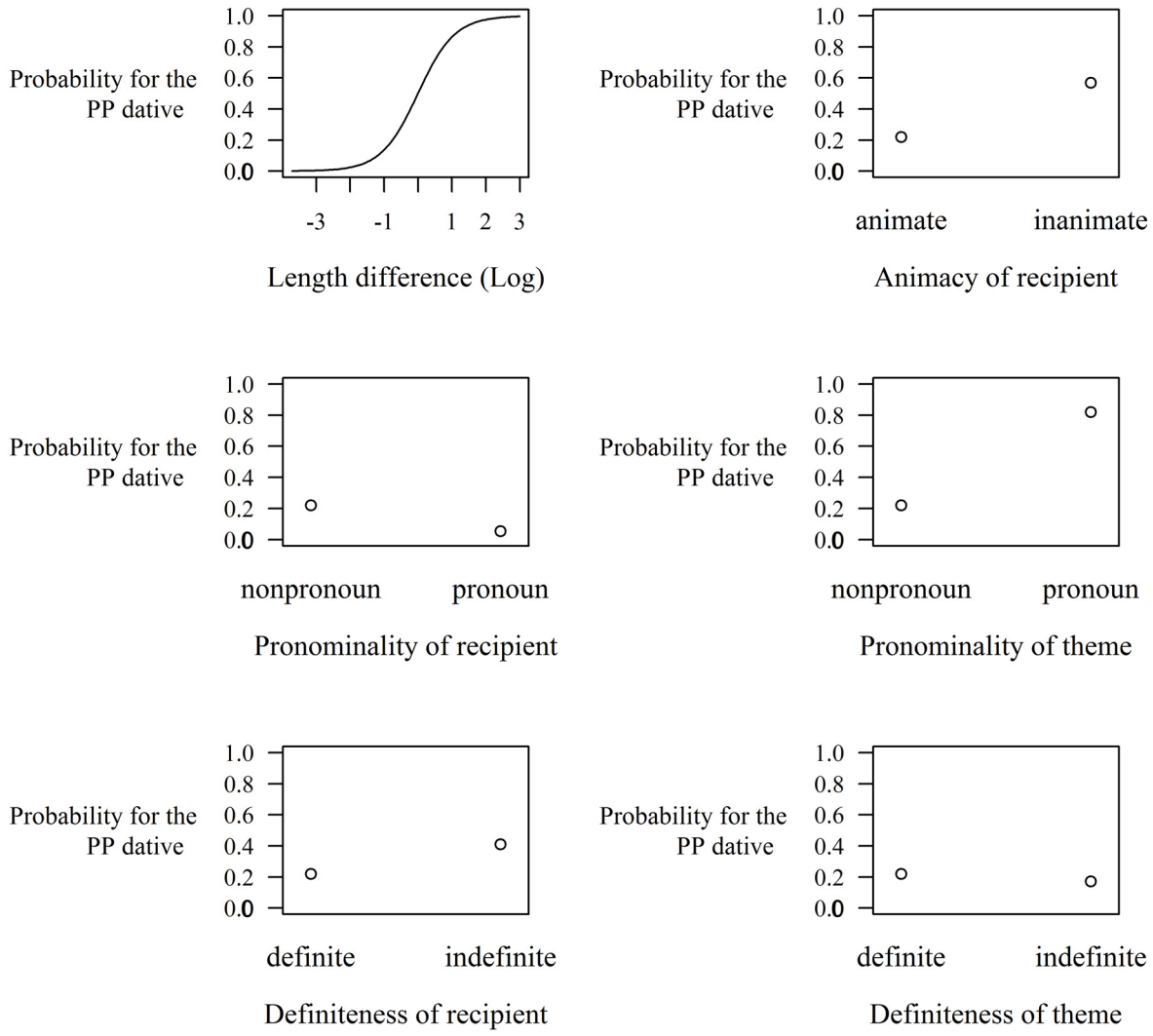

Figure 6.4: Partial Effects of the final model – L2 Data (ICLE)

NUMBER OF RECIPIENT. ANIMACY OF THEME probably fails to reach significance as there is hardly any variation in the data. Only about 1% of the themes are animate.

The factors that remain significant in the model are LOGLENGTHDIFFERENCE, PRONOMINALITY OF THEME and RECIPIENT, DEFINITENESS OF THEME and RECIPIENT, ANIMACY OF RECIPIENT, NUMBER OF THEME and PERSON OF RECIPIENT. The factors DEFINITENESS and NUMBER OF THEME only reach marginal significance.

Figure 6.4 shows that learners follow the predictions made by the harmonic alignment pattern. The upper left panel shows that the probability of producing a PP dative rises with an increasing value for the factor LENGTH DIFFERENCE. The higher that value, the longer the recipient compared to the theme and thus, according to the end weight principle, the higher the probability of placing the theme after the recipient. This corresponds

to the PP dative.

The upper right panel illustrates the effect of the factor ANIMACY OF RECIPIENT. The probability of placing the recipient in a position preceding the theme is higher when the recipient is animate (e.g. *give the girl a box*), thus we get a higher probability of a DO dative when the recipient is animate than for inanimate recipients.

The panels in the center show the effects for the factors PRONOMINALITY OF THEME and RECIPIENT. The left panel shows that the effect for the recipient and the right panel for the theme. The probability of producing a PP dative rises when the recipient is pronominal compared to nonpronominal recipients. The opposite holds true for themes: The probability of producing a PP dative rises when the theme is pronominal.

The effects of definiteness are illustrated in the bottom panels. The probability of producing a PP dative rises when the recipient is indefinite compared to definite recipients, whereas the probability to produce a PP dative rises when the theme is definite.

All panels (apart from the upper left one which depicts a continuous variable) show how the probability of producing a PP dative differs, compared to the baseline (see above), when the value of the predictor in question is altered. The probability of producing a PP dative is very low in this constellation of factors, about 20%, as can be seen in all panels in Figure 6.4, except the upper left one.

All factors which were meant to encode the learners' proficiency failed to reach significance. This may be unexpected, as the conditional inference tree in Figure 6.2 implies that learners who have spent more than 2.25 months in an English-speaking country produce more DO datives than the other learners. Figure 6.2 shows that, apparently, learners who have received more years of formal English instruction at a university use more PP datives than those who have received less instruction. The linear mixed-effects model has revealed, however, that these tendencies are not statistically significant in the presence of other factors.

The differences between learners from different backgrounds will be discussed next. The final model (Table 6.11) shows that learners whose L1s are Dutch, Norwegian, Tswana and Turkish differ from Bulgarian learners in that Turkish speakers show a higher probability of producing a PP dative, while L1 speakers of Dutch, Norwegian and Tswana have a lower probability of producing PP datives compared to the L1 speakers of Bulgarian.

Figure 6.5 illustrates that Dutch speakers have the lowest probability of producing a PP dative, compared to learners from other L1 backgrounds. Table 6.12 shows that these differences are significant in almost all cases. Turkish speakers have by far the highest probability of producing a PP dative. Table 6.11 shows whether the differences between the learners with different L1 backgrounds which are illustrated in Figure 6.5 are significant. There is e.g. a significant difference between Dutch and Chinese speakers. Chinese

Figure 6.5: Partial effects of the factor NATIVELANGUAGE in the final model – L2 Data (ICLE)

speakers are significantly more likely to produce PP datives than Dutch speakers. The visibly smaller difference between German and Dutch speakers is also significant, whereas the difference between Dutch and Norwegian speakers does not reach the level of significance (see Table 6.12).

The model in Table 6.11 only tells us about the difference of Bulgarian learners compared to learners who speak other native languages, but not whether, for instance, the differences in probability of producing a PP dative between Russian and Turkish learners are significant. To get a complete matrix which covers all possible contrasts between the different native languages, I used the final model and set the baseline to each of the 16 L1s, one at a time. This enabled me to see all pairwise contrasts between different native languages. Table 6.12 offers an overview of the pairwise comparison. The headline lists abbreviations for all the native languages in my data set, in the first column the same languages are listed. The diagonal row of empty cells indicates where the language in question would have been compared with itself. The cells above the row of empty cells is mirrored beneath it. For the convenient readability I, however, kept the cells in the table twice. If you follow down the column of one of the L1s you can compare this L1 background to all the other backgrounds and see which it is significantly different from.

What is striking when looking at Table 6.12 is that learners of many different L1 backgrounds do not significantly differ from each other when it comes to the probability of producing a PP dative. When going into greater detail, we can see that learners whose L1 is Turkish behave significantly different from all other languages, which is really a prominent effect in this sample. Speakers of Dutch are significantly different from all L1 backgrounds except from Norwegian and Tswana. Norwegian and Spanish learners also significantly differ from a vast number of the learners from other L1 backgrounds, whereas speakers of other L1s like Bulgarian, German and Russian are somewhere in the middle and there are hardly any significant differences between those learners and others.

The question is whether we can detect a pattern in the L1 backgrounds. Do speakers of certain L1s pattern together or are the differences between the different learner groups arbitrarily distributed? On closer inspection, it becomes evident that speakers whose L1s are part of the same language family seem not to differ from speakers whose L1 is part of the same language family. To illustrate that more clearly, Table 6.13 lists only those languages which are members of a particular language family in my set. They are grouped into blocks. The first block represents the Germanic languages, the second one the Slavic and the third block the Romance languages.

The first block of cells in the upper left corner shows a comparison of the Germanic languages within their group. Dutch is significantly different from German and Swedish. The difference between Dutch and German and Swedish, respectively, is, however, smaller

Table 6.12: Contrasts between learners of different L1 backgrounds based of the final mixed-effects model – L2 data (ICLE)

L1	Bul	Chi	Cze	Dut	Fin	Fre	Ger	Ita	Jap	Nor	Pol	Rus	Spa	Swe	Tsw	Tur
Bulgarian		–	–	**	–	–	–	–	–	**	–	–	–	–	*	***
Chinese	–		m.s.	***	m.s.	–	–	–	–	**	–	–	–	m.s.	*	***
Czech	–	m.s.		**	–	–	–	–	–	*	–	–	–	–	*	***
Dutch	**	***	**		**	***	*	***	***	–	**	***	***	*	–	***
Finnish	–	m.s.	–	**		–	–	m.s.	m.s.	*	–	–	m.s.	–	m.s.	***
French	–	–	–	***	–		–	–	–	**	–	–	–	m.s.	*	***
German	–	–	–	*	–	–		m.s.	m.s.	–	–	–	m.s.	–	–	***
Italian	–	–	–	***	m.s.	–	m.s.		–	***	–	–	–	*	**	***
Japanese	–	–	–	***	m.s.	–	m.s.	–		***	m.s.	–	–	*	**	***
Norwegian	**	**	*	–	–	**	–	***	***		*	**	***	–	–	***
Polish	–	–	–	**	–	–	–	–	m.s.	*		–	m.s.	–	m.s.	***
Russian	–	–	–	***	–	–	–	–	–	**	–		–	–	*	***
Spanish	–	–	–	***	m.s.	–	m.s.	–	–	***	m.s.	–		*	**	***
Swedish	–	m.s.	–	*	–	m.s	–	*	*	–	–	–	*		–	***
Tswana	*	*	*	–	m.s.	*	–	**	**	–	m.s.	*	**	–		***
Turkish	***	***	***	***	***	***	***	**	***	***	***	***	***	***	***	

Significance codes:

'***' p<.001 '**' p<.01 '*' p<.05 'm.s.' p<.1 '–' not significant

Table 6.13: Contrasts between learners of different language families based of the final mixed-effects model – L2 data (ICLE)

		Germanic			Slavic				Romance		
L1	Dut	Ger	Nor	Swe	Bul	Cze	Pol	Rus	Fre	Ita	Spa
Dutch		*	–	*	**	**	**	***	***	***	***
German			–	–	–	–	–	–	–	m.s.	m.s.
Norwegian				–	**	*	*	**	**	***	***
Swedish					–	–	–	–	m.s.	*	*
Bulgarian						–	–	–	–	–	–
Czech							–	–	–	–	–
Polish								–	–	–	m.s.
Russian									–	–	–
French										–	–
Italian											–
Spanish											

Significance codes:

'***' p<.001 '**' p<.01 '*' p<.05 'm.s.' p<.1 '–'not significant

than the difference between Dutch and the languages from different language families in terms of significance levels, but also in effect size. In the central block of cells which shows the comparison between the Slavic languages, we cannot find any significant difference between any of them. The same holds true for the comparison of the Romance languages, which is shown in the block of cells in the lower left corner. This analysis shows that, within one language family, the probability of producing PP datives is very similar. If we look at comparisons across language families, we find, for example, that Germanic languages differ from Slavic as well as Romance languages, but that there are not that many differences between learners who have a Romance or Slavic L1 background.

In order to test whether this observation holds when language families are contrasted as factors in a mixed model, another model was fitted which includes all the linguistic factors as reported above. The factor NATIVE LANGUAGE was replaced by the factor LANGUAGE FAMILY. The factors which are supposed to measure proficiency are not used, as they are well below the level of significance in the earlier models. On top of this, the factor ENGYEARSUNI is very unevenly distributed. The majority of learners whose L1 is Germanic has received up to two years of English instruction at a university, whereas most learners from a Slavic background have received 2 to 3 years of English instruction at a university and most of the learners with a Romance background received

Table 6.14: Fixed-effect coefficients in the final mixed-effects model – language family – L2 Data (ICLE)

Predictor	Estimate	*p* value
Intercept)	0.01	.98
LOGLENGTHDIFFERENCE	1.86	<.001
ANIMACYOFRECIPIENT = `inanimate`	1.47	<.001
PRONOMINALITYOFTHEME = `pronoun`	2.72	<.001
PRONOMINALITYOFRECIPIENT = `pronoun`	-1.57	<.001
DEFINITENESSOFTHEME = `indefinite`	-0.36	.042
DEFINITENESSOFRECIPIENT = `indefinite`	0.81	<.001
NUMBEROFTHEMES = `singular`	-0.37	.024
PERSONOFRECIPIENT = `notlocal`	1.45	<.001
LANGUAGEFAMILY = Other	0.52	.004
LANGUAGEFAMILY = Germanic	-0.82	<.001
LANGUAGEFAMILY = Romance	0.38	.075

3 to 4 years of instruction. A chi-squared test revealed that this uneven distribution is significant (p <.001). Constellations like this make it impossible to meaningfully include both variables in one model. The initial model was simplified using standard procedures. The final model is reported in Table 6.14.

The baselines for the categorical predictors in this model are the following:

- RECIPIENT: `animate, nonpronoun, definite, local`
- THEME: `nonpronoun, definite, plural`
- LANGUAGE FAMILY: `Slavic`

It can be observed that in this model the same predictors are significant which were significant in the model which tested the influence of the individual native languages instead of the language families (compare Table 6.11). All factors work in the direction which is predicted by harmonic alignment.

By changing the baseline of the factor language family, it is possible to compare the language families one by one, analogous to the analysis above. The results are reported in Table 6.15. It can be observed that, with the exception of Roman and Slavic learners who only marginally significantly differ from each other, all other contrasts are significant. This means that learners whose L1s are part of the same language family have a different probability of producing PP datives than learners whose L1 is part of another language family. The contrast between Romance languages and the languages which are covered by the label `other` is not significant.

Table 6.15: Contrasts between language families based on the final model – language family – L2 Data (ICLE)

	Slavic	Romance	Germanic	Other
Slavic		m.s.	***	***
Romance			***	–
Germanic				***
Other				

Significance codes:

'***' p<.001 '**' p<.01 '*' p<.05 'm.s.' p<.1
'–' not significant

The question which cannot be answered at this point is why the learners from different L1 backgrounds differ from each other to such a great extent, although it can be observed that language families pattern together.

When turning back to the simplified corpus model which contains the individual L1s and not the language families (Table 6.11), there is one more question that arises, namely, which factor is the most important one for predicting the dative alternation. In order to find an answer to this question, I removed one significant factor at a time from the final model and compared the log-likelihoods of the full final model to the models which were diminished by one factor. The decrease in log-likelihood for each factor is reported in Figure 6.6. The factors are ordered from least important at the top of the figure to most important at its bottom. It becomes evident that not only less theme-related factors remain significant in the model, but also that these factors have the least predictive power. When they are removed, the goodness-of-fit of the model is barely influenced. When it comes to the recipient, there are more factors in the model and they are also more important. The two most important factors in the model are the native language of the speakers and the factor LOG LENGTH DIFFERENCE.

Another factor which is important in predicting the dative alternation is certainly the dative verb itself. A mixed model which only contains the factor VERBANDSENSE[7] as a random effect and no fixed effects has a C-value of 0.76 compared to a C-Value of 0.97 for the model which contains all the predictors. This shows that the verb alone is already a strong predictor, but the model does not reach its high predictive power without taking the linguistic factors and the native language of the learners into account.

In the next section, we will have a look at the data set which includes L1 and L2 speak-

[7]It was not possible to include the verb in the analysis which is shown above. The factor VERB was the only random effect in the mixed model. If I had removed it, another type of analysis would have had to be used for the remaining factors, i.e., a logistic regression model. Two different types of models can, however, not be compared by means of an ANOVA.

ers and see how the two groups compare.

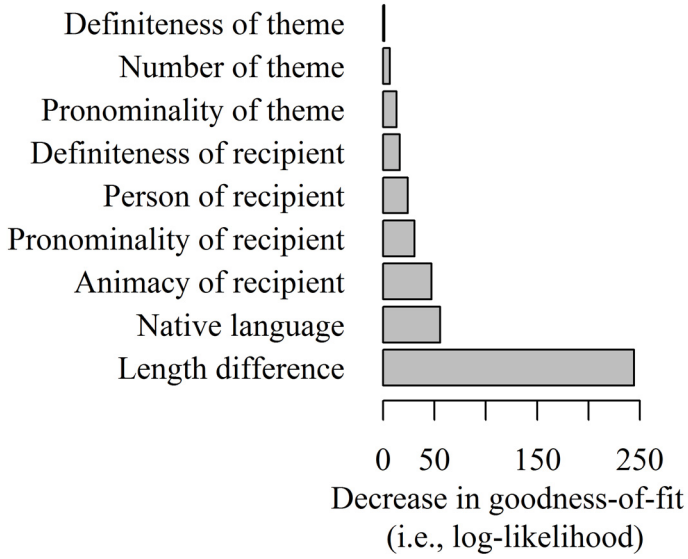

Figure 6.6: Effect sizes of the final model in the corpus model – NATIVELANGUAGE – L2 Data (ICLE)

6.4 Mixed Data Set

In this section, I will present the results of a data set which includes learner as well as native speaker data. First of all, the L1 and L2 data sets will be compared. The first and most obvious difference is, of course, the fact that the Treebank Wall Street collection corpus covers texts which were written by native speakers of English and the ICLE consists of essays written by learners.

Apart from this difference, the Treebank Corpus is a collection of articles related to financial topics. The learners wrote essays on a wide array of topics, sometimes as part of an exam. The two corpora cover different registers. The native speakers' data set consists of more formal pieces of writing than the L2 texts. This does not necessarily pose a problem. Bresnan et al. (2007) shows that, even though the proportion of PP and DO datives differs when comparing spoken (Switchboard Corpus) and written (Treebank Wall Street Journal) data, the linguistic factors which govern the choice are the same. They go in the same direction and they are equally strong. What changes, however, is the distribution

of factors in the respective data sets. The spoken data set featured by far more pronominal recipients than the written data set, which is why the DO datives in the spoken data set outnumbers the DO datives in the written data set. The corpus model which Bresnan (2007) fits for a combined data set of written and spoken data is able to correctly classify the proportion of DO datives, which was expected for each data set. Thus, it should not play an important role which corpus is chosen when comparing L1 to L2 speakers, as it can be assumed that the effects of the linguistic factors which influence native speakers are constant in different modalities, i.e., spoken or written, and also across different registers.

The mixed data set contains the same factors as the L1 data set, namely: DATIVE, VERB, VERBANDSENSE, LENGTH OF RECIPIENT, ANIMACY OF RECIPIENT, DEFINITENESS OF RECIPIENT,PRONOMINALITY OF RECIPIENT, LENGTH OF THEME, ANIMACY OF THEME, DEFINITENESS OF THEME and PRONOMINALITY OF THEME. The factor LANGUAGEFAMILY was coded, whereas the native speakers were not included in the value `Germanic` as discussed above, but received the value `English`. Further, the native languages and the factor ENGLISH with the values `native` and `learner` were coded. The latter factor expresses whether English is the speakers' first or second language and thus allows to differentiate between learners and native speakers in the mixed data set.

6.4.1 Comparing the L1 and L2 Data Sets

In this section, we will have a look at the differences in the distribution between the L1 and L2 data sets to get an impression of similarities and differences.

The first difference is that the native speakers use significantly more DO datives (63%) than the learners (58%) (chi-squared test, p=.001).

In Table 6.16, the distribution of the different factors is reported for both data sets and it also indicates whether the difference between the distributions of the L1 and the L2 data is significant. This was tested by means of chi-squared tests. As can be seen, there is no difference in the distribution of certain factors between the L1 and the L2 data. The factors ANIMACY OF THEME, PRONOMINALITY OF THEME, and DEFINITENESS OF THEME and DEFINITENESS OF RECIPIENT have the same distribution in both corpora. The distribution of the factors ANIMACY OF RECIPIENT and PRONOMINALITY OF RECIPIENT differs between the L1 and L2 corpus. As Bresnan et al. (2007) already reported, the native speakers in this particular data set do not use many pronominal recipients. In the learner data, 43% of all recipients are pronominal, whereas only 18% of the recipients in the native speaker data have been realized by a pronoun. The learners, in contrast, use

Table 6.16: Comparison of the distribution in the L1 (Treebank Wallstreet Journal collection) and L2 data (ICLE) sets

Predictor	Values	Learner	Native	*p*-value
ANIMACY OF THEME	animate	40 (1%)	4 (<1%)	n.s.
	inanimate	2992 (99%)	695 (>99%)	
ANIMACY OF RECIPIENT	animate	2244 (74%)	632 (90%)	<.001
	inanimate	744 (26%)	67 (10%)	
PRONOMINALITY OF THEME	pronoun	68 (2%)	16 (2%)	n.s.
	nonpronoun	2967 (98%)	683 (98%)	
PRONOMINALITY OF RECIPIENT	pronoun	1321 (43%)	132 (18%)	<.001
	nonpronoun	1714 (57%)	576 (82%)	
DEFINITENESS OF THEME	definite	727 (24%)	174 (25%)	n.s.
	indefinite	2307 (76%)	525 (75%)	
DEFINITENESS OF RECIPIENT	definite	2132 (70%)	473 (68%)	n.s.
	indefinite	898 (30%)	226 (32%)	

Abbreviations:
'n.s.' not significant

significantly more inanimate recipients than the native speakers.

The differences in the distribution between L1 and L2 bias the data slightly. Animate recipients increase the probability of DO datives. Learners use more animate recipients than natives in the data sets which are used for analysis here. Pronominal recipients also trigger the DO dative and there are more pronominal recipients in the learner data. All else being equal, we should find more DO datives in the learner data than in the native speakers' data, but this is not the case (see above). The proportion of DO datives is higher for natives than for learners.

The mere comparison of the distribution of the data sets does not lead to reliable results as many other factors, i.e., the verb bias, are not controlled for. Thus, a proper statistical analysis is necessary. As mixed-effects models can deal with unbalanced data sets, the uneven distribution within and across the two data sets does not pose a problem for such an analysis.

6.4.2 Statistical Analysis and Results: Mixed Data Set

As a first step, it was tested whether there is a general difference between learners and native speakers in the usage of dative constructions, i.e., DO and PP datives. In order to do so, a linear mixed-effects model was fitted. The factor DATIVE was the dependent variable. The factors LENGTH OF RECIPIENT, ANIMACY OF RECIPIENT, DEFINITENESS OF

Table 6.17: Fixed-effect coefficients in the final mixed-effects model – mixed data set

Predictor	Estimate	*p* value
(Intercept)	1.22	<.001
LOGLENGTHDIFFERENCE	1.82	<.001
ANIMACYOFRECIPIENT = `inanimate`	1.43	<.001
PRONOMINALITYOFTHEME = `pronoun`	2.02	<.001
PRONOMINALITYOFRECIPIENT = `pronoun`	-2.01	<.001
DEFINITENESSOFTHEME = `indefinite`	-0.40	.001
DEFINITENESSOFRECIPIENT = `indefinite`	0.96	<.001
ENGLISH = `native`	-1.00	<.001

RECIPIENT, PRONOMINALITY OF RECIPIENT, ANIMACY OF THEME, DEFINITENESS OF THEME, PRONOMINALITY OF THEME, LOGLENGTHDIFFERENCE and ENGLISH (i.e., `learner` vs `native`) were used as fixed effects. The factor VERBANDSENSE was used as a random effect. The initial model was simplified by removing the only factor which was not significant, i.e., ANIMACY OF THEME. The simplified model is reported in Table 6.17.

All linguistic factors in the model (see Table 6.17) go in the direction predicted by harmonic alignment. The negative estimate for the factor ENGLISH indicated that native speakers of English are less likely to produce PP datives than DO datives. This observation has been made several times in the literature (see Chapter 2), but this is the first time it has been observed while controlling for the linguistic factors and the influence of the verb bias.

In the next step, I fitted a linear mixed model like the one above and included interaction between all linguistic factors and the factor ENGLISH to determine whether certain factors only affect one group of speakers. The model was simplified by first removing all insignificant interaction terms, followed by the insignificant factors. The final model is summarized in Table 6.18.

The same linguistic factors as reported in the previous model (Table 6.17) are significant in this model (Table 6.18). Additionally, there is one significant interaction between the factors DEFINITENESS OF RECIPIENT and ENGLISH. This means that the factor DEFINITENESS OF RECIPIENT apparently has a different influence on learners of English than on English native speakers in my data sets. The interaction is shown in Figure 6.7.

Figure 6.7 shows that the effect of the factor DEFINITENESS OF RECIPIENT works in the same direction for learners and native speakers, but the effect is stronger for native speakers than for learners.

Both, the model presented in Table 6.17 and Figure 6.7 show that there is a general

Table 6.18: Fixed-effect coefficients in the final mixed-effects model – interactions between ENGLISH and linguistic factors – mixed data set

Predictor	Estimate	*p* value
Intercept)	1.30	<.001
LOGLENGTHDIFFERENCE	1.82	<.001
ANIMACYOFRECIPIENT = `inanimate`	1.41	<.001
PRONOMINALITYOFTHEME = `pronoun`	2.02	<.001
PRONOMINALITYOFRECIPIENT = `pronoun`	-2.07	<.001
DEFINITENESSOFTHEME = `indefinite`	-0.41	.001
DEFINITENESSOFRECIPIENT = `indefinite`	0.80	<.001
ENGLISH = `native`	-1.33	<.001
DEFINITENESSOFRECIPIENT = `indefinite` *ENGLISH = `native`	0.77	.017

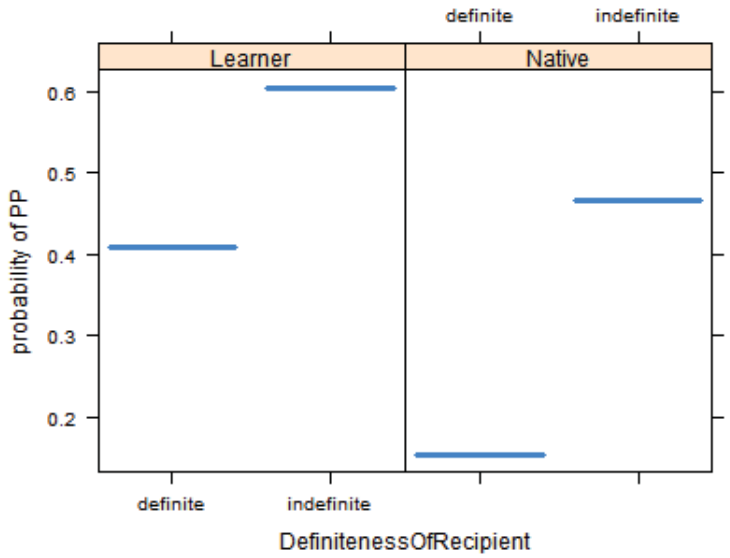

Figure 6.7: Interaction final mixed-effect model–ENGLISH * DEFINITENESSOFRECIPIENT – mixed data set

difference between learners and native speakers in my data set. Learners in general show a higher probability to produce PP datives than natives and are less strongly influenced by the factor DEFINITENESS OF RECIPIENT. The question which arises is whether this generalization holds true for learners from all L1 backgrounds or whether there are differences between the individual interlanguages. In order to test whether there are differences between the learners of different L1 backgrounds, a linear mixed regression model was fitted in which the probability of the PP dative was predicted on the basis of the pertinent linguistic factors and the native language of the speaker. The dependent variable was the DATIVE and the linguistic factors LENGTH DIFFERENCE, ANIMACY OF THEME and ANIMACY OF RECIPIENT, DEFINITENESS OF THEME and DEFINITENESS OF RECIPIENT, PRONOMINALITY OF THEME and PRONOMINALITY OF RECIPIENT and NATIVE LANGUAGE were used as fixed effects. To control for the influence of the verb bias, the factor VERB SENSE was used as a random effect.

The model was simplified using standard procedures (see Crawley 2007). The only factor which is not significant in the model was ANIMACY OF THEME. This is probably due to the fact that the majority of themes are animate and thus there is hardly any variation within that factor. Table 6.19 reports the final model in which the baseline constitutes a recipient which is animate, not pronominal, and definite. The theme is not pronominal and definite. The baseline for the native language is English. The model has a very high predictive power (C-value = .97).

We will go through the model in two steps. First the linguistic factors will be discussed, followed by the factor NATIVE LANGUAGE. With respect to the linguistic factors, the model shows that the probability for a PP dative rises when the value for the length differences increases. This is in line with the prediction. The probability for PP datives also increases when the recipient is animate or definite. The probability for a PP dative decreases for nonpronominal recipients and definite themes. All this is in line with the harmonic alignment pattern.

The model also shows which L1 speakers significantly differ from the native speakers. We can see that Bulgarian, Czech, Chinese, Finnish, French, German, Italian, Japanese, Polish, Russian, Spanish, and Turkish speakers significantly differ from English native speakers in their production of dative constructions. The estimates are all positive, which reveals a difference in that learners produce more PP datives than native speakers. Other learner groups, i.e., L1 speakers of Dutch, Norwegian, Swedish and Tswana, do not significantly differ from the native speakers. As became evident above, learners whose L1s belong to the same language families seem to pattern together. Table 6.20 displays the the L1 results depicted in Table 6.19 rearranged. The languages are now grouped together in the language families they belong to. The effects are shown in Table 6.20.

Table 6.19: Fixed-effect coefficients in the final mixed-effects model – NATIVELANGUAGE – mixed data set

Predictor	Estimate	*p* value
(Intercept)	0.12	.602
LOGLENGTHDIFFERENCE	1.85	<.001
ANIMACYOFRECIPIENT = `inanimate`	1.60	<.001
PRONOMINALITYOFTHEME = `pronoun`	2.47	<.001
PRONOMINALITYOFRECIPIENT = `pronoun`	-2.11	<.001
DEFINITENESSOFTHEME = `indefinite`	-0.37	.022
DEFINITENESSOFRECIPIENT = `indefinite`	1.05	<.001
NATIVELANGUAGE = Bulgarian	0.99	.003
NATIVELANGUAGE = Chinese	1.35	<.001
NATIVELANGUAGE = Czech	1.06	.002
NATIVELANGUAGE = Dutch	-0.54	.144
NATIVELANGUAGE = Finnish	0.83	.008
NATIVELANGUAGE = French	1.22	<.001
NATIVELANGUAGE = German	0.69	.085
NATIVELANGUAGE = Italian	1.63	<.001
NATIVELANGUAGE = Japanese	1.39	<.001
NATIVELANGUAGE = Norwegian	-0.11	.726
NATIVELANGUAGE = Polish	0.93	.001
NATIVELANGUAGE = Russian	1.20	<.001
NATIVELANGUAGE = Spanish	1.55	<.001
NATIVELANGUAGE = Swedish	0.41	.213
NATIVELANGUAGE = Tswana	-0.24	.599
NATIVELANGUAGE = Turkish	2.78	<.001

Table 6.20 reveals again that language families pattern together again. Whereas there are hardly any differences between English native speakers and learners of English whose L1 is a Germanic language, there are many significant contrasts between English native speakers and learners from other language family backgrounds. Only learners of English whose first language is Tswana, which is not a Germanic language, do not differ from English native speakers.

To investigate whether these effects hold when explicitly testing language families, a linear mixed regression model as described above was fitted in which the factor NATIVE LANGUAGE is replaced by the factor LANGUAGE FAMILY 1. The model was simplified using standard procedures (Crawley 2007). The final model and the contrast between the language families are reported in Tables 6.21 and 6.22. All linguistic factors go into the predicted direction and follow the harmonic alignment pattern.

When considering the language families, it becomes apparent that learners whose L1s

Table 6.20: Fixed-effect coefficient of the final mixed-effects model for the NATIVELANGUAGE grouped by language families

NATIVE LANGUAGE	Estimate	*p* value	LANGUAGE FAMILY
Bulgarian	0.99	**	Slavic
Czech	1.06	**	
Russian	1.20	***	
Polish	0.93	**	
German	0.69	m.s.	Germanic
Norwegian	-0.11	–	
Dutch	-0.54	–	
Swedish	0.41	–	
Spanish	1.55	***	Romance
Italian	1.63	***	
French	1.22	***	
Finnish	0.83	**	Other
Japanese	1.39	***	
Tswana	-0.24	–	
Turkish	2.78	***	
Chinese	1.35	***	

Significance codes:

'***' p<.001 '**' p<.01 '*' p<.05 'm.s.' p<.1 '–' not significant

Table 6.21: Fixed-effect coefficients in the final mixed-effects model – LANGUAGEFAMILY – mixed data set

Predictor	Estimate	*p* value
(Intercept)	0.28	.450
LOGLENGTHDIFFERENCE	1.85	<.001
ANIMACYOFRECIPIENT = `inanimate`	1.50	<.001
PRONOMINALITYOFTHEME = `pronoun`	2.38	<.001
PRONOMINALITYOFRECIPIENT = `pronoun`	-2.10	<.001
DEFINITENESSOFTHEME = `indefinite`	-0.42	.008
DEFINITENESSOFRECIPIENT = `indefinite`	0.96	<.001
LANGUAGEFAMILY = `Slavic`	1.01	<.001
LANGUAGEFAMILY = `Other`	1.49	<.001
LANGUAGEFAMILY = `Germanic`	0.05	.831
LANGUAGEFAMILY = `Romance`	1.42	<.001

Table 6.22: Contrasts between language families based on the fixed-effect coefficients in the final mixed-effects model – LANGUAGEFAMILY – mixed data set

	English	Slavic	Romance	Germanic	Other
English		***	***	–	***
Slavic			m.s.	***	**
Romance				***	–
Germanic					***
Other					

Significance codes:

'***' p<.001 '**' p<.01 '*' p<.05 'm.s.' p<.1
'–' not significant

are Slavic, Romance or 'Other' languages differ significantly from English native speakers, whereas there is no difference between learners of a Germanic language and English native speakers. Most of the other contrasts between the language families are significant. Learners whose native language is a Slavic language differ only marginally from learners whose L1s are Romance. Learners whose L1 is a Romance language do not differ significantly from the group of 'Other' languages either.

In this section, it has been shown that learners are influenced by the same factors which influence English native speakers when they produce dative constructions. It became also evident that there are differences between the learners and the native speakers. These differences manifest themselves in that learners produce more PP datives. What is more, there is variation in the strength of the influence of the factor DEFINITENESS OF THEME. Native speakers are more heavily influenced by this factor than learners. Further, it was shown that the learners differ across different L1 backgrounds. Learners whose L1 is a Germanic language do not differ as strongly from English native speakers. In the next section, these differences will be examined more closely.

6.4.3 "What would a native speaker say?"

It has been shown in the previous section that learners of English differ from English L1 speakers in the use of dative constructions to varying degrees, depending on their L1 backgrounds. In order to investigate in more detail how exactly L2 speakers differ from L1 speakers in their use of the dative alternation, I adopt the method presented in Gries and Deshors (2015) (see Chapter 2.2 for a detailed discussion of Gries and Deshors 2015), who set out to answer the question: "What would a native speaker say?".

This analysis was conducted in three steps, using the mixed data set which has been

Table 6.23: Fixed-effect coefficients in the final mixed-effects model – L1 data[8]

Predictor	Estimate	*p* value
(Intercept)	-0.4574	.473
LOGLENGTHDIFFERENCE	2.1700	< .001
PRONOMINALITYOFTHEME = `pronoun`	2.3441	.080
PRONOMINALITYOFRECIPIENT = `pronoun`	-3.0093	.015
ANIMACYOFRECIPIENT = `inanimate`	1.3209	.004
DEFINITENESSOFRECIPIENT = `indefinite`	1.8263	<.001

discussed in Section 6.1.4. First, I only use the part of the data which was produced by L1 speakers, i.e., the dative constructions which have been extracted from the Treebank Wall Street Journal collection by Bresnan et al. (2007). For this part of the data, I fitted a linear mixed-effects regression model, in which the factor DATIVE is the the dependent variable and the linguistic factors LOGLENGTHDIFFERENCE, PRONOMINALITY OF THEME, DEFINITENESS OF THEME, ANIMACY OF RECIPIENT, PRONOMINALITY OF RECIPIENT and DEFINITENESS OF RECIPIENT are the fixed effects. The factor VERBANDSENSE is used as a random effect. It was not possible to include the factor ANIMACY OF THEME because the factor is so unevenly distributed that it causes statistical problems. The model was simplified using standard procedures (Crawley 2007). The simplified model is reported in Table 6.23.

The model shows that the known linguistic factors are significant in predicting the native speakers' DO vs PP dative choices. The factor PRONOMINALITY OF THEME only reaches marginal significance. All effects work in the direction which is predicted by harmonic alignment. The factor DEFINITENESS OF THEME failed to reach significance in this data set. It has, however, been reported to have reached significance in other corpus models which investigate native speakers of English (see Bresnan et al. 2007). These authors have, however, reported on the analysis of the complete data set which also includes the spoken data extracted from the Switchboard corpus. Since the previous analyses are based on written data, I decided to use written data for this analysis as well, despite of the discrepancies both to Bresnan et al.'s (2007) results.

In the second step of the analysis, I used the estimates of the significant predictors of the L1 corpus model (see Table 6.23), the intercept and the random intercepts of the factor VERBANDSENSE to predict the probability of a given dative construction to occur in the PP or DO dative in the part of the data set which was produced by L2 speakers (ICLE). In other words, for each dative construction a learner produced, it was calculated how high the probability of a native speaker to produce a PP dative in the presence of the given linguistic factors would have been.

Thirdly, on the basis of the analysis in the second step, a new factor called NATIVEDATIVE was inserted in the data frame. It encodes which dative construction a native speaker would have chosen in the presence of the same linguistic factor. If the predicted probability for a speaker of a given item to use a PP dative is equal to or higher than 0.5, it received the value PP. If the predicted probability was below 0.5, it receives the value DO. As mentioned earlier in Chapter 2.2, splitting the data at a probability of 0.5 for a PP dative does not do justice to the gradualness of the dative alternation, as probabilities around 0.5 are neither especially prone to the PP nor to the DO dative. For native speakers, a great deal of variability in this middle range of probabilities has been reported (see Bresnan and Ford 2010, p. 185, Figure 6). In order to compare the dative constructions predicted by the L1 probabilities to the dative constructions the learners actually produced, it is, however, inevitable to split the data into the categories 'predicted PP dative' versus 'predicted DO dative'.

Table 6.24 shows the dative constructions which were predicted to be used by L1 speakers for the L2 data set, compared with the dative constructions the learners actually used. On the basis of the linguistic factors in the learners' dative constructions, the L1 corpus model predicted 1949 DO datives and 638 PP datives.[9] Out of the 1949 predicted DO datives, learners realized 1541 as DO and 408 as PP datives whereas only 51 of the predicted PP datives (n = 638) were realized as DO datives, contrary to the prediction.

Table 6.24: Predicted versus realized dative construction

	Predicted DO	Predicted PP
Learner DO	1541	51
Learner PP	408	587

Table 6.24 shows that learners produce the dative construction which has been predicted on the basis of the L1 corpus model probabilities in 2,128 cases (i.e., 1,541 DO datives and 587 PP datives). This corresponds to 82% of all dative constructions. This number shows that advanced learners of English are already quite successful in using the competing dative constructions in a native-like manner. In some cases, though, learner do not produce the predicted construction: in 21% of the cases the PP dative is used instead of a DO dative (in 408 out of 1949 cases), while the DO dative is used instead of the PP

[9]There is a discrepancy between the number of items in the L2 data set (3035 dative constructions) and the number of items reported in Table 6.24 (2,587 items). The L1 corpus probabilities can only be calculated for those items which are coded for all the factors mentioned in Table 6.23 as well as for the factor VERBANDSENSE. If there is one cell in a specific item which was coded 'NA', it is not part of the analysis, as is not possible to calculate predicted probabilities for items which contain empty cells.

Table 6.25: Predicted versus realized dative constructions per L1

Native Language	native-like dative	DO instead of PP	PP instead of DO	not native-like (%)
Bulgarian	173	0	17	9%
Chinese	96	2	34	27%
Czech	114	5	26	21%
Dutch	99	10	10	17%
Finnish	139	6	23	17%
French	117	2	18	15%
German	137	1	11	8%
Italian	86	2	23	25%
Japanese	128	4	36	24%
Norwegian	183	7	18	12%
Polish	142	0	33	19%
Russian	190	2	34	16%
Spanish	151	2	40	22%
Swedish	137	3	14	11%
Tswana	74	4	4	10%
Turkish	161	1	67	30%

dative only in 51 of 638 cases (8%). Table 6.25 shows how these figures are distributed in the individual L1s. It also shows how many dative constructions per L1 background were produced in a native-like way (column: 'native-like dative'), i.e., as predicted by the L1 corpus probabilities, and in how many cases a DO dative was predicted, but the learner produced a PP dative instead (column: 'PP instead of DO') and vice versa (column: 'DO instead of PP'). The last column indicates how many percent of the dative constructions were not produced as predicted by the L1 probabilities. As already stated above, it is evident that the majority of all datives were produced in a native-like way by speakers from all L1 backgrounds. The percentages of non-native-like datives differs strongly for the different L1 backgrounds, however. Whereas German speakers only produce 12 dative constructions which have not been predicted by the L1 probabilities (i.e., 8% of the German learners' datives), Turkish speakers produce 68 datives contrary to what has been predicted (30%). There is a clear tendency for learners to produce PP datives when DO datives were predicted. Only Dutch and Tswana learners use unpredicted dative constructions in both directions equally often.

Here, an apparent discrepancy occurs. Recall from the previous section that Dutch learners of English do not differ significantly from L1 speakers with regard to the production of DO versus PP dative, while e.g. Bulgarian speakers do. In the light of the above, the question arises why Dutch speakers produce more (17%) non-native-like datives than

Bulgarian speakers (9%).

The answer can be found when looking at the dative constructions which were not produced in a native-like way and how these constructions relate to the L1 corpus probabilities. Figure 6.8 depicts all non-native-like datives per L1 and indicates the range of L1 corpus probabilities which were calculated for those items. Very low L1 corpus probabilities indicate a very strong DO bias of the respective items whereas high probabilities correspond to a strong PP bias. The middle range of probabilities, i.e., around 0.5, depicts those items for which the bias in neither direction is very strong and variation between the PP and the DO dative is to be expected.

It becomes evident that the L1 corpus probabilities for which the Dutch learners produce non-native-like dative constructions have a median of 0.5 and the interquartile range lies between 0.2 and 0.6. This means that Dutch speakers make non-native-like choices in the middle range of L1 corpus probabilities. As discussed above, we expect variation in this middle range of probabilities for native speakers, too. In other words: When the probabilities for the PP or DO dative are strong, Dutch speakers make the same decision a native speaker would have made. For constructions whose biases are not very strong (probabilities around 0.5), i.e., constructions for which a native speaker may also decide to use either one of the constructions, Dutch speakers make non-native-like choices. The constructions which were classified as 'non-native-like' for Dutch learners, are exactly those, whose probability allows for variation. This is why, Dutch speakers did not differ from native speakers in the corpus model which was presented above. The reason for the apparently large amount of dative constructions which are used in a non-native-like way is not to be attributed to the Dutch learners, but to categorical classification of dative constructions as 'non-native-like'. As discussed above, such a rigid classification does not do justice to the gradualness of the dative alternation and this point is again underlined here.

In contrast to the Dutch speakers, Bulgarian learners produce non-native-like datives for items in which the L1 corpus probabilities have a median of less than 0.2 and the interquartile range lies between approximately 0.05 and 0.3. For those very low L1 corpus probabilities, we expect native speakers to select the DO dative in the great majority of all cases, which Bulgarian learners of English did not do. In general, we can make similar observations for learners from other L1 backgrounds. Speakers of Tswana and Norwegian, who did not significantly differ from native speakers in previous analyses, produce non-native-like datives for items in which the interquartile ranges of L1 corpus probabilities are roughly between 0.2 and 0.7, whereas most of the learners from other L1 backgrounds produce dative constructions in a non-native-like way for items in which the interquartile range of L1 probabilities lies between 0.1 and 0.4. Swedish speakers also have a relatively low median for the L1 corpus probabilities when it comes to the

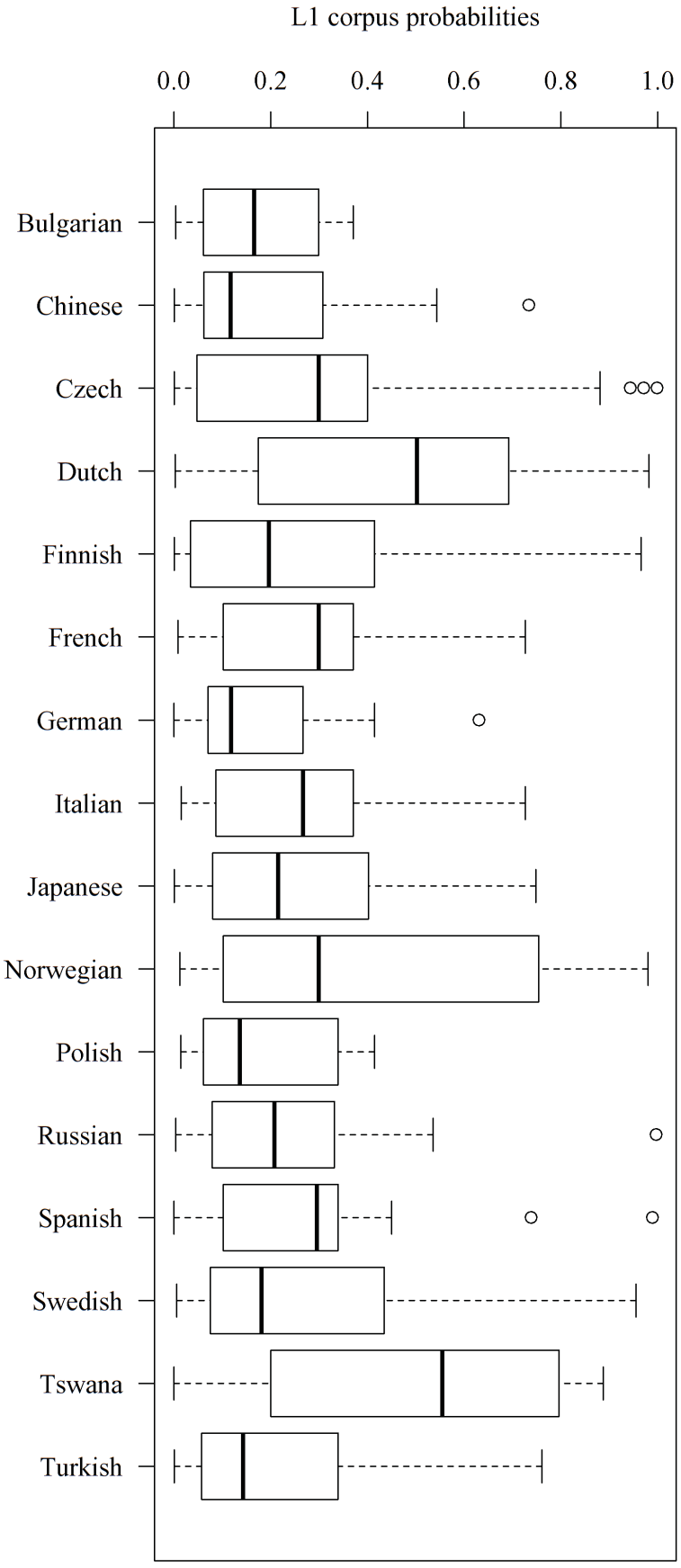

Figure 6.8: Non-native-like datives per L1 related to L1 corpus probabilities

Table 6.26: Logistic regression model: DATIVE predicted by L1 CORPUS PROBABILITIES

Predictor	Estimate	*p* value
(Intercept)	-2.00	<.001
L1 CORPUS PROBABILITIES	6.85	<.001

non-native-like dative constructions. They, however, only produced very few non-native-like datives which explains why Swedish speakers do not significantly differ from native speakers in the previous analyses.

The link between the L1 corpus probabilities and non-native-like datives in the respective languages raises the question whether there is a more general, underlying pattern. As Table 6.24 shows that L2 speakers use 82% of the dative constructions as predicted by the L1 probabilities, we must assume that L1 probabilities are predictive for the use of dative constructions in ESL. A logistic regression model was fitted for the ICLE data in which the factor DATIVE is the dependent variable and the L1 corpus probabilities are the independent variable. The model, which is summarized in Table 6.26, reveals that the L1 probabilities are highly predictive for the L2 choices.

The logistic regression model (Table 6.26) has a relatively high predictive power (p <.001; C-value = 0.94; R^2= 0.61). These values tell us that there is a high correlation between the dative constructions chosen by the L2 speakers of English and the L1 corpus probabilities. However, the variation explained by the model is not satisfying, which is indicated by the rather low R^2.

In order to get a clearer picture of how the L1 corpus probabilities can be related to the choices the learners make, a conditional inference tree was fitted in which the dative constructions produced by the learners are predicted by the L1 corpus probabilities. The conditional inference tree is shown in Figure 6.9.

Conditional inference trees (see Hothorn et al. 2006) use an algorithm to split the data into subsets which are significantly different from each other. The conditional inference tree (Figure 6.9) shows in which way the L1 corpus probabilities are related to the ratio of PP and DO datives produced by learners of English. We will go through the tree from top to bottom. The major significant split is made for L1 corpus probabilities of 0.096 (Node 1). A corpus probability of 0.096 corresponds to a probability of less than 10% for a native speaker to produce a PP dative for the items in that subset. When considering the terminal nodes at the left side of the tree (Nodes 4, 6, 7, 9, 11 and 12) it becomes evident that these subsets contain far less DO datives than the subsets which are displayed in Nodes 15, 16, 18 and 19 (terminal nodes at the right branch of the tree). Thus, the presence of linguistic factors that create a very strong bias towards the DO dative results

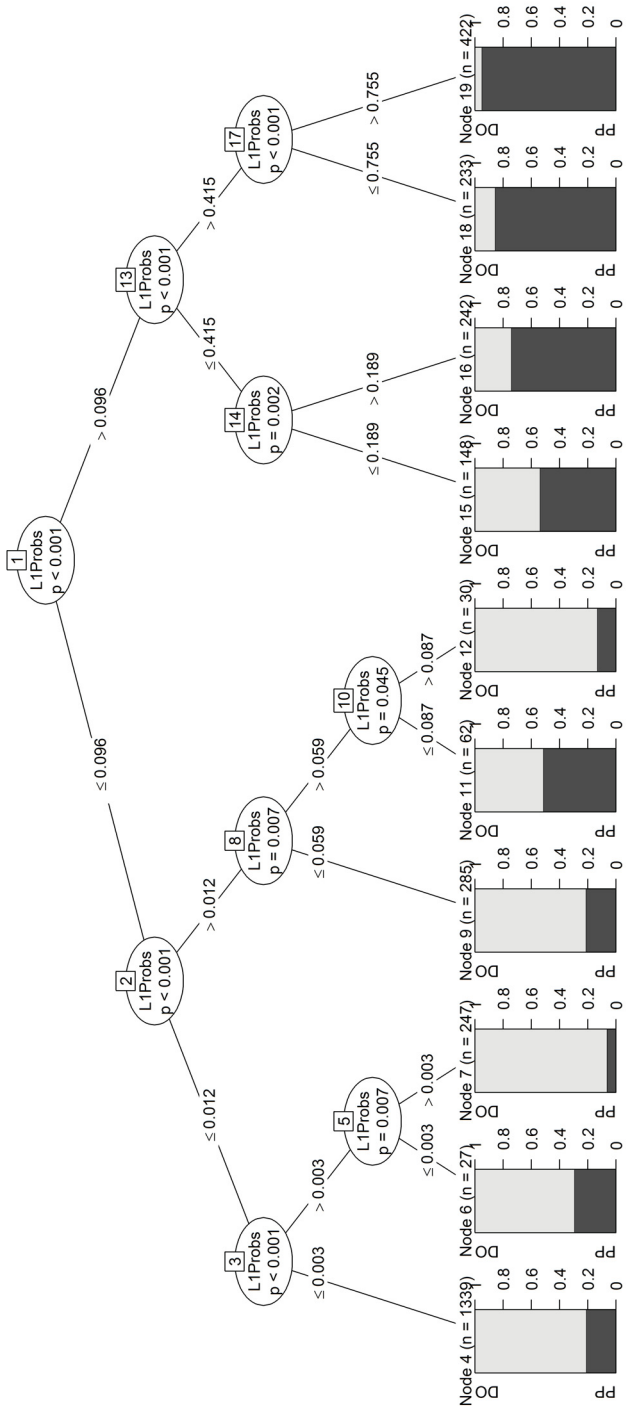

Figure 6.9: L1 corpus probabilities predict L2 dative constructions

in learners using a higher proportion of DO datives.

A different picture emerges for L1 corpus probabilities that range from 0.096 to 0.189 (Node 15). About 50% of the dative construction produced by learners are PP datives. As soon as the probabilities to produce a PP dative reach 19% (Node 16), learners produce PP datives in 80% of the cases. This finding indicates that the learners' threshold to produce PP datives must be much lower than it is the case for L1 speakers. Another explanation for this observation could be that learners produce PP datives by default and only use the DO dative when the linguistic factors strongly bias the construction in that direction.

The conditional inference tree in Figure 6.9 shows that the learners are sensitive to the L1 corpus probabilities, but start producing PP datives when the bias in that direction is still relatively low compared to L1 speakers. It yet remains to be shown whether this equally applies to all L1 backgrounds or whether there are L1-specific differences with regard to the threshold of probabilities. To this end, the conditional inference trees for all 16 languages were examined separately. In what follows, I will present some examples (for the remaining languages, see the Appendix).

First, learners whose L1 background is Swedish (Figure 6.10) will be discussed, representing speakers of those L1 backgrounds who have not significantly differed from L1 speakers in the analysis, which has been presented in the previous chapter.

Figure 6.10 shows that Swedish learners hardly produce any PP datives when the L1 corpus probabilities for PP dative are below 0.033 (Node 3). With an increasing L1 probability, their production of PP datives also increases: for L1 probabilities between 0.033 and 0.415, 35% of the datives are PPs (Node 4), and above this threshold, the learners almost exclusively produce PP datives (Node 5). A clear correlation between the predicted and produced dative constructions is evident, even though it seems that Swedish learners of English have a lower threshold for exclusively producing PP datives than L1 speakers of English.

When it comes to learners who were shown to significantly differ from English native speakers, e.g. French learners of English, the conditional inference tree looks quite different as displayed in Figure 6.11. As Swedish learners of English, French learners also produce almost exclusively DO datives when the predicted probability for an L1 use of a PP dative is very low (<0.061, Node 2). For L1 corpus probabilities between 0.061 and 0.259, more than half of the produced dative constructions are PP datives (Node 4). When the PP probabilities exceed 0.259, French learners stop producing DO datives (Node 5).

Turkish learners (see Figure 6.12), who seemed to be most prone to overuse PP datives, stop producing PP datives when the L1 corpus probabilities exceed 0.176 (Node 5), but when the predicted probability of using a PP dative is lower than 0.045, Turkish learners use DO datives in 80% of all cases (Node 2). For L1 corpus probabilities between 0.045

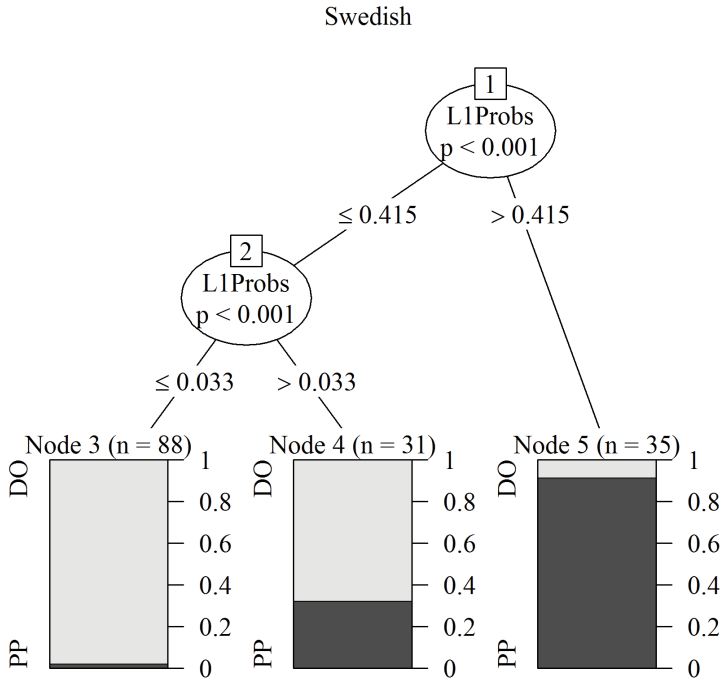

Figure 6.10: Conditional inference tree – Swedish learners of English

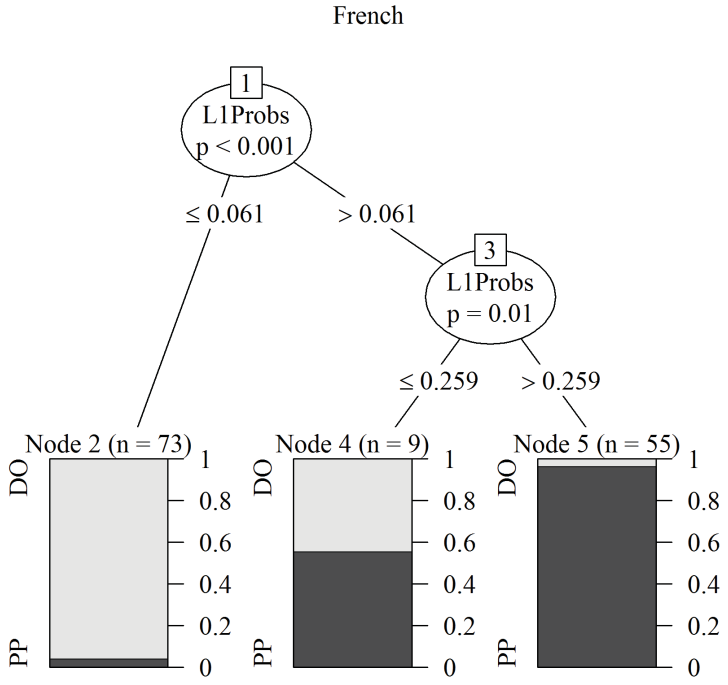

Figure 6.11: Conditional inference tree – French learners of English

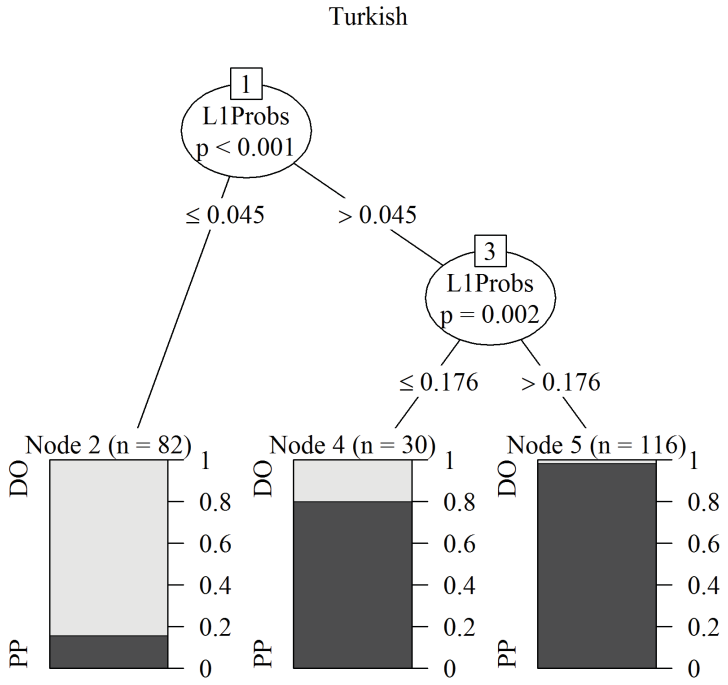

Figure 6.12: Conditional inference tree – Turkish learners of English

and 0.176, 80% of all datives are PPs.

This comparison reveals that learners from all L1 backgrounds are sensitive to the linguistic constraints which were used to calculate the L1 corpus probabilities. They have different cut-off points for (over)using the PP dative. While learners of some L1 backgrounds (e.g. Swedish), display a strong preference for the PP dative once the L1 probability exceeds 0.4, Turkish learners use the PP dative at a much lower probability (> 0.045).

In sum, it can be stated that learners from different L1 backgrounds differ from native speakers in different degrees. It has also been shown that learners do not use the competing dative constructions in a categorical way, being influenced by the linguistic factors which make the dative alternation a gradient phenomenon. The probabilities for using the one or other construction are shifted in favor of the PP dative, compared to native speakers. The strength of this effect varies across different L1 backgrounds, giving rise to the question why the L1 determines to what extent a native-like use of the competing dative constructions can be achieved. This question will be addressed in the next section.

6.5 The Influence of the Native Language

The previous sections have shown that there are considerable differences between speakers who have different L1 backgrounds when it comes to the use of the dative alternation in English as a second language. It is, however, unclear how these differences can be accounted for. The explanations which seem to suggest themselves are that the learners either differ in proficiency or that the influence of the respective native language must be the reason.

In section 6.3.2, the factors used to measure proficiency (i.e., the exposure to the English language: YEARSENGSCHOOL, YEARSENGUNI, ABROAD) were already shown not to be significant. Therefore, the focus will be on the speakers' native languages and the question whether cross-linguistic differences in dative constructions are mirrored in the use of the dative alternation in English as an L2. In order to do so, I looked at the dative constructions in the 16 different languages in my data set and compared them to the English dative constructions with respect to a limited set of features. These features comprise: (I) the relative word order of verb, theme and recipient, (II) the alignment type, i.e., are theme and recipient 'flagged' (i.e., case-marked, marked by an adpositions or zero-marked) in the same or different ways, (III) word-order variants (IV), and factors that have an influence on possible word order alternations.

To provide detailed insights into the dative construction in 16 different languages is beyond the scope of this project, so, the classification provided in Heine and König (2010) was adopted. The authors investigate ditransitive constructions of 315 languages and categorize them with respect to the afore-mentioned features. There are some issues which need to be addressed: The data set which is used by Heine and König (2010) only consists of 390 ditransitive constructions. The 'language-to-data set-ratio' suggest that possible word order variants cannot be accounted for in all languages. A further problem is that the authors only consider nominal arguments (i.e., pronominal and clausal arguments were excluded from Heine and König's analysis). In order to make up for these shortcomings, I added more properties of the dative constructions in the respective languages whenever possible. In the following, I will first summarize the findings of Heine and König (2010) and then discuss my own ditransitive survey.

The aim of Heine and König (2010) is to give a typological overview of the worlds languages' ditransitive constructions. The authors presume ditransitive constructions to take three arguments, which semantically correspond to the categories agent (=A), theme (=T) and recipient (=R) (Heine and König 2010, p. 88).The authors further distinguish between themes in ditransitive constructions and patients (=P) of monotransitive verbs.

With respect to the relative order of theme and recipient, the authors claim that the same principles of word order are influential in languages around the world. These principles

include placing more prominent arguments before less prominent ones, lighter (i.e., arguments with fewer morphemes) before heavier ones, an ordering of arguments that reflects the temporal sequence of events and in a way that obeys the grammatical rules of the respective language (Heine and König 2010, p. 93). The scale of prominence used by Heine and König (2010) is very similar to the harmonic alignment pattern (see Chapter 2) but diverges in some categories.[10] The underlying idea that more prominent arguments are placed before less prominent ones, is, however, the same.

The authors claim that recipients are inherently more prominent (e.g. human, definite) than themes, an observation which corresponds to the findings presented in Chapter 5. An ordering according to prominence principles predicts the most prevalent word order in languages around the world to be R-T (i.e., the recipient precedes the theme) and that is indeed what Heine and König (2010) find.

Heine and König (2010) are also interested in the alignment types of the languages they investigated. The first step in determining the alignment type is to determine whether the arguments of a ditransitive construction are flagged. 'Flagging' (Comrie et al. 2010, pp. 65f.) is a cover-term for argument marking strategies, such as case-marking or the use of an adposition. In English, the theme is not flagged, but the recipient is flagged by the preposition *to* in PP datives. Recipients are not flagged in DO datives in English. There may be differences between full NPs and pronouns (see Comrie et al. 2010, p. 65f.). In German, theme and recipient are flagged by case-marking, i.e., accusative versus dative case.

Depending on the flagging of the pertinent arguments, i.e., theme (=T), recipient (=R) and patient(=P), ditransitive constructions are classified into distinct categories, i.e., alignment types. The types which are relevant for the sample of 16 languages in this project are shown in 36 (see Comrie et al. 2010, Heine and König 2010, and Malchukov et al. 2010 for more details).

(36) IOC (indirect object construction): $T = P \neq R$
DOC (double object construction): $T = P = R$

In English, the PP dative is an IOC because the recipient is flagged by the preposition *to* while P (*She reads (*to) books*) and T (*He gives (*to) the book to the man*) are not flagged. The English DO dative is classified as a DOC construction. Neither theme nor recipient

[10] Heine and König (2010) propose a more distinct animacy hierarchy (i.e., human > (non-human) > animate). They further use the category 'referentiality', i.e., proper noun > definite NP > indefinite-specific NP > indefinite-non-specific NP, which is similar to the category DEFINITENESS in the harmonic alignment pattern. The category 'thematicity', i.e., contoller < controlled, does not have a corresponding category in the harmonic alignment pattern.

(nor patients in monotransitive constructions) are flagged. This classification also holds for recipients and themes which are realized as pronouns.

In my own investigation of ditransitive constructions, I tried to confirm Heine and König's findings on word order and alignment type. When investigating the possible word orders, it turned out, however, that there is no language in my data set which allows for only one fixed word order. This fact inevitably raises the question on the constraints which govern the word order variants. Heine and König (2010), only touch upon this topic and do not provide a detailed analysis for the languages that are of interest for the present study. To my knowledge, the influence of linguistic factors on syntactic alternations is, however, for hardly any language as well researched as it is the case in English (and maybe Dutch). Further, the few available studies are predominantly descriptive ones. For some languages, word order variation in ditransitives is not even covered in reference grammars. With the, in parts admittedly scarce, resources, I tried to determine which linguistic factors influence the word order variation and determine whether the competing word orders can be classified as a 'split', 'scrambling' or a case of 'dative alternation' or 'restricted dative alternation'.

The term 'split' is used when the language has competing dative constructions which occur in complementary distribution, i.e., one of the constructions can only be used with certain verbs, to express a certain semantic concept or in the presence of other linguistic features (e.g. pronominal arguments), whereas the other construction is reserved for the remaining verbs, different meanings or the presence of further linguistic features. It was, however, not always possible for me to decide whether a language has an alternation or a split. In unclear cases, I classified the languages as having a 'dative alternation or split'.

The term 'scrambling'[11] was used for those languages in which the order of theme and recipient varies while the phrasal category of the arguments remains the same. This is mainly the case for case-marked languages and languages in which the recipient is always realized as a PP, independent of its position. It should be noted that scrambling does imply there are no constraints that govern the inversion of theme and recipient.

Table 6.27 outlines an overview of the results summarized in Heine and König (2010) together with my own findings (italicized). The first column lists the languages which were investigated. They are ordered in the following way: English in the first line, serving as reference language for the comparison. It is followed by the languages for which the mixed data set analysis (Table 6.19) revealed no significant differences between L1 and L2 speakers. A horizontal line indicates the next set of languages, i.e., those, where a (marginally) significant difference was detected. They are ordered according to their estimates from high to low, i.e., German is the first since learners showed the least differ-

[11] I use the term 'scrambling' without any theoretical implications.

ences to English speakers, while Turkish learners displayed the greatest differences.

The second column lists the alignment type, i.e IOC and DOC, based on Heine and König's classification. When I added an alignment type based on my own findings it is given in italics.

The third column 'Order structure (V-T-R)' is based on Heine and König (2010). Their categories 'Word Order' (i.e., SVO, OSV) and 'Order Structure' (T-R vs R-T) were conflated to indicate the relative word order of verb (=V), theme and recipient and compared against my survey of ditransitives to ensure that these are attested patterns in the respective languages. Whenever I found additional possible word orders, they will be indicated in italics.

The fourth column 'Match' indicates whether the construction found in the respective languages matches either the English DO or PP dative in terms of word order and flagging (yes vs. no). To perfectly match the DO dative, the recipient has to be followed by the theme and both arguments have to be zero-marked. For a perfect correspondence to the PP dative, the theme has to be followed by the recipient and the recipient has to be flagged while the theme is not.

The column 'Variants' can take on the values 'dative alternation' 'split', and 'scrambling'. The results are listed in Table 6.27 and refer only to nominal NPs and do not include results for pronominal arguments.[12]

The aim of classifying the dative constructions in the way presented here was to capture as many possible word orders as possible per language and thus make the constructions comparable to the target language English. There are, however, cases which are not captured by the classification above. German, Russian and Polish have an additional dative construction in which the recipient is doubly flagged, i.e., by case-marking and a preposition as exemplified in 37 for German.

(37) Ich schickte den Brief an den Diplomaten.
I sent the.ACC letter.ACC to the.DAT diplomat.DAT
'I sent the letter to the diplomat.'

In the classification outlined above, these constructions are subsumed under the alignment type IOC, as there is no additional category for double flagging. These constructions are very similar to the English PP datives both in terms of word order and the use of the preposition, but the match is not perfect when considering the criteria outlined above. There

[12] I omitted two constructions which are listed by Heine and König (2010). Firstly, a case in Dutch in which the PP-recipient precedes the theme since this word order was probably a result of a heavy NP shift. I further excluded the alignment type 'SVC' which was listed for Chinese, since in this so-called 'serial verb construction' a grammaticalized verb serves as a marker for the theme or the recipient (see Heine and König 2010, pp. 90-91 for details).

Table 6.27: Scheme of dative constructions in other languages

Native Language	Alignment	Order structure (V-T-R)	Match	Variants
English	IOC	V-T-R	n.a.	alternation
	DOC	V-R-T	n.a.	
Dutch	IOC	V-T-R	PP	alternation
	DOC	V-R-T	DO	
Tswana	DOC	V-R-T	DO	
Norwegian	IOC	V-T-R	PP	alternation
	DOC	V-R-T	DO	
Swedish	IOC	V-T-R	PP	alternation
	DOC	V-R-T	DO	
German	IOC	V-T-R	neither	scrambling
	IOC	V-R-T	neither	
Finnish	IOC	V-R-T	neither	scrambling
	IOC	*V-T-R*	neither	
Polish	IOC	V-R-T	neither	
Bulgarian	IOC	V-T-R	PP	scrambling
	IOC	*V-R-T*	neither	
Czech	IOC	V-R-T	neither	scrambling
	IOC	*V-T-R*	neither	
Russian	IOC	V-R-T	neither	split
	IOC	*V-T-R*	neither	
French	IOC	V-T-R	PP	scrambling
	IOC	*V-R-T*	neither	
Chinese	DOC	V-R-T	DO	
	IOC	V-T-R	PP	scrambling/split
	IOC	*V-R-T*	neither	
Japanese	IOC	T-R-V	neither	scrambling
	IOC	R-T-V	neither	
Spanish	IOC	V-T-R	PP	scrambling
	IOC	*V-R-T*	neither	
Italian	IOC	V-T-R	PP	scrambling
	IOC	V-R-T	neither	
Turkish	IOC	R-T-V	neither	scrambling
	IOC	T-R-V	neither	

are additional features of ditransitive constructions and word order variations which are not accounted for in Table 6.27. This is why I will give an overview of the ditransitive constructions in the languages in my data set in the next section. But the results presented in Table 6.27 will be discussed first.

Learners who do not significantly differ from English L1 speakers, i.e., learners whose L1s are Dutch, Norwegian, Tswana and Swedish, will be considered first. Table 6.27 shows the native languages of these learners have a construction that perfectly matches the English DO dative in terms of alignment type and word order. Dutch, Swedish and Norwegian feature both an English-like PP and DO dative and alternation, similar to the English dative alternation. Interestingly, learners whose L1 is Tswana are also among those who manage to use the dative alternation in a native-like way in English. Tswana does, to the best of my knowledge, not have a construction which matches the PP dative.

The group of learners who does second best are those whose native languages are German, Finnish or a Slavic language, followed by the learners whose native language belongs to the Romance language family as well as Japanese and Chinese learners of English.

In order to examine whether we can find an explanation for the fact that learners whose L1 is a Romance language exhibit more difficulties in the native-like use of the two constructions, the ditransitive constructions in all 16 languages are more closely examined in the following section.

6.5.1 Ditransitive Constructions in other Languages

In the following, I will present the analysis of the ditransitive constructions in the 16 native languages of my corpus sample in order to answer the following questions:

1) Does the language feature a dative construction that resembles the word order (not the alignment type) in English DO datives?

2) Does the language feature a dative construction that resembles the word order (not the alignment type) in English PP datives?

3) Are theme and recipient flagged?

4) If so, how are they flagged?

5) What governs the usage of the different word order variants and are we dealing with an alternation, a split or scrambling?

6) Does the language feature any other word orders?

I will provide glosses for the categories which are relevant for the present investigation, i.e., flagging of theme and recipient. The internal structure of complex verbs or other word classes were disregarded (i.e., *gave* instead of *give.PAST*) whenever possible. Further, there are some languages, e.g. Japanese, for which there is no agreement on whether the dative marker is to be regarded as a postposition or a case-marker (see Malchukov et al. 2010 among others). As this theoretical difference is irrelevant for the present investigation, I will gloss all markers which flag the direct object with .ACC (accusative) and all makers which flag the indirect object as .DAT (dative), irrespective of their morphological status. The only exception is Finnish, as it uses the allative case to mark indirect objects.

Dative Constructions in Germanic languages

German German has a rather flexible word order in general, and this is also true for dative constructions (Dryer and Haspelmath 2013). As example (38) illustrates, there is a construction that resembles the English DO dative among the possible word orders.

(38) a. Er gab [der Dame] [den Koffer].
He.NOM gave the.DAT lady.DAT the.ACC suitcase.ACC.
'He gave the lady the suitcase.'

b. Er gab [der Dame]$_{\text{recipient}}$ [den Koffer]$_{\text{theme}}$.

c. Er gab [den Koffer]$_{\text{theme}}$ [der Dame]$_{\text{recipient}}$.

As already illustrated in Chpater 2.4, some verbs allow for a PP-recipient, as shown in example (39). Thus, German also has a kind of PP dative, but the word order of theme and recipient can be inverted.

(39) a. Lotte schickte den Brief an Monika.
Lotte.NOM sent the letter.ACC DAT Monika
'Lotte sent the letter to Monika.'

b. Lotte schickte [Monika]$_{\text{NP recipient}}$ [den Brief]$_{\text{theme}}$.

c. Lotte schickte [den Brief]$_{\text{theme}}$ [Monika]$_{\text{NP recipient}}$.

d. Lotte schickte [an Monika]$_{\text{PP recipient}}$ [den Brief]$_{\text{theme}}$.

In German, both objects are case-marked. The direct object carries accusative case while the indirect object carries dative case.

In sum, it can be stated that the dative construction which is prevalently used in German corresponds to the English DO dative word order-wise (Pechmann et al. 1994). The constituents can, however, be scrambled. This permutation of constituents is governed by linguistic factors (see Chapter 2.4, for a more detailed discussion). A construction which resembles the word order of PP dative is available as well, but only for a very restricted set of verbs.

Dutch Dutch dative constructions are very similar to the English dative constructions. The dative alternation is subject to similar conditions as it is the case in English (see Baten and De Cuypere 2014, Colleman 2006, Colleman et al. 2010, van Belle and van Langendonck 1996, *inter alia*). An example is shown in (40):

(40) a. Het meisje gaf de kat melk.

'The girl gave the cat milk.'

b. Het meisje gaf melk aan de kat.

'The girl gave milk to the cat.'

(example taken from Baten and De Cuypere 2014)

Some ditransitive verbs allow for the dative alternation and others do not (Colleman 2006, p. 533 cited in Baten and De Cuypere 2014). In Dutch, the recipient in the PP dative is flagged by the preposition *aan*, while it is not flagged in the double object construction. Thus, Dutch features dative constructions that resemble the ones we find in English.

Swedish Swedish has a dative alternation like English as displayed in (41).

(41) a. Ingvar gav Olle boken.
Karl gave Olle book
'Karl gave Olle the book.'

b. Ingvar gav boken till Olle.
Karl gave a ball DAT Olle
'Karl gave a ball to Olle.'

(examples taken from Holmes and Hinchliffe 1994)

This shows that Swedish has syntactic structures which correspond to the English DO and PP dative, respectively. In the PP construction, the recipient is flagged by the preposition *till*.

Norwegian According to Anderssen et al. (2014), Norwegian has a dative alternation just like English, shown in (42). Norwegian, thus, has a construction which resembles the English PP dative (example 42b) and one which resembles the English DO construction (example 42a). In the PP-like construction, the recipient is flagged by the preposition *til*.

(42) a. Jon ga Marit en bok.
Jon gave Marit a book
'Jon gave Marit a book.'

b. Jon ga en bok til Marit.
Jon gave a book DAT Marit
'John gave a book PREP Marit.'

Anderssen et al. (2014) report that the Norwegian dative alternation is governed by similar constraints as the English dative alternation, i.e., definiteness, pronominality, and length which all coincide with the 'give-before-new' principle. The authors also claim that the Norwegian dative alternation is less restrictive than it is the case for English, in that pronominal themes can occur in clause-final position, as shown in example (43):

(43) a. Jon ga henne den.
Jon gave her it
'Jon gave her it.'

According to Anderssen et al. (2014) constructions like **John gave the girl it* are ungrammatical in American English, because pronominal themes "[...] [cannot appear phrase-final and have to precede the recipient " (Anderssen et al. 2014, p. 75). In the data set 'dative' (compiled by Bresnan et al. 2007, publicly available via the software 'R'), 155 attestations of the DO dative featuring a pronominal theme can be found. Thus, the generalization put forward by Anderssen et al. (2014) cannot be maintained without further restrictions.

Dative Constructions in Romance languages

The dative constructions in the three Romance languages in my sample are very similar across the three different languages. French, Spanish and Italian have a construction which resembles the English PP dative (see examples (44) for French, (45) for Spanish and (46) for Italian)(compare Agard 1984; Kayne 1984; Malchukov et al. 2010; Primus 1998; Zagona 2002). When both recipient and theme are full NPs, the recipient is marked by the preposition/morpheme[13] *à / a*, while themes are not marked (see Agard 1984, p. 78). There is an optional dative clitic (CL.DAT) in Spanish.

(44) **French**

Jean a donné un livre à Marie.
John had give a book DAT Marie

'John gave a book to Mary.'

(example adapted from Kayne 1984, p. 193)

(45) **Spanish**

Roberto (le) regaló un anillo a Patricia.
Roberto (CL.DAT) gave a ring DAT Patricia

[13]There is disagreement in the literature whether to regard *à / a* as prepositions or morphological case markers (Cuervo 2003).

'Roberto gave a ring to Patricia.'

(example taken from Montrul and Bowles 2010)

(46) **Italian**

Ho scritto una lettera a Carlo.
I wrote a letter DAT Carlo

'I wrote a letter to Carlo.'

(example taken from Primus 1998)

The relative word order of theme and recipient is free and is influenced by the end-weight principle as illustrated in example (47) (see Agard 1984, p. 78, Primus 1998, p. 443).

(47) **Italian**

Ho scritto a Carlo una lettera di cinque pagine.
I wrote DAT Carlo a letter of five pages

'I wrote a letter of five pages to Carlo.'

(example taken from Primus 1998)

A word order which resembles the DO dative in English is ungrammatical in all three languages (compare Kayne 1984, Montrul and Bowles 2010) as illustrated below in examples (48) and (49).

(48) **French**

*Jean a donné Marie un livre.
John has given Marie DAT book

'John gave Mary a book.'

(examples are adapted from Kayne 1984, p. 193)

(49) **Spanish**

*Estela dio María el libro.
Estela gave Maria the book

'Estela gave Maria the book.'

(example taken from Montrul and Bowles 2010)

If the recipient is realized as a pronoun clitic, the clitic carries dative case. The use of the construction displayed in (50) for Spanish is limited to constructions in which a pronoun clitic is used. These two constructions, thus, occur in complementary distribution and represent a *split* and not an instance of a *dative alternation* (compare Malchukov et al. 2010).

(50) **Spanish**

Susana les mandó un paquete.
Susana CL.DAT sent a package

'Susana sent them a package.'

(example taken from Zagona 2002)

(51) **French**

Les parents lui ont donné trois livres.
His parents CL.DAT has given three books.

'His parents gave him three books.'

(example taken from Melis 1996, p. 43)

All three languages use dative and accusative clitics when recipient and theme are pronominal, which are placed between subject and verb. According to Zagona (2002, p. 143), it is also possible to use pronouns in the *a* construction in Spanish (e.g. *mandó a ellos* 'sent to them'). Since the use of clitics does not have a counterpart in English, I will not further discuss them here.

To sum up: The Romance languages in my sample all feature a dative construction which resembles the PP dative, but a construction which resembles the DO dative is ungrammatical. Theme and recipient can be inverted in the PP-like construction, a process which is governed by the relative length of the constituents.

Dative Constructions in Slavic languages

Polish Polish has two dative constructions, a PP and a DO dative. The PP dative is, similar to the German PP dative, restricted to spatial constructions and cannot be used with all dative verbs as illustrated in examples (52) and (53) (see Callies and Szczesniak 2008, p. 173).

(52) a. Wytłumacz mi problem.
Explain me.DAT problem.ACC
'Explain the problem to me.'

b. *Wytłumacz problem do mnie.
Explain problem.ACC to me.DAT
'Explain the problem to me.'

(53) a. Rzuć mi piłkę.
Throw me.DAT ball.ACC
'Throw me the ball.'

b. Rzuć piłkę do mnie.
Throw ball.ACC to me.DAT
'Throw the ball to me.'

The direct and the indirect object are case-marked. The direct object carries accusative case, while the indirect object carries dative case (Bartnicka 2004). Personal pronouns are case-marked as well (Bartnicka 2004).

Russian Russian has, according to Levin (2008), two dative constructions, a PP and a DO dative. These constructions do not alternate, but are reserved for semantically different constructions as exemplified in (54) and (55). The DO dative expresses a change in possession, whereas the PP dative is used to express spatial goals. The indirect object carries dative case, while the direct object carries accusative case.

(54) a. Ja dal Ivanu knigu.
I.NOM gave Ivan.DAT book.ACC
'I gave Ivan a book.'

b. *Ja dal knigu k Ivanu.
I.NOM gave book.ACC DAT Ivan.DAT
'I gave a book DAT Ivan.'

(examples taken from Levin 2008)

(55) a. *Ja poslal učenikov direktoru.
I.NOM sent students.ACC director.DAT
'I sent the children to the director.'

b. Ja poslal učenikov k direktoru.
I.NOM sent students.ACC DAT director.DAT
'I sent the children to the director.'

(examples taken from Levin 2008)

Russian has, according to Levin (2008), a relatively free word order and word order variants do not affect the acceptability of the sentences, which implies that the scrambling of theme and recipient is possible in Russian.

Czech The ditransitive constructions in Czech are similar to those in German. There are generally two possible word orders: Either the accusative object precedes the dative object or vice versa, as shown in the examples in (56).

(56) a. Karel podřídil svoje plány Marii .
Charles adjusted his plans.ACC Mary.DAT
'Charles adjusted his plans to Mary.'

b. Karel poslal Marii dopis.
Charles sent Mary.DAT letter.ACC
'Charles sent Mary a letter.'

(examples taken from Dvořák 2010)

Dvořák (2010) claims, however, that the word order in (56a.) is used with a different set of verbs than the word order in (56b.) in neutral contexts, i.e., when both constituents are either new or given. This basic word order can be overridden by information structure in that given constituents precede new ones (Dvořák 2010), as shown in (57).

(57) Karel poslal dopis Marii.
Charles sent letter.ACC Mary.DAT
'Charles sent Mary a letter.'

(examples taken from Dvořák 2010)

In summary, it can be stated that Czech dative constructions seem to be relatively flexible when it comes to the relative order of theme and recipient. Theme and recipient are flagged by case markers.

Bulgarian Bulgarian has a dative construction which is very similar to the English PP dative, as exemplified in the examples in (58):

(58) a. Momče-to dade (edna) kniga na momiče-to.
boy-DEF.NEUT gave (one) book DAT girl-DEF.NEUT
'The boy gave the girl a book.'

b. Momče-to izprati pismo na momiče-to.
boy-DEF.NEUT sent letter DAT girl-DEF.NEUT
'The boy sent the girl a letter.'

(examples were translated by an informant)

The prepositional phrase *na momiče-to* and the NP *(edna) kniga* can also occur in reverse order, as exemplified in (59). The recipient is flagged by the preposition *na*.

(59) Momče-to dade na momiče-to (edna) kniga.
boy-DEF.NEUT gave DAT girl-DEF.NEUT (one) book
'The boy gave the girl a book.'

(examples were translated by an informant)

According to Siewierska and Uhlířová (1998, p. 126), the preferred word order is the one in which the theme precedes the recipient (see example (58)). Slavkov (2008) reports that *na* can be dropped in colloquial Bulgarian in the presence of a dative clitic (see example (60)).

(60) (Na) Ivan mu dadox knigite.
(to) Ivan CL.DAT gave books
'I gave Ivan the books.'

(example taken from Slavkov 2008)

Another case in which the preposition *na* can be dropped is illustrated in example (61). In this case, the recipient is realized as a case-marked pronoun.

(61) Momče-to í dade (edna) kniga.
boy-DEF.NEUT her gave (one) book
'The boy gave her a book.'

(examples were translated by an informant[14])

To sum up, it can be stated that Bulgarian dative constructions are very similar to English PP dative constructions. It is, however, possible to invert the order of theme and recipient, which is only possible with heavy themes in English (e.g. *She gave to John the book I bought yesterday*; see Heine and König 2010, p. 99 for example and discussion). Further, in Bulgarian the theme has to be flagged by the preposition *na* or by case-marking when the recipient is realized as a pronoun. The flagging can only be dropped in colloquial Bulgarian in the presence of a dative clitic.

Other Languages

Japanese The basic word order in Japanese is SOV (Dryer and Haspelmath 2013). With respect to dative constructions, Japanese has allegedly only one possible word order, as stated in Inagaki (1997). This word order is exemplified in (62):

(62) John-ga Mary-ni hon-o atae-ta.
John.NOM Mary.DAT book.ACC gave
'John gave Mary a book.'

(taken from Inagaki 1997, p. 643)

The subject is followed by the indirect object, the direct object and the verb. Subject, object and indirect object are flagged by *-ga*, *-ni* and *-o* respectively. Heine and König

[14] I want to thank my informant, Prof. Dr. Tania Kuteva, for translating the example sentences and providing information on case-marking.

(2010) list Japanese as a language in which the position of theme and recipient can be inverted, as illustrated below (example 63).

(63) John-ga hon-o Mary-ni atae-ta.
John.NOM book.ACC Mary–DAT gave
'John gave a book to Mary.'

(adapted from Inagaki 1997, p. 643)

As Japanese is a language in which the verb occurs clause-finally, the relative word order of verb, theme and recipient neither corresponds to the English PP nor the English DO dative. Theme and recipient are both flagged by different markers.

Turkish The canonical word order in Turkish is SOV (Dryer and Haspelmath 2013). The basic Turkish dative construction is shown in (64):

(64) Murat bir adam-a bir kitap verdi.
Murat.NOM a man.DAT a book gave
'Murat gave the man a book.'

(example taken from Erguvanli 1984, cited in Primus 1998)

The word order of theme and recipient cannot be inverted when both theme and recipient are indefinite. If the theme is, however, definite and marked with the accusative case, the theme precedes the recipient as illustrated by the examples in (65).

(65) a. *Murat bir kitap bir adam-a verdi.
Murat.NOM a book a man.DAT gave
'Murat gave the man a book.'

b. Murat para-yıbir adam-a verdi.
Murat.NOM the-money.ACC man.DAT gave
'Murat gave the man the money.'

(example taken from Erguvanli 1984, cited in Primus 1998)

The recipient is case-marked in Turkish while the theme is not always flagged. As Turkish is, like Japanese, a verb-final language, none of the word orders corresponds to the English PP or DO dative.

Finnish Finnish has a relatively free word order. Among the possible ditransitive constructions are the ones shown in (66).

(66) a. Minä annoin miehelle kirjan.
I.NOM gave man.ALL book.ACC
'I gave a/the man a/the book.'

b. Minä annoin kirjan miehelle.
I.NOM gave book.ACC man.ALL
'I gave a/the book to a/the man.'

(examples taken from Kaiser 2002)

It has to be noted that Finnish does not have a dative case but only the allative case which is used to express a movement 'towards a surface' ("auf eine Oberfläche zu" (Karlsson et al. 2000, p. 137)) or 'to someone' ("zu jemandem hin" (Karlsson et al. 2000, p. 137)(translations of the German quotes are taken from Kaiser (2002)). There is no construction which contains a preposition. The choice between the constructions displayed in 66 is governed by information status (old before new) and pronominality (pronoun precedes nonpronoun), as shown in a preliminary corpus study by Kaiser (2002). It should be noted that Kaiser's the data base was rather small. Yet, the tendencies were very clear.

Tswana The relative word order of verb, theme and recipient in the dative construction in Tswana is V-T-R (see Heine and König 2010, Malchukov et al. 2010). An example is given in (67).

(67) Morutabana o-fa ngwana dibuka.
teacher AgrSubj-CL.give child books
'The teacher gives the child books'

(example taken from Pretorius et al. 2012[15])

Pronominal themes and recipients are realized as object agreement morphemes (see examples (68)).

(68) a. Morutabana o-mo-fa dibuka.
teacher AgrSubj-CL.AgrObj-CL.give books

[15]Nouns belong to different classes in Tswana, which were indicated in the original examples. As this is not of interest for the present investigation, I omitted these labels.

'The teacher gives him/her books.'

b. Morutabana o-a-mo-di-fa.
teacher AgrSubj-CL.PREStense.AgrObj-CL.AgrObj-CL.give
'The teacher gives it to him/her.'

(example taken from Pretorius et al. 2012)

The examples illustrate that Tswana has a word order which resembles the English DO dative. Flagging is also similar. Neither theme nor recipient are case-marked or flagged by a preposition.

Chinese According to Liu (2006), Chinese features three different dative constructions, as displayed in (69).

(69) a. Wo song-le yiben shu gei ta.
I give-as-present-PERF one-CL book to him
'I gave a book to him as a present.'

b. Wo song -gei ta yiben shu
I give-as-present -to him one-CL book
'I gave him a book as a present.'

c. Wo song ta yiben shu
I give-as-present him one-CL book
'I gave to him a book as a present.'

(examples taken from Liu 2006)

Liu (2006) claims that not all verbs license all three constructions which are shown in (69). Some verbs occur only in two of the constructions, others do not alternate at all. These alternating and non-alternating verbs belong to certain semantic classes, such as *teach*-verbs or *tell*-verbs. The use of the latter two groups is restricted to the PP dative.

Thus, Chinese features a dative construction which corresponds to the English PP dative and one which corresponds to the English DO dative. It should be pointed out that the verb classes which license each of the constructions differ in Chinese and English

(see Inagaki 1997). Verbs which belong to the *throw*-class do not license the DO dative in Chinese, whereas the DO dative is grammatical with this type of verb in English.

6.5.2 The Influence of the Native Language

In the light of the above section, a pattern emerges: The learners who most successfully master the native-like distribution of the two dative variants in English are Dutch, Swedish, Norwegian and Tswana learners of English. These four languages have one thing in common: They all feature a construction which perfectly matches the English DO dative in both word order and flagging. Dutch, Swedish and Norwegian even have a dative alternation which is very similar to the English dative alternation. Even though these languages might display differences when it comes to determinants of the dative alternation (e.g. verb bias, strength of the bias, and the influence of pronominal recipients), the underlying mechanisms are very similar.

Learners from all other L1 backgrounds differ from English native speakers. The native language of these learners does not have a construction which perfectly resembles the English DO dative. The only exception is Chinese, which has both, a structure which matches the DO dative and one which matches the PP dative. But in which features do the dative constructions in the L1s of the less successful learners differ from English dative constructions?

Let us start with German, Finnish, Polish and Czech. All of these languages are case-marked and the basic word order seems to correspond to the English DO dative. The difference is that these languages use case-marking and thus the arguments are flagged for different cases. Most of the languages seem to be able to scramble the arguments – I was not able to verify this for Polish, but it may be possible. Further German and Polish also have a construction which is very similar to the English PP dative in that it has the same word order and the recipient is flagged by a preposition. This word order is, however, only licensed by a restricted set of verbs in both languages. Russian has, like German and Polish, a ditransitive construction which resembles the DO dative and one which resembles the PP dative in terms of word order, in Russian, these constructions encode different meanings and occur in complementary distribution. It is striking that none of the learners from those language backgrounds overuses the DO dative, even though their L1 word orders are much closer to the DO than the PP dative.

Bulgarian and the Romance languages all feature a dative construction which perfectly matches the PP dative, but a structure which resembles the DO dative is ungrammatical. Thus, it is not very surprising that learners whose L1 is a Romance language or Bulgarian, overuse the PP dative. The straight forward explanation for this observation is structural

transfer.

Japanese, Chinese and Turkish learners are also among the less successful group of learners. Turkish learners overuse the PP dative so heavily that they even significantly differ in that from all of the other learners (see Table 6.12). Japanese and Turkish are the only languages in the sample which are verb-last languages,[16] thus, it is very difficult to say whether a construction in one of these languages resembles the PP or DO dative in English at all. The question is if the position of the verb can simply be ignored or if the verb can even be seen as the most important part in comparing the two constructions so that a Japanese T-R-V construction would correspond to the English V-R-T construction. In either way, there is no clear answer. Earlier studies have argued that the similarity of the Japanese and the English dative constructions depends on the status of the particle *-ni*. If analyzed as a postposition, the Japanese dative construction can be taken to resemble the PP dative. If considered a case marker, the construction can be seen as similar to the English DO dative (see Inagaki 1997 for discussion). Apart from the unclear status of *-ni*, the question remains whether it is the presence or the absence of a postposition that makes the English ditransitive construction comparable to the Japanese ones even though their orders are mirrored.

Among the unsuccessful learners are also Chinese learners of English, i.e., speakers whose L1 has two constructions which perfectly resemble the English PP and the English DO dative. Chinese learners of English are thus the only ones overusing the PP dative while both dative constructions are available in their L1. Possible explanations for this finding will be discussed in the next section.

In summary, it can be concluded that learners of those languages which have a dative alternation like English are very successful in acquiring the English-like distribution of the two competing dative constructions. However, Tswana speakers are also among the most successful learners even though their L1 lacks a PP equivalent.

All other learners whose dative constructions diverge in either word order or flagging were not as successful. The only exception to this generalization are learners whose L1 is Chinese.

6.6 Summary and Discussion

This study examined the use of the English dative alternation by learners from different L1 backgrounds. It addressed several questions: First, whether the harmonic alignment pattern correctly predicts the word order we find in the language of learners of English.

[16] In German subordinate clauses the verb is also in clause-final position.

Second, whether learners from different L1 backgrounds vary in their production of dative constructions and to what extent, and finally whether explanations for the differences across learner groups can be found in the dative construction in the learners' native languages.

It has often been claimed that learners of English acquire the PP dative before the DO dative (R. Hawkins 1987; Le Compagnon 1984; Mazurkewich 1981, 1984, 1985) and that it is thus more frequently used. The present study provides support for this claim: The majority of learners investigated here overuse the PP dative compared to English native speakers. Only Dutch, Norwegian, Swedish and Tswana learners of English do not exhibit an overly strong preference for the PP dative compared to L1 speakers. Compared to previous research, this is the first study which finds a PP preference while controlling for other factors which are known to influence the ordering of constituents.

Apart from this, it could be shown that the learners' choices can be predicted by the well-known linguistic factors (e.g. length, pronominality) and that all factors work in the direction predicted by the harmonic alignment pattern. The most important factor in predicting the learners' choices, was the factor LOGLENGTHDIFFERENCE. This means that learners are highly influenced by the end-weight principle, which supports the findings of previous studies (e.g. Callies and Szczesniak 2008, among others). The second most important factor in predicting the learners' choices were the learners' native languages, followed by recipient-related factors and finally by theme-related factors. A possible explanation for the recipient being more important than the theme in predicting the learners' choices is that recipients are linguistically more prominent than themes, e.g. more often animate and definite (see Heine and König 2010). All factors which were meant to encode the learners' proficiency, i.e., the length of the exposure to the English language in an institutional setting or the time spent in an English-speaking country, failed to reach significance.

A comparison of the results of learners and native speakers revealed a difference in the relative importance of the linguistic factors. Bresnan and Ford (2010) report the factors PRONOMINALITY OF THEME and PRONOMINALITY OF RECIPIENT to be the most important ones in predicting Australian and American speakers' choices, followed by their factor for LENGTH, DEFINITENESS OF THEME, ANIMACY OF RECIPIENT and some other factors. It should be noted, however, that a large part of Bresnan and Ford's data was taken from the Switchboard corpus and thus resembled spoken data. The relative importance of factors may differ across genres. It is also thinkable, though, that the recipient can be considered more important in predicting learners' choices. Recall the results of the split rating task in Chapter 4 – in this experimental setting, the recipient-related factors were also more predictive of learners' ratings than theme-related factors.

When it comes to the influence of the learners' native languages it was demonstrated that, all else being equal, learners whose L1s are Dutch and Norwegian are significantly less likely to produce PP datives than learners from the other L1 backgrounds, while Turkish learners of English have the highest probability to produce a PP dative. An across comparison of all learner groups indicated that learners whose L1s belong to the same language family pattern in their preferences.

Unfortunately, it was not possible to meaningfully test interactions between the linguistic factors and the individual learner groups. The number of observations which was available per L1 were to small for the high number of predicting factors. To limit the predicting factors to only a few is, of course, a possible solution, but it bears several problems. Firstly, it is difficult to decide which factors to exclude from the analysis and which ones to use. This decision would inevitably bias the results in some way. Secondly, the aim of this study was to test the effects of influential linguistic factors simultaneously. It has been argued before that testing only one or a few factors at a time can cause misleading results as it is impossible to determine whether the effect found is really to be attributed to the tested factor or is actually caused by another factor which is not controlled for (see Chapter 3.3 for discussion). Thus, the exclusion of linguistic factors was not an option and the questions whether the importance or effects sizes of the linguistic factors differ across different interlanguages has to be left to future research.

A comparison of the learners and native speakers of English revealed that native speakers differ from learners in two respects. Firstly, native speakers produce fewer PP datives than learners, all else being equal, and secondly, the native speakers in my data set were more heavily influenced by the factor DEFINITENESS OF THEME. The effect worked in the same direction for learners and native speakers, but the effects size was bigger for L1 speakers.

On inspection of the influence of the different L1 backgrounds, it was shown that learners of different L1 backgrounds are not equally successful in the acquisition of the native-like distribution of PP and DO datives. Learners of Dutch, Swedish, Norwegian and Tswana did not differ from English native speakers, whereas the learners of all other L1 backgrounds did in that they produced more PP datives than the native speakers. The analysis identified tendencies for language families to pattern together in this respect. While learners whose L1 belongs to the Germanic language family did not differ from English L1 speakers, speakers of Romance and Slavic languages differed from L1 speakers. For the same reasons as mentioned above, it was not possible to investigate interactions of the linguistic factors and the individual native languages. Previous research by Deshors (2014) suggests, however, that French and German learners of English are sensitive to the factor LENGTH OF RECIPIENT like native speakers and that the effect for both groups

work in the same direction. Native speakers, however, started using the PP dative when the recipient was much longer than it was the case for French learners of English. German learners were in between the two groups (see Chapter 2). Thus, the differences between the learners of different L1 backgrounds can possibly be explained by a different sensitivity for the linguistic factor, but this question needs closer examination in future research.

In order to explore the nature of the differences between learners and native speakers in some more detail, I adopted the method presented in Gries and Deshors (2015), which enables us to answer the question 'What would a native speaker have say?', in the presence of certain linguistic factors. In order to do that, the estimates of a native speaker mixed model which predicted their use of the PP and DO datives were extracted. Those estimates were used to predict the probability of each dative construction which was uttered by the learners to be realized as a PP or DO dative if it had been uttered by a native speaker. A comparison of the dative constructions which were predicted on the basis of the L1 corpus probabilities and the dative constructions the learners actually produced showed that learners mostly use PP datives when DO datives were predicted but the opposite case hardly ever occurs.

A further finding was that the learners' use of the dative alternation is by no means categorical. The L1 corpus probabilities are highly predictive of the learners' choices. For learners who heavily overuse the PP dative, it was shown that rather low L1 corpus probabilities for the PP dative correlate with a very high proportion of PP datives. Only very high L1 corpus probabilities for a DO dative correlate with an actual production of DO datives. This was different for the more successful learners. They started using a high proportion of PP datives for L1 corpus probabilities much higher compared to the less successful learners.

This finding is an indication of the different sensitivity to the linguistic factors by the more and less successful learners as the L1 corpus probabilities have been computed on the basis of these linguistic factors. Thus, future research should test whether the influence of an individual linguistic factor is responsible for some learners being more successful than others or whether the successful learners differ in their overall sensitivity for the linguistic factors.

In the last part of this chapter, I investigated whether the reason for the differences across learner groups can be found in the dative constructions in the native languages of the learners in my set. An overview of the ditransitive constructions of the learners' L1s revealed that all learners who manage to use the dative alternation in a native-like way are speakers of a native language which features a construction which perfectly matches the English DO dative in word order and alignment type.

The learners who seem to be second best are those whose L1 has a word order which

resembles the word order in the English DO dative, but in which theme and recipient are distinctly flagged, i.e., learners whose L1 is German, Finnish, Polish, Russian or Czech. These learners, however, also overuse the PP and not the DO dative. Speakers whose L1 is a Romance language or Bulgarian also overuse the PP dative. A possible explanation for the overuse of the PP dative by native speakers of a Romance language and Bulgarian might be structural transfer from the L1. If that was, however, the explanation, we should find that German, Finnish, Polish, Russian or Czech learners of English overuse the DO dative.

Learners whose L1s are Turkish and Japanese also overuse the PP dative. These two languages are verb-final languages and thus structurally very different from English and it is unclear whether they would overuse the PP or DO dative if structural transfer played a role. Chinese learners of English are special in that Chinese features dative constructions which resemble the PP and the DO dative in English, but they still overuse the PP dative.

But how can the L1 influence be accounted for? If unconstrained structural transfer was the answer, we would expect learners whose L1 language has a construction which rather resembles the DO than the PP dative (e.g. Finnish) to overuse the DO dative. This is, however, not the case. When learners differ from native speakers, they always overuse the PP dative. A possible explanation for this finding is developmentally moderated transfer, as proposed by Håkansson et al. (2002) (see Chapter 2 for more details). Even though Processability Theory (Pienemann 1998) does not make any predictions for the dative alternation or other phenomena of syntactic variation, the spirit of the theory is that learners start their acquisition with those structures that are least marked and thus easier to process, irrespective of the structure which is used in their L1. This hypothesis has been strongly supported by Håkansson et al. (2002). They found that Swedish learners of German use SVO word order in German before they use the target-like, but more difficult to process, verb-second construction. Only when learners have acquired the necessary processing procedures for the more marked V2-structure, they can transfer it to the L2 and use it.

When transferring this approach to the dative alternation, the structure which is allegedly less marked and thus easier to process is the PP dative. Developmentally moderated transfer would, thus, predict that the PP dative is acquired first and that those learners whose L1 features a DO dative construction can transfer this construction to the L2 as soon as they can process it. Hence, the idea of developmentally moderated transfer would not only explain why the PP dative is overused by learners of English, but it could also account for why those learners whose L1 has a DO dative construction are more successful than others, while the presence of a structure which resembles the English PP dative (e.g. in Romance languages) or the absence of a structure which resembles the PP dative (e.g. Tswana) does not seem to influence the learners' success. Chinese learners

are either not advanced enough to transfer the DO dative to the L2 or they do not realize that transfer is possible as English and Chinese are typologically very distinct. It has been argued that transfer can only occur between typologically similar languages, or languages that the learners perceive to be typologically related (see Chapter 2.4 for discussion,Ellis 2008)and Ringbom 1987.

What is unclear at this point is why the English DO dative is more difficult to process than the PP dative and at which of the stages proposed by Processability Theory the necessary processing procedures to process them are available. I assume that the difficulty in the use of the DO dative is caused by the lack of overt marking, i.e., the act of transferring something from A to B is not overtly shown by any morpheme, while the preposition *to* indicates the transfer in the PP dative. The question why the PP dative seems to be less marked than the DO dative and the question if the findings of this corpus study can be implemented in the stages proposed by Processability Theory cannot be answered at this point. I leave this open for future research.

Another factor which cannot be neglected is that proficiency may still play a role in the findings presented here. The measures available to me did not properly control for proficiency. Granger et al. (2009), however, state that there are differences in proficiency within and across the different L1s which were sampled in the ICLE. In order to give a proxy as to which learners are more advanced than others, Granger et al. (2009) had 20 essays (out of an average of 380) per L1 background classified by professional raters to determine the proficiency in each subset.[17] These results are not very reliable given the small size of the rated subsets and the variation within L1 groups. When taking the ratings into account, they do not explain the variable success of the learners of different L1 backgrounds. Learners whose L1s are Turkish, Chinese, Japanese and Tswana received the lowest proficiency ratings of all groups. While learners whose L1 is Chinese, Japanese and Turkish are among those who struggle most when it comes to using the dative alternation in a native-like way, Tswana speakers do not have this problem. Further, French and Norwegian learners received about equal proficiency ratings, but while Norwegian learners did not differ from L1 speakers in my sample, French speakers did.

Thus, the ratings provided in Granger et al. (2009) do not explain the differences found between the learners of different L1 backgrounds. In future research, proficiency should still be controlled for as this is the only way to make sure that the effects which are found can be attributed to differences in the respective L1 and are not overridden by proficiency

[17] I did not include the result of the ratings in the statistical analyses which were presented in the previous chapter, as 20 rated essays per L1 did not seem to representative enough. The average number of essays which was submitted per L1 is 380, thus basing a proficiency estimate on 20 essays per L1 when it is explicitly stated that there are differences within one L1 group does not seem to be reliable enough as to include this factor in a mixed model. Especially when considering that such a factor can be detrimental for the analysis, the inclusion of these ratings cannot be justified.

effects.

Apart from the results which were yielded by the systematic comparison of the ditransitive constructions with respect to the acquisition of the dative alternation in ESL, the overview of the ditransitive constructions provided insights into two more aspects. First, the study by Heine and König (2010) showed that the word order in ditransitive constructions depends on very similar factors in many of the world's languages. This brings up the question whether learners really have to acquire the ordering of constituents predicted by harmonic alignment or this is a universal tendency to govern constituent alignment.

The overview of the ditransitive constructions showed, secondly, that investigating structural transfer is not a simple undertaking and that it is hardly possible to propose clear-cut hypotheses, as there is so much syntactic variation within only one language it is hard to determine which structure is to be transferred to the L2. In summary, it can be stated that the investigation provides further evidence for the L1 being influential in L2 acquisition, and for the concept of developmentally moderated transfer.

6.7 Conclusion

This chapter presented a corpus study which investigated 3035 dative constructions produced by learners of 16 different native languages. The data was also compared to 699 dative constructions produced by L1 speakers of English.

It was shown that learners of all 16 L1s have acquired the PP and the DO dative. They align theme and recipient as predicted by the harmonic alignment pattern, i.e., short, animate, definite and pronominal constituents precede long, inanimate, indefinite and non-pronominal constituents. When it comes to linguistic factors, LENGTH DIFFERENCE is the most important one in predicting the dative constructions used by the learners. Learners, thus, do not categorically select the one or other dative construction but select them in a gradient way, influenced by the same linguistic factors which are predictive for L1 speakers' choices.

Another finding was that learners generally produce more PP datives than native speakers, all else being equal, but that learners of different L1 backgrounds differ in their probabilities of producing PP datives. Learners whose L1s belong to the same language family pattern together. The native language also plays a role in the successful acquisition of the native-like use of the English dative alternation. While learners whose L1s feature a construction which exactly resembles the English DO dative are very successful in mastering the native-like use of English dative constructions, learners whose L1s have a construction which resembles the PP dative do not seem to benefit from that. A possible explanation

for this finding is developmentally moderated transfer.

Chapter 7

Summary and Outlook

The aim of this project was to investigate the dative alternation in English as a second language. In order to do so the grammatical judgment, processing, and written production of dative constructions were examined. The target group were advanced learners of English. The main questions to be answered in this project were the following: (I) Are advanced learners influenced by the same linguistic predictors as L1 speakers, and if so, in which way? (II) Does the learners' native language influence the learners' use of dative constructions? (III) Do learners have a preference for one or the other construction, and if they do, why do they prefer the one variant and not the other? (IV) How are dative constructions processed by learners?

With respect to the linguistic factors, I examined whether learners place short, pronominal, definite, animate, and given constituents before long, nonpronominal, indefinite, inanimate, and new ones, whether they rate constructions which follow this order better than others and whether this ordering has influence on the processing of dative constructions. In previous research only the influence of individual factors such as LENGTH or DEFINITENESS had been tested (e.g. Callies and Szczesniak 2008; Chang 2004; Tanaka 1987). The present project is the first one which systematically tested the simultaneous influence of these linguistic factors.

I further investigated whether learners, as has been claimed in the pertinent literature (R. Hawkins 1987; Le Compagnon 1984; Mazurkewich 1981, 1984, 1985 *inter alia*), really have a general preference for the PP dative in grammatical judgment tasks and use this construction earlier and thus probably more often than the competing DO dative. This question is intertwined with the question whether the learners' native languages have an influence on the judgments and the use of dative constructions in ESL. Although it has proven to be difficult to infer a clear-cut prediction from existing theories of second language acquisition, I hypothesized that learners would overuse the construction prevalently used in their own L1 if structural transfer plays a role (Schwartz and Sprouse 1996). When making predictions on the basis of processing-based approaches (Pienemann 1998), it was

assumed that learners, irrespective of the dative constructions in their L1, overuse the PP dative.

This project dealt with the question *why* learners order constituents in a certain way. When it comes to L1 speakers, it has been hypothesized that constituents are ordered in a way that those constituents which are easier to produce by a speaker and easier to process by a listener precede those which require more processing effort (Arnold et al. 2000; Gries 2002). If this assumption is correct and also valid for learners, the preferred constituent order should be easier to process, and that should be reflected in reading times. I further tested whether certain features of constituents generate expectations in learners as they read, whether these expectations are reflected in reading latencies, and whether results obtained in grammatical judgments are predictive of reading times.

In order to address these questions, three studies were conducted. A split rating task and a continuous lexical decision task with advanced German learners of English, and a corpus study which investigated dative constructions, produced by higher intermediate to advanced learners of English from 16 different L1 backgrounds.

The split rating task was a replication of the study presented in Bresnan and Ford (2010). In this task, learners had to rate which of two possible continuations for a text passage they considered to be more natural and to express their ratings on a gradient scale. The two continuations were identical in all but one feature. One continuation was realized as a PP dative, the other one as a DO dative.

The items were constructed in a way that the whole range of PP probabilities were covered, i.e., some items had a really low probability to be realized (or chosen) as a PP dative whereas others had a very high probability to be realized as a PP dative. All intermediate probabilities were covered as well. The probability of each item to be used in the PP or the DO dative is created by the interplay of multiple factors, such as the VERB BIAS, LENGTH DIFFERENCE, ANIMACY OF THEME and RECIPIENT, PRONOMINALITY OF THEME and RECIPIENT, DEFINITENESS OF THEME and RECIPIENT and ACCESSIBILITY OF THEME and RECIPIENT.

The results of the study show that learners are influenced by the same linguistic predictors as native speakers are, and that the effects work in the same direction. A one-to-one comparison of the results of Bresnan and Ford (2010) and the results of the study presented here was not possible, as the factors LENGTH DIFFERENCE and PRONOMINALITY OF RECIPIENT had to be residualized due to collinearity problems. Thus, the factors which were used for modeling here are no longer comparable to the ones used by Bresnan and Ford (2010). The factor which was most influential in predicting learners' ratings was ANIMACY OF RECIPIENT, followed by PRONOMINALITY OF THEME, PERSON OF RECIPIENT, LENGTH DIFFERENCE and DEFINITENESS OF RECIPIENT. The factors which have

shown to be significant in this study have partly been reported to have an influence on the dative alternation in ESL in previous studies as well, i.e., DEFINITENESS and LENGTH DIFFERENCE (see Callies and Szczesniak 2008; Tanaka 1987). All discourse-related factors failed to reach significance.

A comparison of a monofactorial analysis for each of the predictors and the results of multifactorial modeling revealed that many predictors which had reached the level of significance in monofactorial modeling did not turn out to be significant when controlling for other factors at the same time. This finding once more emphasizes the importance of multifactorial analysis when investigating complex phenomena like the dative alternation.

The study also revealed that German learners of English do not generally prefer either the PP or the DO dative. The median of ratings for the PP dative was 50 points (out of 100 points) which suggests no preference in either direction. When comparing the learners' ratings to the ones obtained by Bresnan and Ford (2010), a very slight PP preference was visible. This finding showed two things: First, the question of a general preference for the one or other construction can only be addressed if all other influencing factors are controlled for. If, under those conditions, a preference is detected, there is real evidence a certain group of speakers really prefers one over the other construction and that this preference was not induced by the presence of certain linguistic factors. Secondly, in this rating task, there was no evidence for either structural transfer nor processability-based approaches. On inspection of the individual participants, it turned out that some of them make more gradient choices than others. More gradient ratings are possibly an indication for a more advanced speaker and a more fine-grained acquisition of the interplay of the effects of the individual linguistic factors. When looking at the ratings of Bresnan and Ford's study (2010, p. 187), we can observe similar rating patterns for L1 speakers. Thus, differences in rating patterns must not necessarily indicate differences in proficiency or the acquisition of the harmonic alignment pattern, but can also reflect individual rating behavior. In future research, the question whether the preference for a construction in which the constituents are ordered in a native-like way develops gradually, or whether learners perceive those constructions to be 'better' when they are not that advanced yet, has to be tested. The PP preference which has been reported in earlier studies could be an indication that the categorical preference for this construction either overrides the influence of the linguistic predictor or that learners are not sensitive to them in early stages of acquisition. As the questionnaires in previous research were, however, not set out to answer this question, they did not cover a very wide range of linguistic predictors, e.g. very long constituents were not used. Thus, it is not possible to infer from results of those studies that learners were not sensitive to the end-weight principle. Thus, a study which includes early and intermediate learners should be conducted to better understand the de-

velopment of the sensitivity for the harmonic alignment pattern.

The second study presented here was a reading-time experiment (a continuous lexical decision task), which was also a replication of an experiment conducted by Bresnan and Ford (2010). The participants were again advanced German learners of English. The items which were already used in the split rating task were manipulated in order to meet the requirements to be used in a self-paced reading task. Learners had to read an introductory passage followed by a PP dative. The reading time on the preposition *to* was measured, as this is the point of syntactic disambiguation, i.e., readers realized that the NP they have just read is the theme of the construction.

The properties of the NP preceding the preposition *to* were used to predict the reading time on the preposition itself. It was shown that shorter and defintite NPs lead to shorter reading times than longer and indefinite ones. This finding suggests that the ordering of constituents which is proposed by harmonic alignment is the order of constituents which can be taken to reflect processing advantages in that constituents which are easier to process are placed before those that are more difficult to process (see Arnold et al. 2000; Gries 2002). There was also a marginally significant effect for the predictor ANIMACY which did not go in the direction predicted by the harmonic alignment pattern. For animate NPs, the reading time on *to* increased, which suggests that animate NPs are more difficult to process than inanimate ones. The reason for this finding could, however, also have a different cause. Levy (2008) and Tily et al. (2008) present evidence that expectations play a role in syntactic processing. Thus, participants may have anticipated that an animate NP in a ditransitive construction is the recipient. When they encountered the preposition *to*, they realized that they have to revise their previous interpretation.

Whether these interpretations of my results can really be held up should be verified in future research by a study which uses a more balanced data set. The set of items used in the present study only contained three animate NPs and three pronominal NPs, out of a total of 23 items. The lack of pronominal NPs is possibly the reason why there was no effect for the factor PRONOMINALTY. Wolk et al. (2011) reported that pronominal NPs were read faster than full NPs in their eye-tracking study. Shorter RTs for a pronominal NP should have lead to shorter RTs on the preposition *to* in my experiment.

My results, nevertheless, suggest that German learners of English really have a processing advantage when they place short and definite constituents before long and indefinite ones and that the order of constituents which is predicted by the harmonic alignment pattern reflects the order which is easiest to process.

It was also tested whether the preposition *to* is read faster in those items which received a high PP rating in the split rating task. There was a small effect for this factor, but it only explained about 1% of the variation in the reading times. It has to be kept in mind,

however, that the ratings were based on theme-related and recipient-related factors. When subjects rated the items in the split rating task, they saw theme and recipient. Thus a really long recipient could have possibly led to a very high PP rating while the theme itself had hardly any influence on that specific rating. The participants in the continuous lexical decision task were not influenced by any recipient-related variables as the recipient was only read after the measuring point. Thus, this very small effect is not very surprising. For future research, it would be desirable to create a better match between an off-line and an on-line task to better understand how off-line ratings and on-line processing are related to one another.

The third study in this project was a corpus study. The ICLE, which was used in this project, is a collection of essays, written by students who are higher intermediate to advanced learners of English of a variety of L1 backgrounds. I collected 3035 dative constructions with a variety of ditransitive verbs, uttered by learners of 16 different L1 backgrounds. It was tested whether the learners align themes and recipients in the way it is predicted by harmonic alignment, and whether learners with different L1 backgrounds differ in their probability to produce a PP dative. It was further explored whether and how learners of English differ in their use of the two dative constructions from L1 speakers and to what extent the learners' native languages are predictive of the successful acquisition of the native-like use of the dative alternation.

The results of this study showed that learners are sensitive to the same predictors which have been found to influence the use of dative constructions in English native speakers. All factors worked in the predicted direction. The most influential linguistic factor is LENGTH DIFFERENCE, i.e., the end-weight principle, followed by ANIMACY OF RECIPIENT, PRONOMINALITY OF RECIPIENT, PERSON OF RECIPIENT, and PERSON OF RECIPIENT, and finally PRONOMINALITY OF THEME, NUMBER OF THEME and DEFINITENESS OF THEME. The effects of all theme-related variables were, however, rather small.

Apart from the linguistic factors, the native language of the learners was overall the second most important predictor for determining which dative construction a learner was likely to use. I found that especially speakers of Germanic languages have a rather low probability of uttering a PP dative, compared to learners whose L1 is a Romance language.

When comparing the learners' data to that of native speakers two things became evident. First, learners and native speakers generally differ in their production of dative constructions in that learners produce more PP datives, all else being equal. Further, learners are less strongly influenced by the factor DEFINITENESS OF RECIPIENT but the effect works in the same direction in both groups of speakers. Secondly, it became apparent that learners of some L1 backgrounds do not significantly differ from English L1

speakers, while others do. Various analyses showed that learners whose L1 languages have a structure which perfectly resembles the English DO dative have an advantage over the other learners when it comes to using the two constructions in a native-like way. It was, however, also shown that learners do not categorically choose between the two constructions but that they make probabilistic choices. Learners who strongly overuse the PP dative have a rather low threshold when it comes to using the PP dative, i.e., when the probabilities to produce a PP dative are still relatively low, they already produce a high proportion of PP datives compared to more successful learners.

In summary, this project systematically tested whether learners are sensitive to the harmonic alignment pattern in different types of data. It was shown that they are and that the effects work in the same direction as for native speakers. This is in line with the results of previous studies (Callies and Szczesniak 2008; Tanaka 1987, among others).

It was also shown that learners of some L1 backgrounds overuse the PP dative compared to L1 speakers, but that was not the case for all learners in my data set. Interestingly, there was no evidence that learners ever overuse the DO dative, which seriously challenges the hypothesis of structural transfer (Schwartz and Sprouse 1996), but supports the theory of developmentally moderated transfer (Håkansson et al. 2002). At the time being, neither Processability Theory (Pienemann 1998) nor the theory of developmentally moderated transfer make any predictions for cases of grammatical variation. An implementation of the findings presented in this study into the theoretical framework of PT has to be left to future research.

Further, it is still unexplored is how the influence of the individual predictors differs for learners from different L1 backgrounds. Deshors (2014) provided first evidence that learners of different L1s and native speakers differ in their sensitivity to the end-weight principle. These differences should be explored in more detail in future research. The investigation of these interactions could not only give insights with respect to differences between learners from different L1 backgrounds but it would also provide the opportunity to investigate whether constraints on word order are transferred from the L1 to the L2. The transfer of these types of constraints has, to the best of my knowledge, never been investigated. The overview of ditransitive constructions in other languages has shown that similar principles are at work in almost all languages (see Heine and König 2010 for a more detailed overview). Thus, it is possible that these constraints do not even have to be transferred because they constitute universal principles of structuring information in all languages and thus also interlanguages.

For future research it is also desirable to thoroughly control for proficiency, as this factor probably plays a role in the native-like use of the dative alternation. Findings in that direction could not be provided by the current project.

In conclusion, the project presented here has shown that learners are sensitive to the harmonic alignment pattern in on-line and off-line tasks. When it comes to the written production of dative constructions, learners also order constituents in the predicted way. The project has also provided evidence that learners of different L1 backgrounds are not equally successful in the native-like use of English dative constructions. When learners do not use the dative alternation in a native-like way, they overuse the PP dative.

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Chapter 8

Appendix

8.1 Chapter 4 - Split Rating Task

8.1.1 Instructions

Anleitung

Wir sind daran interessiert, wie sich Lerner des Englischen in informellen Konversationen spontan zwischen verschiedenen Möglichkeiten, die den gleichen Sachverhalt ausdrücken, entscheiden.
In den folgenden Textabschnitten sprechen ein oder zwei Personen über verschiedene Themen. In jedem dieser Textabschnitte gibt es die Möglichkeit zwischen zwei Alternativen auszuwählen, wie der Textabschnitt fortgesetzt werden könnte. Diese Alternativen sind mit (1) und (2) nummeriert.
Ihre Aufgabe ist es, die Textabschnitte zu lesen und zu entscheiden, wie natürlich Ihnen die zur Wahl gestellten Alternativen vorkommen.
Sie haben 100 Punkte, die Sie zwischen den beiden Alternativen aufteilen können. Die Summe der Punkte, die Sie pro Textabschnitt verteilen, muss immer 100 Punkte ergeben. Wenn Sie z.B. denken, dass beide Alternativen (1) und (2) in dem gegebenen Kontext gleich natürlich klingen, verteilen Sie jeweils 50 Punkte. Wenn eine der Alternativen völlig unnatürlich klingt, bewerten Sie diese mit 0 Punkten und die andere mit 100 Punkten. Natürlich können die Punkte auch in anderen Verhältnissen, z.B. 40 Punkte und 60 Punkte oder 25 Punkte und 75 Punkte verteilt werden, wenn eine Alternative nur etwas besser erscheint als eine andere.
Bitte lesen Sie die Abschnitte sorgfältig und verteilen die Punkte nach Ihrem Sprachgefühl. Es gibt keine „richtigen“ oder „falschen“ Antworten. Wir sind daran interessiert herauszufinden, was Sie in ungezwungenen englischen Konversationen als natürlich empfinden.

Bevor Sie anfangen, beantworten Sie bitte folgende Fragen:

1. Ist Deutsch Ihre Muttersprache?

   ☐ Ja
   ☐ Nein
   ☐ (weitere)Muttersprache:

2. Haben Sie längere Zeit im englischsprachigen Ausland verbracht (ab 3 Monaten)?

   ☐ Ja
   ☐ Nein
   Dauer:
   Land:

3. Haben Sie schon ein Seminar zum Thema Syntax besucht?
   ☐ Ja
   ☐ Nein

VIELEN DANK FÜR IHRE TEILNAHME AN DIESER FRAGEBOGENSTUDIE!

8.2 Chapter 5 - Continuous Lexical Decision Task

8.2.1 Instructions

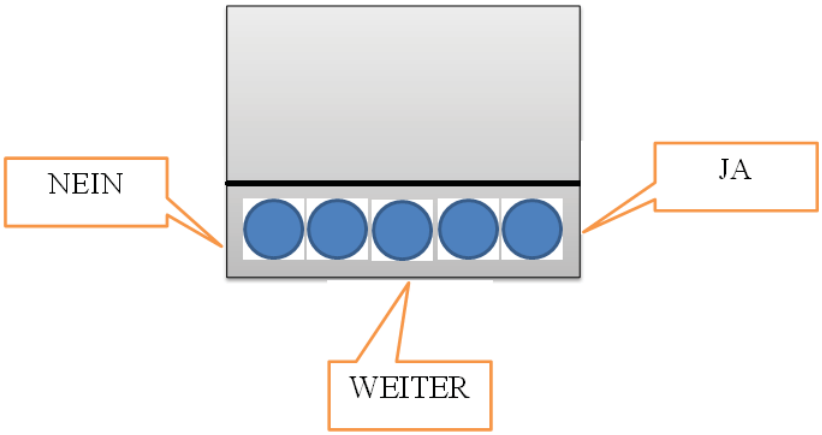
Anleitung

Guten Tag!
Vielen Dank für Ihre Teilnahme an unserem Experiment. Wir wollen mit dieser Studie untersuchen, wie gelesene Sätze verstanden werden. Aus den Daten lassen sich keinerlei Rückschlüsse auf Intelligenz oder persönliche Eigenschaften ziehen. Die Daten werden anonym behandelt.
Lesen Sie die folgenden Informationen sorgfältig. Wir bitten Sie, die Anleitung genau zu befolgen.
In diesem Experiment geht es um Genauigkeit und Schnelligkeit. Arbeiten Sie daher bitte zügig und konzentriert.

Informationen zum Versuchsablauf

Setzen Sie bitte vor dem Experiment die (geräuschschützenden) Kopfhörer auf. Das Experiment starten Sie selbst per Knopfdruck (**WEITER**-Taste).
Sie werden Dialoge in englischer Sprache lesen. Es handelt sich dabei oft um umgangssprachliches Englisch. Jeder Dialog hat eine Ergänzung von mehreren Wörtern. Diese Wörter sind durch gestrichelte Linien verdeckt. Wenn Sie die erste Passage gelesen haben, drücken Sie bitte auf die **WEITER**-Taste, um das erste Wort aufzudecken. Jetzt müssen Sie entscheiden, ob es sich bei dem aufgedeckten Wort tatsächlich um ein englisches Wort handelt oder nicht. Handelt es sich um ein Wort, drücken Sie bitte auf **JA**, wenn nicht, drücken Sie bitte auf **NEIN**. Sobald Sie eine Taste betätigt haben, erscheint das nächste verdeckte Wort. Verfahren Sie genauso wie bei dem ersten verdeckten Wort.
Wenn Sie alle verdeckten Wörter gelesen haben erscheint entweder sofort eine Verständnisfrage oder aber eine weitere kurze Textpassage. Wenn Sie diese gelesen haben, können Sie mit der **WEITER**-Taste zur Frage gelangen. Die Frage bezieht sich immer auf den vorangegangenen Dialog. Beantworten Sie die Frage bitte mit **JA** oder **NEIN**. Sollte die Antwort nicht eindeutig aus dem Dialog hervorgehen antworten Sie bitte mit **NEIN**.
Lesen Sie die verdeckten Wörter bitte so schnell wie möglich, aber vergessen Sie nicht, dass Sie den Inhalt des Gelesenen dabei erfassen müssen. Lassen Sie sich nicht beunruhigen. Es gibt keine Tricks und es wird offensichtlich sein, wann es sich um ein englisches Wort handelt und wann nicht. Wenn Sie ein Wort im Dialog nicht kennen, ist das nicht so

schlimm. Lesen Sie einfach ganz natürlich weiter.
Sie werden während des gesamten Experiments sämtliche Eingaben ausschließlich mit dem hier abgebildeten Eingabegerät tätigen!



Vor dem Experiment gibt es drei Probedurchgänge, damit Sie sich an den Ablauf gewöhnen.
Bitte verfahren Sie zügig und konzentriert. Falls Ihnen ein Fehler unterläuft, fahren Sie bitte ruhig fort. Das Experiment dauert ca. 30 min. Nach Beendigung des Experiments klopfen Sie bitte an der Tür.

Haben Sie noch Fragen?

8.2.2 Personal Details

Angaben zur Person

Name:
Muttersprache:
Waren Sie länger als 3 Monate im englischsprachigen Ausland?
Ja ☐ Nein ☐ Wie lange? Wo?

Geschlecht:
Alter:
Ich bin
☐ Rechtshänder ☐ Linkshänder

Semester:
Möchten Sie für Ihre Teilnahme am Experiment ein Assignment erlassen haben oder eine Schlüsselkompetenz erwerben („Aktive Mitarbeit an einem Forschungsprojekt des Instituts / Fachbereichs“)?

Assignment:☐
Schlüsselkompetenz:☐

8.3 Chapter 6

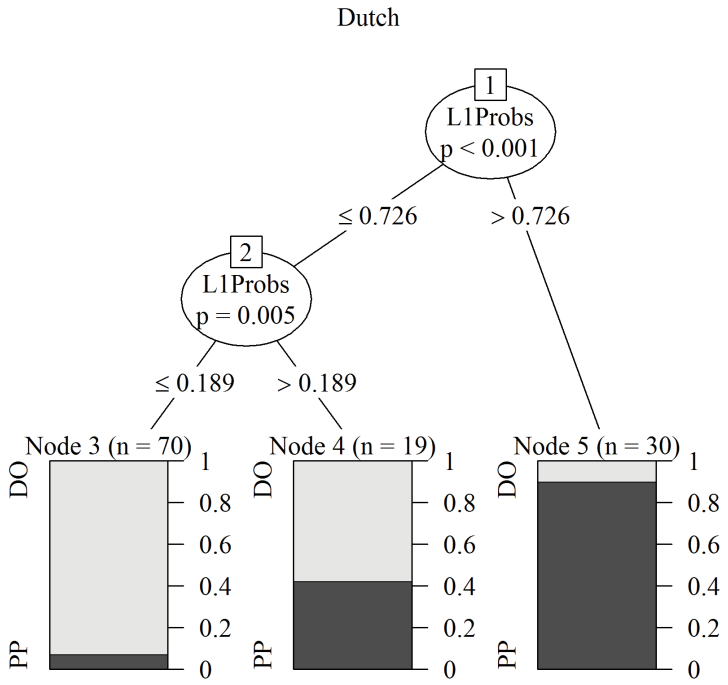


Figure 8.1: Conditional inference tree - Dutch learners of English

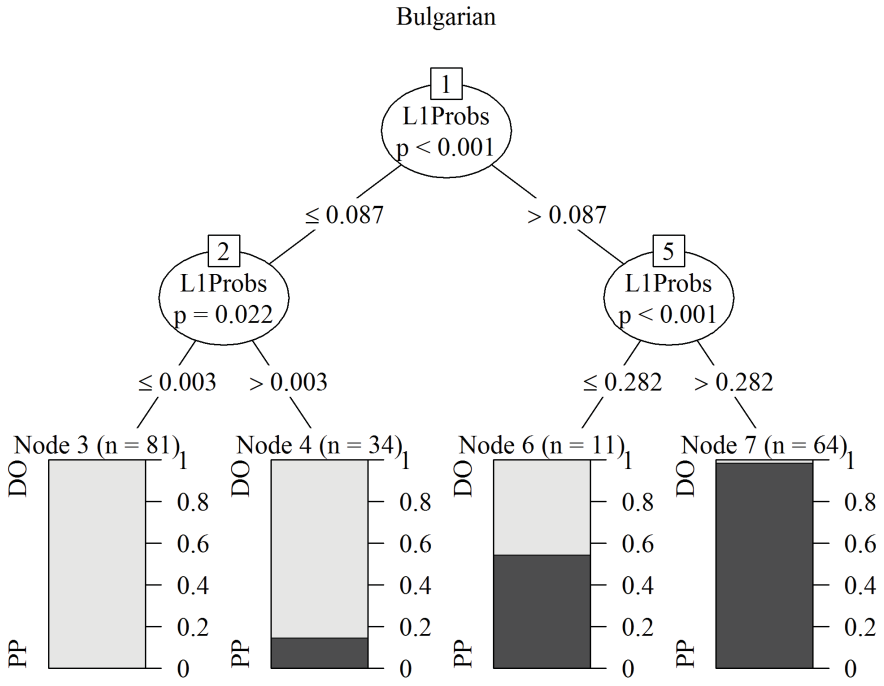


Figure 8.2: Conditional inference tree - Bulgarian learners of English

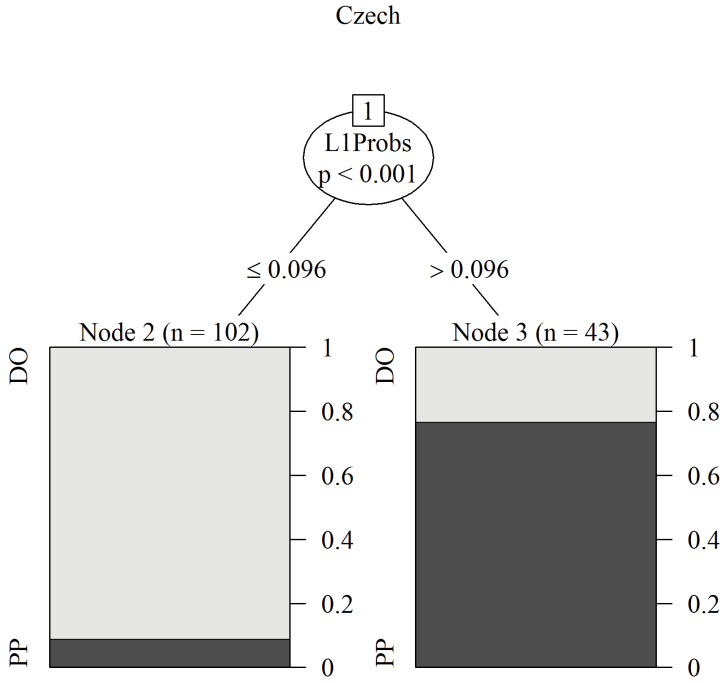


Figure 8.3: Conditional inference tree - Czech learners of English

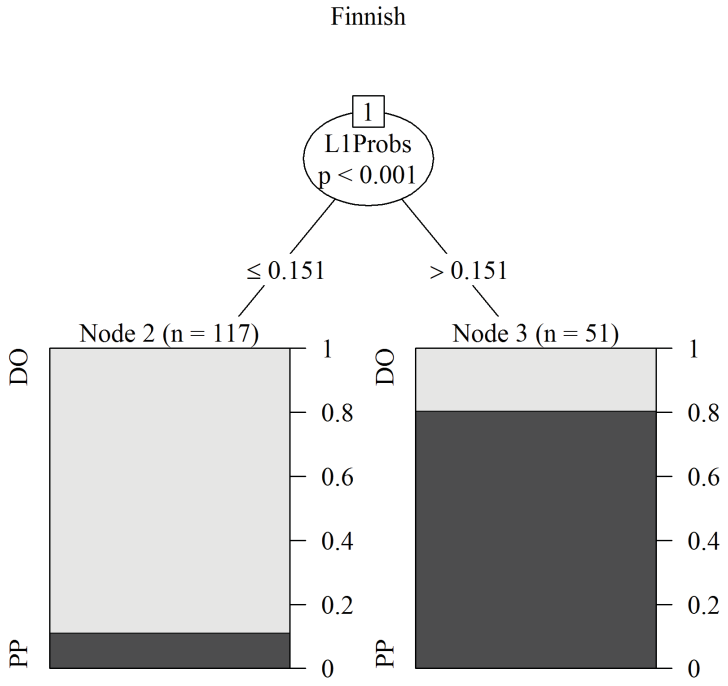


Figure 8.4: Conditional inference tree - Finnish learners of English

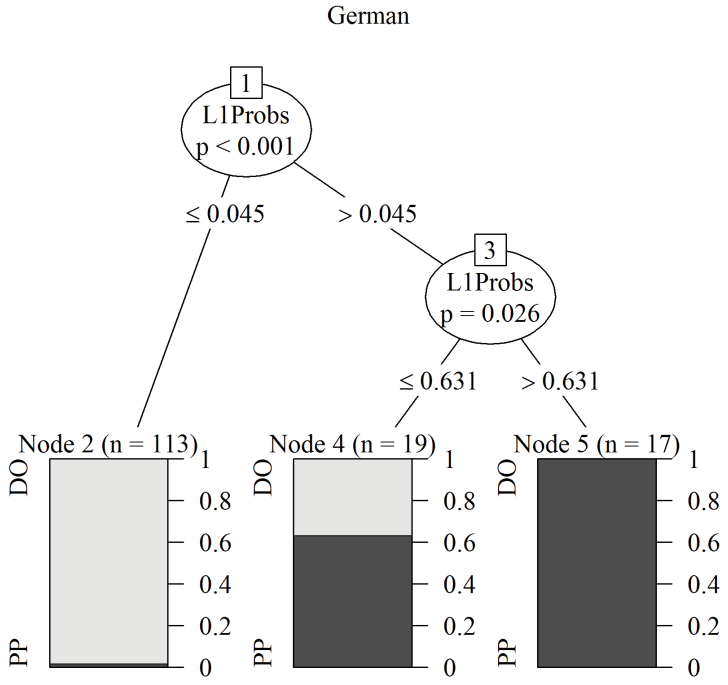


Figure 8.5: Conditional inference tree - German learners of English

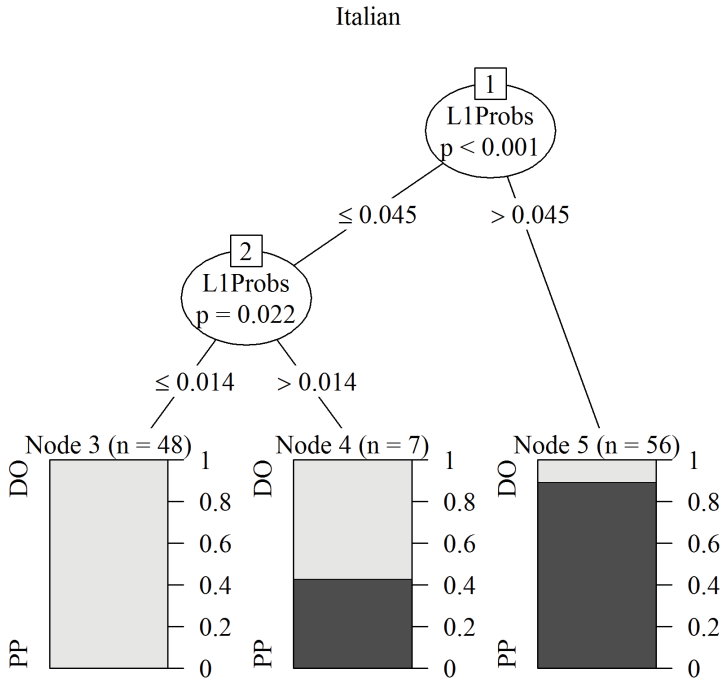


Figure 8.6: Conditional inference tree - Italian learners of English

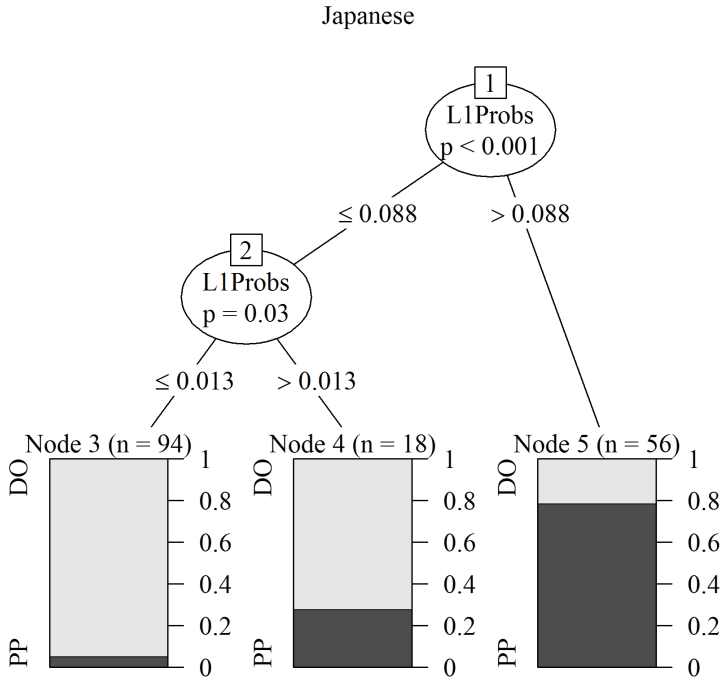


Figure 8.7: Conditional inference tree - Japanese learners of English

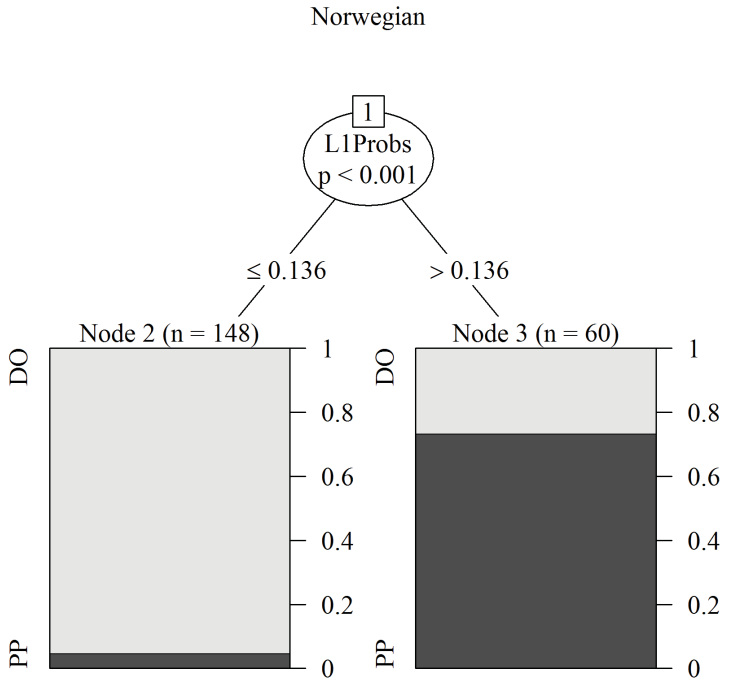


Figure 8.8: Conditional inference tree - Norwegian learners of English

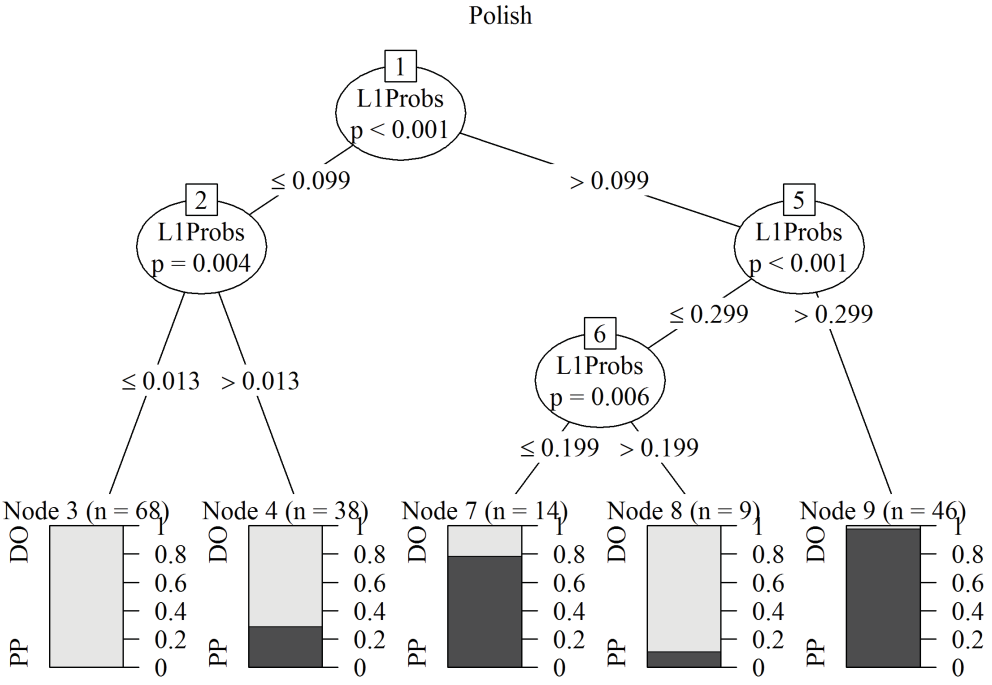


Figure 8.9: Conditional inference tree - Polish learners of English

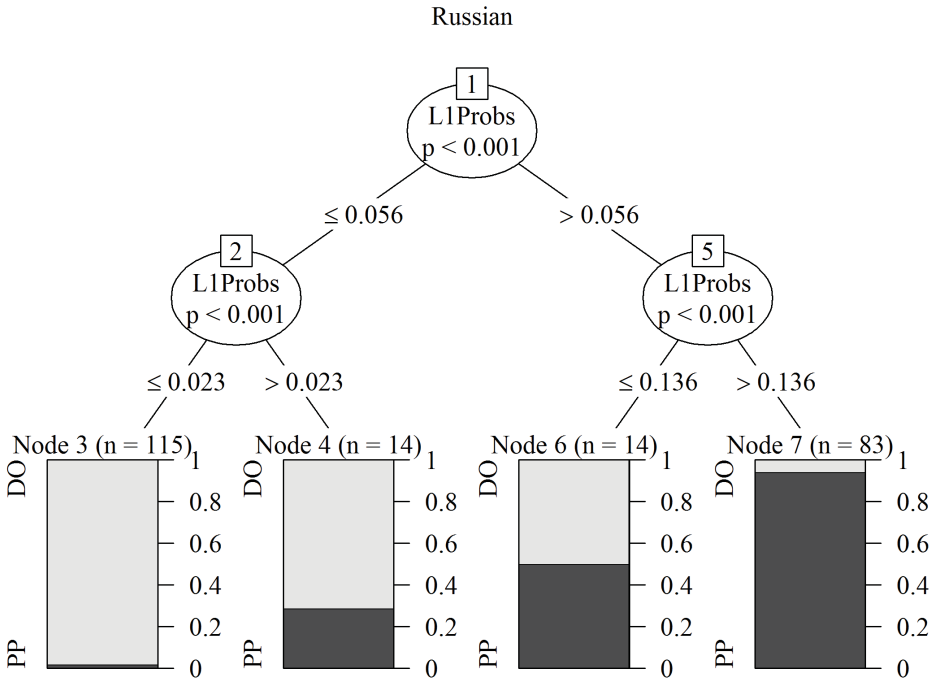


Figure 8.10: Conditional inference tree - Russian learners of English

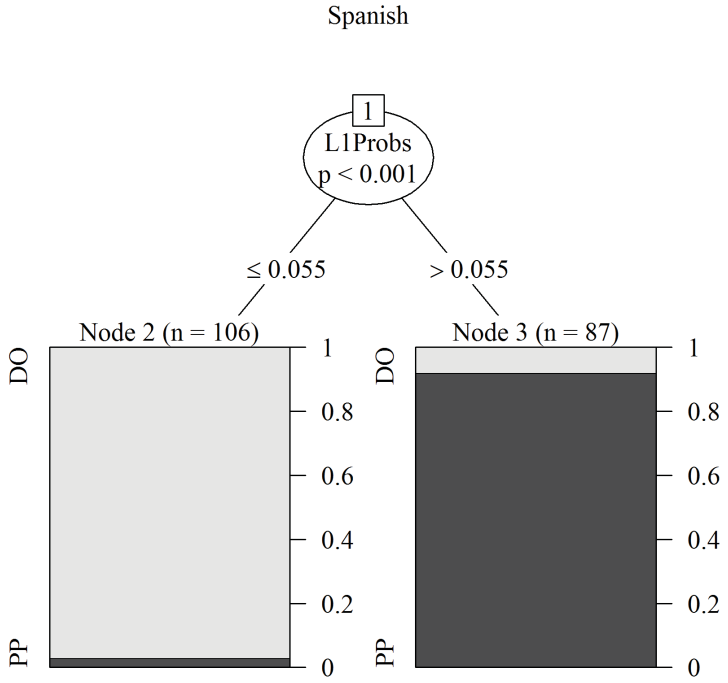


Figure 8.11: Conditional inference tree - Spanish learners of English

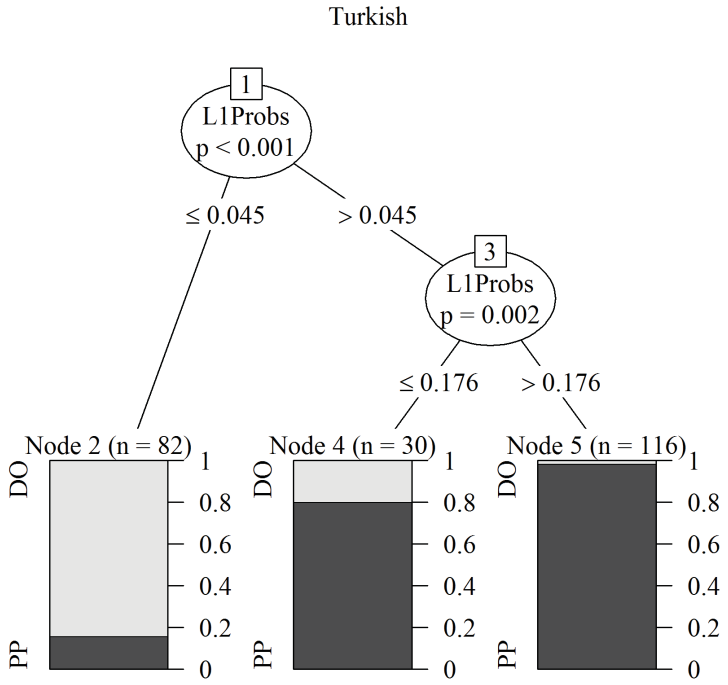


Figure 8.12: Conditional inference tree - Turkish learners of English