

The Dative Alternation in German-English Interlanguage

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Abstract

This study investigates the role of probabilistic grammatical constraints on the dative alternation in English as a second language. It presents the results of an experiment in which the different factors that are influential in English L1 are tested with advanced learners of English with German as their L1. L2 learners are influenced by the same determinants as L1 speakers, but to a lesser degree. Together with the results of previous studies the present results suggest that initially the learners do not make use of probabilistic constraints in spite of the constraints being influential in L1, and only gradually acquire a sensitivity towards the constraints that govern the choice between the two dative constructions.

In cases of so-called ‘grammatical variation’ speakers have a choice between different syntactic or morphosyntactic constructions that are semantically equivalent. In English examples of grammatical variation are the competition between the *of*-genitive and the *s*-genitive, between the *more*-comparative and the *-er* comparative, or the choice between two kinds of object constructions with ditransitive verbs of transfer (e.g. *give*). The latter phenomenon is commonly referred to as ‘dative alternation’. It has been shown that native speakers are sensitive to probabilistic (rather than categorical) factors that govern the selection of a particular variant in a given context. On the basis of such cases of grammatical variation (and other gradient phenomena, see, for example, the papers in Bod et al., 2003) it has been argued that grammatical knowledge must have a probabilistic component (e.g. Bresnan & Hay, 2008). Thus, it can be shown that the probability of finding a particular variant in a certain context in a corpus correlates with the intuitions of speakers in acceptability judgment tasks, given the same context (e.g. Bresnan, 2007; Bresnan & Ford, 2010).¹ It has also been demonstrated that the choices depend on a variety of influential factors (such as animacy, syntactic complexity, definiteness etc.) that together determine the selection of a particular variant in a particular context (see, for example, Mondorf, 2009 on the comparative, Hinrichs & Szmrecsanyi, 2007 on the genitive, and Bresnan & Ford, 2010 on the dative alternation).

The study of SLA syntax has largely focused on the acquisition of syntactic patterns and constructions as such, neglecting phenomena of grammatical variation and the acquisition of probabilistic constraints that govern the selection of variants. This paper presents a study of the role of such constraints in advanced German learners of English, focusing on the dative alternation.

In the English dative alternation we find two ways of expressing what seems to be the same kind of event with two different syntactic structures, i.e. either with a prepositional ob-

ject ('PP dative') or with an NP object ('NP dative'), with different orders of theme and recipient, as shown in (1).

(1) Mary gave the wonderful watch to her mother.

Mary gave her mother the wonderful watch.

There is a growing consensus in the literature that the constructions in (1) are syntactic variants without any clear semantic differences (e.g. Bresnan et al., 2007; Bresnan & Nikita, 2009; Bresnan & Ford, 2010; Collins, 1995), contra earlier approaches that tried to attribute the alternation to semantic differences (e.g. Krifka, 2003; Oehrle, 1976; Pinker, 1982). Recent studies employ various factors such as animacy and syntactic complexity of recipient and theme to successfully predict which structure is chosen in a given context (e.g. Bresnan et al, 2007; Bresnan & Nikitina, 2009; Bresnan & Ford, 2010).

Most available studies exploring the dative alternation focus on English native speakers of different varieties. Comparatively few studies address the dative alternation in English as a Second Language (ESL) and most of these studies were interested in the acquisition of the two syntactic patterns themselves, not in their competition. Furthermore, many of the studies were conducted in the 1980s (e.g. Hawkins, 1987; Le Compagnon, 1984; Mazurkewich, 1981; 1984; 1985), a time in which transformational and semantic approaches were prevalent and little was known about the multiple factors governing the dative alternation. And statistical methods necessary to make predictions using all of these factors were only beginning to be used in linguistic research. Even recent studies often employ monofactorial analyses to investigate the effects of predictors known to have effects on the dative alternation in the L1 in learners' language, e.g. the effect of length and information status (Callies & Szczesniak, 2008) or the given-new distinction (Chang, 2004). There is an absence of

studies that employ the kind of multifactorial analysis that would be necessary to substantiate claims about individual factors or general tendencies. The present study seeks to fill this gap.

The study of probabilistic constraints in SLA raises new questions concerning the role of transfer and of processing constraints in the development of grammatical knowledge. Transfer is usually discussed assuming a non-probabilistic, categorical view of grammar (see, for example, the full transfer/full access hypothesis by Schwartz & Sprouse, 1996), and there is little work on how transfer might influence the acquisition of probabilistic constraints.

In a categorical transfer approach to the problem one might want to predict for German learners of English that there are no transfer effects because the syntax of German also employs NP datives and PP datives. If frequency is allowed to play a role in transfer, learners should prefer the double object construction, in which the recipient precedes the theme, over the prepositional dative because this is the most frequent word order in German dative constructions (Pechmann et al., 1994).

But what is the real nature of these probabilistic constraints anyway? It has been argued that at least some of the probabilistic constraints are in fact constraints on processing. For example, an ordering of shorter before longer constituents has advantages for short term memory (e.g. Hawkins, 1994; 2014). If probabilistic constraints have their origin in processing, it is unclear how such processing constraints can be integrated into a theory of syntactic acquisition. There is one theory, i.e. Processability Theory (Pienemann, 1998; 2005), that presents an account of how processing constraints determine the stages of syntactic acquisition. However, this theory is interested in the acquisition of L2 morphosyntactic structures themselves and in the processing procedures necessary for their implementation in speech production. The theory says nothing about phenomena of grammatical variation where, in the case of the dative alternation, two processing procedures for constructing a VP are in competition. However, if we take the spirit rather than the letter of that theory, we

might want to predict that the structure which is easier to process will be acquired first and will be used more frequently later. This is allegedly the PP dative (cf. Hawkins, 1987; Mazurkewich, 1981; 1984; 1985).

The present study addresses these issues based on a replication of a sentence rating study conducted with L1 speakers by Bresnan & Ford (2010). The participants in the present study are advanced German learners of English, who were asked to rate dative constructions. In particular, we will address the following questions. First, this study examines whether in general learners of English prefer the PP over the NP dative, as has often been claimed in the literature (Chang, 2004; Hawkins, 1987; Mazurkewich, 1981; 1984; 1985). Second, we test whether the learners' choices are influenced by the same predictors which have been put forward in the L1 literature, and whether these predictors have the same kind of effects in German-English interlanguage.

The dative alternation in English (L1 and L2) and German

In this section we will give an overview of different approaches which have been employed to account for the dative alternation in English as an L1 and English as a Second Language.

(2) illustrates the structures at issue again, with the pertinent terminology.

(2) a. *Prepositional dative ('PP dative')*:

He brought [a pony]_{NP theme} [to my children]_{PP recipient}.

b. *Double object construction ('NP dative')*:

He brought [my children]_{NP recipient} [a pony]_{NP theme}.

As we will see, many L2 studies on the dative alternation have been carried out on the basis of the results and theoretical implications of pertinent L1 studies.

The Dative alternation in English L1

Early generative work has centered around questions like what the underlying or base generated structure is (Edmonds, 1972; 1976; Fillmore, 1965; Jackendoff & Culicover, 1971), how preference patterns of individual verbs are to be represented in the lexicon (Jackendoff, 1975; Oehrle, 1976), and whether and in how far there are semantic differences between the two competing constructions (Pinker, 1982; Krifka 2003).

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 & Nikitina, 2009). For example, the categories of alternating and non-alternating verbs proposed in early approaches cannot be upheld, since numerous counter-examples to the proposed classification have been found. For example, verbs such as *pull*, which have been traditionally classified as non-alternating verbs and permitting the PP dative only, can be found in both constructions as the one shown in (3) (taken from Bresnan et al., 2007, p.73):

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

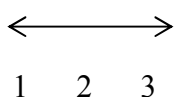
In contrast to a categorical classification in which each verb licenses only one constituent order, it has been shown that the dative verbs have a specific lexical bias. This lexical bias is the statistical tendency of each verb to occur in one or the other construction, all else being equal (cf. Bresnan & 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 the following.

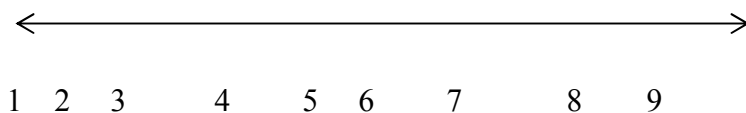
One of these factors is syntactic weight. In general, the relative weight (or length) of constituents has been shown to be influential of the choice of syntactic constructions (Arnold et al., 2000; Hawkins, 1994). Speakers tend to place long and heavy constituents at the end of a sentence, an effect which is also known as the end-weight principle (e.g. Behagel, 1909; Wasow, 2002). This principle is standardly interpreted as having its origin in processing complexity (e.g. Hawkins, 1994; 2014).

This principle is reported to have an effect on the dative alternation as well (e.g. Collins, 1995; Bresnan et al., 2007). Thus, sentence (4a) is preferred over sentence (4b). In example (4b) nine words have to be processed before the second constituent is recognized, in sentence (a) it is only three, which makes (4a) preferable to (4b) (see for example Hawkins, 1994; Wasow, 1997 for discussion).

- (4) a. I gave [Sue] [the almost antique and very expensive watch].



- b. I gave [the almost antique and very expensive watch] [to Sue].



Another factor that influences the choice of constructions is the type of noun phrase (Aissen, 1999; O'Connor et al., 2004; Silverstein, 1976). Pronominal constituents precede non-pronominal 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 & Ford, 2010).

These factors can be summarized in the so-called harmonic alignment pattern, illustrated in Figure 1 (adapted from Bresnan et al., 2007), which summarizes the effects found in their corpus studies.

insert Figure 1 here

Harmonic alignment was originally used in Optimality Theory “to preserve hierarchical structure between different prominence hierarchies of constraints” (Bresnan & Ford, 2010, p. 183, for details see, Aissen, 1999; Prince & Smolensky, 1993), but was adapted by Bresnan & Ford (2010, p.183) to account for the quantitative patterns which can be observed in post verbal constituent ordering with respect to the 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 non-pronouns and less complex constituents before more complex ones.

This 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 we can achieve with the NP 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 & 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 non-pronominal, indefinite and long ones (cf. Bresnan et al., 2007 for discussion), the latter kinds of constituents are also more likely to be more informative.

This principle of Uniform Information Density is in line with another factor which 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 which have been mentioned in previous discourse occur before those which have not been mentioned. Thus, we could extend the harmonic alignment pattern by one more claim, namely, ‘given before new’.

In addition to the aforementioned factors, things like 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. NPs that refer to local persons, i.e. first and second person, have been observed to occur before non-local NPs, i.e. third person (Bresnan & Nikitina, 2009, p.27, Bresnan et al., 2001). 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 NP 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 & Nikitina, 2009; Bresnan & Ford, 2010; 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 & Ford (2010) by using statistical techniques such as multiple logistic regression and linear mixed effect 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). We will discuss such potential problems as we go along.

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.

Dative constructions in German

In order to be able to discuss the possibility of L1 transfer with respect to the dative alternation we need to inspect German dative constructions. 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 below (5) (example taken from Pechmann et al., 1994, p.8):

- (5) Dann wird [der Dirigent]_{NOM} [dem Geiger]_{ACC}
 Then will the conductor the violinist

[den Taktstock]_{DAT} geben.

the baton give.

‘Then the conductor will give the violinist the baton.’

a. Dann wird der Dirigent [dem Geiger]_{recipient} [den Taktstock]_{theme} geben.

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

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

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

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

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

Pechmann et al. (1994: 8) claim that all of these sentences are grammatical but vary in their degree of acceptability. They show in numerous experiments that the word order displayed in (5a) 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 (6). Thus, German also has a kind of PP dative, but the sequencing of NP and PP is not as restricted as in English.

(6) Lotte hat den Brief an Monika geschickt.

Lotte has the letter to Monika sent.

‘Lotte sent the letter to Monika.’

- a. Lotte hat [Monika]_{N_{Recipient}} [den Brief]_{theme} geschickt.
- b. Lotte hat [den Brief]_{theme} [Monika]_{N_{Recipient}} geschickt.
- c. Lotte hat [den Brief]_{theme} [an Monika]_{P_{Recipient}} geschickt.
- d. Lotte hat [an Monika]_{P_{Recipient}} [den Brief]_{theme} geschickt.

Various attempts to account for these word order alternations have been made in generative and non-generative frameworks (see for example Büring, 2001, Lenerz 1977 and 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 especially 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 like 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 been found to be influential also in another type of word order variation in German, i.e. the order of subject and object (Bader and Häußler, 2010). In that corpus-based study, a logistic regression analysis reveals 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 in the German middle field.

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.

In sum, we have a situation in which there is no straightforward mapping of German structures onto English structures, with additional lexically determined possibilities and preferences in both languages. But 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 might 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 NP 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, double object constructions should have a privileged status in German-English interlanguage because NP datives are much more frequent in German.

Alternatively, we can consider the potential role in SLA of the general principles of alignment discussed above. If they are general, language-independent principles of alignment (similar in status to what in some approaches is called ‘Universal Grammar’) these principles should be available to any language user, including L2 learners. And indeed, 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 cross-linguistic regularities (Aissen, 2003; Bresnan & Nikitina, 2009; Bresnan et al., 2001; 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. Hawkins, 1994), so that learners still have to find out in how far the grammar is actually determined by such principles. This would enable us to rephrase the question of transfer by ask-

ing how the process of fine-tuning the universal determinants of syntactic choices in an L2 is influenced by the L1.

One hypothesis would be that at early stages the choices are still very much influenced by the constellation of factors as found in the L1. Another conceivable hypothesis would be that initially the learners would disregard the factors in spite of their potential role in their L1, and the learners would only later and gradually acquire some sensitivity towards alignment factors.

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

The Dative alternation in English as an L2

Research on the dative alternation in English as a second language is more scarce. Most studies focus on the acquisition of the verbal categories, i.e. the distinction between alternating and non-alternating verbs. Some studies, however, explore some of the other factors that are influential in the dative alternation in L1 English. In the majority of studies grammatical judgment tasks were used and the analyses were mostly monofactorial, even though some studies explored more than one variable. Many studies did not explicitly distinguish between themes and recipients but merely tested whether the predictor in question influences the speakers' 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 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 preferably used by learners. A forced choice questionnaire study by Führer (2009), which was conducted in order 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 NP dative (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 NP dative. Le Compagnon (1984) observed the same sequence of acquisition in a case study and grammatical judgment tasks with French subjects.

Tanaka (1987), who investigates Japanese subjects using translation and grammatical judgment tasks, observed that the NP and PP dative are used equally often with the verb *give*, but that the PP dative is preferred in non-prototypical dative constructions, the hypothesized prototype being (7):

(7) 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*) which 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.

Mazurkewich (1985) also published a paper dealing with learners' acquisition of the dative alternation in questions and passives, as did Hawkins (1987) who investigates passives. These studies confirm the previously mentioned sequence of acquisition. However, the results of these studies cannot be straightforwardly generalized to clauses in the active voice. Nor can the results be used to argue that the PP structure is acquired earlier than the NP 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 complexity principle states that "explicitly marked phrases are preferred over zero-marked counterparts in cognitively complex environments" (Rohdenburg, 1996). Thus the explicitly marked structure (i.e. the PP dative) is expected to occur in interrogatives and passives more often anyway since these structures are more complex than affirmatives (Aarts, 2008).

Apart from the question which structure is acquired first and preferably used by learners, studies have looked at the influence of the verb (Callies & Szczesniak, 2008; Davies 1994; 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 & 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, using verbs of the 'whisper'- and 'tell'-class and of the 'push'- and 'throw'-class.

'Throw'- and 'tell'-verbs constitute alternating verb classes, while the other two are said not to 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 verbs classes in the 'tell'- and 'whisper'-classes, but not in the 'throw'- and 'push'-class. His results have to be seriously questioned, as the test items contained an introductory text passage which 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 French learners of English of different proficiency levels had acquired verb biases (what they call 'soft constraints'). Wolk et al. (2011) show 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 towards the PP dative.

Definiteness and accessibility are also factors which 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 & Szczesniak (2008) investigated the effect of discourse accessibility, as defined above, but no effects were found. Marefat (2004) 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 the 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 he could not find a major effect.

The effect of syntactic complexity was investigated by Tanaka (1987) and Callies & 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 our knowledge, the effects of pronominality were never explicitly tested. However, Le Compagnon (1984) and Hawkins (1987) observed that the NP dative is used and accepted by not so advanced learners if the recipient is pronominal.

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

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 conclusion based on such samples rest on shaky foundations. Furthermore, little is known about the individual variation between advanced speakers and their sensitivity towards the different factors.

The present study addresses these questions with the help of an experiment that was successfully implemented in the study of the dative alternation in two varieties of L1 English (Bresnan & Ford, 2010). The present paper presents a replication of that experiment with L2 speakers as subjects. The speakers in Bresnan & Ford's study can thus serve as our control group.

Methodology

The aim of the present study is to systematically test the predictors which are known to be influential of the dative alternation in English as an L1 on German learners of English. Bresnan & Ford (2010) used a sentence rating task in their study, and they kindly provided us with 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.²

Materials and Participants

The sentence rating task developed by Bresnan & 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 participant's proficiency was not tested, but as English is an obligatory subject on German school curricula, all participants have received a minimum of 8 years of formal instruction, and they can therefore be safely assumed to have successfully acquired both variants of the dative construction.³ 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. The completion 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 natural to them (see Appendix 1 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 & Ford 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 & Ford, 2010, pp. 184-185 for a detailed description). The items were presented to the participants in pseudo-randomized order, adjusted to avoid apparent patterns. Example (8) through (10) show three items for illustration.

(8) *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.

(9) *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.

(10) *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. The participants were asked to distribute 100 points to express their ratings. If they thought continuation (8a) was perfectly fine, but continuation (8b) was not proper English, they could express this by giving 100 points to continuation (8a) and 0 points to continuation (8b). If they thought that both continuations were equally fine, they could distribute 50 points for 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 the one or other structure, 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.

Coding

The items were coded for several predictor variables that had been shown to influence the dative alternation in English L1. The coding, which emulated that of Bresnan & Ford (2010), will be briefly summarized in the following.⁴

VERB: Nine different verb lexemes were used in the sentences to be judged. Each lexeme was treated as one factor level.

RELATIVE SYNTACTIC COMPLEXITY OF RECIPIENT AND THEME: The logarithmized theme length in words was 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 (cf. Bresnan & Ford, 2010). The length of the recipient and theme was coded in terms of the number of orthographic words as this measure has been shown to highly correlate with other measures of syntactic complexity, such as the number of syllables (Grafmiller & Shih, 2011)

PRONOMINALITY OF THEME AND RECIPIENT: Recipient and theme were coded for pronominality. Pronouns included personal, reflexive as well as demonstrative pronouns. All other NPs were considered non-pronouns.

DEFINITENESS OF THEME AND RECIPIENT: As described in Bresnan & Ford (2010), pronouns were coded as definite. So were noun phrases containing a definite article.

ANIMACY OF THEME AND RECIPIENT: As there were only two instances of themes or recipients which were animals, the data was coded for being either animate, including humans and animals, or inanimate for all others.

ACCESSIBILITY OF THEME AND RECIPIENT: An NP was considered as given if the NP or its referent was mentioned previously in the text passage. In all other instances the NP was considered as not given.

NUMBER AND PERSON OF RECIPIENT AND THEME: Following Bresnan & Ford (2010) person was coded as local (first and second person) and non-local (third person). Number was coded as singular and plural.

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

PREVIOUS PP DATIVE : This variable encoded whether a PP dative occurred in the context the subjects had to read.

To illustrate how these predictors influence the choice of dative structure have a look at (11), which is an item from the actual experiment.

(11) *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]_{THEME} to [them]_{RECIPIENT},

b. at least if we are going to be giving [them]_{RECIPIENT} [all this money]_{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 as it is shorter, i.e. sentence (11b) should be preferred. Animate constituents should occur before inanimate ones, which is true in sentence (11b). We further expect definite constituents to precede indefinite ones and pronouns to precede non-pronouns, which is also realized in sentence (11b). Finally, constituents which are discourse accessible are mentioned before constituents that have not been mentioned in previous discourse, which also votes for sentence (11b).

Even though the NP dative in this example seems the only possible choice, we should always keep two things in mind: firstly, that the verb itself also plays a major role in dative sentences and can work against the other factors, and secondly, that these are only statistical preferences and by no means categorical decisions. This is why sentence (11a) will also be accepted by speakers.

In the following two sections we will provide answers to the two main research questions. Section 4 presents the analysis of the general preferences and the differences between individual speakers, as they emerge from the two experiments.

General preference and individual variation

After removal of missing answers, our 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 we want to say anything about potential preferences of L2 learners, we would have to take the same sample of pertinent sentences and then compare the preferences of L1 speakers versus that of L2 speakers. In our case it would be ideal to compare for each item the rating of the native speakers from Bresnan & Ford's study with that of the learners in our experiment. Unfortunately, this comparison is not possible as we were unable to obtain Bresnan & Ford's original data set.

There is, however, an indirect way of comparing the natives' choices with that of the non-natives. Bresnan & Ford (2010) investigate the relationship between the experimental choices of their subjects and the choices as found in the Switchboard Corpus. In order to measure the sensitivity of the speakers to the various factors Bresnan & 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 2, with the solid regression line representing the Australian speakers and the dotted line representing the US 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.

insert Figure 2 here

The corresponding graph for the L2 speakers looks very similar (see Figure 3). We also find a strong relationship between the corpus log odds and the ratings (Adjusted $R^2=0.697$, Bresnan & 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 this tendency is very small indeed.

insert Figure 3 here

Figure 3 cannot tell us anything about the patterning of the data with individual learners. The relationship between the learners' individual ratings and the corpus log odds is shown in Figure 4. Each scatterplot shows the individual ratings of one 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 an NP dative.

insert Figure 4 here

The different shapes of the non-parametric 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, 20), similar to what Bresnan & Ford (2010: 187) show for their native speakers. Within this subset of ESL speakers, some participants show a

stronger relationship (e.g. participants 5, 14), while others do not show very clear preferences, even when the corpus log odds are extreme (e.g. participants 11 or 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.

The other large subset of participants is the one where 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 we find ceiling effects already 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 where the corpus log odds are still rather low. For some learners this effect is at the NP dative end of the rating scale (e.g. participants 4, 15, 17). Some participants even show a regression line that levels off at both ends, approximating an S-curve (4 and 22). The distributions in this subset of learners suggest that there are certain cut-off points at which the influence of the different factors is categorical, and no longer probabilistic and gradient.

To summarize, we 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 vs. categorical choices. Let us now look in more detail at the determinants of these choices.

Determinants of the dative alternation in German-English Interlanguage

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

Hypothesis a: Length

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

Hypothesis b: Animacy

(1) The PP dative is more likely if the recipient is inanimate.

(2) The PP dative is more likely if the theme is animate.

Hypothesis c: Definiteness

(1) The PP dative is more likely if the recipient is indefinite.

(2) The PP dative is more likely if the theme is definite.

Hypothesis d: Pronominality

(1) The PP dative is more likely if the recipient is not a pronoun.

(2) The PP dative is more likely if the theme is a pronoun.

Hypothesis e: Givenness

(1) The PP dative is more likely if the recipient is new.

(2) The PP dative is more likely if the theme is given.

Statistical Analysis

In order to test the simultaneous effects of the different predictors we used linear mixed effect regression models.⁵ 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. The latter property is especially welcome since not all combinations of all values of the different predictors are represented in the stimuli with equal frequency.

We used VERB and SUBJECT as random effects. As subjects might 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. We also tested a random contrast for verbs by subject, but log-likelihood tests showed that the inclusion of this random contrast was not justified.

PP-RATING was used as the dependent variable. It consists of the score each item received for the PP dative sentence (which is complementary to the rating of the NP dative). Positive coefficients in the models work in the direction of the PP dative, negative ones in the direction of the NP dative.

In a first step linear mixed effect models were fitted with only one predictor variable as fixed effect at a time. These monofactorial models were devised for two reasons. Firstly, 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 which 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) because the coefficient estimates of individual predictors may change erratically in response to small changes in the model, for examples after removal of a predictor. For example, highly interrelated predictors can lead to a coefficient estimate changing its algebraic sign and thus making false predictions (‘suppression’, Friedman & 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 our analyses were RELATIVE SYNTACTIC COMPLEXITY, 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 Coreteam, 2011) was used. The package lme4 (Bates et al., 2007) was used for the linear mixed effects models. The results will be presented in the following section.

Monofactorial Analyses

The monofactorial linear models show effects for the majority of predictors tested. Every single predictor has been tested in an individual linear mixed regression model. The models are summarized in Table 1. 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.

insert Table 1 here

The models show that many, but not all, of the predictors which 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 does not

influence the choice of the learners either. The results of these models are comparable to those of previous studies in which monofactorial analyses were used (Callies & Szczesniak, 2008; Chang, 2004; Hawkins, 1987; Le Compagnon, 1984; 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.

Multifactorial Analysis

Initially, we fitted a model with all predictor variables as described in section 3. 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 RELATIVE SYNTACTIC COMPLEXITY. To alleviate the problem we opted for residualization. In a separate regression model PRONOMINALITY OF RECIPIENT was used to predict RELATIVE SYNTACTIC COMPLEXITY. The residuals of this model leave us with exactly that part of RELATIVE SYNTACTIC COMPLEXITY which cannot be predicted by PRONOMINALITY OF RECIPIENT. We then used the residualized syntactic complexity variable in the mixed models, and fitted the model again with all predictors. This full model is documented in Table 2. We can see that eight predictors have no significant effect: PRONOMINALITY OF RECIPIENT, the definiteness, animacy and concreteness of the theme, accessibility (of either theme or recipient), and number (of either theme or 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 anymore in the multifactorial analysis.

insert Table 2 here

The initial model shows significant effects for the following predictors: RELATIVE SYNTACTIC COMPLEXITY, 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 non-significant predictors. The final model is documented in Table 3. All effects are in accordance with harmonic alignment.

insert Table 3 here

The final model accounts for over 50% of the variation ($R^2 = 0.518$), with the random effects explaining over 30 % of the variation ($R^2 = 0.306$, VERB alone: $R^2 = 0.259$).

For a better understanding we will go through the predictors and illustrate their effects in Figure 5. 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 becomes. This result is perfectly in line with the predictions made by the principle of end-weight.

insert Figure 5 here

In the upper right panel we see the effect of pronominality of the theme. If the theme is represented by a pronoun, the chances of the PP dative increase (hypothesis d.2). Indefinite recipients increase the PP-rating (hypothesis c.1), too, as shown in the left panel of the second row of Figure 5. The effect for ANIMACY OF RECIPIENT can be seen the right panel of the second row of Figure 5. The rating in favor of the PP dative increases if the recipient is inanimate (hypothesis b.1). Finally, we get a higher PP-rating if the recipient is not local. All effects go in the direction predicted by hypotheses a-e.

We also computed the effects sizes with the help of log-likelihood tests. Figure 6 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.

insert Figure 6 here

Let us compare our results with the patterning of the native speaker data in the Bresnan & Ford experiment. Table 4 summarizes the effects across the two groups.

insert Table 4 here

We can see that the L1 speakers are influenced by more predictors than the L2 learners in our 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 with native speakers. Apart from PERSON OF RECIPIENT, all factors that do not influence the L1 speakers are also non-influential with the learners.

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

An interesting difference concerns 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 sen-

sitivity 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, Brennan & Ford implemented the corpus log odds as a random slope by speaker, and this random effect improved their model significantly. We 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, $\chi^2(2)=3.7971, p=0.1498$).

Summary and Discussion

Summary of Results

The main aim of this paper 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 in German-English interlanguage.

It has often been claimed that learners prefer the PP dative over the NP dative. The present study lends only little support to this claim because the advanced learners in our study on average show only a slightly increased tendency towards the PP dative as against 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. they show an overall preference for the NP 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 these learners are not much under the influence of probabilistic constraints.

With regard to the influence of different factors potentially determining the selection of variants, we have to distinguish between the univariate and the multivariate analysis. In the monofactorial analysis of these determinants seven out nine factors participating in the harmonic alignment hierarchy turned out to be significant (and 10 out of all 14 factors under investigation). 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, 2004; Tanaka, 1987).

The multifactorial analysis reveals, however, that many of the predictors which were significant in the monofactorial analysis are not significant in a multifactorial model anymore. This shows that monofactorial analyses may lead to false conclusions as important covariates are not controlled.

As already mentioned in this paper most of the variables are strongly interrelated, i.e., pronouns are short, definite and usually given, long NPs are usually new etc. This interrelatedness can lead to epiphenomenal findings in the 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 underlines the necessity of multifactorial analysis when addressing problems involving multiple influential factors.

The effects which remained significant in the multifactorial analysis are RELATIVE SYNTACTIC COMPLEXITY, PRONOMINALITY OF THEME, ANIMACY OF RECIPIENT, DEFINITENESS OF RECIPIENT, and PERSON OF RECIPIENT. All of these effects go 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 as for English native speakers. Furthermore, for both groups we can predict the choices almost equally well on the basis of these predictors (cf. the R^2 values of the two models: learner model $R^2=0.518$, Bresnan & Ford's native speaker model $R^2=0.529$). 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, RELATIVE SYNTACTIC COMPLEXITY, PRONOMINALITY OF THEME and DEFINITENESS OF RECIPIENT are influences that are shared by the two groups, but this set does not seem to be arbitrary. It includes all four parameters of harmonic alignment, as shown in Figure 1.

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

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) find that the recipients have longer fixation times in eye-tracking experiments than 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 second language acquisition.

Theoretical Implications

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

The present study investigated what determines the dative choice of advanced German learners of English. At the theoretical level, the results of our investigation may shed some new light on the question of transfer and processing factors in SLA. We are now in a position to return to the hypotheses developed in above and evaluate them in the light of the evidence.

The traditional, categorical transfer approach does not make any predictions as to what might govern the choice of the two dative constructions, once the two constructions are acquired. If frequency is allowed to have a role to play in transfer, the prediction is that German learners of English will prefer the NP object construction in English, as this is the preferred order of constituents in German. In our data set 11 of our advanced learners show some preference for the NP dative, while 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 our study that prefer the PP dative might 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.

If we consider the potential transfer of influential factors from 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 towards alignment factors. Our results seem to point in this direction. Given that earlier studies of non-advanced speakers showed a preference for the PP dative with these learners, our results can be interpreted in such a way that an earlier PP bias gives way to the more complex influence of alignment factors as 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 can 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.

In order to further test the validity of this assumption further 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 whether principles of alignment can be transferred needs to be addressed by comparing learners with an L1 that features probabilistic constraints on flexible word orders, with L2 learners that do not have a flexible word order in their L1. Japanese would be such a language. Tanaka (1987) observed that Japanese learners of English also follow the end-weight principle, which could be an indication that the constraints are not transferred.

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Appendix

Instructions

Anleitung

VP:

Wir sind daran interessiert, wie sich Lerner des Englischen in informellen Konversationen spontan zwischen verschiedenen Möglichkeiten, die den gleichen Sachverhalt auszudrücken, 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!

Distribution of Experimental Items

insert Table 5 here

insert Table 6 here

insert Table 7 here

Author note

The authors are grateful to the editor and the reviewers of *SSLA* for comments on an earlier version. Special thanks go to Sabine Arndt-Lappe for valuable feedback along the way.

¹ One reviewer raises the question whether probabilistic constraints are part of the grammar or only used for computations on that grammar. This question is part of a larger, and rather fundamental, debate on the nature of grammar which is beyond the focus of the present paper (see, for example, Bod et al., 2003, Aarts, 2007, or Kapatsinsky, 2014 for some contributions to this debate).

² Inevitably, the decision to replicate an experiment from the literature had the disadvantage that the experiment could not be tailored to the specific needs of the present study but had to be carried out in close parallel to the original experiment. We nevertheless decided to replicate an available study with native speakers because that study yielded very interesting results, was very carefully designed, was highly suitable for a comparison of advanced interlanguage and native language, and had passed the quality control of one of the most prestigious journals in linguistics (i.e. *Language*). If the design worked well with native speakers, there was no a priori reason to believe that it would not work with advanced non-native speakers.

Our results do not directly relate to language production and on-line processing. Studies investigating these kinds of data may in principle yield different results with respect to the learners' preference for the one or other dative construction, or with respect to the influence of the predictors which were found to be significant in our study.

³ The results strongly support the assumption that all participants have acquired both variants. All participants used at least 80 per cent of the range of the rating scale (cf. Figure 4), which shows that they know and accept both structures if the context is right.

⁴ As we were not provided with the full data set (including the coding) by Bresnan & Ford, we had to do our own coding. The vast majority of coding decisions were unproblematic, but

in a few cases our coding may be different from that of Bresnan & Ford. These occasional problematic codings concern the classification of pronominality, accessibility and verb sense (concrete vs. abstract). The distribution of the predictor values can be found in Appendix II.

⁵ As the dependent variable can be conceived of as ranging between 0 and 1, this raises potential problems of heteroskedasticity and skewedness, which are often observed with data taking values in the standard unit interval. We therefore also fitted beta regression models (e.g. Ferrari and Cribari-Neto, 2004) to our data. These models showed essentially the same results, with the disadvantage of not taking statistical control over subject and verb variation. An additional disadvantage of beta regression is that it is not so commonly used and therefore potentially less accessible to the reader. We therefore decided to report only the results of the mixed effects regression models.

Table 1. Results of the monofactorial analyses

Predictor	Estimate	p-value	Harmonic Alignment
relative syntactic complexity	15.754	0	+ ^a
pronominality of theme = pronoun	42.37	0.000	+
pronominality of recipient = pronoun	-19.51	0.000	+
animacy of recipient = animate	35.204	0.000	+
definiteness of theme = indefinite	-5.928	0.032	+
definiteness of recipient = indefinite	9.321	0.076	m.s. ^b / +
accessibility of recipient = new	13.868	0.000	+
person of recipient = not local	27.567	0	n.a. ^c .
number of recipient = singular	8.628	0.003	n.a.
previous PP = yes	15.274	0.000	n.a.
number of theme = singular	-6.439	0.071	m.s./ n.a.
animacy of theme = inanimate	6.911	0.2140	n.s.
accessibility of theme = new	0.024	0.926	n.s.
concreteness of theme = concrete	-3.646	0.302	n.s./ n.a.
a ‘+’	in accordance with the harmonic alignment pattern		
b ‘m.s.’	marginally significant		
c ‘n.s.’	not significant		

Table 2. Fixed-effect coefficients in the initial mixed-effects model. Estimate: estimated coefficient, based on 10,000 Markov chain Monte Carlo samples, *p*: two-tailed MCMC probability. MCMC estimates are based on 10,000 samples. Non-significant predictors are placed in the bottom part of the table, separated from the significant predictors by a horizontal line.

	Estimate	p value (> t)
(Intercept)	42.840	0.002
resid. relative syntactic complexity	10.411	0.011
pronominality of theme=pronoun	24.880	0.001
definiteness of recipient=indefinite	15.149	0.031
animacy of recipient=inanimate	35.959	0.000
person of recipient=not local	11.575	0.012
pronominality of Recipient=pronoun	-3.787	0.337
definiteness of theme=indefinite	1.637	0.746
animacy of theme=inanimate	-4.546	0.436
accessibility of recipient=new	-5.615	0.223
accessibility of theme=new	0.799	0.823
number of recipient=singular	-6.199	0.126
number of theme=singular	1.406	0.757
previous PP=yes	-9.303	0.111
concreteness of theme=inconcrete	2.691	0.524

Table 3. Fixed-effect coefficients in the final mixed-effects model. Estimate: estimated coefficient, based on 10,000 Markov chain Monte Carlo samples, *p*: two-tailed MCMC probability. MCMC estimates are based on 10,000 samples.

	Estimate	p value (> t)
(Intercept)	30.840	0.000
resid. relative syntactic complexity	9.361	0.000
pronominality of theme=pronoun	25.275	0.000
definiteness of recipient=indefinite	15.629	0.001
animacy of recipient=inanimate	28.183	0.000
person of recipient=not local	15.917	0.000

Table 4. Comparison of significant effects across L1 and L2 speakers

group	variable	L1	L2
1	relative syntactic complexity	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

Table 5. Distribution of verb lexemes and previous PP datives in the questionnaire

Predictors	Values (number of occurrence is given in brackets)
Verb	give (16), take (3), bring (2), pay (2), sell (2), teach(2), owe (1), show (1), tell (1)
Previous PP Dative	yes (4), no (26)

Table 6. Distribution of all binary predictors (theme and recipient) in the questionnaire

values	predictors	
	animacy of theme	animacy of recipient
animate	4	24
inanimate	26	6
	pronominality of theme	pronominality of recipient
pronoun	3	14
non-pronoun	27	16
	definiteness of theme	definiteness of recipient
definite	16	28
indefinite	14	2
	accessibility of theme	accessibility of recipient
given	13	18
new	17	12
	number of theme	number of recipient
singular	25	16
plural	5	14
	person of theme	person of recipient
local	/	8
not local	30	22
	concreteness of theme	concreteness of recipient
concrete	20	/
abstract	10	/

Table 7. Distribution of all numeric predictors in the questionnaire

	length of theme (in no. of words)	length of recipient (in no. of words)	relative syntactic complexity (logarithmized)
minimum	1.0	1.0	-2.303
1 st quartile	1.0	1.0	-0.693
median	2.0	2.0	0.000
mean	2.1	2.0	-0.057
3 rd quartile	2.0	2.0	0.693
maximum	10.0	7.0	1.946

Figure Captions

Figure 1. Quantitative harmonic alignment (adapted from Bresnan et al., 2007, p.80)

Figure 2. Mean ratings of US and Australian participants for each item by corpus log odds. Regression lines show ratings increasing with log odds for both groups. (Reproduced from Bresnan & Ford, 2010, p.186, with permission)

Figure 3. Mean ratings of ESL participants for each item by corpus log odds. The regression line shows ratings increasing with log odds.

Figure 4. Individual ratings of individual ESL participants for each item by corpus log odds. The lines show a non-parametric scatterplot smoother fit through the data (Cleveland, 1979)

Figure 5. Partial effects of the final model

Figure 6. Effect sizes of the final model.

Figure 1

animate	<i>before</i>	inanimate
definite	<i>before</i>	indefinite
pronoun	<i>before</i>	non-pronoun
less complex	<i>before</i>	more complex

Figure 2

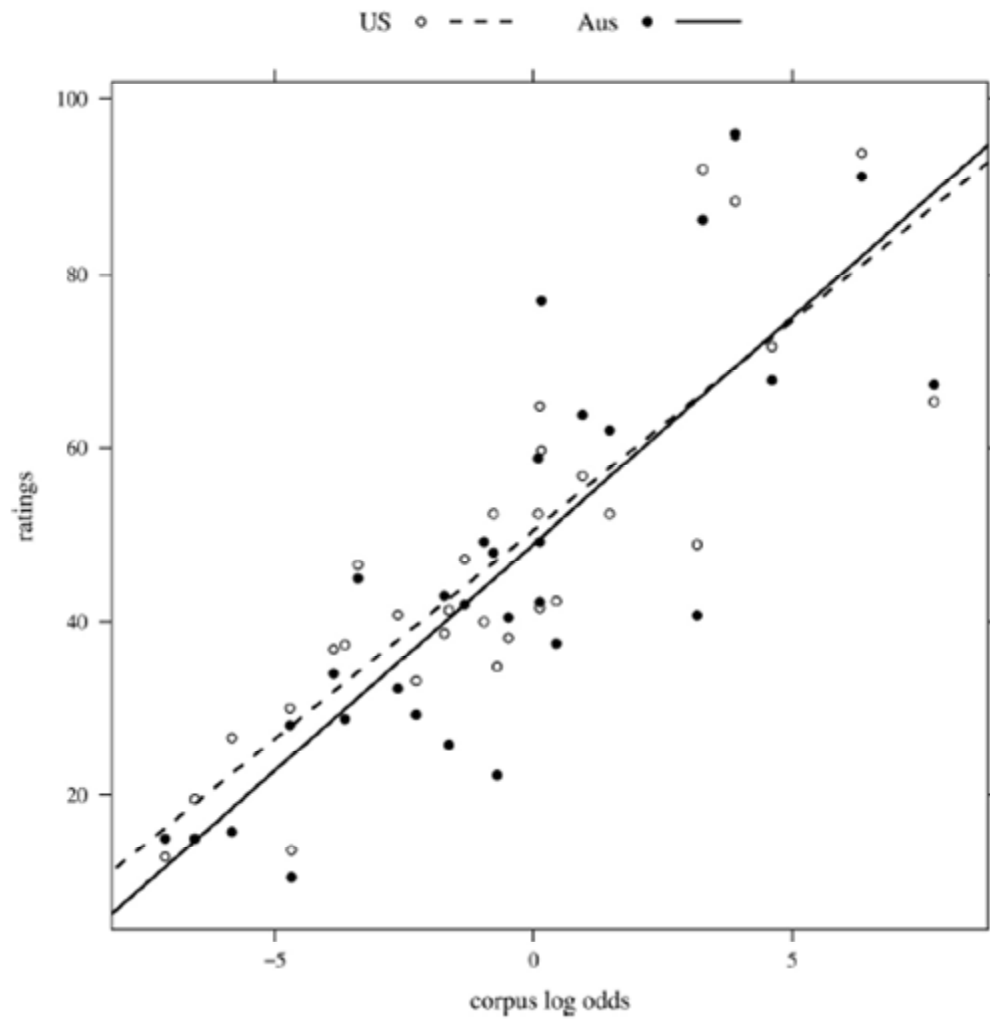


Figure 3

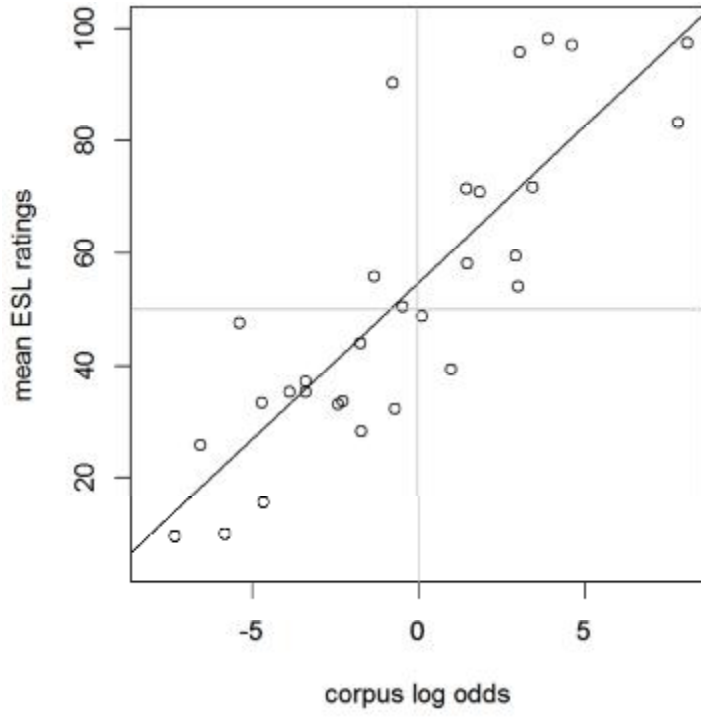


Figure 4

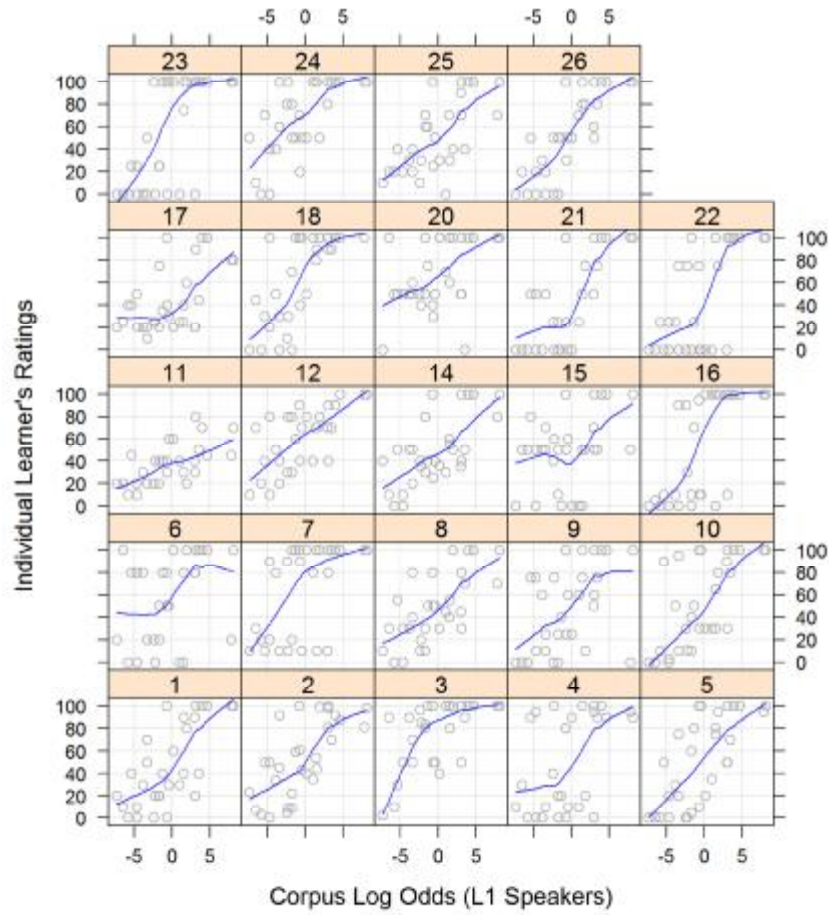


Figure 5

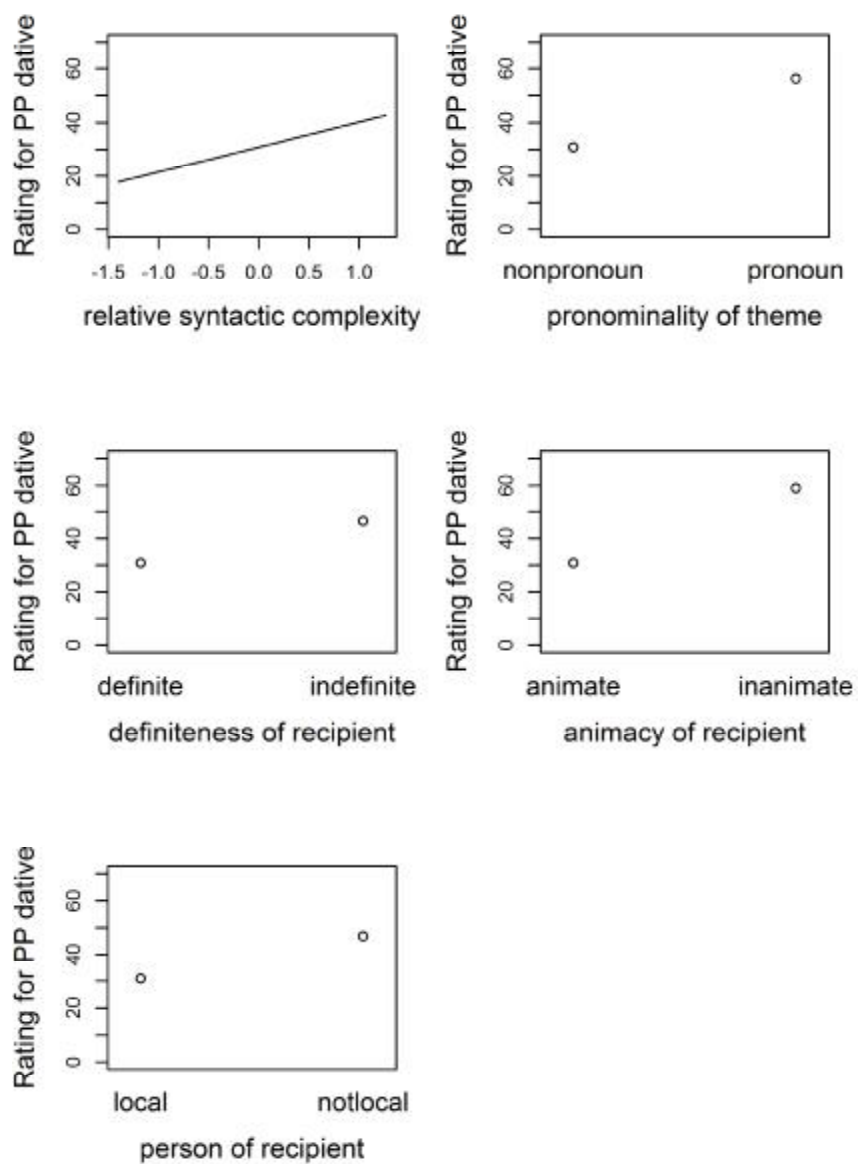


Figure 6

