The Ditransitive Alternation in German: Structural Preferences and Verb Bias Effects

ABSTRACT

Many ditransitive events can be expressed in German using either the indirect object construction (IOC) or the prepositional object construction (POC). While most previous research on ditransitives in German has focused on the IOC, very little attention has been paid to the much rarer POC or to individual verb biases for the IOC vs. the POC. We investigated structural preferences of native speakers of German using elicited production and acceptability judgment studies. The results show that the POC is not as restricted as previously thought, and that different modalities (i.e., production vs. comprehension) reveal different aspects of verb biases, which can be easily missed when relying on one type of data.

Keywords: verb bias, German, ditransitive structure, structural preference, dative alternation, probabilistic language production, syntactic representation

Introduction

Languages often offer more than one structural option for expressing a particular message. One common example of this is found with ditransitive verbs, usually used for expressing transfer events, which appear in many languages throughout the world (Malchukov, Haspelmath & Comrie 2010). Ditransitive verbs such as give, bring and send typically appear with three arguments - an agent, a theme, and a recipient. However, these verbs can be expressed using two different constructions, differentiated by the realization of the recipient (the theme is always a direct object). In one construction, the recipient is realized as a prepositional phrase; we refer to this as the prepositional object construction (POC),
illustrated in examples (1a) and (2a). In the other construction, the recipient is realized as a second object which can be either a direct object as in English (1b) or an indirect object as in German (2b). We refer to these as the double object construction (DOC) for English and the indirect object construction (IOC) for German.

(1) English ditransitives
   a. Prepositional object construction (POC)
      [The boy]_{AG} gave [the present]_{TH} [to the girl]_{REC}.
   b. Double object construction (DOC)
      [The boy]_{AG} gave [the girl]_{REC} [the present]_{TH}.

(2) German ditransitives
   a. Prepositional object construction (POC)
      [Die Frau]_{AG} schickte [den Brief]_{TH} [an den Beamten]_{REC}.
      the.NOM woman sent the.ACC letter to the.ACC official
      ‘The woman sent the letter to the official.’
   b. Indirect object construction (IOC)
      [Die Frau]_{AG} schickte [dem Beamten]_{REC} [den Brief]_{TH}.
      the.NOM woman sent the.DAT official the.ACC letter
      ‘The woman sent the official the letter.’

German has obligatory case marking on articles and pronouns, which helps to differentiate the role of each noun phrase. It also allows two different prepositions in the POC: some verbs take an (with accusative case), some take zu (with dative case), and some allow both. Schicken ‘send’ in (2) is a verb of the latter type, and thus could also occur with zu. Finally, the order of the theme and recipient can also be reversed in German – a
phenomenon which has been the subject of much debate in the field (e.g., Büring 2001a, 2001b; Drenhaus 2004; Meinunger 2006; Pappert et al. 2007). Since this reverse word order is not common with ditransitives where both theme and recipient are expressed by full NPs (Büring 2001b; Gast 2007; Müller 1999) – the focus of the present chapter – we do not consider these structures further here.

In most languages, individual verbs are only permitted to appear in one of the two structures (POC or DOC/IOC). However, in a small number of languages including English and German, alternation between the two structures is possible for an individual verb; Sierwierska (1998:179) found this for only 6% of the 219 languages she investigated. This variation of structure for a given verb is termed the ditransitive alternation or dative alternation.

The ditransitive alternation has been most extensively studied in English, largely because both the DOC and POC variants are frequently used (e.g., Bresnan & Nikitina 2008; Goldberg 2006; Mukherjee 2005; Rappaport Hovav & Levin 2008). Much attention in the literature on English has thus been paid to investigating verb biases and speaker preferences for the POC vs. the DOC, as well as the conditions under which each is preferred. In German, however, the IOC is overwhelmingly preferred for almost all verbs that alternate (Dehé 2004; Rappaport Hovav & Levin 2008), and thus the focus of research has been on the two possible word order variants within the IOC (recipient-theme vs. theme-recipient). In contrast, very little attention has been paid to the details of preference for the POC vs. the IOC. The few existing studies on preference for the POC vs. the IOC tend to be descriptive rather than quantitative, focusing on categorizing the semantic nature of each structure and the resulting theoretical implications, but providing little quantitative information about which verbs allow which structures to which extent. Further, there is considerable controversy over whether verbs such as geben ‘give’ and reichen ‘hand’ allow the POC at all (Adler 2011; Callies &
Szczesniak 2008; Dehé 2004; De Vaere et al. 2018; Drenhaus 2004; Proost 2015; Rappaport Hovav & Levin 2008; Sabel 2002).

In the present chapter, we seek to fill this gap in the literature by providing new empirical data on the use of the POC vs. the IOC in German. We report on two studies designed to quantitatively investigate the structural preferences of German native speakers: a written sentence completion task in which participants describe a ditransitive scene, and an acceptability judgment task in which participants rate the acceptability of ditransitive structures. These studies focus on six of the most commonly used ditransitive verbs in German: *bringen* ‘bring’, *geben* ‘give’, *reichen* ‘hand’, *schicken* ‘send’, *verkaufen* ‘sell’, and *zeigen* ‘show’. In the remainder of the Introduction, we outline previous research on the ditransitive alternation in general and also in German, as well as details of the present study.

*The ditransitive alternation*

Considerable research has focused on documenting and understanding structural preferences in the use of the ditransitive alternation. Because of the frequent use of both the POC and the DOC in English, the majority of studies have focused on English and have targeted the choice between these two structures. In general, these studies have found that the structural preferences are influenced by a number of factors related to semantics (Goldberg 1992; Harley 2003; Krifka 1999, 2004; Pinker 1989), discourse (Arnold et al. 2000; Biber et al. 1999; Collins 1995; Wasow 1997), dialect (Hughes & Trudgill 1996), pragmatics and topicality (Biber et al. 1999; Givón 1999; Hawkins 1994; Polinsky 1998; Van Valin 2007). Early theoretical accounts of the structural preferences were semantic in nature. The *monosemy* view considered the two structures as two possible syntactic realizations expressing the same concept without any consistent meaning difference (Aoun & Li 1989; Baker 1988; Butt et al. 1997; Larson 1988). The *polysemy* view, in contrast, endeavoured to
categorize each syntactic realization according to a particular meaning so that, for example, the DOC denotes caused possession while the POC denotes caused motion (Harley 2003; Krifka 1999, 2004; Pesetsky 1995; Pinker 1989). Related to this is the *verb sensitive* view which assumes that not only the structure but also the verb itself can determine the meaning of the two structural realizations (Rappaport Hovav & Levin 2008).

Increasingly, attention has also turned to the role of information structure and other related factors in explaining the structural preferences, rather than simply verb-related underlying semantic differences. Numerous studies on English have revealed that factors such as phonological weight, heaviness, focus, givenness, definiteness, pronominality, animacy, and discourse accessibility affect the choice between the POC and the DOC (Arnold et al. 2000; Bresnan & Nikitina 2008; Collins 1995; Erteschik-Shir 1979; Hawkins 1994; Wasow 2002). Under this view the ditransitive alternation is not a categorical phenomenon, but instead a gradient probabilistic phenomenon (e.g., Bresnan & Hay 2008). The specific lexical bias - that is, a speaker’s preference to use a particular verb in one or the other structure - can be statistically modelled by including various predictors (Bresnan 2007). All of these factors have been shown to affect a speaker’s syntactic choice across different types of data including corpus studies, grammaticality judgment tasks, and sentence completion tasks as well as comparative studies across varieties of English (Bresnan et al. 2007; Bresnan & Ford 2010; Bresnan & Nikitina 2008; Collins 1995).

Interestingly, certain structures appear in some types of data but not others. For example, Bresnan & Nikitina (2008) found that manner-of-speaking verbs (e.g., whisper, yell, *mumble*) occurred only in the POC in the one-million-word Switchboard corpus of English telephone conversations. However, those same verbs were found in the DOC in a search of some 47 billion words on the internet, in phrases like *she muttered him a hurried apology* and *you just mumble him an answer*. Evidence for probabilistic production also comes from cross-corpus studies between varieties of English (American, Australian, British) which have shown
that speakers of these varieties do not differ in the grammatical rules they use, but in the
statistical occurrence of the structures in spoken and written language (Bresnan & Ford 2010;
Rohdenburg & Schlüter 2009; Schneider 2007).

Ditransitive structures have also been investigated extensively in German. However,
given that the IOC is typically strongly preferred in German (Callies & Szczesniak 2008;
Dehé 2004; McFadden 2004), research on structural preferences has focused mainly on the
use of the two variants of the IOC: the canonical recipient-theme structure vs. the non-
canonical theme-recipient structure. Numerous studies have sought to enumerate the
typologies of these two variants, and to explore the patterns of use of each with respect to
factors including information structure (focus), prosody, markedness, animacy, nominality,
definiteness, and c-command rules (Büring 2001a, 2001b; Dehé 2004; De Vaere et al. 2018;
Meinunger 2006; Müller 1999; Pappert et al. 2007; Sabel 2002).

In contrast to the abundant research on the IOC, the alternation between the IOC and
the POC in German has received very little attention in the literature. Most of the existing
research has been theoretical rather than empirical, focusing on the semantic equivalence
between the IOC and the POC. This work generally concludes that the two structures differ in
meaning, supporting either the polysemy view (Meinunger 2006; Wunderlich 2005) or its
subtype the verb sensitive view (Adler 2011; Proost 2014, 2015). A few of these studies have
also touched on the effects of animacy, definiteness, use of pronouns, information structure,
or language contrasts in certain verbs, but again from a theoretical perspective based on
author intuitions rather than on quantitative analysis of empirical data. Only one recent study
has quantitatively investigated the occurrence of the IOC vs. the POC (De Vaere et al. 2018).
This study analyzed occurrences of the verb geben ‘give’ in a large newspaper corpus
(DeReKo), using Bresnan et al.’s (2007) probabilistic approach to determine the effect on
structural choice of several factors that have been found to play a role in English (e.g.,
definiteness, pronominality, animacy, concreteness, voice, number). The rest of the literature on the German ditransitive tends either to negate or to ignore the POC depending on the verb. There is general consensus that the POC is in principle possible although relatively rare with several verbs including bringen ‘bring’, schicken ‘send’, and verkaufen ‘sell’, and that it is not possible for many verbs including zeigen ‘show’. However, there is considerable controversy over whether it can be used with verbs such as geben ‘give’ or reichen ‘hand’ (Adler 2011; Callies & Szczesniak 2008; Dehé 2004; De Vaere et al. 2018; Drenhaus 2004; Liamkina 2008; Proost 2015; Rappaport Hovav & Levin 2008; Sabel 2002). Some authors claim that the POC is not grammatical at all for these verbs. Others suggest that geben ‘give’ and reichen ‘hand’ can be used in the POC in some limited contexts such as in order to emphasize the recipient, in certain semantic senses of the action (e.g., ‘donate’ or ‘distribute’ for geben), in certain dialects, or when particles are added to the verb which results in a different meaning of the verb (e.g., über+geben ‘hand over’, weiter+reichen ‘pass on’). These latter derived transfer verbs are well-attested in present-day German and are widely used with the POC.

Some research has also focused on which prepositions are used in the POC. As noted earlier, German allows two prepositions for denoting transfer events: an and zu. The consensus in the literature is that zu is typically used with bringen ‘bring’ while an is typically used with verkaufen ‘sell’, and both prepositions are commonly used with schicken ‘send’. The literature is less clear for geben ‘give’ and reichen ‘hand’, especially given the controversy over whether these verbs occur in the POC at all. Some studies claim that the verb itself as well as various semantic cues determine whether one or both prepositions are acceptable (Adler 2011; Matzel 1976). However, most semanticists have contrary views on meaning differences (e.g., Erben 1972; Meinunger 2006; Wegener 1985; Wunderlich 1996). In general, the literature on dative prepositional constructions is scarce and shows that the patterns are more likely attributable to subtle aspects of meaning based on intuitions which is often not supported by actual data.
In sum, although an abundance of information is available about the intricacies of the use of the IOC in German, far less is known about the use of the POC, or about the relationship between the IOC and the POC. As one step towards filling this gap in the literature, we conducted two empirical studies to determine the preferences of German native speakers for the IOC vs. the POC in several common verbs. In contrast with most existing studies that analyze corpora or use author intuitions, we opted for two different methods that elicit data directly from participants. The first is a sentence completion task, exploring participants’ own production of the IOC vs. the POC in a controlled context (Study 1). The second is an acceptability judgment task, investigating the structures that participants find acceptable, regardless of whether they spontaneously produce those structures (Study 2). As noted earlier, these studies focus on six of the most commonly used ditransitive verbs in German: *bringen* ‘bring’, *geben* ‘give’, *reichen* ‘hand’, *schicken* ‘send’, *verkaufen* ‘sell’, and *zeigen* ‘show’. Using these two methods allows us to gather evidence for rarer structures, as well as to collect data in a relatively fixed linguistic context, thus controlling for effects from certain linguistic factors known to affect syntactic choice. We expect that these data will provide new insights into both the use of alternative variants and verb biases in general.

We focus on two main questions across the studies. First, we ask how much speakers prefer the POC vs. the IOC for each of the six verbs. Although the literature is clear that the IOC is preferred in German for those ditransitive verbs that allow alternation, it is not clear whether the degree of bias is the same for every verb, and whether the preferences are consistent across different modalities (e.g., production vs. acceptability judgment). Differences in preferences across modality have been shown, for example, in Bresnan and Nikitina (2008) for oral vs. written production of ditransitives in English, or in Keller (2000) and Kempen & Harbush (2005) for corpus analysis vs. grammaticality judgments of IOC
variants in German. Further, there is disagreement in the literature about whether two of our verbs – geben ‘give’ and reichen ‘hand’ – allow the POC at all.

Second, we ask which prepositions (an or zu) are used in the POC for each of the six verbs, and which is preferred under which conditions if both are permitted. While the literature agrees that bringen ‘bring’ and verkaufen ‘sell’ use only one of the variants, it is less clear which preposition is preferred for schicken ‘send’ and what is possible for geben ‘give’ and reichen ‘hand’ if and when the POC is allowed.

**Study 1: Sentence completion task**

In Study 1, we used a written picture description task to investigate what structural choices participants make when describing pictures of ditransitive events. In order to reduce the influence of animacy on structural choice, we controlled the context of the pictures such that each contained an animate agent, an animate recipient, and an inanimate theme. On the basis of the literature on ditransitive verbs in German, we hypothesized that participants would most often use the IOC. We further hypothesized that participants would occasionally use the POC for all verbs except zeigen ‘show’, which is uniformly reported in the literature to never allow the POC. For the five other verbs, we were particularly interested in exploring the strength of the verb’s bias for the POC vs. the IOC. We also investigated preferences for which preposition (an or zu) was used with each verb in the POC.

**Method**

**Participants**
A total of 996 students and employees (721 male, mean age 24.02 years, SD 5.85) from the Technische Universität Kaiserslautern participated in the sentence completion task. All participants confirmed orally that they were native speakers of German. However, answers to a written question about language background on the response sheet revealed that 316 participants were simultaneous or early successive bilinguals or non-native speakers of German, or did not provide information about their language background. Since these participants did not meet the inclusion criteria, their data were removed from the study. Thus, the final sample included 680 participants (491 male, mean age 24.07 years, SD 5.59).

Design and materials

We designed 23 pictures representing an action with an animate agent, an inanimate theme and an animate recipient. The verbs bringen ‘bring’, geben ‘give’, reichen ‘hand’, verkaufen ‘sell’, and zeigen ‘show’ were each represented by four different pictures, while schicken ‘send’ was represented by three different pictures (due to depiction difficulties). For each of the pictures for a given verb, different referents were used for each thematic role (see Appendix 1). Many referents were repeated across the items because they were easy to recognize (girl, boy, grandmother, etc.). Ease of recognition was important for our design, in which each participant responded to one item, because we wanted to avoid guesses or misinterpretations of the thematic roles depicted.

Half of the pictures for a given scene showed the event occurring from right to left (see Figure 1) and half from left to right. Instructions were written above the picture: Was passiert im Bild? Ergänzen Sie den Satz mit dem Verb darunter. ’What is happening in the picture? Complete the sentence with the verb provided below.’ The target verb (here, reichen ‘hand’) was presented directly underneath the picture in the infinitive form. Below that, the picture description began with the agent (here, Der Junge ‘the boy’), followed by two lines where the participant could complete the description. Four demographic questions were given
at the bottom of the page asking about the participant’s age, gender, native language, and age of starting to learn a first foreign language.

Figure 1. Sentence completion sheet with additional background questions about gender, age, native language and the onset of a second language.

Procedure

Participants were approached at the entrance to the university cafeteria, asked if they were a native speaker of German and, if so, whether they were willing to participate in a short study. They were also briefly informed about the task as follows: *Sie werden ein Bild sehen,*
You’ll be given a picture which you should describe using one sentence. This procedure will take you approximately one minute. Your description will serve as a comparison to child descriptions. Each person who agreed was given one response sheet and was instructed to complete the sentence by using the agent and the verb provided, and by using the first description that came to their mind. These instructions were standardized for all experimenters. However, because these were spontaneous conversations in the cafeteria, participants occasionally asked further questions such as What is this study for? or Can I use as many words as I want in the sentence? All questions were answered with whatever of the following information was pertinent: responses should comprise only one sentence, responses should ideally name all the objects in the picture, and responses can contain as many words as desired. There were no restrictions on the type of words to use. We avoided detailed written instructions because participants might be distracted while reading in the cafeteria, which could lead to misinterpretations of the task.

Two main reasons led us to have each participant describe only one picture. First, we wanted to control for possible priming effects - i.e., the influence of a structure used previously on further production (see Bock 1986). Second, we wanted to avoid possible item confounds by having participants see the same referent in two or more pictures, given that several referents were used more than once across the pictures.

Coding

All completions were classified as either an IOC, a POC, or ‘other’. Completions were classified as an IOC or a POC only if both the recipient and the theme were realized by lexical NPs. These lexical NPs could include adjectives or attributes with or without articles (e.g., die nette Oma ‘the nice grandmother’, eine Oma ‘a grandmother’, Oma ‘Grandmother’).
Some participants used a different verb than the verb provided for their picture. If the verb was one of the other verbs considered in our study, we included the response in the analysis for that verb rather than discarding the response (0.9% of total data). This was done because the pictures can in principle be described with any of the six verbs, and participants may have just overlooked the verb provided below the picture.

Most completions used a simple main clause. However, we also included completions using more complex syntactic structures (1.7% of total data). These more complex structures took two forms: main clauses including an auxiliary or modal in the expression of the verb (e.g., *Das Mädchen möchte ihrer Oma Blumen schicken* ‘The girl wants to send her grandmother flowers’), and infinitive+zu constructions where the zu preceding the verb is an infinitival marker and not a preposition (e.g., *Das Mädchen denkt daran, ihrer Oma Blumen zu schicken* ‘The girl is thinking about sending her grandmother flowers’).

A completion was coded as an IOC when the agent and verb were followed by a recipient in dative case and a theme in accusative case, with no preposition preceding the recipient (e.g., *Das Mädchen schickt der Oma die Blumen* ‘The girl sends the grandmother the flowers’). Non-canonical completions with the theme preceding the recipient were coded as ‘other’ (1.7% of total data).

A completion was coded as a POC when the agent and verb were followed by a theme in accusative case and a recipient preceded either by the preposition zu (with recipient in dative case) or an (with recipient in accusative case) (e.g., *Das Mädchen schickt die Blumen an die Oma / zu der Oma* ‘The girl sends the flowers to the grandmother’). Each POC was also coded for which preposition was used preceding the recipient: an or zu. Non-canonical completions with the recipient preceding the theme were coded as ‘other’ (0.9% of total data).

A completion was coded as ‘other’ if it did not conform to the requirements for either an IOC or a POC as just described. Five structures were typical in this category: (1) completions in which either the recipient or theme was a pronoun or a demonstrative,
completions in which the recipient and theme were in the non-canonical order, (3)
completions in which a verb was used with a particle such as zuschicken ‘send over’, (4)
completions that used verbs other than our six target verbs, and (5) completions that used
structures other than ditransitives. The first three were not included as IOCs or POCs because
the use of the relevant forms is known to affect syntactic preferences. Although we could
have included such completions as an additional category for analysis, there were too few of
them to yield meaningful results.

Results

In the results, we focus on two research questions relating to the sentence completion
data. First, we assess the frequency of use for the IOC vs. the POC for each verb, to determine
if each verb allows both structures and, if so, what the preference is for each structure.
Second, we analyze the use of an vs. zu for the POC for each verb.

Use of IOC and POC

The 680 picture descriptions comprised 404 (59.4%) canonical IOC completions, 103
(15.2%) canonical POC completions, and 173 (25.4%) ‘other’ completions. We first
determined the frequency of completions using the IOC and the POC for each verb (see Table
1).

Table 1: Frequency and percentage of completions in the IOC or POC for each verb

<table>
<thead>
<tr>
<th>Verb</th>
<th>IOC</th>
<th>%</th>
<th>POC</th>
<th>%</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>bringen ‘bring’</td>
<td>71</td>
<td>87.7%</td>
<td>10</td>
<td>12.3%</td>
<td>81</td>
</tr>
<tr>
<td>geben ‘give’</td>
<td>104</td>
<td>97.2%</td>
<td>3</td>
<td>2.8%</td>
<td>107</td>
</tr>
<tr>
<td>reichen ‘hand’</td>
<td>77</td>
<td>100.0%</td>
<td>0</td>
<td>0.0%</td>
<td>77</td>
</tr>
<tr>
<td>schicken ‘send’</td>
<td>25</td>
<td>30.9%</td>
<td>56</td>
<td>69.1%</td>
<td>81</td>
</tr>
<tr>
<td>verkaufen ‘sell’</td>
<td>53</td>
<td>60.9%</td>
<td>34</td>
<td>39.1%</td>
<td>87</td>
</tr>
<tr>
<td>zeigen ‘show’</td>
<td>74</td>
<td>100%</td>
<td>0</td>
<td>0.0%</td>
<td>74</td>
</tr>
<tr>
<td>TOTAL</td>
<td>404</td>
<td>79.7%</td>
<td>103</td>
<td>20.3%</td>
<td>507</td>
</tr>
</tbody>
</table>
We then used Bayesian parameter estimation to determine what our data tell us about the degree to which each of the two kinds of completion is preferred over the other. If the use of IOC over POC were hypothetically random, with a probability \( p \) of using IOC and \( (1-p) \) of using POC, then the probability of \( N_I \) completions using IOC relative to \( N_P \) completions using POC would be given by elementary probability theory as

\[
P(N_I, N_P|p) = \frac{(N_I + N_P)!}{N_I!N_P!} p^{N_I}(1-p)^{N_P}
\]

where \( N! \) denotes the factorial function

\[
N! = N \times (N - 1) \times \ldots \times 2 \times 1
\]

Bayes’s theorem then allows us to infer the relative likelihood, given our data, of one hypothetical value of \( p \) over another. Normalizing such that the integrated likelihood over all \( p \) from 0 to 1 is one, the formula for the likelihood of \( p \) given the data \( N_I \) and \( N_P \) is

\[
L(p|N_I, N_P) = \frac{P(N_I, N_P|p)}{\int_0^1 dp' P(N_I, N_P|p')}
\]

In this case the normalization integral in the denominator evaluates to another ratio of factorials, and so the final result for the likelihood of \( p \) given the data is very similar to the probability of the data given \( p \):

\[
L(p|N_I, N_P) = \frac{(N_I + N_P + 1)!}{N_I!N_P!} p^{N_I}(1-p)^{N_P}
\]

This likelihood density is plotted for each of our six verbs (see Figure 2). We see that our sample sizes are sufficient to give fairly narrow peaks for all six likelihoods, while the most likely values of \( p \) vary considerably among the six verbs, from around 0.3 to above 0.95.
Figure 2: Likelihood density $L$ of IOC preference probabilities $p$, for each verb.

The horizontal axis $p$ in the figure denotes the fraction of IOC completions (as opposed to POC completions) in the entire population of German native speakers. Our finite experimental sample only allows us to estimate $p$; the likelihood function $L(p)$ indicates how confident and precise an estimate is justified by our data, according to the principles of Bayesian inference. For the verbs *zeigen* ‘show’, *reichen* ‘hand’, and *geben* ‘give’, the preponderance of IOC over POC completions in our sample is so great that a high $p$ can be inferred with high confidence: the likelihood of $p$ being less than 0.9 in these three cases is extremely low, given our data. However, our data do not rule out that these verbs could occasionally occur in the POC. For the other three verbs, the preponderance of IOC over POC completions in our data is weaker. For *verkaufen* ‘sell’, for example, the data indicate that $p$ is probably in the range 0.5–0.7, but the data do not support a more precise estimate of $p$. The likelihood density curve for *verkaufen* is therefore a lower and broader peak. The most likely
For *verkaufen*, given our data, is 60.9%, but the true $p$ in the entire population is not too unlikely to be as low as 0.5 or as high as 0.7, if our sample happened to be an unusual one. In sum, on the basis of this Bayesian analysis, we can conclude that *schicken* ‘send’ is moderately POC-biased, *verkaufen* ‘sell’ is weakly IOC-biased, *bringen* ‘bring’ is strongly IOC-biased, and the other three verbs are very strongly IOC-biased.

**Use of prepositions in the POC**

In the second analysis, we investigated which preposition (*an* or *zu*) was preferred in the POC. Again, we first calculated the frequencies of completions using each preposition for each verb (see Table 2).

Table 2: Frequency and percentage of POC completions with *an* vs. *zu* for each verb

<table>
<thead>
<tr>
<th>Verb</th>
<th>an</th>
<th>%</th>
<th>zu</th>
<th>%</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>bringen ‘bring’</td>
<td>0</td>
<td>0.0%</td>
<td>10</td>
<td>100.0%</td>
<td>10</td>
</tr>
<tr>
<td>geben ‘give’</td>
<td>2</td>
<td>66.7%</td>
<td>1</td>
<td>33.3%</td>
<td>3</td>
</tr>
<tr>
<td>reichen ‘hand’</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>schicken ‘send’</td>
<td>48</td>
<td>85.7%</td>
<td>8</td>
<td>14.3%</td>
<td>56</td>
</tr>
<tr>
<td>verkaufen ‘sell’</td>
<td>34</td>
<td>100.0%</td>
<td>0</td>
<td>0.0%</td>
<td>34</td>
</tr>
<tr>
<td>zeigen ‘show’</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>84</td>
<td>81.6%</td>
<td>19</td>
<td>18.4%</td>
<td>103</td>
</tr>
</tbody>
</table>

We then used Bayesian parameter estimation to determine what our data tell us about the degree to which each of the two kinds of completion is preferred over the other, with a probability $p$ of choosing *an* and $(1-p)$ of choosing *zu*. Following the calculations noted earlier, the likelihood density is plotted for each of the six verbs (see Figure 3).
Figure 3: Likelihood density $L$ of an preference probabilities $p$, for each verb.

The sample sizes for three of the verbs are sufficient to give fairly narrow peaks for the likelihoods, with the most likely values of $p$ ranging from 0 (verkaufen ‘sell’) to 1 (bringen ‘bring’). Bringen ‘bring’ clearly prefers zu while both schicken ‘send’ and verkaufen ‘sell’ clearly prefer an. Although bringen ‘bring’ and verkaufen ‘sell’ were only used with one of the two prepositions in our data, our sample size is not large enough to rule out that the other preposition is possible with these verbs. For geben ‘give’, the small sample size (3 cases) is not sufficient to support any strong conclusion about $p$, and so the Bayesian procedure produces a very broad $L(p)$. Since reichen ‘hand’ and zeigen ‘show’ do not appear in the POC at all, the data says nothing at all about $p$ of an versus zu completion for these verbs. The $L(p)$ curve is flat, indicating that all possible $p$ are still equally plausible given our data.

**Discussion**
In Study 1, we used a sentence completion task to investigate the structural preferences of German native speakers for either the POC or the IOC with six commonly used ditransitive verbs. Our first research question was whether participants preferred to use the IOC for all verbs. Two of the verbs – zeigen ‘show’ and reichen ‘hand’ – were only used with the IOC and found to be highly IOC-biased in the Bayesian analysis. This finding is in line with the literature (Callies & Szczesniak 2008:174; Dehé 2004:87; Drenhaus 2004:86; Meinunger 2006; Woods 2012:13). Three other verbs – bringen ‘bring’, geben ‘give’, and verkaufen ‘sell’ – were used with both structures but showed an IOC bias. Interestingly, the distribution of likelihood of use with IOC is significantly different across these five IOC-biased verbs with verkaufen showing the weakest bias and reichen ‘hand’ and zeigen ‘show’ showing the strongest bias. In contrast to the other verbs, schicken ‘send’ showed a moderate bias for appearing in the POC. This contradicts Wunderlich’s (2005:35) observation that animate recipients trigger the IOC and inanimate recipients trigger the POC in German, since the recipients in our study were always animate. According to Wunderlich’s semantic analysis, the indirect object in the IOC is associated more with a recipient, and in the POC more with a goal. However, our data clearly show that animate recipients can be preferred in the POC, possibly depending on the verb. Had our study included inanimate recipients, we may well have observed even stronger preference for the POC with the verbs under investigation here. Overall, our findings illustrate that German contains at least one POC-biased verb and that, at least for certain verbs, the POC occurs to a greater extent than previously thought. The verbs showing more use of the POC merit further careful study in order to understand what linguistic factors trigger the use of POC.

A second main goal was to investigate whether geben ‘give’ and reichen ‘hand’, previously categorized in the literature as non-alternating IOC or only alternating under certain conditions, would occur in the alternative structural variant (POC) in actual production. The literature on the dative alternation with geben ‘give’ and reichen ‘hand’ is
mixed. Several authors claim that German does not allow the dative alternation with core dative verbs such as *geben* ‘give’ (e.g., Callies & Szczesniak 2008:173; Rappaport Hovav & Levin 2008:162; Sabel 2002:231). Others claim that the POC with *geben* ‘give’ is possible under the following four conditions: (1) when the speaker wishes to strongly emphasize the recipient, which is suggested to hold for *reichen* ‘hand’ as well (Liamkina, 2008:156). (2) when it is used in the sense of ‘donate’ – *Der Professor gab seine Bücher an die Bibliothek* ‘The professor donated his books to the library’ (Adler 2011:70; Dehé, 2004:87), (3) when the semantics of the action imply distribution, payment, giving (in the sense of sending) an article to the newspaper, etc. (Adler 2011:70), and (4) when used in certain dialects of German – *John gibt das Glas zur Mama* ‘John gives the glass to Mommy’ (Drenhaus, 2004:86). For *reichen* ‘hand’, Callies & Szczesniak (2008:173) suggest that the POC is possible only if using prepositional particles such as *weiterreichen* ‘pass on’ or *überreichen* ‘hand over’ (e.g., *Er reichte seinem Nachbarn ein Wörterbuch* ‘He handed his neighbor a dictionary’ (IOC) / *Er reichte sein Wörterbuch an seinen Nachbarn weiter* ‘He passed a dictionary on to his neighbour’ (POC)). In our study we found the verb *geben* ‘give’ used occasionally by participants in the POC, even though it was primarily used in the IOC. This is in line with Proost (2015:2) and De Vaere et al. (2018:15) who also found a small number of uses of *geben* ‘give’ with *an* in the POC in the DeReKo corpus of written German (less than 5% of total ditransitive uses of *geben*). These results taken together show that *geben* is indeed used with the POC, though not frequently. Our study did not include information about sentence context or dialect use of participants, so cannot shed light on what motivates the use of this structure. The verb *reichen* ‘hand’ was not used in the POC in our study, but our Bayesian analysis leaves open the possibility that it occurs rarely in production and just did not arise in the productions of our participants.

Our final research question asked which preposition is used in the POC for each verb. Here our results again support findings from previous literature in that *bringen* ‘bring’ is
typically produced with zu, verkaußen ‘sell’ with an, and schicken ‘send’ with both prepositions. A new finding is that although schicken ‘send’ was used with both prepositions, we found a strong preference for an compared to zu. This may be tied to the design of our materials which all used animate agents, animate recipients, and inanimate themes. We also found that geben ‘give’ was produced in the POC with both possible prepositions - twice with an (Der Junge gibt ein Geschenk an das Mädl ‘The boy gives the present to the girl’, Der Polizist gibt eine Nettigkeit an die alte Dame ‘The police officer gives something nice to the old lady’) and once with zu (Das Mädchen gibt hoffentlich den Ball zu dem Jungen ‘The girl will hopefully give the ball to the boy’). The latter case is interesting given that some research states that the preposition zu is not possible with geben ‘give’ (Malchukov et al. 2010:49; De Vaere et al. 2018:2). Despite their small number, these POC completions for geben ‘give’ with different prepositions suggest potential to discover more about which circumstances trigger POC production with different prepositions.

In sum, the written production task used in this study provides further information about the alternation behaviour of six commonly used ditransitive verbs in the context of two animate arguments (agent and recipient) and one inanimate argument (theme). However, since relatively few POCs were produced, we could only reach limited conclusions about the possibilities for POC use. Further, we were not able to control for definiteness and pronominal use, as the spontaneous productions from the participants included both definite and indefinite articles for both themes and recipients, as well as pronouns. In order to address these limitations, and also to more closely examine patterns for geben ‘give’ and reichen ‘hand’ given their limited coverage in the literature, we designed an acceptability judgment task to elicit acceptability ratings for structures containing each of the six verbs occurring in the two structures (POC and IOC).
Study 2: Acceptability Judgment Task

To gain a complementary view of the structural preferences for the ditransitive alternation in comprehension, we elicited acceptability judgments for the POC and the IOC for the same six verbs of interest. For each verb, we included POCs with each of an and zu in order to investigate the acceptability of each preposition. The items were also controlled for effects of animacy, definiteness, sentence length and concreteness of referents. The differences between Study 1 and Study 2 in design (single measure vs. repeated measures) and item characteristics (inanimate theme vs. animate theme) mean that the studies are not directly comparable. Nonetheless, it is informative to assess both production and comprehension of the ditransitive alternation. As we will show, changing animacy of the theme in the second study reveals verb-specific patterns that would otherwise have gone unnoticed.

Method

Participants

A total of 42 students and employees of the Technische Universität Kaiserslautern participated in the study (mean age 23.7 years, SD 4.6). All participants were native speakers of German, and none had begun learning a second language before the age of 7. Participants were not compensated for their participation.

Design and materials

The six verbs from the previous study were also investigated in this study: bringen ‘bring’, geben ‘give’, reichen ‘hand’, schicken ‘send’, verkaufen ‘sell’, and zeigen ‘show’. We created 18 experimental sentences – three for each verb – which were controlled for animacy,
definiteness and constituent complexity (see Appendix 1). All three arguments in each sentence were animate, in contrast with Study 1 where the theme was always inanimate. The theme was always realized as a definite lexical NP comprising small animals (e.g., bird, turtle) or small humans (baby, child). However, the agent and recipient were realized with proper names in half of the sentences (e.g., Sarah zeigte Klaus den Welpen ‘Sarah showed Klaus the puppy’), and as definite lexical NPs in the other half (e.g., Der Junge reichte dem Mädchen den Fisch ‘The boy handed the girl the fish’). This was divided across verbs as follows. For three of the verbs (bringen ‘bring’, reichen ‘hand’, zeigen ‘show’), two sentences used proper names for the agent and recipient, while a third sentence used definite lexical NPs. For the other three verbs (geben ‘give’, schicken ‘send’, verkaufen ‘sell’), one sentence used proper names for the agent and recipient, while the other two sentences used definite lexical NPs. None of the arguments in this study were repeated across items.

Each sentence appeared in three conditions: IOC (e.g., Der Bauer verkaufte der Dame die Ente ‘The farmer sold the lady the duck’), POC with an (Der Bauer verkaufte die Ente an die Dame ‘The farmer sold the duck to the lady’), and POC with zu (Der Bauer verkaufte die Ente zu der Dame ‘The farmer sold the duck to the lady’). The experimental sentences were distributed across three lists according to a Latin square design, such that each participant saw all 18 experimental sentences but never saw the same sentence in more than one condition. On the basis of the literature and the results of Study 1, we expected that participants would judge 14 of the sentences as grammatical (all six with the IOC as well as eight with the POC), and the remaining four as ungrammatical (POCs with atypical prepositions for the given verb).

The study also included 36 filler sentences comprising both intransitive and transitive sentences with adjuncts. To attain a balance of 50% of the sentences likely to be acceptable and 50% not, we designed 13 grammatical and 23 ungrammatical filler sentences. The ungrammatical sentences included various morpho-syntactic errors such as incorrect verbal
agreement, prepositions, case agreement, word order, and the like. The final questionnaire comprised a total of 54 sentences. It began with two filler sentences, then one experimental sentence, then two more filler sentences, then one experimental sentence, and so on. Sentences were presented in the same order for every participant.

The repeated measures design of this study could have led to some priming effects, unlike Study 1 which collected only a single measure from each participant in order to avoid priming effects. We tried to limit possible priming in Study 2 by including two fillers between every experimental item, and by not having participants read the sentences aloud (given that reading aloud or repeating stimuli is often used to enhance priming effects).

**Procedure**

Participants completed the study online via KwikSurveys in a location of their choice. They first completed a short background questionnaire in which they specified their age, education status, native language, any dialects spoken, and age of beginning to learn a second language. Then they completed the acceptability judgment questionnaire, in which they were given the instructions in (4).

(4) In diesem Test werden Ihnen deutsche Sätze präsentiert, die Ihnen als deutscher Muttersprachler mal grammatikalisch akzeptabel oder inakzeptabel erscheinen. Ihre Aufgabe besteht darin, die Akzeptabilität dieser Sätze auf der Skala von 1 bis 5 zu bewerten.

‘In this test you will be presented with German sentences which will seem either grammatically acceptable or grammatically unacceptable to you as a German native speaker. Your task is to rate the acceptability of these sentences on a scale of 1 to 5.’

The scale provided with the questions clarified that “1” signified ‘absolutely acceptable’ while “5” signified ‘absolutely unacceptable’. The questionnaire began with six practice
items, for which no feedback was provided. Then the 54 test sentences were shown. Participants saw only one sentence at a time on the screen, and were able to move to the next item with no time pressure. They were instructed to rate each sentence as quickly as possible, with the goal that the decision would be as natural and spontaneous as possible. They were not allowed to go back to a previous item once their rating for it was made. The entire procedure took around 20 minutes. All ratings were anonymously stored in a KwikSurveys analysis file and then extracted into SPSS.

Results

The mean acceptability ratings for each structure are shown in Figure 2. A one-way repeated measures ANOVA comparing all 6 verbs used in the IOC revealed no difference in ratings [F(5, 34)=2.11, p=0.089]. As expected, these results indicate that the IOC is fully acceptable for all verbs, with ratings of either 1 or 2 (M=1.33, SD=0.74).

One-way within-subject ANOVAs were conducted to compare the acceptability judgements for the three possible structures (IOC, POC with an, POC with zu) for each verb separately (see Table 3). All six ANOVAs were significant, indicating significant differences among the three conditions for each verb. In order to verify whether the choice between IOC and POC is categorical for both POC variants, we computed additional paired-samples t-tests to make pairwise comparisons between the means for the three structures, for each verb separately (see Table 4). The results revealed that each verb except zeigen ‘show’ (accepted only in the IOC) is acceptable in both the IOC and the POC (indicated by p-values higher than 0.05). Whether an or zu was preferred for the POC depended on the verb.
Figure 2: Mean acceptability ratings with error bars (95%) for each verb appearing in the IOC, POC with an, or POC with zu. The scale ranges from 1 (absolutely acceptable) to 5 (absolutely not acceptable).

Table 3. One-way analysis of variance (ANOVA) comparing the acceptability judgments across the three possible variants (IOC, POC with an, POC with zu) for each verb.

<table>
<thead>
<tr>
<th>Verb</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>bringen ‘bring’</td>
<td>211.62</td>
<td>2</td>
<td>105.98</td>
<td>126.42</td>
<td>.000</td>
</tr>
<tr>
<td>geben ‘give’</td>
<td>63.52</td>
<td>2</td>
<td>31.76</td>
<td>38.82</td>
<td>.000</td>
</tr>
<tr>
<td>reichen ‘hand’</td>
<td>45.00</td>
<td>1.74</td>
<td>25.80</td>
<td>18.30</td>
<td>.000</td>
</tr>
<tr>
<td>schicken ‘send’</td>
<td>32.46</td>
<td>1.66</td>
<td>19.57</td>
<td>13.99</td>
<td>.000</td>
</tr>
<tr>
<td>verkaufen ‘sell’</td>
<td>236.07</td>
<td>2</td>
<td>118.03</td>
<td>192.07</td>
<td>.000</td>
</tr>
<tr>
<td>zeigen ‘show’</td>
<td>256.11</td>
<td>2</td>
<td>128.06</td>
<td>205.36</td>
<td>.000</td>
</tr>
</tbody>
</table>
Table 4: Pairwise comparisons (t-tests) of structures for each verb.

<table>
<thead>
<tr>
<th>Verb</th>
<th>Structures compared</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>bringen (bring)</td>
<td>IOC vs. POC-an</td>
<td>14.30</td>
<td>40</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>IOC vs. POC-zu</td>
<td>1.09</td>
<td>39</td>
<td>.284</td>
</tr>
<tr>
<td></td>
<td>POC-an vs. POC-zu</td>
<td>-13.50</td>
<td>39</td>
<td>.000</td>
</tr>
<tr>
<td>geben (give)</td>
<td>IOC vs. POC-an</td>
<td>4.30</td>
<td>39</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>IOC vs. POC-zu</td>
<td>8.62</td>
<td>40</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>POC-an vs. POC-zu</td>
<td>4.68</td>
<td>39</td>
<td>.000</td>
</tr>
<tr>
<td>reichen (hand)</td>
<td>IOC vs. POC-an</td>
<td>2.13</td>
<td>40</td>
<td>.039</td>
</tr>
<tr>
<td></td>
<td>IOC vs. POC-zu</td>
<td>5.60</td>
<td>40</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>POC-an vs. POC-zu</td>
<td>3.71</td>
<td>40</td>
<td>.001</td>
</tr>
<tr>
<td>schicken (send)</td>
<td>IOC vs. POC-an</td>
<td>4.26</td>
<td>38</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>IOC vs. POC-zu</td>
<td>-0.42</td>
<td>38</td>
<td>.680</td>
</tr>
<tr>
<td></td>
<td>POC-an vs. POC-zu</td>
<td>-4.14</td>
<td>40</td>
<td>.000</td>
</tr>
<tr>
<td>verkaufen (sell)</td>
<td>IOC vs. POC-an</td>
<td>-0.33</td>
<td>40</td>
<td>.743</td>
</tr>
<tr>
<td></td>
<td>IOC vs. POC-zu</td>
<td>15.90</td>
<td>39</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>POC-an vs. POC-zu</td>
<td>16.13</td>
<td>39</td>
<td>.000</td>
</tr>
<tr>
<td>zeigen (show)</td>
<td>IOC vs. POC-an</td>
<td>15.90</td>
<td>40</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>IOC vs. POC-zu</td>
<td>17.10</td>
<td>40</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>POC-an vs. POC-zu</td>
<td>0.16</td>
<td>40</td>
<td>.872</td>
</tr>
</tbody>
</table>

Regarding Figure 2 and assuming a rating of 3 as the cut off for acceptability, the data show that the verbs bringen ‘bring’ and verkaufen ‘sell’ were rated as acceptable in the IOC and in only one POC variant (zu for bringen ‘bring’ and an for verkaufen ‘sell’). In contrast, geben ‘give’, reichen ‘hand’, and schicken ‘send’ were rated as acceptable in the IOC and both POC structures, although post hoc tests indicated that an was significantly preferred over zu for geben ‘give’ and reichen ‘hand’, and zu was significantly preferred over an for schicken ‘send’. Variability was also somewhat higher for the less preferred POC variant for these three verbs, suggesting a less consistent view of the acceptability of these structures across participants. The lack of significant difference in acceptability between the IOC and the POC with zu for either bringen ‘bring’ or schicken ‘send’, or between the IOC and the POC with an for verkaufen ‘sell’, suggests that the IOC and POC variants are perceived as equally acceptable for these verbs. In contrast, the significant difference in acceptability between the IOC and the POC with an and zu for both geben ‘give’ and reichen ‘hand’ suggests that these two verbs are perceived as most acceptable in the IOC.

Discussion
In Study 2, we investigated the acceptability judgments of German native speakers for the IOC, the POC with *an*, and the POC with *zu* for six commonly used ditransitive verbs. All items had animate agents, recipients, and themes. Our first goal was to determine whether the IOC and the POC were judged equally acceptable or whether the IOC had higher ratings for each verb. All verbs were judged acceptable in the IOC, and all verbs except *zeigen* ‘show’ were judged acceptable with at least one POC variant. For three of those verbs, the acceptability ratings were not significantly different for the IOC and the preferred POC variant (*bringen* ‘bring’, *schicken* ‘send’, *verkaufen* ‘sell’). For the other two verbs (*geben* ‘give’, *reichen* ‘hand’), the acceptability ratings were significantly higher for the IOC than for the preferred POC variant. These findings are in line with the literature in that the IOC is fully acceptable for all of our verbs, and is the only or most acceptable structure for three of them (e.g., Callies & Szczesniak 2008; Dehé 2004; Drenhaus 2004; Meinunger 2006; Woods 2012). However, the findings also show that that POC is more acceptable than previously thought, and is equivalently acceptable to the IOC for three of our verbs.

Our second research question focused on patterns for *geben* ‘give’ and *reichen* ‘hand’, in order to shed light on controversies in the literature about whether these two verbs can occur with the POC. We found that all three possible structures – IOC, POC with *an*, and POC with *zu* – were judged acceptable for both verbs, although ratings for the IOC were significantly higher than for both POC variants, and ratings for the POC with *an* were significantly higher than for the POC with *zu*. These results contradict claims that German does not allow the dative alternation with core dative verbs such as *geben* ‘give’ (e.g., Callies & Szczesniak 2008:173; Rappaport Hovav & Levin 2008:162; Sabel 2002:231). They also speak against findings from Rappaport Hovav & Levin (2008:162) who suggest that the *zu* variant of the POC does not occur with give-type verbs, and findings from De Vaere et al. (2018:2) who claim that the POC with *zu* is not appropriate to express transfer with *geben*.
‘give’. However, our results are consistent with those of Adler (2011:71-77) who claims that while *geben* ‘give’ occurs rarely in the POC with *zu*, it still can appear in certain contexts associated with custody of the recipient (e.g., *Er gab das Kind zu seinen Eltern* ‘He gave the child to his parents’ – animate theme; *Er gab das Buch, ein unersetzbarer Familienschatz, zu seinen Eltern* ‘He gave the book, which is an irreplaceable family treasure, to his parents’ – inanimate theme). It could well be that the acceptability ratings for *geben* ‘give’ and *reichen* ‘hand’ in the POC with *zu* (with means of 2.95 and 2.68 respectively) were triggered by the fact that we included only animate constituents in the study resembling thus the examples in Adler (2011).

The third research question focused on whether *an* or *zu* was preferred in the POC. We found that *an* was preferred with *geben* ‘give’, *reichen* ‘hand’, and *verkaufen* ‘sell’, while *zu* was preferred with *bringen* ‘bring’ and *schicken* ‘send’. The preposition *an* was also found acceptable for *schicken* ‘send’ but with a significantly lower rating, and the same held for *zu* with *geben* ‘give’ and *reichen* ‘hand’. These results are in line with the literature apart from the findings regarding *zu* for *geben* ‘give’ discussed in the previous paragraph.

**General Discussion**

In this chapter, we aimed to investigate verb biases and metalinguistic acceptability judgments for the POC vs. the IOC in native speakers of German across six commonly used ditransitive verbs: *bringen* ‘bring’, *geben* ‘give’, *reichen* ‘hand’, *schicken* ‘send’, *verkaufen* ‘sell’, and *zeigen* ‘show’. Most of the previous literature on ditransitive structures in German has focused on the use of canonical vs. non-canonical word order in the IOC, as the IOC is taken to be the default structure in German. It is also largely concerned with qualitative rather than quantitative comparisons, and has primarily focused on whether the two structures have
similar or different semantic interpretations (*monosemy* vs. *polysemy* views). It has paid little attention to the POC, or to the preference for which preposition (*an* or *zu*) is used in the POC for particular verbs. Further, there is considerable controversy in the literature concerning whether the verbs *geben* ‘give’ and *reichen* ‘hand’ allow the POC at all, and/or whether the POC with these verbs may be allowed under certain pragmatic, semantic or derivational conditions, or in certain dialects of German.

The two studies reported in the present chapter were designed to fill some of these gaps in the literature on the ditransitive alternation in German. The first study, a sentence completion task, asked participants to use the verbs above to describe pictures of events with animate agents and recipients and inanimate themes. The second study, an acceptability judgment task, asked participants to rate the acceptability of sentences containing the verbs above in which all three arguments were animate. These two studies aimed to increase our understanding of speakers’ syntactic choices regarding the dative alternation, depending on the verb and the context in which these occur.

The results from the two studies confirmed the well-established finding in the literature that German ditransitives are largely biased towards the IOC, and that many verbs including *zeigen* ‘show’ are restricted to the IOC (e.g., Callies & Szczesniak 2008; Dehé 2004; Drenhaus 2004; Meinunger 2006; Woods 2012). However, our studies also show that the POC is not as uncommon as one might assume from the literature. Participants frequently produced a POC in the sentence completion study (20% of ditransitive responses), and accepted the POC as equally acceptable to the IOC for three of our six verbs (*bringen* ‘bring’, *verkaufen* ‘sell’, *schicken* ‘send’). These results contradict Wunderlich’s (2005:35) observation that animate recipients trigger the IOC and inanimate recipients trigger the POC in German, since all recipients in both our studies were animate. Finally, we found that the likelihood of producing a POC differs in magnitude across the verbs we analyzed, with a relatively low likelihood for *geben* ‘give’ and *bringen* ‘bring’, but a much higher likelihood
for *verkaufen* ‘sell’ and *schicken* ‘send’. These outcomes are the first to show this spread of structural preferences for the POC vs. the IOC across verbs in German.

A salient question in the literature has focused on the verbs *geben* ‘give’ and *reichen* ‘hand’, with some researchers claiming that these verbs are ungrammatical in the POC (e.g., Callies & Szczesniak 2008; Rappaport Hovav & Levin 2008; Sabel 2002) and others claiming that they are grammatical but constrained to particular discourse contexts or dialects (e.g., Adler 2011; Dehé 2004; De Vaere et al. 2018; Drenhaus 2004; Liamkina 2008; Proost 2015). Our results suggest that the POC is indeed grammatical for these verbs, even in situations where the discourse context is relatively neutral. Consistent with other studies, we found that POC productions with *geben* ‘give’ and *reichen* ‘hand’ were rare in our sentence completion task – only 3% of productions with *geben* ‘give’ and no productions with *reichen* ‘hand’.

However, participants in the acceptability judgment study fully accepted the POC structure for these verbs, albeit with significantly lower ratings than for the IOC, in situations where there was no preceding context of the sort discussed in the literature as prerequisite for the use of the POC (i.e., for emphasis on the recipient, in certain semantic senses of the action, when particles are added to the verb which results in a different meaning of the verb; cf. Adler 2011; Callies & Szczesniak 2008; Dehé 2004; Liamkina 2008). Our findings from sentence completion and acceptability judgment tasks thus extend the findings in the literature based on intuition, elicitation, and corpus analysis, and illustrate the importance of considering data from a variety of tasks.

We also analyzed the use of the two prepositions *an* and *zu* for the POC across both the sentence completion and grammaticality judgment tasks. In line with Wegener’s (1985) analysis of prepositions used in ditransitive structures, we found more use of *an* than *zu* across the verbs that allowed the POC taken together. However, we found that the verbs exhibited individual preferences. The verbs *geben* ‘give’, *reichen* ‘hand’ and *verkaufen* ‘sell’ showed a preference for *an* across both tasks, while *bringen* ‘bring’ showed a preference for *zu* across
both tasks, and *schicken* ‘send’ showed different preferences across the tasks: *an* for the sentence completion task and *zu* for the grammaticality judgment task. Further, results for both *bringen* ‘bring’ and *verkaufen* ‘sell’ showed no evidence that the alternative preposition was acceptable at all (though the Bayesian analysis left open the possibility that it might be used in the general population), while results for both *geben* ‘give’ and *reichen* ‘hand’ showed that the alternative preposition was fully acceptable albeit being less preferred. Our results do not support claims in the literature that the POC with *zu* is not possible with *geben* ‘give’ (Rappaport Hovav & Levin 2008), but are consistent with claims that this can occur in restricted semantic contexts (Adler 2011; De Vaere et al. 2018). Some literature has investigated the slight semantic differences that *an* vs. *zu* can trigger in the interpretation of individual verbs. For example, although *geben* ‘give’ is most commonly used with *an*, *zu* can be used to express a custody relationship (Adler 2011: 71-77). Since our study did not consistently vary such semantic differences, we can shed no light on this discussion.

A particularly interesting finding is the difference in preference for *an* vs. *zu* for the verb *schicken* ‘send’, depending on the task. We suspect that this must have come at least partially from the difference in animacy of the theme across the two studies. According to Adler (2011), the preposition *an* implies an addressee meaning in that the theme is moved by someone to the goal, whereas *zu* entails a directional meaning in that the theme moves by itself to the goal. This entails that for *an*, the theme must be inanimate in order to be moved, which was indeed the case in our sentence completion task. Similarly, for *zu*, the theme must be animate in order to move itself, which was also the case in our acceptability judgment task. Although our items in the latter task did not explicitly convey that the theme moved by itself, it is of course possible that participants interpreted some items in that way (*Der Zauberer schickte den Frosch zu der Meerjungfrau* ‘The magician sent the frog to the mermaid’, *Der Prinz schickte die Katze zu der Prinzessin* ‘The prince sent the cat to the princess’, *Kirsten schickte den Schmetterling zu Horst* ‘Kirsten sent the butterfly to Horst’). In contrast to Adler
(2011), De Vaere et al. (2019:2) and Proost (2015:19) state that *schicken* ‘send’ can be used with both *an* and *zu* to entail the meaning of transfer to a recipient, and do not distinguish between transfer of location and transfer of possession as Adler does. It would be interesting to test the competing claims of Adler (2011) vs. De Vaere et al. (2019) and Proost (2015) more extensively in an acceptability judgment task with more items that are explicitly manipulated for the relevant factors.

Finally, our results highlight the value of considering different types and modalities of data in analyzing structural preferences, consistent with previous findings from Bresnan and Nikitina (2008) and from Kempen and Harbush (2005). As these authors have noted, each type of data reveals a different part of the full picture, so focusing on only one or the other might lead to a more restricted view of structural preferences than is warranted. For example, certain structures may appear rarely in production tasks due to structural bias or frequency effects, although those same structures are classified as fully acceptable on receptive tasks (see Gries 2005).

Two results from our studies were particularly enlightening in illustrating the need for multiple approaches. First, the POC was rare (*geben* ‘give’, *bringen* ‘bring’) or absent (*reichen* ‘hand’) for three of the verbs in the sentence completion task, but rated as fully acceptable in the grammaticality judgment task. For the other three verbs, the level of production and acceptance for the POC structure was similar across the two tasks: frequently used and fully accepted for *verkaufen* ‘sell’ and *schicken* ‘send’ vs. never produced and rated as ungrammatical for *zeigen* ‘show’. Second, we found diverging preferences for the two possible prepositions in the POC structure for *schicken* ‘send’ across the two studies: *an* was preferred in the sentence completion task while *zu* was preferred in the acceptability judgment task. Looking at either the productive or receptive task alone would have yielded a misleading understanding of the structural preferences for these verbs.
Similar cross-task effects have been shown previously for the German ditransitive by Kempen and Harbusch (2005) in their assessment of preferences for linear ordering of the IOC (i.e., recipient-theme vs. theme-recipient order) in various conditions. They found that several structures that were never or rarely produced in their own production task were nonetheless judged as fully grammatical on a grammaticality judgment task conducted by Keller (2000), suggesting that metalinguistic judgements indicate a greater freedom of word order than production data do. Kempen & Harbusch (2005) hypothesized that there is a critical value or “production threshold” on grammaticality rating scales, such that structures rated well above the threshold usually occur in corpora with moderate to high frequencies, while structures rated slightly above or below the threshold hardly ever occur in production (structures with very low values typically appear only as production errors). This is consistent with our results to some degree. If we take the critical value on our scale as 3 (half way between the endpoints 1 and 5), then the values for the POC with zu for both geben ‘give’ (2.98) and reichen ‘hand’ (2.69) are just above the threshold, and these structures appeared rarely or not at all in our production task. Further, the structures that were rated well below the critical value on our acceptability judgment task never appeared in our production task, and all but one of the structures that were rated well above the critical value were used frequently in our production task. However, there are also some exceptions. First, the value for schicken ‘send’ in the POC with an (2.57) is just above the threshold on the receptive task, but this structure was produced very frequently in our sentence completion task. Second, geben ‘give’ occurred in the POC with an in only 2% of the ditransitive sentence completion responses but its score on the acceptability judgment task was well above the threshold (1.93). Thus, we suggest that further research is necessary to fully understand the relationship between structural preferences on production vs. reception tasks.
Conclusion

This chapter reports two empirical investigations of structural verb bias effects across six commonly used ditransitive verbs in German. Our findings support the literature in showing that the IOC is produced and accepted for all the verbs under study. More importantly, our findings extend the literature in showing that the POC is judged fully acceptable for five of the six verbs including geben ‘give’ and reichen ‘hand’, which have often been categorized in the literature as non-alternating. We further show that the five verbs that allow the POC differ substantially in their preference for its use, and that one of the five verbs (schicken ‘send’) was biased towards the POC in the sentence completion task. The verbs also differ in their preference for preposition use in the POC: three verbs preferred the preposition an, one preferred zu, and one allowed both. Using two different modalities for the empirical studies (sentence completion and grammaticality judgment) was essential for obtaining a broader understanding of the structural preferences that one method would not have provided on its own. In particular, one verb (reichen ‘hand’) was not produced with the POC but was judged fully grammatical with that structure, and one verb (schicken ‘send’) was used preferentially with an in the sentence completion task but with zu in the grammaticality judgment task. Such tasks requiring different skills – e.g., production vs. reception – are helpful in that each may reveal patterns that are hidden in other domains. Overall, we conclude from these two studies that POCs are an essential part of the German language and should continue to be investigated in more detail.

References


