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A corpus-based analysis of the Dat-Nom/Nom-Dat alternation in German

Abstract: A subgroup of German Nom-Dat verbs have received considerable attention in the literature due to the propensity of the dative to occur preverbally, which is unexpected on an object analysis of the dative. Here we argue for a different analysis, namely that the relevant verbs alternate between two different argument structures, Dat-Nom and Nom-Dat, and hence that either argument, dative or nominative, may be the syntactic subject. Earlier studies have shown that topicalization of direct arguments is found in ca. 4–12% of cases in German texts. For comparison, we have extracted 13,000 tokens of 76 verbs from the deTenTen13 corpus and coded these for ten different variables. Our findings support an alternating Dat-Nom/Nom-Dat analysis for these verbs, as 42% of the tokens instantiate the Dat-Nom order and the remnant 58% instantiate the Nom-Dat order. In contexts with full NPs only, the share of Dat-Nom tokens is even higher, 46% compared to 54% Nom-Dat, altogether ruling out a topicalization analysis of the Dat-Nom order. Further light is thrown upon this alternation through a bivariate and multivariate analysis. This confirms the effect of topicality, definiteness and length, while also revealing an inherent correlation between datives and animate referents and nominatives and inanimate referents.

Keywords: non-canonical case marking, Dat-Nom/Nom-Dat alternation, word order, argument structure, statistical modelling

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1 Introduction

Ever since Primus (1994), it has been observed that certain verbs selecting for both a dative and a nominative argument may instantiate two diametrically opposite word orders, both of which appear to be equally neutral. By *equally neutral* we mean that these involve neither topicalization nor fronting for focus purposes. Typical (constructed) examples involve the German verb *gefallen* ‘like, please’, as in (1) below:

- (1) a. *Diese Idee gefiel dem Mann richtig gut.*
 this-NOM idea liked the-DAT man really well
 ‘This idea really was to the man’s liking.’
 b. *Dem Mann gefiel diese Idee richtig gut.*
 the-DAT man liked this-NOM idea really well
 ‘The man really liked this idea.’

Corresponding verbs in Icelandic also appear to alternate between two different argument structures with an associated alternation in word order (Barðdal 1999, 2001), as shown here in (2) with the verb *falla vel* ‘like, please’, a cognate of German *gefallen* in (1) above:

- (2) a. *Þessi hugmynd féll mann-i-num virkilega vel.*
 this-NOM idea liked man-DAT-DEF really well
 ‘This idea really was to the man’s liking.’
 b. *Mann-i-num féll þessi hugmynd virkilega vel.*
 man-DAT-DEF liked this-NOM idea really well
 ‘The man really liked this idea.’

While the dative of the Dat-Nom argument structure and the nominative of the Nom-Dat argument structure each passes the subject tests in Icelandic (Barðdal 1999, 2001), this type of analysis has not yet gained a foothold in the German scholarship. Traditionally, verbs like in (1) have been regarded as Nom-Dat verbs with a high frequency of topicalization of the dative to first position, thus resulting in Dat-Nom word order (Haspelmath 2001; Kempen & Harbusch 2005; Bader & Häussler 2010; Verhoeven 2015, *inter alia*). Such an analysis is not satisfactory, however, since topicalization is an optional (and rare) response to information-structural pressures (Engel 1970: 90; Rosengren 1993: 274; Barðdal et al. 2019: 116; Barðdal 2023: 354, *inter alia*), as confirmed by Sahel & Jonischkait (2008), who show that clauses containing a single object topicalize that object in a mere 12% of the cases.

More recently, Verhoeven (2015: 75) has shown that topicalization of accusative objects in German is substantially less frequent than Sahel & Jonischkait’s baseline, since canonical transitive verbs only front the accusative in 3.4% of the cases across both the prefield and the

middle field when both arguments are full NPs. Somers & Barðdal's (2023) verbs licensing dative objects, like *helfen* 'help', yield slightly higher topicalization numbers, or 7%, but this number is based on tokens featuring both pronouns and full NPs.

Under more formal approaches (Fanselow 2002; Bayer 2004; Haider 2005, 2010; Schlesewsky & Bornkessel 2006; Wunderlich 2009), these verbs have been analysed as selecting for the Dat-Nom argument structure and labelled *Dat-Nom* verbs. Nevertheless, the second argument of the argument structure, that is, the nominative, has been analysed as the syntactic subject. Clearly, such an analysis is not satisfactory either, since the subject tests target the first argument, not the second (cf. Barðdal 2023: Ch. 2 and Section 2.2.2 below).

In the present article, we argue in favour of a third hypothesis, that is, that these verbs alternate between two diametrically opposite argument structures, Dat-Nom and Nom-Dat. In other words: when the relevant verbs instantiate the dative-before-nominative order, the dative is the first argument and the nominative the second argument, whereas the nominative is the first argument and the dative the second argument when these verbs instantiate the nominative-before-dative order. Such an analysis is implicit in Primus (1994, 2012), on the assumption that both word orders are equally neutral. The relevant alternation in German has also been observed by Blume (2000: 65), Haspelmath (2001), Eythórsson & Barðdal (2005) and specifically argued for by Barðdal et al. (2014, 2019), Rott (2016), Barðdal (2023: Ch. 6) and Somers & Barðdal (2023).

However, what is missing from the literature is a systematic study of an additional subject test, that is, the preverbal position of the subject in verb-second clauses. We aim to bridge this gap by investigating word order variation in a broad sample of 76 potential alternating Dat-Nom/Nom-Dat verbs in German, selected on the basis of Somers (2021). This involves 200 tokens each of the 76 verbs, extracted from the deTenTen13 corpus, thus amounting to a total of 13,000 observations. In addition, we explore the properties associated with the dative and nominative arguments, respectively, through a number of bivariate analyses, before subjecting our material to a multivariate analysis in order to uncover the factors controlling the alternation.

We start in Section 2 below with a description of the state-of-the-art, including a comprehensive overview of the relevant structures, a terminological discussion and an outline of the semantic and syntactic properties of Dat-Nom/Nom-Dat verbs in German. Section 3 describes the dataset, how the relevant material has been extracted from the deTenTen13 corpus and how it has been cleaned and annotated for ten different variables. In Section 4, we present word order statistics for five Nom-Dat verbs as a baseline, comparing these with corresponding statistics for a set of alternating Dat-Nom/Nom-Dat verbs. In Section 5 we discuss the correlation between case marking and six linguistic factors. Section 6 presents the results of our logistic regression analysis and Section 7 summarizes and concludes our article.

2 State-of-the-art

Our investigation contributes to a terminologically diverse area of research. Section 2.1 therefore contrasts the notion of *Dat-Nom/Nom-Dat verbs* with related notions such as *experiential verbs*, *psych verbs* and *unaccusative verbs*. In Section 2.2 we flesh out the semantic and syntactic properties of potential Dat-Nom/Nom-Dat verbs in German.

2.1 The scope of Dat-Nom/Nom-Dat verbs

Research on non-canonical case marking often revolves around so-called *psych verbs*, *experiential verbs* and *unaccusative verbs*. While scholars have observed similarities between these classes, they have tended to emphasize their commonalities over the differences. The present section bridges this gap. For non-canonically case-marked verbs licensing both a dative and a nominative argument, we argue that the classes of psych verbs, experiential verbs and unaccusative verbs are in a meronymic relation to each other. At the same time, we maintain that all these verb classes may be subsumed under the umbrella of *Dat-Nom/Nom-Dat verbs*, which additionally contains verbs not belonging to any of the remaining semantic categories.

The structure of this section is as follows: Section 2.1.1 discusses the labels *psych verbs* and *experiential verbs*, Section 2.1.2 introduces the overarching label of *Dat-Nom/Nom-Dat verbs* and Section 2.1.3 examines the status of so-called *unaccusative verbs*. Section 2.1.4 summarizes the main findings.

2.1.1 Psych verbs and experiential verbs

The term *psych verbs* has been used rather loosely in the literature to refer to verbs expressing some sort of psychological awareness. Depending on the verb in question, the psych participant may be realized either in the nominative, as in (3), the accusative, as in (4), or the dative, as in (5):

- (3) *Ich liebe diesen Duft.*
I-NOM love this-ACC smell
'I love this smell.'

- (4) *Mich wurmt dieses Problem schon länger.*
me-ACC bothers this-NOM problem already longer
'I have been bothered by this problem for a long time.'

- (5) *Diese Idee gefiel mir richtig gut.*
this-NOM idea liked me-DAT really well
'I liked this idea a lot.'

Our focus is on verbs selecting for both a dative and a nominative argument, that is, constructions as in (5). These verbs will be referred to as *Dat-Nom/Nom-Dat psych verbs*.

Interestingly, several scholars have used *psych verbs* interchangeably with *experiential verbs* (Anagnostopoulou 1999; Haspelmath 2001; Verhoeven 2015, *inter alia*). This is odd, as experience need not affect a participant mentally. Consider the Dat-Nom/Nom-Dat verbs *munden* ‘taste good’, which denotes perception, or *aufstoßen* ‘make (sb) burp’, which refers to a bodily state: these make reference to human experience, but are not psychological verbs.

Klein & Kutscher (2002) also observe the alleged synonymy of the terms *psych verbs* and *experiential verbs*, distinguishing between psych verbs in the narrow sense (verbs of emotion only) and psych verbs in the broad sense (synonymous with experiential verbs). According to Klein & Kutscher, the terms *psych verbs* and *experiential verbs* are often treated as interchangeable, since verbs of emotion account for the largest subgroup of experiential predicates. This is confirmed by Somers (2021) for Present-Day German: nearly 50 different German Dat-Nom/Nom-Dat verbs (out of a total of 146) denote emotion in at least one of their senses.

Now, if psych verbs are essentially verbs of emotion, how exactly should one define *experiential verbs*? According to Dowty (1991), an experiencer non-volitionally engages in an act of sentience or perception. On his definition, experiencers are licensed by verbs of emotion (e.g. *gefallen* ‘please, like’), verbs of cognition (e.g. *klarwerden* ‘become clear’), verbs of perception (e.g. *auffallen* ‘strike, notice’), verbs referring to bodily states (e.g. *aufstoßen* ‘make (sb) burp’) and verbs of evidentiality (e.g. *scheinen* ‘seem, appear’). Observe that all of these predicates denote activities prototypically carried out by humans, leading some scholars to believe that experiencers are animate *by definition* (see Kutscher 2009; Verhoeven 2009, 2015; Rott 2013). This is clearly an oversimplification, as it fails to acknowledge the role of creativity (and metaphor in particular) in language use. We return to this point in Section 5.5.

The fact that experiencers are prototypically animate has probably also facilitated the perceived synonymy of the terms *experiential verb* and *psych verb*: the capacity to experience emotion is what sets humans, and animate beings in general, apart from objects and abstract concepts. Here, we adopt Klein & Kutscher’s (2002) narrow definition of psych verbs as verbs of emotion (cf. Viti 2016). Experiential verbs, by contrast, are defined in line with Dowty’s (1991) definition of the experiencer role, thus comprising verbs of emotion alongside verbs of cognition, verbs of perception, bodily state verbs and verbs of evidentiality. As such, Dat-Nom/Nom-Dat psych verbs are fully subsumed under the category of *Dat-Nom/Nom-Dat experiential verbs*.

2.1.2 Dat-Nom/Nom-Dat verbs

Apart from the confusion surrounding Dat-Nom/Nom-Dat psych verbs and Dat-Nom/Nom-Dat experiential verbs, these terms have been used by various scholars in reference to verbs that

are neither experiential nor psychological, thus implicitly acknowledging the inability of both labels to capture the richness of a category we refer to as *Dat-Nom/Nom-Dat verbs*.

Within the German scholarship, one of the first researchers to overstretch the term *psych verb* in this way was Lenerz (1977: 114), who includes in this class the verbs *folgen* ‘succeed, follow’ (a happenstance verb), *fehlen* ‘lack’ (a verb of possession), *gelingen* ‘succeed’ (a success verb), *gehören* ‘belong’ (a verb of belonging) and also *zukommen* ‘be entitled to; be allowed to’, which is a verb of gain and benefit as well as of modality. Haspelmath (2001) expands the list even further by including verbs of attitude like *genügen* ‘be enough, be sufficient’.

While all the aforementioned verbs share important properties, labelling them *psych verbs* or *experiential verbs* is inappropriate and confusing. In line with Barðdal (2001, 2004) and Barðdal et al. (2019), we refer to the category as a whole as *Dat-Nom/Nom-Dat verbs*. The interrelation between the categories Dat-Nom/Nom-Dat psych verbs, Dat-Nom/Nom-Dat experiential verbs and Dat-Nom/Nom-Dat verbs may be captured by the following implicational hierarchy:

- (6) Dat-Nom/Nom-Dat psych verbs < Dat-Nom/Nom-Dat experiential verbs < Dat-Nom/Nom-Dat verbs

According to (6), all Dat-Nom/Nom-Dat psych verbs are Dat-Nom/Nom-Dat experiential verbs and all Dat-Nom/Nom-Dat experiential verbs are Dat-Nom/Nom-Dat verbs – but not vice versa. The specific properties of German Dat-Nom/Nom-Dat verbs, including their respective semantic fields, are discussed in Section 2.2.

2.1.3 Unaccusative verbs

Syntactic studies of Dat-Nom/Nom-Dat verbs have shown that some are in fact unaccusatives, forming the perfect tense with *sein* ‘be’ rather than *haben* ‘have’. In their seminal paper on non-canonical case marking in present-day Italian, Belletti & Rizzi (1988) argue that forming the perfect tense with *essere* ‘be’ is a core property of so-called *piacere verbs*, that is, Dat-Nom/Nom-Dat psych verbs. At least for Present-Day German, Belletti & Rizzi’s (1988) proposal raises three issues.

First, under Belletti & Rizzi’s account, all Dat-Nom/Nom-Dat verbs would seem to be psych verbs in the narrow sense, that is, verbs of emotion. The preceding sections have shown that this is not the case; some are actually Dat-Nom/Nom-Dat experiential verbs, whereas others, like verbs of success, verbs of speaking or happenstance verbs, solely belong to the overarching class of Dat-Nom/Nom-Dat verbs.

Secondly, Belletti & Rizzi’s claim that Dat-Nom/Nom-Dat psych verbs are invariably unaccusative verbs is too reductive, at least for German. Consider verbs like *wohltun* ‘do (sb)

good’, *grauen* ‘dread, be afraid of’ or *stinken* ‘enrage’: while these pertain to emotion, they are unergatives, not unaccusatives. The fact that German psych verbs do not always form the perfect tense with *sein* has also been observed by den Besten (1985: 46). He sidesteps this incongruity by stating that auxiliary selection as a diagnostic for unaccusativity is less dependable for German than for Italian. As a result, some verbs forming the perfect tense with *haben* ‘have’ (like *gefallen* ‘please, like’) may still be considered unaccusatives. Den Besten’s failure to elaborate on the purported invalidity of the auxiliary test in German is peculiar given that auxiliary selection is considered one of the core properties of unaccusativity (Haider 1985: 236; Alexiadou et al. 2004: 5; Kallulli 2007: 777, *inter alia*).

Thirdly, not every dative unaccusative verb is a psych verb. Consider *auffallen* ‘strike, notice’ and *entschlüpfen* ‘escape (words)’: both are unaccusatives, yet *auffallen* is a verb of cognition and *entschlüpfen* is a verb of speaking. As such, the former belongs to the class of Dat-Nom/Nom-Dat experiential verbs and the latter to the overarching class of Dat-Nom/Nom-Dat verbs.

Thus, the relation between such *dative unaccusative verbs* on the one hand, and Dat-Nom/Nom-Dat psych verbs, Dat-Nom/Nom-Dat experiential verbs and Dat-Nom/Nom-Dat verbs, on the other, is one of partial overlap: the class of unaccusatives cross-cuts each of the remaining three categories, not fully coinciding with any of these.

2.1.4 Summary

The present section has argued that the classes of Dat-Nom/Nom-Dat psych verbs, Dat-Nom/Nom-Dat experiential verbs, dative unaccusative verbs and the semantically more general Dat-Nom/Nom-Dat verbs share a meronymic relation. At the heart of these four categories lies the class of *piacere* verbs, which displays all properties exhibited by each remaining class. Figure 1 visualizes the interrelation between the classes.

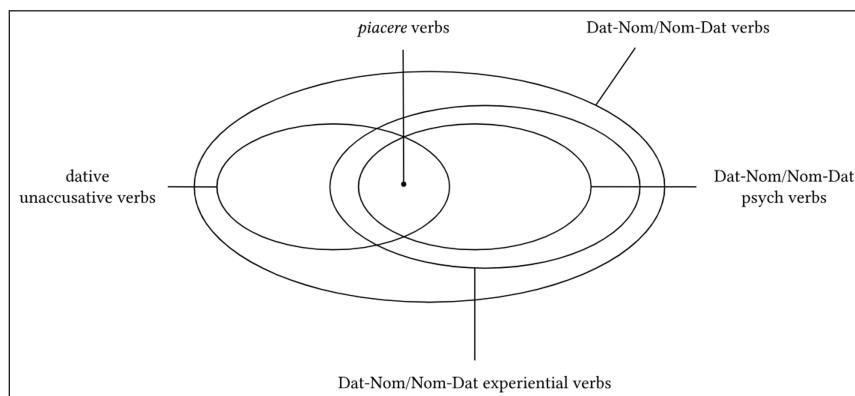


Figure 1: The interrelation between Dat-Nom/Nom-Dat psych verbs, Dat-Nom/Nom-Dat experiential verbs, dative unaccusative verbs, Dat-Nom/Nom-Dat verbs and *piacere* verbs. Diagram not to scale

We now move on to Section 2.2, which examines the semantic and syntactic properties of the overarching class of Dat-Nom/Nom-Dat verbs.

2.2 Dat-Nom/Nom-Dat verbs: definition

Dat-Nom/Nom-Dat verbs display a number of properties that set them apart from other verbs, in particular from ordinary Nom-Dat verbs like *gehören* ‘obey’, *vertrauen* ‘have faith in’ or *glauben* ‘believe’. Section 2.2.1 provides an overview of the semantic properties of Dat-Nom/Nom-Dat verbs while Section 2.2.2 elaborates on their syntactic peculiarities.

2.2.1 Semantic properties

Semantically, German Dat-Nom/Nom-Dat verbs exhibit three fundamental properties: (1) they are low in agentivity, (2) they display a thematic asymmetry between the dative and the nominative and (3) they express a meaning that is compatible with one of 16 semantic domains. Each of these properties will be discussed in turn.

First, various scholars have noted that Dat-Nom/Nom-Dat verbs are low in agentivity, deviating from the transitive prototype, which postulates a highly individuated agent willingly targeting a non-individuated, inert patient (Hopper & Thompson 1980; Barðdal 2004; Barðdal & Eythórsson 2009; Barðdal et al. 2016; Somers 2021, *inter alia*). Since low agentivity is a property that Dat-Nom/Nom-Dat verbs share with all other predicates with non-canonical case marking (Haspelmath 2001), it qualifies as a necessary, but not sufficient, diagnostic for Dat-Nom/Nom-Dat verbs.

Secondly, Dat-Nom/Nom-Dat verbs display a mismatch between case marking and thematic roles. According to Primus (1999), cases and thematic roles may each be ranked hierarchically, giving rise to the case hierarchy (7) and the thematic hierarchy (8):

(7) Case hierarchy: nominative > accusative > dative

(8) Thematic hierarchy: proto-agent > proto-recipient > proto-patient

In the case of Dat-Nom/Nom-Dat verbs, the two hierarchies conflict with one another, as the dative, being the lower-ranked case, is mapped onto the argument corresponding with the proto-agent, while the nominative, being the higher-ranked case, is mapped onto the argument bearing the lower-ranked proto-patient role. This form-meaning mismatch clearly sets Dat-Nom/Nom-Dat verbs apart from Nom-Dat verbs like *gehören* ‘obey’, *vertrauen* ‘have faith in’ or *glauben* ‘believe’, which fail to display such a discrepancy. As a consequence, the mismatch between case marking and thematic roles may be considered another necessary diagnostic for Dat-Nom/Nom-Dat verbs.

Thirdly, German Dat-Nom/Nom-Dat verbs pertain to one of the following 16 semantic domains: emotion, cognition, gain and benefit, happening, hindrance, attitude, possession, perception, bodily states, modality, ontological states, evidentiality, success, belonging, speaking and natural occurrences. These domains were first discussed by Barðdal (2004), Barðdal et al. (2012), Barðdal et al. (2016) and Somers (2021) in the context of Proto-Indo-European, Proto-Germanic, Present-Day German, Icelandic and Faroese.

2.2.2 Syntactic properties

Apart from the aforementioned semantic properties, several scholars have drawn attention to the syntactic peculiarities of German Dat-Nom/Nom-Dat verbs. These essentially demonstrate that such verbs are *alternating predicates*, which means that either the dative or the nominative may be analysed as the subject, but obviously not at the same time (cf. Barðdal 2001, 2023: Ch. 6; Eythórsson & Barðdal 2005; Barðdal et al. 2014, 2019; Somers & Barðdal 2023). This means that the nominative and the dative independently pass an array of subject tests: first position in declarative clauses, subject-verb inversion, conjunction reduction, clause-bound reflexivization, raising-to-subject, raising-to-object and control infinitives. Note that verb agreement is not listed here, being a coding property generally confined to nominatives in the Indo-European languages, irrespective of syntactic behaviour (Sigurðsson 1990–1991).

All of the aforementioned tests have in common that they target the first argument of the argument structure. Any bottom-up attempt to generalize across the behaviour of the arguments relative to these tests will therefore apply to the first argument of the argument structure only. This led Eythórsson & Barðdal (2005: 827–832) to argue for a subject definition in terms of the location of the arguments in the argument structure, with the subject being defined as the leftmost or the first argument of the argument structure and the object as its rightmost or second argument (cf. also Barðdal 2023: Ch. 2).

Our definition of subject raises two follow-up questions: i) What determines the internal order of the arguments? ii) Is the first argument, and hence the subject, necessarily the topic? We start with (ii), as we know that topicality and subjecthood are intertwined. Consider (9) below:

- (9) A: What happened to my Chomsky book? I can't find it.
 B: **A woman** came by and bought **it**. You put your books up for sale, remember?

In this particular example, the subject, *a woman*, is indefinite and non-topical, while the object, *it*, is definite and topical. The difference in topicality is further highlighted by the fact that the subject is a full NP while the object is pronominal. This shows that subjects are not necessarily topics, even though they tend to be. The same holds, *mutatis mutandis*, for objects.

We now turn to question (i), that is, the factors determining the order of the arguments. We believe that these factors are derivatives of event structure, which is in turn determined by force-dynamics (Croft 1998, 2001, 2012). The concept of force-dynamics (Talmy 1985, 1988) captures the dynamics between two entities of an event when exposed to force, be it physical or emotional. If one entity acts upon another, this entity is a causer and thus the initiator of the event, while the entity acted upon is a non-causer and thus the endpoint of the event. Consequently, the initiator of the event is mapped onto the first argument of the argument structure and hence to the subject role, while the endpoint is mapped onto the second argument and hence to the object role.

The scenario described above involves a causative event with a dedicated causer and non-causer. However, matters are different with event structures which do not involve a causer, such as mental states. In these cases, two construals are available for the respective verbs, both cross-linguistically and language-internally: one in which a stimulus affects an experiencer (the *frighten* construal) and one in which an experiencer directs his/her attention towards a stimulus (the *fear* construal). In the former, the stimulus is mapped onto the first argument of the argument structure, that is, the subject, and the experiencer onto the second argument, that is, the object. In the second construal, by contrast, it is the experiencer which maps onto the first argument and thus to the subject role, while the stimulus maps onto the second argument and thus to the object role.

In most languages, the two construals are lexically defined, as with *frighten* and *fear* in English. In several Indo-European languages, however, certain Dat-Nom verbs may be found with both construals, as documented for Icelandic (Barðdal 2001) and Faroese (Barnes 1986), Old English (Allen 1995), Romanian (Iliaia et al. 2025), Greek (Anagnostopoulou 1999: 69), Italian (Haspelmath 2001: 68–69), Lithuanian (Holvoet 2013: 266), Russian (Barðdal 2023: 118–120) and Latin (Cluyse et al. 2025).¹ These are the verbs that we refer to here as alternating Dat-Nom/Nom-Dat verbs.

The most widely discussed fact about alternating verbs is that either argument, the dative or the nominative, may take initial position in declarative clauses without either order being more marked than the other (Primus 1994, 2012; Barðdal 2001, 2023: Ch. 3, Ch. 6; Haspelmath 2001; Eythórsson & Barðdal 2005; Rott 2013, 2016; Barðdal et al. 2014, 2019, *inter alia*). Examples (10a–b) illustrate this phenomenon for the alternating verb *auffallen* ‘strike, notice’:

- (10) a. *Auch der Dame mit der Feile war der Fleck aufgefallen.*
 also the-DAT lady with the file was the-NOM stain noticed
 ‘The lady with the file had also noticed the stain.’

¹ See, however, Elens et al. (2024) on Old Norse-Icelandic *líka* ‘like’, which appears not to be an alternating Dat-Nom/Nom-Dat verb, as opposed to its cognate *lician* ‘like’ in Old English.

- b. *Der 15-jährige ist der Polizei bereits aufgefallen.*
 the-NOM 15-year-old is the-DAT police already noticed
 ‘The police have already noticed the 15-year-old.’

A second subject test which either argument of Dat-Nom/Nom-Dat verbs passes is subject-verb inversion (Barðdal 2006: 52–53, 2023: 289–292; Barðdal et al. 2019: 131–132), here shown in (11a–b):

- (11) a. *War der Dame mit der Feile der Fleck aufgefallen?*
 was the-DAT lady with the file the-NOM stain noticed
 ‘Had the lady with the file noticed the stain?’
 b. *War der Fleck der Dame mit der Feile aufgefallen.*
 was the-NOM stain the-DAT lady with the file noticed
 ‘Had the lady with the file noticed the stain?’

We do not pursue any of the remaining subject tests here (see, however, Barðdal et al. 2014, 2019 and Barðdal 2023: Ch. 6 for such examples), since our primary goal is to focus on the positional test under (10a–b). This diagnostic has so far been ignored in research on subjecthood in German (Reis 1982), which has instead focused on conjunction reduction and control infinitives (Zaenen et al. 1985; Sigurðsson 1989, 1992; Fanselow 2002; Bayer 2004; Haider 2005, 2010; Wunderlich 2009; Pankau 2016). We therefore aim to show that (a) word order may be used to distinguish between subjects and objects in German and (b) that either argument of Dat-Nom/Nom-Dat verbs, the dative or the nominative, passes this test.

3 Methodology

This study takes as its starting point the list of 145 German Dat-Nom/Nom-Dat verbs compiled by Somers (2021). For each verb, a lemmatized search was run in the German Web 2013, or deTenTen13 corpus, accessed through the Sketch Engine interface (Kilgarrieff et al. 2004; Kilgarrieff et al. 2014).² Data inspection, cleaning and annotation proceeded based on samples of 10,000 randomized tokens per verb, which were downloaded and further processed as local data files outside the Sketch Engine environment. Each of these procedural stages is discussed in turn below.

3.1 Data inspection

In order to estimate the total frequencies of the Dat-V-Nom and the Nom-V-Dat orders, each 10,000 token verb-sample was first subjected to a data inspection stage. This entails the first 300

² Available at www.sketchengine.eu/detenten-german-corpus.

tokens being checked for at least seven eligible instantiations of either the Dat-V-Nom or the Nom-V-Dat order. If fewer than seven eligible tokens were found, the verb was excluded from further investigation for feasibility reasons.

Based on these methodological choices, the following 76 verbs were retained (see Appendix A for translations of these verbs into English):

abhandenkommen – angehören – aufdämmern – auffallen – aufstoßen – begegnen – behagen – beifallen – dämmern – dazwischenkommen – drohen – dünken – einfallen – einleuchten – entfahren – entgegenschallen – entgegenschlagen – entgegen – entgleiten – entschlüpfen – ermangeln (an) – erscheinen – fehlen – fernliegen – folgen – gebrechen (an) – gebühren – gefallen – gelingen – gelten – genügen – geziemen – glücken – grauen – grausen – guttun – imponieren – klarwerden – konvenieren – leichtfallen – leidtun – mangeln (an) – missfallen – missglücken – misslingen – missraten – munden – nahegehen – nützen – obliegen – passieren – pressieren – reichen – scheinen – schlechtgehen – schmecken – schwanen – schwerfallen – stinken – unterlaufen – verlorengelassen – vorkommen – vorschweben – widerfahren – widerstreben – winken – wohltun – zufallen – zufließen – zugehören – zugutekommen – zupasskommen – zusetzen – zustoßen – zuteilwerden – zuwachsen

For each of these 76 verbs, we endeavoured to collect a total of 200 eligible tokens. For 60 verbs, this threshold proved to be unproblematic, but for the remaining 16 verbs, we ran into data sparsity issues. The number of tokens returned by each of these verbs is presented in Figure 2.

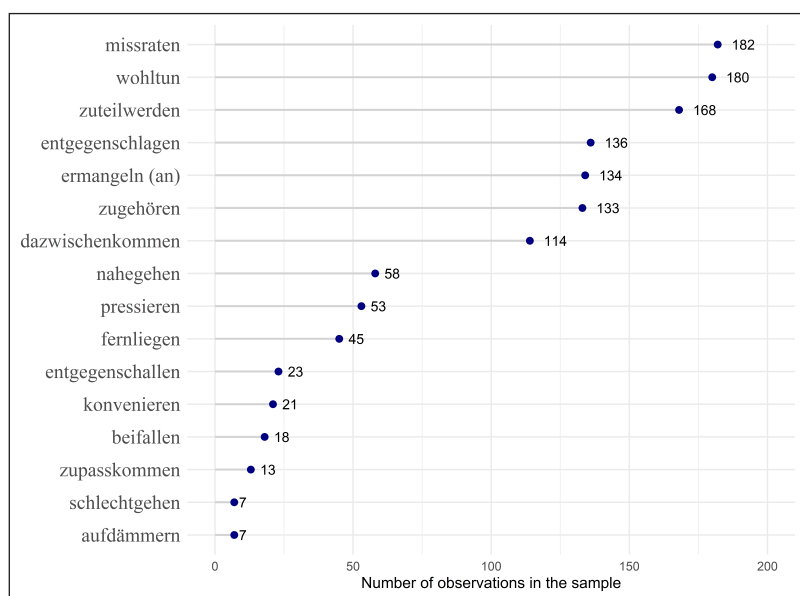


Figure 2: Number of data points for verbs yielding fewer than 200 eligible tokens

The full dataset thus comprises 60 times 200 tokens plus the remaining 1,292 tokens for the 16 verbs presented in Figure 2. This equals a total of 13,292 tokens.

3.2 Data cleaning

This study focuses on the relation between case marking and linearization in the German prefield, that is, in contexts where the main verb is flanked by two nominal arguments. Each argument slot may be filled by either a pronoun or a full NP. Tokens with clausal constituents have been barred from study. As a result, tokens may instantiate one of four configurations: NP-V-NP, Pro-V-Pro, NP-V-Pro and Pro-V-NP. Following Heylen (2005: 103), tokens containing a pronoun conjoined with either another pronoun, e.g. *nichts und niemand* ‘nothing and nobody’, or a full noun phrase, e.g. *ihm und dem Klub* ‘him and the club’, have been excluded on grounds that a conjoined pronoun loses its pronominal status (Heylen 2005: 103).

Another prerequisite for a token to be included is that it represents an eligible verb sense. As argued by Somers (2021), subject-like datives are not an inherent property of a particular verb, but associated with specific verb senses. Both examples below contain the verb *genügen* ‘fulfil; be enough, be sufficient’: (12) instantiates the sense ‘fulfil’ and (13) the sense ‘be enough, be sufficient’:

- (12) *Die Zimmer genügen hohen Ansprüchen von Bewohnern und Gästen.*
 the-NOM rooms fulfil high-DAT standards-DAT of residents and guests
 ‘The rooms meet high standards on the part of residents and guests.’
- (13) *Danny genügte das Ergebnis.*
 Danny-(DAT) sufficed the-NOM result
 ‘Danny was satisfied with the result.’

Examples (12) and (13) illustrate the importance of verb semantics in assessing the eligibility of a given token (cf. also Johnson et al. 2019). It stands to reason that (12), which is more agentive than (13), contains a dative that is more object-like than the one in (13). As a result, only (13) is potentially associated with the Dat-Nom/Nom-Dat alternation, whereas (12) is invariably associated with the non-alternating Nom-Dat argument structure. Thus, only verb senses as in (13) have been included for study.

Some polysemous verbs like *begegnen* ‘come across; experience, be confronted with’ have more than one eligible sense, as illustrated by (14–15) below. If such is the case, all eligible senses are included for study.

- (14) *Neue Tier- und Pflanzenarten begegnen uns heute fast überall.*
 new-NOM animal and plant species meet us-DAT today almost everywhere
 ‘Today, we come across new animal and plant species almost everywhere.’
- (15) *Langeweile wird euch hier bestimmt nicht begegnen.*
 boredom-NOM will you-3PL-DAT here definitely not meet
 ‘You will definitely not feel bored here.’

In addition, tokens displaying incorrect case-marking or erroneous subject-verb agreement have been excluded, too. Also barred, in line with Verhoeven (2015), were tokens containing elided constituents and tokens with question words.

Finally, a number of verbs in the dataset allow for their oblique argument to be marked either in the dative or in the accusative, as for example *grauen* ‘dread, be afraid of’. As the present study focuses on Dat-Nom/Nom-Dat verbs, all instantiations with accusative obliques have necessarily been excluded, as have been verbs whose oblique argument is structurally ambiguous between accusative and dative case, such as proper names or syncretized object pronouns like *uns* ‘us’ 1PL.ACC/DAT and *euch* ‘you’ 2PL.ACC/DAT.

3.3 Data annotation

All tokens have been annotated for (1) verb lemma and (2) order. In addition, both the dative and the nominative have been annotated for (3) (pro)nominality, (4) pronoun type, (5) referentiality, (6) person, (7) number, (8) definiteness, (9) animacy and (10) length (in number of words), based on which we then calculated the Length Difference as *NomLength minus DatLength*.

- Verb lemma: infinitival form of the main verb (see Appendix A for a full list of all 76 lemmas under study)
- Order: *Dat-Nom* or *Nom-Dat*, being the outcome variable
- (Pro)nominality: *pronoun* (*das* ‘that’ NOM.SG, *ihnen allen* ‘them all’ DAT.PL) or *full NP* (*Vegetarier* ‘vegetarians’ NOM.PL, *meinen Kindern* ‘my children’ DAT.PL)
- Pronoun type: *personal* (*ihm* ‘him’ 3P.DAT.SG, *sie* ‘she’ 3P.NOM.SG), *demonstrative* (*diese* ‘these’ NOM.PL, *dem* ‘that one’ DAT.SG) or *indefinite* (*etwas* ‘something’ NOM.SG, *allen* ‘all’ DAT.PL)
- Referentiality: *expletive*, *correlative* or *referential*. *Expletive* refers to all uses of personal *es* ‘it’ in which *es* functions as a mere syntactic filler without any semantic content. *Correlates* are instances of personal *es* ‘it’ or demonstrative *das* ‘that’ serving as placeholders for a subclause or infinitival clause. All other uses of personal *es* ‘it’, demonstrative *das* ‘that’ and all other pronouns and full NPs are tagged as *referential*. In line with Siewierska’s (1993: 831) claim that non-referential elements typically follow referential ones, we assume that correlates and especially expletives prefer the postverbal slot
- Person: *local* (*mir* ‘me’ 1P.DAT.SG, *wir* ‘we’ 1P.NOM.PL) or *non-local* (*ihm* ‘him’ 3P.DAT.SG.M, *das Schiff* ‘the ship’ NOM.SG)
- Number: *singular* (*dieser Film* ‘this film’ NOM.SG, *einer jungen Frau* ‘a young lady’ DAT.SG) or *plural* (*die Vögel* ‘the birds’ NOM.PL, *den Texten* ‘the texts’ DAT.PL)
- Definiteness: *definite* or *indefinite*. With the exception of indefinites (cf. supra), German pronouns are *definite*. NPs are considered definite if preceded by a definite article (*der*

Satz ‘the sentence’ NOM.SG), a possessive pronoun (*seinem Trainer* ‘his trainer’ DAT.SG) or a demonstrative pronoun (*diese Aussage* ‘this statement’ NOM.SG). In line with Abbott (2004: 122), a preposed genitive (*Tacitus’ ausführlicher Bericht* ‘Tacitus’ detailed account’ NOM.SG) is also considered to signal definiteness. Proper names (*Andreas*) are considered inherently definite. By contrast, NPs preceded by a zero determiner (*Ärzten* ‘doctors’ DAT.PL), an indefinite article (*ein Schrei* ‘a cry’ NOM.SG), an indefinite pronoun (*allen Musikern* ‘all musicians’ DAT.PL) or a numeral (*acht Jahre* ‘eight years’ NOM.PL; see Lyons 1999: 33) are coded for as *indefinite*. Conjoined constituents displaying a conflict in definiteness, with one conjunct definite and the other indefinite, are coded for the first conjunct

- Animacy: *individual*, *collective*, *inanimate*, *non-inferable* or *NA*. *Individual* is used to tag humans (*der Sportler* ‘the athlete’ NOM.SG), animals (*meinem Hund* ‘my dog’ DAT.SG) and what Bresnan & Ford (2010: 175) term “humanoid beings” (*den Elfen* ‘the elves’ DAT.PL). Viruses (*dem Virus* ‘the virus’ DAT.SG) are also subsumed under this category. Groups of individuals are annotated as *collective* (*der Partei* ‘the party’ DAT.SG). Inanimate entities (*die Jacke* ‘the jacket’ NOM.SG) and abstract concepts (*das Glück* ‘luck’ NOM.SG) are tagged as *inanimate*, as are plants (*den Bäumen* ‘the trees’ DAT.PL). For a number of tokens, animacy status cannot be established beyond reasonable doubt. This is mainly the case with constituents that may both be interpreted as denoting individuals or collectives, e.g. *den Sponsoren* ‘the sponsors’ DAT.PL. All such cases are subsumed under *non-inferable*. Finally, *inan_corr/expl* is applied in cases like expletives and correlates, where animacy is irrelevant as a defining feature because no extralinguistic entities or concepts are denoted. Conjoined constituents displaying a conflict in animacy are coded for the first conjunct
- Length difference: calculated by subtracting the length of the dative from the length of the nominative in number of words. If a constituent is broken up and partly right-dislocated (G. *ausgeklammert*, *rechtsversetzt*), only the length of the phrase that is positioned within the verbal bracket is counted (cf. also Heylen 2005: 103)

4 Word order baseline

The aim of this article is to show that either argument of alternating Dat-Nom/Nom-Dat verbs occupies the preverbal slot with reasonable frequency. In order to determine what counts as *reasonable frequency*, we appeal to word order counts for a set of ordinary Nom-Dat verbs from a pilot study by Somers et al. (2024b: 8). These will serve as the baseline against which we compare the 76 target verbs in focus in the present study.

The five baseline verbs are presented in Table 1, together with five alternating Dat-Nom/Nom-Dat verbs from the same pilot study. Since pronouns tend to skew word order distributions (Du Bois 1987; Siewierska 1993: 838, *inter alia*), the statistics are based exclusively on tokens

involving two full NPs. The numbers in the left column show that ordinary Nom-Dat verbs, whose syntactic subject invariably corresponds to the nominative, appear in the nominative-before-dative order in 96% of the tokens, while the antipodal dative-before-nominative order is attested in 4% of the tokens, across all five verbs. Unambiguous Nom-Dat verbs thus topicalize the syntactic object in 4% of the tokens on average when both arguments are full NPs.

Table 1: Word order frequencies for five Nom-Dat baseline verbs and five Dat-Nom/Nom-Dat verbs (Somers et al. 2024b: 8, 15)

Verb	Nom-Dat		Dat-Nom		Verb	Nom-Dat		Dat-Nom	
	N	f	N	f		N	f	N	f
<i>ähneln</i>	132	100%	0	0%	<i>entgehen</i>	23	39%	36	61%
<i>danken</i>	49	96%	2	4%	<i>genügen</i>	36	55%	29	45%
<i>helfen</i>	53	96%	2	4%	<i>geziemen</i>	20	56%	16	44%
<i>vertrauen</i>	46	98%	1	2%	<i>nützen</i>	53	83%	11	17%
<i>widersprechen</i>	95	90%	10	10%	<i>reichen</i>	15	38%	24	62%
Total	375	96%	15	4%	Total	147	56%	116	44%

By contrast, the numbers for the five verbs in the right column paint a very different picture, as the distribution across the two word orders is relatively even, although the frequencies vary from verb to verb. On average, the distribution is 56% nominative-before-dative versus 44% dative-before-nominative. To assume that the 44% dative-before-nominative are all due to topicalization would be illogical and constitute a major breach with the 4% baseline. In addition, informal native speaker consultations suggest that the two word orders are equally neutral, again ruling out a topicalization analysis. We therefore take the frequency differences between the verbs on the left and on the right in Table 1 to reflect the fact that Dat-Nom/Nom-Dat verbs instantiate two diametrically opposed argument structures in contrast to unambiguous Nom-Dat verbs, which instantiate only one (cf. also Barðdal et al. 2014, 2019 and Barðdal 2023: Ch. 6 for examples of either argument of alternating verbs passing further subject tests).

Having now established that alternating Dat-Nom/Nom-Dat verbs exist in German, we now want to expand existing research to a broader set of verbs and to unravel the factors correlating with the alternation. For this purpose, we have collected 13,292 tokens of 76 potential Dat-Nom/Nom-Dat verbs. In total, 5,519 tokens (42%) occur in the dative-before-nominative order, while 7,773 tokens (58%) occur in the nominative-before-dative order. When both arguments are full NPs, the dative-before-nominative order is instantiated by 2,092 tokens (46%) and the reverse nominative-before-dative order by 2,476 tokens (54%). We take these numbers to confirm our

claim that alternating Dat-Nom/Nom-Dat verbs constitute a robust verb class in German. How exactly the different variables presented in Section 3.3 weigh in on the variation between both word order patterns is the subject of Section 6 below.

5 Dative vs. nominative: factors and correlations

This section discusses co-occurrences between case marking and (pro)nominality, pronoun type, person, definiteness, animacy and number, in this order. The goal is to uncover the factors correlating with either the nominative or the dative argument, irrespective of their relative order.

5.1 (Pro)nominality

Table 2 presents the differences in pronominality between the dative and the nominative. It shows that (1) the dative is realized as a pronoun (53%) and as a full NP (47%) approximately equally often and that (2) the nominative is slightly more often realized as a full NP (62%) than as a pronoun (38%). The distribution is statistically significant ($\chi^2 = 601$; $df = 1$; $p_{\text{two-tailed}} < .0001$), although the effect size is weak (Cramér's $V = 0.15$).

Table 2: (Pro)nominality of the dative and the nominative

(Pro)nominality	Dat	Nom
NP	6,296 (47%)	8,287 (62%)
Pronoun	6996 (53%)	5,005 (38%)
Total	13,292 (100%)	13,292 (100%)

In her study of dative and accusative *experiencer-object* verbs in Modern German, Verhoeven (2015) also investigates the extent to which either the nominative or the accusative/dative is realized pronominally. Excluding local and non-referential pronouns, her findings show that *object-experiencers* are indeed more often realized as pronouns than nominatives are (Verhoeven 2015: 71).

However, we found no evidence of an association between case marking and pronominality. Excluding correlates and expletives as well as local pronouns, the total number of pronominal datives amounts to 2,884 (52%) as opposed to 2,675 (48%) for pronominal nominatives. Thus, both arguments are equally prone to pronominalization. This result is fully in line with the alternating hypothesis from Section 1, as pronominality is also a property associated with subjects. Since both the dative and the nominative of Dat-Nom/Nom-Dat verbs independently pass the subject tests (Barðdal 2006, 2023: Ch. 6; Barðdal et al. 2014, 2019), it is not surprising that both arguments are equally prone to pronominalization.

5.2 Pronoun type

Table 3 shows the distribution of the different types of pronouns. It reveals that both datives and nominatives strongly tend to be realized as personal pronouns, with as many as 59% of nominative pronouns and 88% of dative pronouns being personal pronouns. The second most common pronoun type found in the dataset is demonstratives. These are most often realized in the nominative (1,503 tokens), but dative demonstratives are also attested (265 tokens). Indefinite pronouns are relatively rare and evenly divided across both cases (577 dative tokens vs. 537 nominative tokens). The distribution in Table 3 is statistically significant ($\chi^2 = 1,700$; $df = 2$; $p_{\text{two-tailed}} < .0001$). The effect size is moderately strong (Cramér's $V = 0.38$).

Table 3: Pronoun type according to case marking

Pronoun type	Dat	Nom
Personal	6,154 (88%)	2,965 (59%)
Demonstrative	265 (4%)	1,503 (30%)
Indefinite	577 (8%)	537 (11%)
Total	6,996 (100%)	5,005 (100%)

A tendency not seen in Table 3 is that a substantial number of nominative (mostly personal) pronouns are expletives (1,141 attestations) or correlates (1,163 attestations). Expletives take the form of a semantically void *es* 'it', which serves as a syntactic placeholder. The following verbs mandatorily require expletives to fill their nominative slot: *ermangeln* (*an*) 'lack', *gebrechen* (*an*) 'lack', *mangeln* (*an*) 'lack' and *schlechtgehen* 'suffer; go through economically hard times'. Three other verbs show a very strong, yet not absolute, preference for nominative expletives: *grauen* 'dread, be afraid of', *grausen* 'dread, be afraid of' and *pressieren* 'be urgent'.

The correlates *es* 'it' or *das* 'that', which serve as placeholders for extraposed subclauses, also cluster heavily around certain verbs. The ten most common verbs with a correlative (nominative) pronoun are *geziemen* 'befit', *schwerfallen* 'be difficult', *gelingen* 'succeed', *widerstreben* 'be reluctant', *dämmern* 'dawn on', *dünken* 'seem, appear', *scheinen* 'seem, appear', *leichtfallen* 'be easy', *einleuchten* 'be clear' and *genügen* 'be enough, be sufficient'. Taken together, these verbs account for 62% of all tokens with nominative correlates.

5.3 Person

Table 4 maps out the interaction between local and non-local pronouns, on the one hand, and case marking, on the other. Local pronouns refer to speech-act participants, which means that they are either first or second person, as opposed to non-local pronouns, which are third person.

Table 4: Local vs. non-local dative and nominative pronouns

Person	Dat	Nom
Local	4,112 (59%)	26 (1%)
Non-local	2,884 (41%)	4,979 (99%)
Total	6,996 (100%)	5,005 (100%)

The distribution in Table 4 is statistically significant, with a strong size of effect ($\chi^2 = 4,776$; $df = 1$; $p_{\text{two-tailed}} < .0001$; Cramér's $V = 0.42$). More often than not, dative pronouns code discourse-immediate participants: out of a total of 6,996 tokens, 59% are first or second person, that is, *mir* 'me', *dir* 'you', *uns* 'us' or *euch* 'you'. The remaining 41% code non-local participants. Nominative pronouns show the opposite tendency: they almost invariably code third-person participants (99%) and rarely first-person participants (1%). Recall that approximately half of all non-local nominatives are either expletives or correlates (cf. Section 5.2).

5.4 Definiteness

Table 5 shows the correlation between case marking and definiteness. The tendency for both datives and nominatives to correlate with definite constituents is striking, but it is still slightly stronger for datives: in total, the dative is definite in 87% and the nominative in 69% of the cases. The remaining 13% of datives as well as the remaining 31% of nominatives code indefinite constituents. The distribution is statistically significant ($\chi^2 = 1,327$; $df = 1$; $p_{\text{two-tailed}} < .0001$), the size of effect moderately strong (Cramér's $V = 0.22$).

Table 5: Definiteness of the dative and the nominative (pronominal constituents and full NPs)

Definiteness	Dat	Nom
Definite	11,616 (87%)	9,160 (69%)
Indefinite	1,676 (13%)	4,132 (31%)
Total	13,292 (100%)	13,292 (100%)

Remarkably, half of the tokens with indefinite datives represent a mere 17 verbs. The ten most common ones are *leidtun* 'take pity; be sorry', *einleuchten* 'be clear', *aufstoßen* 'strike, notice; make (sb) burp; annoy', *vorkommen* 'happen to; experience; strike (as)', *munden* 'taste good', *zugutekommen* 'benefit', *drohen* 'threaten' and *zugehören* 'belong to', *passieren* 'happen to', *nützen* 'be of use' and *dämmern* 'dawn on'.

Table 6 sheds further light on the distribution in Table 5 by zooming in on full NPs. The most notable observation is that only 17% of dative NPs are indefinite, while 83% are definite. With

nominative NPs, the distribution is more balanced, definite nominatives being only slightly more frequent than indefinite nominatives (57% vs. 43%). Nevertheless, the distribution is statistically significant ($\chi^2 = 1,100$; $df = 1$; $p_{\text{two-tailed}} < .0001$), with a moderately strong size of effect (Cramér's $V = 0.27$).

Table 6: Definiteness of dative and nominative full NPs

Definiteness	Dat	Nom
Definite	5,197 (83%)	4,692 (57%)
Indefinite	1,099 (17%)	3,595 (43%)
Total	6,296 (100%)	8,287 (100%)

As for the 1,099 tokens with indefinite dative NPs, the data again show heavy clustering around certain verbs, as half of these are found with only 18 verbs. The top ten set is similar, yet not identical, to the top ten with indefinite constituents in general (cf. supra), comprising *zugutekommen* ‘benefit’, *drohen* ‘threaten’, *aufstoßen* ‘strike, notice; make (sb) burp; annoy’, *zugehören* ‘belong to’, *vorkommen* ‘happen to; experience; strike (as)’, *mangeln (an)* ‘lack’, *geziemen* ‘befit’, *einleuchten* ‘be clear’, *gelten* ‘be worth; be considered’, *widerfahren* ‘happen (to), experience’, *zuwachsen* ‘receive’ and *schwerfallen* ‘be difficult’.

5.5 Animacy

As seen in Table 7, there is a clear distinction in animacy between the dative and the nominative: whereas the dative overwhelmingly correlates with animate referents, the nominative clearly prefers inanimate referents. Recall that the label *animate* covers both individuals and collectives.

Table 7: Animacy of the dative and the nominative

Animacy	Dat	Nom
Animate	11,755 (89%)	744 (7%)
Inanimate	1,477 (11%)	10,238 (93%)
Total	13,232 (100%)	10,982 (100%)

Note that Table 7 excludes tokens containing constituents whose animacy is non-inferable, as well as correlative and expletive nominatives, which do not refer to extralinguistic entities and therefore have an animacy status of NA. The distribution shown in Table 7 yields a statistically significant result ($\chi^2 = 16,179$; $df = 1$; $p_{\text{two-tailed}} < .0001$), with a strong effect size (Cramér's $V = 0.83$). Thus, German Dat-Nom/Nom-Dat verbs strongly tend to code an animate dative and an inanimate nominative.

Zooming in on the 1,477 tokens containing inanimate datives, it is striking that more than half of them cluster around ten specific verbs: *folgen* ‘succeed, follow’, *angehören* ‘belong’, *zusetzen* ‘affect badly’, *zuteilwerden* ‘be bestowed upon’, *guttun* ‘do good’, *gelten* ‘be worth; be considered’, *zugutekommen* ‘benefit’, *zugehören* ‘belong to’, *entschlüpfen* ‘escape (words)’ and *zufließen* ‘receive’. Five of these are verbs of belonging (*angehören* and *zugehören*) or verbs of gain and benefit (*zuteilwerden*, *zugutekommen*, *zufließen*). Verbs of gain and benefit are generally also very common with inanimate datives. As many as 21% of all tokens with inanimate datives represent a mere eight verbs: *zuteilwerden* ‘be bestowed upon’, *zugutekommen* ‘benefit’, *zufließen* ‘receive’, *zuwachsen* ‘receive’, *nützen* ‘be of use’, *zufallen* ‘fall to, receive (lit.); fall to, receive (fig.)’, *winken* ‘can expect, be in store for’ and *zupasskommen* ‘come in handy’.

More remarkably still, datives can have inanimate referents with verbs of emotion or cognition, as is illustrated by *guttun* ‘do good’, *wohltun* ‘do (sb) good’, *behagen* ‘please’ or *vorschweben* ‘have in mind’. One relevant example is given in (16):

- (16) *Der Haut dürfte der kosmetische Mineralbeauty-Trend behagen.*
 the-DAT skin should the-NOM cosmetic-NOM mineral.beauty.trend please
 ‘The cosmetic mineral beauty trend should please the skin.’

This conspicuous finding invalidates previous claims that experiencers, that is, those entities participating in an act of emotion, cognition, volition, perception or bodily sensation, are animate by definition (Kutscher 2009: 24; Verhoeven 2009: 356, 2015: 46; Rott 2013: 93). Our dataset shows that the tendency for such verbs to attract animate referents is indeed very strong, but by no means absolute.

5.6 Number

Table 8 summarizes the correlation between number and case marking for full NPs. While 65% of datives are singular, the corresponding number for nominatives is 79%. A chi-square test again yields a significant result ($\chi^2 = 357$; $df = 1$; $p_{\text{two-tailed}} < .0001$), although the effect size is weak (Cramér’s $V = 0.16$).

Table 8: Number specifications for dative and nominative full NPs

Number	Dat	Nom
Singular	4,107 (65%)	6,566 (79%)
Plural	2,189 (35%)	1,721 (21%)
Total	6,296 (100%)	8,287 (100%)

Table 9 details the correlation between number and case marking for pronominal constituents. Both tables essentially show the same tendency; singular arguments are more common than plurals, irrespective of case marking. Nevertheless, this tendency is stronger with pronouns than with full NPs. Note that nominative pronouns show the strongest association with the singular, the plural representing only 3% of the tokens.

Table 9: Number specifications for dative and nominative pronouns

Number	Dat	Nom
Singular	5,462 (78%)	4,866 (97%)
Plural	1,534 (22%)	139 (3%)
Total	6,996 (100%)	5,005 (100%)

5.7 Interim conclusions

The current section has shed light on the relation between case marking and six other variables: pronominality, pronoun type, person, definiteness, animacy and number. It turns out that the dative and the nominative converge on three variables: (1) both are realized with approximately equal frequency as pronouns and as full NPs, (2) both are very often definite, with indefinite nominatives being slightly more common than indefinite datives and (3) both are more often singular than plural. Recall that the first two properties are strongly correlated with subjecthood, which explains why the two arguments systematically compete for the subject slot.

On the three remaining variables, the dative and the nominative diverge remarkably. First, pronominal datives are nearly always personal pronouns, whereas pronominal nominatives are mostly either personal pronouns or demonstrative pronouns. Secondly, the dative is strongly associated with local pronouns, whereas the nominative is nearly always realized as a non-local pronoun. And thirdly, the dative is very strongly associated with animate referents, whereas the nominative is most often inanimate. Bearing in mind the crosslinguistic tendency for animacy to correlate with subjecthood (Hopper & Thompson 1980; Comrie 1981; Du Bois 1987, *inter alia*) and the mismatch displayed by Dat-Nom/Nom-Dat verbs between case marking and thematic roles, one may expect the dative and the nominative to heavily compete for the first position in declarative clauses when both are realized as full NPs. As Section 6.2 below will show, this is indeed the case.

Another result of the current section is that datives in particular are very often both animate and definite. This finding squares with Hopper & Thompson's (1980: 259) cross-linguistic observation that indirect dative objects tend to be animate and definite. In the current dataset, as many as 77% of the tokens contain such a dative.

In conclusion, our findings show that *both* the dative *and* the nominative of alternating verbs display important properties associated with subjects, such as definiteness and pronominality. Other properties are found *either* with the dative *or* the nominative. Datives are more strongly associated with animacy and occur more often as local pronouns, making them good candidates for the first slot in a Dat-Nom argument structure. Nominatives, by contrast, more often occur as demonstrative pronouns, making them good candidates for the first slot in a Nom-Dat argument structure. As a consequence one may expect each of these arguments to occupy the first position in declarative clauses with reasonable frequency. This is the topic of the following section.

6 The internal order of the nominative and the dative arguments

We now perform a mixed-effects logistic regression analysis scrutinising the relative order of the two arguments in relation to the predictor variables. Section 6.1 discusses our model-building strategy, while the findings are presented in Section 6.2.

6.1 Model-building strategy

The objective of this section is to model the multifactorial association between the outcome variable, *order*, a binary categorical variable with two possible realizations, dative-before-nominative vs. nominative-before-dative, and the annotated predictor variables that are hypothesized to motivate the alternation. To this end, we have fitted a mixed-effects logistic regression model, including a random intercept for *verb* and all other predictor variables as main effects. The random intercept captures baseline differences between verbs, acknowledging that certain verbs exhibit a stronger tendency to co-occur with the nominative-before-dative order, whereas others favour dative-before-nominative. These preferences clearly emerge from the subset of verbs in Table 10 and their sample occurrences.

Table 10: Verb biases for nine verbs from the dataset

	Verb	Gloss	Dat-Nom	Nom-Dat
i)	<i>drohen</i>	‘threaten’	188 (94%)	12 (6%)
	<i>schwanen</i>	‘have a sense of foreboding’	186 (93%)	14 (7%)
	<i>winken</i>	‘can expect, be in store for’	183 (92%)	15 (8%)
ii)	<i>entgehen</i>	‘miss out on; fail to notice’	103 (51.5%)	97 (48.5%)
	<i>gebühren</i>	‘be due to’	98 (50.3%)	97 (49.7%)
	<i>dämmern</i>	‘dawn on’	97 (48.5%)	103 (51.5%)
iii)	<i>zugutekommen</i>	‘benefit’	14 (7%)	186 (93%)
	<i>zusetzen</i>	‘affect badly’	14 (7%)	186 (93%)
	<i>zugehören</i>	‘belong to’	8 (6%)	125 (94%)

Our model-building strategy is informed by linguistic considerations rather than by any attempt to capture a minimally adequate model, that is, the smallest possible model with the best prediction accuracy. The model has been created using the following formula (17):

$$(17) \quad \text{Order} \sim \text{DatAnim} + \text{DatPron} + \text{DatPerson} + \text{DatNum} + \text{NomPron} + \text{NomNum} + \text{LengthDiff} + (1|\text{Verb})$$

To improve our model, we also had to rebin and recombine certain variables to avoid data being skewed and unbalanced. First, we merged the variables *nominative (pro)nominality* and *nominative referentiality* because the latter, which captures the distinction between correlates, expletives and referential pronouns, is principally relevant for personal pronouns only. The category of correlative demonstratives, represented by a mere seven tokens, has been merged with the category of referential demonstratives.

Secondly, we have merged *nominative (pro)nominality* with *nominative definiteness*. Again, the reason for the merger is mutual complementarity, as definiteness is only relevant with full NPs, whereas pronominal constituents, with the exception of indefinite pronouns, are always definite. As a result, *nominative (pro)nominality* now comprises seven levels: *demonstrative pronoun*, *indefinite pronoun*, *referential personal pronoun*, *expletive personal pronoun*, *correlative personal pronoun*, *definite full NP* and *indefinite full NP*.

Thirdly, we have also combined *dative (pro)nominality* and *dative definiteness*. As such, the newly created *dative (pro)nominality* variable consists of five values: *demonstrative pronoun*, *indefinite pronoun*, *personal pronoun*, *definite full NP* and *indefinite full NP*.

All statistical analyses have been performed in R (version 4.4.2; R Core Team 2024) via RStudio (Posit Team 2024). The mixed-effects model was fitted using the `lme4::glmer()` function (Bates et al. 2015). Other packages used include *gridExtra* (Auguie 2017), *car* (Fox & Weisberg 2019), *Hmisc* (Harrell 2024), *lmerTest* (Kuznetsova et al. 2017), *ggeffects* (Lüdtke 2018), *sjPlot* (Lüdtke 2021), *performance* (Lüdtke et al. 2021), *easystats* (Lüdtke et al. 2022), *ggplot2* (Wickham 2016) and *dplyr* (Wickham et al. 2023).

6.2 Findings

Our final model includes the random effect for *verb* and the following main effects: *dative animacy*, *dative (pro)nominality*, *dative person*, *dative number*, *nominative (pro)nominality*, *nominative number* and *length difference*. All variables, except for *nominative animacy*, were found to be significant at the 5% significance level based on a Type II Anova. The quality of this model appears to be very good based on various model checks with a C-index of concordance equalling 82% (the Nom-Dat baseline equals 58%), suggesting good classification accuracy. There is some collinearity between *nominative animacy* and *nominative (pro)nominality*.

To interpret the model, we start by examining the random intercept *verb*, which has a standard deviation of 1.04. Based on the *intraclass correlation coefficient*, about a quarter of the variability in the order seems to be related to the random intercept for *verb* (adjusted ICC = 0.25). Moreover, the model has a marginal R^2 of 15% (the R^2 associated with the fixed effects), but a conditional R^2 of 36% when taking into account the random intercept, suggesting that the predictors, despite their significant effect, have a fairly low impact, as most of the variability is explained by the *verb*.

The conditional modes associated with each of the 76 verbs are visualized in Figure 3.

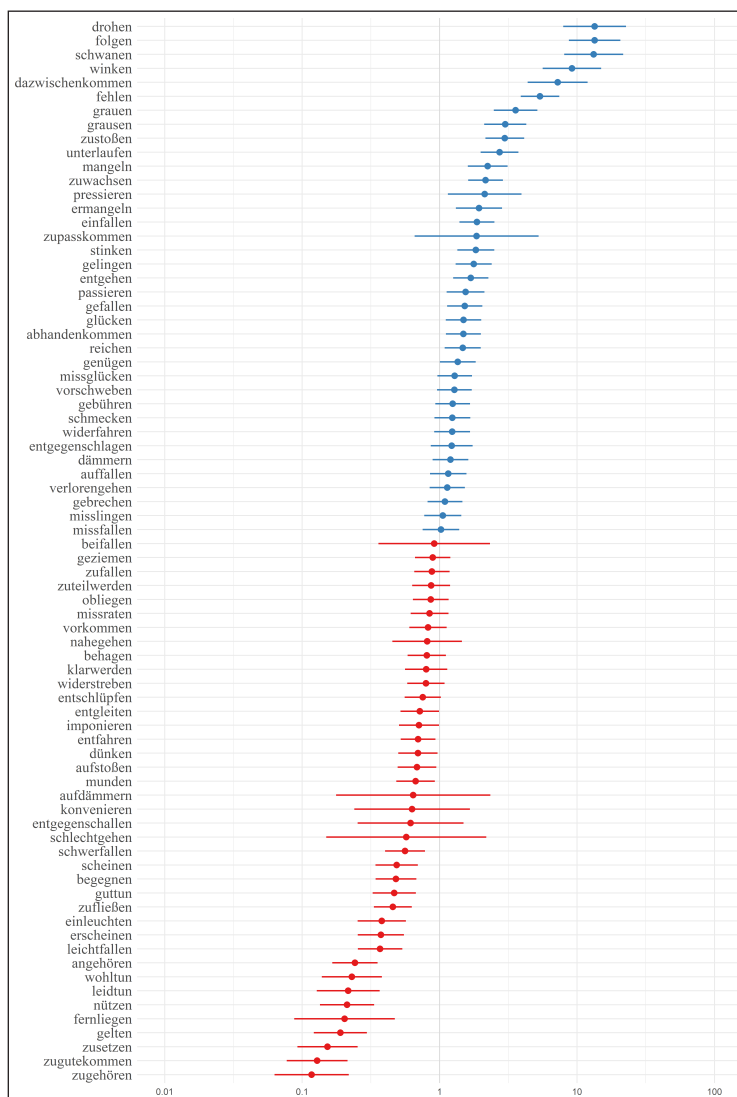


Figure 3: Conditional modes associated with the random intercept *verb*. Conditional modes highlighted in blue indicate a preference for the dative-before-nominative order, conditional modes highlighted in red a preference for the nominative-before-dative order. See Appendix B for the exact numbers

Figure 3 bears out our earlier prediction that the Dat-Nom/Nom-Dat alternation is susceptible to a verb effect. The inclination of individual verbs towards either the dative-before-nominative order or the nominative-before-dative order therefore cannot be reduced entirely to secondary factors.

Apart from the verb effect, the Dat-Nom/Nom-Dat alternation is also motivated by several fixed factors, whose respective effects are visualized in Figure 4.

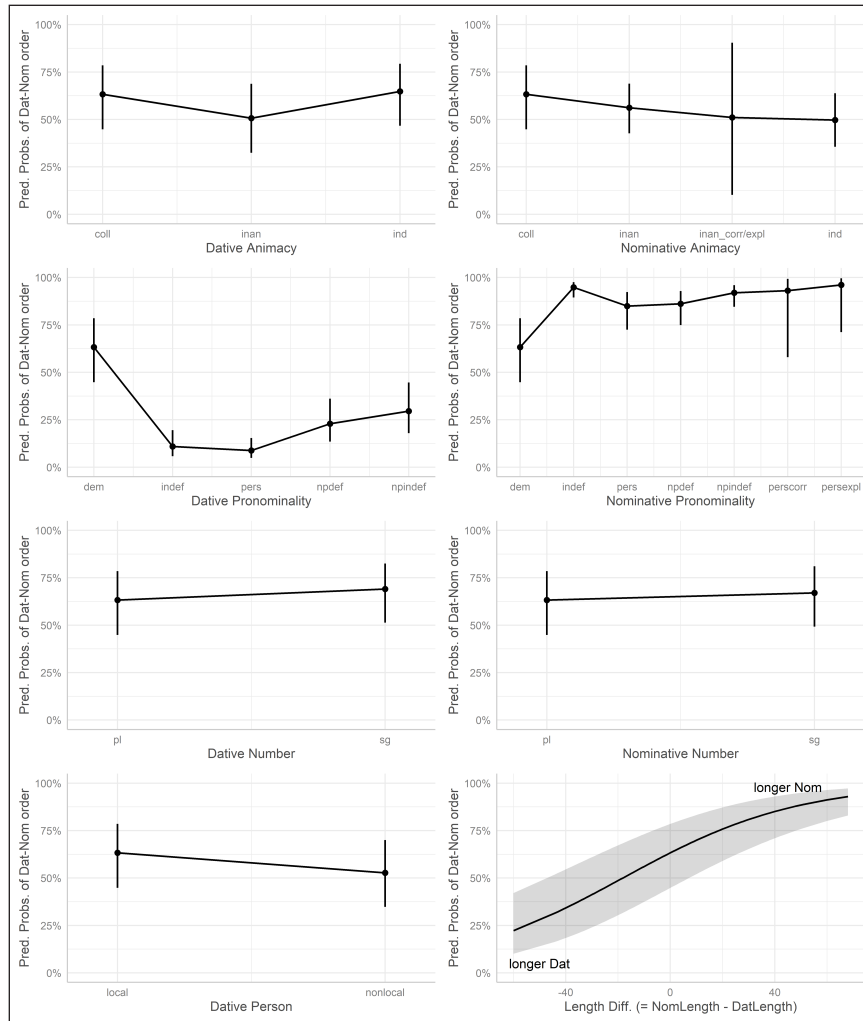


Figure 4: Predicted probabilities for the dative-before-nominative order (*nominative animacy* is the only non-significant factor)

The strongest effects are generated by *dative (pro)nominality*, *nominative (pro)nominality* and *length difference*. We zoom in on *length difference* first. Recall that difference in length has been calculated by subtracting the length of the dative from the length of the nominative. Accordingly, a negative result on the x-axis signals a longish dative in combination with a

shortish nominative, while a positive result signals the opposite. The effect plot shows that the likelihood of the dative-before-nominative order increases with longer nominatives and that both orders, dative-before-nominative and nominative-before-dative, are equally likely when the nominative is some 20 words longer than the dative. This confirms the observation, at least as old as Behaghel's (1909/10) law of increasing terms (cf. also Allan 1987; Hawkins 1992; Siewierska 1993; Arnold et al. 2000; Somers et al. 2024a, *inter alia*), that longer constituents tend to follow shorter ones.

The effect for *dative (pro)nominality* shows that dative demonstratives especially are strongly associated with the dative-before-nominative order, whereas dative indefinite pronouns and dative personal pronouns are more inclined towards the nominative-before-dative order. Dative full NPs are approximately halfway along the spectrum, alternating most freely. The fact that indefinite full NPs are associated more strongly with the dative-before-nominative order than definite NPs may be an epiphenomenon of the verb effect discussed above, as the top-ten verbs associated with the dative-before-nominative order (cf. Figure 3) account for 28% of all tokens with preposed indefinite dative NPs.

The results for *nominative (pro)nominality* may be summarized as follows. First, nominative demonstratives clearly favour the nominative-before-dative order. A very similar tendency has been observed earlier with dative demonstratives, which are also very common in the dative-before-nominative order. This means that demonstratives, regardless of case marking, strongly prefer the preverbal slot. The opposite holds for indefinite pronouns, as nominative indefinites tend to be postposed, exactly like dative indefinites. The Dat-Nom/Nom-Dat alternation therefore seems to be guided by an effect of topicality, as indeed suggested by Barðdal (2001), Barðdal et al. (2014, 2019) and Somers et al. (2024a).

Secondly, *nominative (pro)nominality* also yields strong effects for the values *correlative personal pronoun* and *expletive personal pronoun*, even though the length of the respective error bars calls for caution. The effect is also strikingly gradient, with expletives tending most strongly towards dative-before-nominative, followed by correlatives and only then by classic coreferential personal pronouns. Thus, the poorer in semantic content the pronoun *es*, the higher the likelihood of the dative-before-nominative order. As for full NPs, definite arguments pattern differently from indefinite arguments, with the latter inclining more towards the postverbal slot (cf. Siewierska 1993; Croft 2003: 130; Somers et al. 2024a, *inter alia*).

We now turn to the effect of animacy. As for *dative animacy*, the results are entirely in line with our expectations: constituents referring to individuals allow for most variation, followed closely by collectives. Inanimate datives are very rare (cf. Section 5.5) but have a clear preference for the less prominent postverbal slot. The output for *nominative animacy*, by contrast, turns out not to be significant. However, as mentioned in Section 5.5, Dat-Nom/Nom-Dat verbs typically occur with inanimate nominatives.

The remaining plots may be interpreted as follows: singular facilitates dative-before-nominative order, regardless of case marking. The same holds for dative local pronouns, which occupy clause-initial position more often than non-local ones. As argued by Barðdal (2001), Barðdal et al. (2014, 2019) and Somers et al. (2024a) for the class of alternating Dat-Nom/Nom-Dat verbs in Icelandic, this suggests an effect of topicality.

For configurations with double NPs, we have fitted another mixed-effects logistic regression model based on a similar model formula as for the full dataset (except for the variables *dative (pro)nominality* and *nominative (pro)nominality*, of course), here shown in (18):

$$(18) \quad \text{Order} \sim \text{DatAnim} + \text{DatDef} + \text{DatNum} + \text{NomAnim} + \text{NomDef} + \text{NomNum} + \text{LengthDiff} + (1|\text{Verb})$$

Again, the quality of this model is good. All variables (except for *nominative animacy*) are again significant at the 5% level based on a Type II Anova. The effect plots for this model are shown in Figure 5.

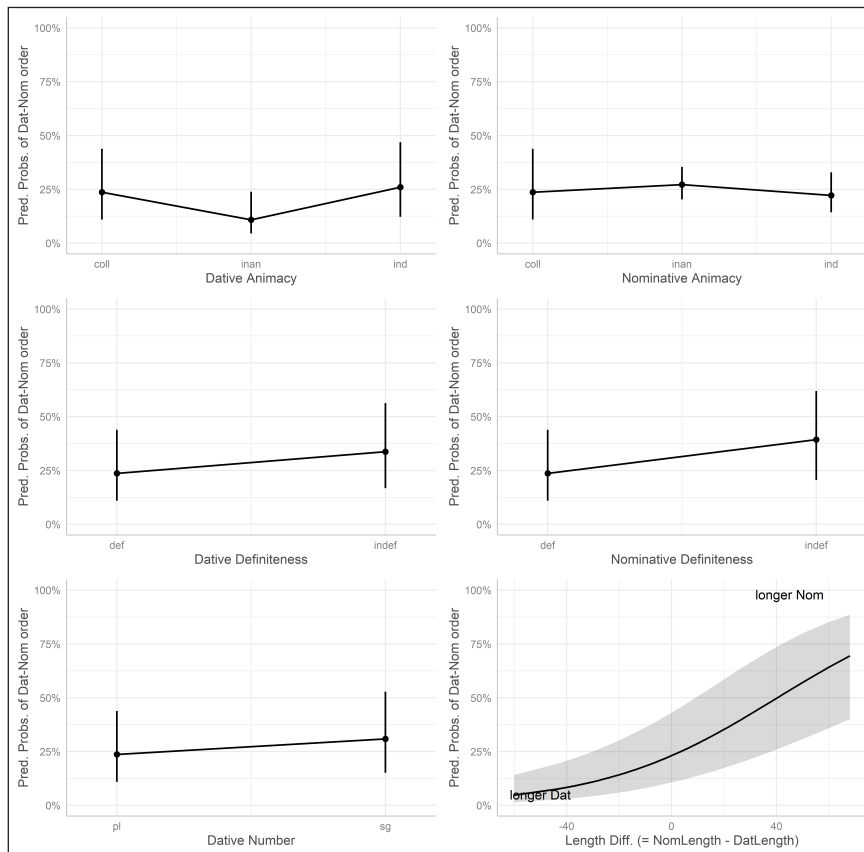


Figure 5: Predicted probabilities (marginal effects) for the dative-before-nominative order associated with the significant fixed effects with full NPs only (*nominative animacy* is not significant)

First, the plots in Figure 5 are remarkably flatter than those in Figure 4: with the exception of *length difference* and the *inanimate datives* value in the *dative animacy* plot, none of the explored variables yield any strong effects. This reflects the fact that configurations with pronominal arguments skew the results towards the dative-before-nominative order or the nominative-before-dative order more readily than configurations with only two NPs (cf. Somers & Barðdal 2022; Somers 2023; Somers et al. 2024a).

Secondly, the plots in Figure 5 show a higher degree of dative-before-nominative than those in Figure 4: the double-NP plots generally move up towards a 50–50 distribution. This is not only true for the variables *nominative number* and *dative number*, but also for *length difference*: the length curve is slightly higher in the current configuration and its zero point, representing tokens with arguments of exactly equal length, is at approximately 45%. This means that the probability of the dative-before-nominative order is nearly as high with equally long NPs as that of the nominative-before-dative order. Nevertheless, dative-before-nominative is more strongly associated with longer nominatives than vice versa. As for *dative animacy*, the values *collective* and *individual* also exhibit a higher probability of dative-before-nominative than inanimate datives, which take initial position in only 25% of the cases. The effect of *nominative animacy* on the word order variation is again not significant. *Nominative definiteness* shows that indefinite nominative NPs especially prefer dative-before-nominative. As for *dative definiteness*, indefinite datives are counterintuitively more prone to fronting than definite datives, but this is again an epiphenomenon of the powerful verb effect: some verbs tend to allocate the dative to the preverbal slot regardless of any contending factors.

As shown by Figure 5, the elimination of configurations with at least one pronoun increases the share of dative-before-nominative attestations. This result is consistent with earlier research, especially on Modern Icelandic, showing that nominative pronouns rigorously push alternating verbs towards the nominative-before-dative order (Somers et al. 2024a, 2024b). However, a comparison of Figures 4 and 5 reveals that the differences are less outspoken than originally anticipated, due perhaps to the fact that German is more inclined than Icelandic to place correlates and expletives in the middle field (cf. *nominative (pro)nominality* in Figure 4).

The following five claims summarize our findings. First, some verbs are clearly more inclined to alternate than others. Secondly, alternation is most likely when the dative is animate. Thirdly, nominative arguments of Dat-Nom/Nom-Dat verbs are most often inanimate. However, since *nominative animacy* does not yield a significant result, dative-before-nominative and nominative-before-dative are equally likely as far as the animacy status of the nominative is concerned. Fourthly, both orders, dative-before-nominative and nominative-before-dative, are roughly equally likely when the dative and the nominative are of the same length, at least in contexts involving two full NPs. Fifthly, for contexts involving pronouns the results are slightly

more skewed, with demonstratives, irrespective of case, strongly preferring the preverbal subject slot, while indefinite pronouns, again irrespective of case, strongly tend towards the postverbal object slot. This, again, confirms the impact of topicality on the internal order of the arguments with Dat-Nom/Nom-Dat verbs. By contrast, 83% of nominative referential personal pronouns occur in the nominative-before-dative order in configurations where both arguments are personal pronouns³. To conclude, the reason that our class of Dat-Nom/Nom-Dat verbs shows alternation between the two argument structures is that the nominative argument is never a causer. After all, these verbs are force-dynamically neutral.

7 Summary and conclusions

This article zooms in on a subgroup of German verbs licensing a nominative and a dative, also referred to in the literature as *dative-object experiencer verbs* or *Dat-Nom verbs*. Our goal has been to show that these verbs alternate between two different argument structure constructions, Dat-Nom and Nom-Dat. Such Dat-Nom/Nom-Dat verbs constitute a syntactically and semantically homogeneous class and one of their shared properties is their ability to instantiate both a dative-first and a nominative-first structure without one order being less neutral than the other. The pilot study by Somers et al. (2024b) shows that this is not a commonality of all German verbs licensing a dative and a nominative. Rather, unambiguous Nom-Dat verbs virtually always instantiate the nominative-before-dative order and hardly ever the dative-before-nominative order (96% vs. 4%, respectively, in contexts with two full NPs).

For alternating Dat-Nom/Nom-Dat verbs, by contrast, we have shown that the distribution between dative-before-nominative and nominative-before dative is relatively even with full NPs, that is, 46% versus 54%, respectively, contrasting starkly with the numbers for unambiguous Nom-Dat verbs. Corresponding numbers for four established alternating Dat-Nom/Nom-Dat verbs in Modern Icelandic reveal a 54% Dat-Nom versus 46% Nom-Dat distribution when both arguments are full NPs (cf. Somers et al. 2024a: 22). Thus, the numbers are strikingly similar for our Icelandic and German datasets when full NPs are involved, again supporting our analysis of these verbs as instantiating two diametrically opposed argument structures, Dat-Nom and Nom-Dat.

Turning to the distribution of Dat-Nom/Nom-Dat word orders irrespective of the (pro)nominal status of the arguments, our German dataset reveals that 42% of the examples instantiate the dative-before-nominate order, while 58% instantiate the nominative-before-dative order. A

³ Corresponding numbers for configurations with two referential personal pronouns are 100% for Old English (Allen 1995: 109) and 94% for Modern Icelandic (Somers et al. 2024a: 18–20). Cluyse et al. (2025: Section 6.2.4) show for Latin that this effect may be reduced to length, as nominative personal pronouns are generally shorter than dative personal pronouns in that language.

comparison with the baseline established by Sahel & Jonischkait (2008) for German, where only 12% of the instances are topicalizations, shows that a topicalization analysis of the Dat-Nom alternant in German is entirely out of the question for this class of verbs in general (*contra* Fanselow 2002; Bayer 2004; Haider 2005, 2010; Schlesewsky & Bornkessel 2006; Wunderlich 2009).

The current study is based on the word order statistics of 76 German Dat-Nom/Nom-Dat verbs which have been annotated for ten different variables. Our bivariate analysis has revealed that each argument displays properties of syntactic subjects: definiteness and pronominality (datives and nominatives alike), animacy (datives), local pronouns (datives) and demonstrative pronouns (nominatives). Hence, either argument of alternating verbs may be expected to compete for the subject slot.

Our multivariate analysis has revealed that about a quarter of the word order variation is linked to specific verbs, with some verbs being strongly attracted to the Dat-Nom argument structure, others to the Nom-Dat argument structure and yet others to both argument structures in approximately equal measure. This begs the question to what extent the verbs at either end of the spectrum truly alternate and whether these are potentially unambiguous Nom-Dat verbs and unambiguous Dat-Nom verbs, respectively (cf. Somers 2024: 225–233 for more discussion).

In addition, factors such as length and (pro)nominality skew the distribution. The longer an argument is, the more likely it is to occupy the object slot. Demonstratives tend to occur in the subject slot, while indefinites tend to occur in the object slot, irrespective of case. Inanimate datives tend to occupy the object slot. Nominative referential personal pronouns, in configurations with dative personal pronouns, also select for the subject slot in the majority of cases, although this may be an effect of length. Assuming the latter is the case, all these factors correlate with topicality.

A further issue raised by our findings is whether or not the two argument structure constructions, Dat-Nom and Nom-Dat, are interchangeable. We do not believe this to be the case, as the Nom-Dat construction appears to be used when the nominative is topical and the Dat-Nom construction when the dative is topical. The properties exhibited by the dative and the nominative in the Nom-Dat construction are therefore different from the properties exhibited in the Dat-Nom construction. In this respect, alternating verbs are different from other verbs, as the speakers' choice between the two constructions appears to be steered by pragmatic factors such as topicality, while the grammar does not offer a corresponding choice for non-alternating verbs.

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Abbreviations

ACC = accusative
 DAT = dative
 G = German
 NOM = nominative
 PL = plural
 SG = singular

Appendix A: Verbs included in the analysis

Verb	Meaning
<i>abhandenkommen</i>	'lose'
<i>angehören</i>	'belong'
<i>aufdämmern</i>	'dawn on'
<i>auffallen</i>	'strike, notice'
<i>aufstoßen</i>	'strike, notice; make (sb) burp; annoy'
<i>begegnen</i>	'come across; experience, be confronted with'
<i>behagen</i>	'please'
<i>beifallen</i>	'occur to'
<i>dämmern</i>	'dawn on'
<i>dazwischenkommen</i>	'come up'
<i>drohen</i>	'threaten'
<i>dünken</i>	'seem, appear'
<i>einfallen</i>	'occur to; remember'
<i>einleuchten</i>	'be clear'
<i>entfahren</i>	'escape (words)'
<i>entgegenschallen</i>	'hear'

(Contd.)

Verb	Meaning
<i>entgegenschlagen</i>	'beat against; experience intensely'
<i>entgehen</i>	'miss out on; fail to notice'
<i>entgleiten</i>	'drop; slip; escape (words)'
<i>entschlüpfen</i>	'escape (words)'
<i>ermangeln (an)</i>	'lack'
<i>erscheinen</i>	'appear before; seem, appear'
<i>fehlen</i>	'lack; miss; be unhealthy; not be available; need'
<i>fernliegen</i>	'not occur to; not be someone's intention'
<i>folgen</i>	'succeed, follow'
<i>gebrecchen (an)</i>	'lack'
<i>gebühren</i>	'be due to'
<i>gefallen</i>	'please, like'
<i>gelingen</i>	'succeed'
<i>gelten</i>	'be worth; be considered'
<i>genügen</i>	'be enough, be sufficient'
<i>geziemen</i>	'befit'
<i>glücken</i>	'succeed'
<i>grauen</i>	'dread, be afraid of'
<i>grausen</i>	'dread, be afraid of'
<i>guttun</i>	'do good'
<i>imponieren</i>	'impress'
<i>klarwerden</i>	'become clear'
<i>konvenieren</i>	'be convenient, suit'
<i>leichtfallen</i>	'be easy'
<i>leidtun</i>	'take pity; be sorry'
<i>mangeln (an)</i>	'lack'
<i>missfallen</i>	'displease'
<i>missglücken</i>	'fail'
<i>misslingen</i>	'fail'
<i>missraten</i>	'fail'
<i>munden</i>	'taste good'
<i>nahegehen</i>	'touch, care'

(Contd.)

Verb	Meaning
<i>nützen</i>	‘be of use’
<i>obliegen</i>	‘be someone’s duty’
<i>passieren</i>	‘happen to’
<i>pressieren</i>	‘be urgent’
<i>reichen</i>	‘suffice’
<i>scheinen</i>	‘seem, appear’
<i>schlechtgehen</i>	‘suffer; go through economically hard times’
<i>schmecken</i>	‘taste; have a particular taste (lit.); have a particular taste (fig.); please’
<i>schwanen</i>	‘have a sense of foreboding’
<i>schwerfallen</i>	‘be difficult’
<i>stinken</i>	‘enrage’
<i>unterlaufen</i>	‘happen to; make a mistake’
<i>verlorengehen</i>	‘be lost’
<i>vorkommen</i>	‘happen to; experience; strike (as)’
<i>vorschweben</i>	‘have in mind’
<i>widerfahren</i>	‘happen (to), experience’
<i>widerstreben</i>	‘be reluctant’
<i>winken</i>	‘can expect, be in store for’
<i>wohltun</i>	‘do (sb) good’
<i>zufallen</i>	‘fall to, receive (lit.); fall to, receive (fig.)’
<i>zufließen</i>	‘receive’
<i>zugehören</i>	‘belong to’
<i>zugutekommen</i>	‘benefit’
<i>zupasskommen</i>	‘come in handy’
<i>zusetzen</i>	‘affect badly’
<i>zustoßen</i>	‘happen to’
<i>zuteilwerden</i>	‘be bestowed upon’
<i>zuwachsen</i>	‘receive’

Appendix B: Conditional modes associated with the random intercept for Verb

Verb	Estimate
<i>drohen</i>	13.433
<i>folgen</i>	13.427
<i>schwanen</i>	13.223
<i>winken</i>	9.184
<i>dazwischenkommen</i>	7.228
<i>fehlen</i>	5.380
<i>grauen</i>	3.573
<i>grausen</i>	3.006
<i>zustoßen</i>	2.982
<i>unterlaufen</i>	2.731
<i>mangeln (an)</i>	2.240
<i>zuwachsen</i>	2.160
<i>pressieren</i>	2.130
<i>ermangeln (an)</i>	1.936
<i>einfallen</i>	1.869
<i>zupasskommen</i>	1.860
<i>stinken</i>	1.836
<i>gelingen</i>	1.773
<i>entgehen</i>	1.688
<i>passieren</i>	1.545
<i>gefallen</i>	1.524
<i>glücken</i>	1.494
<i>abhandenkommen</i>	1.491
<i>reichen</i>	1.474
<i>genügen</i>	1.357
<i>missglücken</i>	1.289
<i>vorschweben</i>	1.282
<i>gebühren</i>	1.246
<i>schmecken</i>	1.239
<i>widerfahren</i>	1.235
<i>entgegenschlagen</i>	1.225
<i>dämmern</i>	1.199
<i>auffallen</i>	1.156
<i>verlorengehen</i>	1.137
<i>gebrechen an</i>	1.095
<i>misslingen</i>	1.055
<i>missfallen</i>	1.024

(Contd.)

Verb	Estimate
<i>beifallen</i>	0.915
<i>geziemen</i>	0.891
<i>zufallen</i>	0.880
<i>zuteilwerden</i>	0.869
<i>obliegen</i>	0.862
<i>missraten</i>	0.846
<i>vorkommen</i>	0.824
<i>nahegehen</i>	0.812
<i>behagen</i>	0.807
<i>klarwerden</i>	0.799
<i>widerstreben</i>	0.796
<i>entschlüpfen</i>	0.755
<i>entgleiten</i>	0.718
<i>imponieren</i>	0.708
<i>entfahren</i>	0.698
<i>dünken</i>	0.696
<i>aufstoßen</i>	0.685
<i>munden</i>	0.669
<i>aufdämmern</i>	0.643
<i>konvenieren</i>	0.631
<i>entgegenschallen</i>	0.615
<i>schlechtgehen</i>	0.572
<i>schwerfallen</i>	0.561
<i>scheinen</i>	0.487
<i>begegnen</i>	0.482
<i>guttun</i>	0.468
<i>zufließen</i>	0.457
<i>einleuchten</i>	0.380
<i>erscheinen</i>	0.374
<i>leichtfallen</i>	0.369
<i>angehören</i>	0.242
<i>wohltun</i>	0.230
<i>leidtun</i>	0.216
<i>nützen</i>	0.212
<i>fernliegen</i>	0.204
<i>gelten</i>	0.190
<i>zusetzen</i>	0.153
<i>zugutekommen</i>	0.129
<i>zugehören</i>	0.117

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