# The Case for Caseless Prepositional Constructions with *voller* in German*

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**Abstract**

In this article I will focus on the German deadjectival quasi-preposition *voller* 'full of', which appears to occur with genitive, dative, accusative and even nominative argument forms, e.g.: *eine Stadt voller Kinder*$_{gen?}$ 'a city full of children', *eine Badewanne voller Wasser*$_{dat?}$ 'a tub full of water', *ein Koffer voller böse Gräuel*$_{acc?}$ 'a suitcase full of evil horrors', *Menschen voller Aberglaube*$_{nom?}$ 'people full of superstition'. Using the largest sample of corpus examples to date, normative dictionaries, and native speakers' forum discussions on the subject, I will defend an analysis of constructions involving *voller* as prepositional constructions without an unambiguous case assignment. Overt case in specific environments is determined not by the head but by the argument's morphosyntax, including the properties of number, gender, morphological class and the presence of attributive adjectives. Inconvenient forms will be shown to be systematically avoided and replaced by alternative constructions. I describe a unification based, constructional approach with underspecified case assignment to capture the data using the formalism of Sign-Based Construction Grammar (SBCG).

## 1. Introduction

This chapter presents the case for a unification based, underspecification analysis of case assignment in some prepositional phrases in German, by focusing on the behavior of a family of unusual constructions informally expressed as *X voller Y* 'X full of Y'. Specifically, I will be concerned with questions about the part-of-speech category of *voller* 'full of' and the behavior of the grammatical case of its internal argument *Y*, as found in usage data. The extent to which this seemingly marginal word is interesting can be gleaned from the fact that there is no simple answer to these questions, neither empirically in corpus data nor introspectively by consulting speakers, including trained linguists. The basic problem is that, in contradiction to traditional generative Case Filter or Visibility Condition analyses (Chomsky 1981: 49, 1986: 94; see Bobaljik & Wurmbrand 2009 for a recent overview) which postulate a single case governed by a head to be linked to a semantic role, *voller* occurs with forms which, taken together, are not compatible with any one case analysis:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (1) | *eine* | *Badewanne* | *voller* | *(warmem)* | *Wasser* | | 'a bathtub full of warm water' |
| | a | bathtub | full-of | warm.DAT | water.DAT? | | |
| (2) | *eine* | *Stadt* | *voller* | *(netter)* | *Kinder* | | 'a city full of (nice) children' |
| | a | city | full-of | nice.GEN | children.GEN? | | |
| (3) | *Menschen* | *voller* | *Aberglaube* | | | | 'people full of superstition' |
| | people | full-of | superstition.NOM? | | | | |

Especially when adjectives (given in brackets above) are not present, it is far from clear which case form has been used in any particular example. I will be suggesting that this uncertainty results from the unique status of the originally de-adjectival construction containing *voller*: while not quite an example of an ordinary German prepositional phrase, *voller* itself comes

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closest to being a preposition, and while generally governing something like an oblique case (dative or genitive), the distribution of forms shows particular kinds of bias and, from a normative perspective, 'errors'. Argument case and the choice of construction will be shown to depend on the number and gender of the object, its morphological class, as well as its syntactic environment (particularly the presence of modification through adjectives), factors which I will suggest can be captured in a constructional analysis.

A formal description of this phenomenon is problematic but at the same time highly interesting: arguments are not supposed to be able to 'choose' the case they are governed with based on their own properties or internal composition. However from the point of view of a constructional approach, there are little or no constraints on the arbitrary specification of the form side of a construction, a conventional pairing of meaning and form. Towards the end of this chapter a formalization of the construction's behavior will be attempted using Sign-Based Construction Grammar (SBCG, Boas & Sag 2012). In the course of that effort, I intend to show that the construction can be seen as in effect 'caseless'. What is meant by this is not that we find arguments with unique morphological forms corresponding to no known grammatical case, but rather that the construction resists ordinary case assignment analyses, in which we normally assume that a preposition or verb governs some particular case (or perhaps even different ones in different senses or registers), and this assignment applies to any applicable argument we choose. As we shall see, in certain environments necessitating an inconvenient case assignment, the construction is avoided unconsciously with significant frequency or in some cases even very clearly consciously. In other cases, conflicts in the assignments expected from different constructions involved in the formation of a complete phrase lead to behavior best explained if we postulate *voller* to make no deterministic case assignment by itself.

I will support my analysis with data from two sources. The primary source will come from corpora, including the largest sample of examples for the construction in adult use to date (over 20,000 cases drawn from a Web corpus), and supplemented with a small amount of qualitative data on child language use from specific corpora. The second source of evidence, which will turn out to be problematic but irreplaceable, is formed by speakers' introspective data from online discussion forums about German grammar. This data will shed some light on what speakers believe is right and how they may justify seemingly aberrant forms and their underlying structure.

The remainder of this chapter is structured as follows. Section 2 gives a brief overview of case in German prepositional phrases, the phrasal category closest in its behavior to the *voller* construction. Section 3 goes deeper into the question of *voller*'s part of speech, and consequently its phrasal category, by outlining theories about its etymology and discussing distributional criteria to determine its status as a (quasi-)preposition. Section 4 presents empirical corpus data and grammar forum discussions about the case forms governed by *voller* in bare noun arguments and arguments containing adjective modifiers. Section 5 presents the formal analysis using SBCG, and Section 6 discusses some consequences for this analysis and some of its alternatives.

## 2. *Voller* in the context of German prepositional phrases

German prepositions generally govern a DP in one of the three non-nominative cases: accusative (4), dative (5) or genitive (6).

(4) *ohne* *den* *Tisch* 'without the table'
without the.ACC table.ACC

(5) *mit* *dem* *Tisch* 'with the table'
with the.DAT table.DAT

(6) *statt* *des* *Tisches* ‘instead of the table’
instead the.GEN table.GEN

As in other Indo-European languages, locational prepositions can govern either the accusative for a dynamic interpretation (7) or the oblique dative for a stative interpretation (8) (see also Willems, this volume).

(7) *in* *die* *Stadt* ‘into the city’
in the.ACC city.ACC

(8) *in* *der* *Stadt* ‘in the city’
in the.DAT city.DAT

Some prepositions vary more or less freely between dative (9) and genitive (10) government in contemporary speech, with dative variants usually being considered more colloquial and the genitive remaining the written standard (see Petig 1997). A small number of these prepositions also exist as postpositions in very formal registers, as in (11).[1]

(9) *wegen* *dem* *Tisch* ‘because of the table (informal)’
because the.DAT table.DAT

(10) *wegen* *des* *Tisches* ‘because of the table (formal)’
because the.GEN table.GEN

(11) *des* *Tisches* *wegen* ‘because of the table (very formal)’
the.GEN table.GEN because

There is thus considerable variation in the case assignment behavior of German adpositions, but no sense of chaos or lack of fixed argument structure specification: the alternation between dynamic and stative government marks a distinction of meaning in truth value semantics, i.e. one of ‘deep case’ in terms of Fillmore’s (1968) seminal paper. The alternation between dative and genitive (and possibly use of a postposition) expresses no difference in formal semantic meaning but corresponds to a difference in register, i.e. we are dealing with different ‘surface’ forms representing the very same semantic roles.

The word *voller* initially seems to conform to the pattern seen in (9) and (10) as far as case assignment is concerned. It requires a nominal argument to express the sense ‘full of Y’, with the Y argument often being a mass noun or indefinite plural without an article (since being full of something usually implies either a substance or a plurality, though see Section 3.2 below on unacceptability of determiners in the construction). Some frequent arguments seen in the construction can be interpreted as either in the dative (12) or the genitive case (13), much like (9) and (10) (see below for quantitative corpus data).

(12) *eine* *Badewanne* *voller* *Wasser* ‘a bathtub full of water’
a bathtub full-of water.DAT

(13) *eine* *Stadt* *voller* *Kinder* ‘a city full of children’
a city full-of children.GEN

As it will turn out, it is not all that certain that the case glosses in (12)–(13) are correct, since syncretism of case forms often makes it impossible to be certain what the case of a German noun is, and more so in the case of the bare nouns that tend to occur in the construction. For

[1] The latter construction is however becoming less productive, being used only rarely with non-lexicalized arguments, see Zeldes (2012: 106–114) for discussion.

the arguments *Wasser* 'water' and *Kinder* 'children' (both neuter, the former singular and the latter plural), there are only two possible forms:

| | | |
|---|---|---|
| *Wasser*$_{\{\text{NOM,ACC,DAT}\}}$ | : | *Wassers*$_{\{\text{GEN}\}}$ |
| *Kinder*$_{\{\text{NOM,ACC,GEN}\}}$ | : | *Kindern*$_{\{\text{DAT}\}}$ |

It therefore appears that we can only be certain that the form in (12) is not a genitive and the form in (13) is not a dative, but not much else.[2] One of the best indications that we are dealing with dative and genitive arguments is at this point precisely the analogy to cases such as (9)–(10), though we will come to more complex and infrequent argument phrases with adjectives which give us more information further below. Before approaching these, it is worth considering whether the analogy to prepositions like *wegen* 'because of' is justified. Is *voller* actually a preposition?

## 3. The grammatical category of *voller*

### 3.1 Etymology

The word *voller* is derived from the Indo-European adjective root *$plh_1$ carrying the basic meaning 'full', and more specifically from its *-n-* suffix derivate *$plh_1$-n-os* 'full', cf. Sanskrit *pūrṇa-* 'full', Old Church Slavonic *plъnъ* 'full', Gothic *fulls* 'full' (from Proto-Germanic **fulnaz*, cf. Beekes 1995: 146, 251). The adjective *voll* 'full' remains a regular adjective in Modern German used similarly to its English counterpart. It can be used as in (14) without arguments in the inflected attributive form (a) or as a predicative or adverbially used adjective form (b,c) without inflectional suffixes, much like any German adjective.

(14) a. *Das volle Glas* 'the full glass'
b. *Das Glas ist voll* 'the glass is full'
c. *Das Geld reicht voll aus* 'the money is fully sufficient' (lit. 'suffices fully')

A possible complement generally appears in the genitive, equivalent to the English complement with an *of* phrase, cf. (15). However some inconsistencies in its behavior with regard to the case of the complement are remarked on already by Hermann Paul (1959 [1919]: 330), who cites literary examples with the dative (16a,b) next to the genitive. Klaus (2004:180) adds to this forms which she views (introspectively) as accusative as in (16c), though in principle they are indistinguishable from nominative forms (see also Section 4 for further discussion). She also notes the absence of dative plural forms, which fits Paul's largely singular examples in the dative (notwithstanding some mixed examples below; see also Sahel 2010 for similar corpus results on the lack of dative plurals after *voll*, which largely reiterate Klaus's introspective findings, of which he seems unaware).

(15) *Herzen voll Gefühls* 'hearts full of feeling' (genitive)

(16) a. *voll göttlichem Tiefsinn* 'full of godly profundity' (dative)
b. *voll ziemlich saurem Wein* 'full of quite sour wine' (dative)
c. *voll bunte Murmeln* 'full of colorful marbles' (accusative/nominative)[3]

Acceptability of the accusative form seems to be questionable, at least for some speakers, and clear forms of this sort are rare in the data presented here (Section 4). If we disregard the final

[2] Many other cases are even less clear, particularly feminine nouns which distinguish no case forms at all (e.g. *voller Freude* 'full of joy' or plural *voller Überraschungen* 'full of surprises').

[3] A reviewer postulates that this example may be dialectal and in fact stand for an *n*-less dative adjective form; however the form is presented by Klaus (2004:179-180) as accusative and possible in standard usage. See below on the rarity of such examples in corpus data.

form, the examples suggest, at least for *voll*, a similar complementation behavior to that of genitive/dative prepositions discussed in the previous section. Taking all patterns together, however, we find a more flexible case assignment behavior than that of any German preposition.

The construction involving *voller* shown in (12)–(13) above seems to have been lexicalized from a special case of the construction involving *voll*. A popular etymology derives *voller* from a fusion of *voll* with a following article *der*, which is used with feminine singular objects in the dative and genitive and genitive plural objects of all genders: *voll* + *der* + *NP* > *voller NP*. An early appearance of this theory is found in Heyse (1849: 176): "*It apparently arose from a hasty pronunciation of* voll der […] *admittedly also in places where the definite article* der *is not permissible*".[4] The supposed reanalysis is shown in (17). It begins with a structure analogous to that of (15) but with an added article, which is then grammaticalized to produce something like (13), repeated here as (17b).

(17) a. *eine Stadt voll der Kinder* 'a city full of children'
a city full the.GEN children.GEN

b. *eine Stadt voller Kinder* 'a city full of children'
a city full-of children.GEN

This etymology is currently believed to be false and is probably based, among other things, on common phrases such as *voll der Gnade* 'full of grace', which do have the suggested structure from (17a) (Paul 1959: 95; Hentschel and Weydt 2003: 220; this false etymology will be important for some of the introspective evidence below). The more generally accepted etymology is that *voller* is the strong inflected form of a postposed adjective qualifying the preceding noun, originally in particular when this was nominative masculine singular (see Paul, ibid. and 2007:322, Hentschel and Weydt, ibid., Kieffer 1977: 379, to name a few). Just as the addition of an argument to *voll* causes the extraposition of the attribute from its position in (18a) to that in (18b), the same process is said to apply to *voller* in (19a) instead of the conceivable but ungrammatical structure in (19b).

(18) a. *Ein voller Becher* 'a full cup'
a full.NOM.SG.MASC cup

b. *Ein* $t_i$ *Becher [voll Wassers]*$_i$ 'a cup full of water'
a cup full water.GEN

(19) a. *Ein* $t_i$ *Becher [voller Wasser]*$_i$ 'a cup full of water'
a cup full water

b. **Ein [voller Wasser] Becher* 'a full of water cup'
a full water cup

The difference between *voller* and *voll* is therefore that of a strongly inflected attributive form and an uninflected adjective, usually used as a predicative or adverbial form.[5]

[4] My translation. The original reads: "*Sie ist allem Anschein nach durch flüchtige Aussprache aus* voll der *entstanden [...] freilich auch da, wo der bestimmte Artikel* der *nicht statthaft ist*".

[5] Some support from this view can be found in older examples which have other suffixes, e.g. the following found via Google Books: *wie das Meer volle**s** Waſſers iſt* 'as the sea is full of water' (Pauli, *Extract oder Auszug aus der Postill*, 1584), or *die ort / ſo man vormals hett gewandlet / ſind volle**n** waſſer* 'the places which one formerly walked are full of water' (Caspar Hedio [ed.], *Chronica der Alten Christlichen Kirchen*, 1558). Paul (2007:322) gives as possibly the earliest example of non-congruence, already in 1290, Heinrich von Meißen's *Frauenleich* (55,6): *ihr tât[?] ist voller sûchen* 'their deed is full of searching'.

The same process is said to be responsible for the appearance of other frozen postnominal forms in *-er*, such as *selber* 'oneself' in (20).

(20) a. *der* *selbe* *Mann* 'the same man'
a self.NOM.SG.MASC man.NOM.SG.MASC

b. *der* *Mann* *selber* 'the man himself'
a man.NOM.SG.MASC self

c. *die* *Frau* *selber* 'the woman herself'
a woman.NOM.SG.FEM self

Although the *-er* suffix is originally masculine, the form *selber*, much like *voller*, is synchronically used to modify any gender, as shown in (20) above. Hermann Paul refers to this form as 'inflectionless' (German *flexionslos*, Paul 1959: 95–98). From this etymology we may expect that *voller* should behave just like *voll* and may consequently have the same grammatical category: an attributive adjective, albeit postposed, with a flexible genitive/dative argument much like its progenitor. However as we shall see below, this categorization will turn out to be inadequate.

## 3.2 Distributional analysis

The grammatical category of *voller* has rarely been discussed in the literature, but the apparently simpler form *voll* has enjoyed some more attention in this context (see Klaus 2004 for an overview). As we have seen, *voll* is etymologically an adjective, but possibly because of the frequent complementation which creates a heavy constituent, ends up being placed after its noun. Its un-inflectable status is regular for postposed adjectives in Modern German, which are however rare. For example, adjectives like *pur* 'pure' in the following example are also uninflected if placed after the noun:[6]

(21) a. *purer* *Realismus* 'pure realism,' adjective inflects (*-er*)
pure.NOM.SG.MASC realism. NOM.SG.MASC

b. *Realismus* *pur* 'pure realism,' no inflection
realism.NOM.SG. MASC pure

In this respect there is nothing unusual about *voll* or *voller*. The fact that the two words take complements is also not unique within the adjectival domain. As the following examples show, adjectival arguments can be realized using case marking (but are then usually preposed) or even a connector in (22), as well as by forming a compound:

(22) a. *einem Tisch ähnlich* 'similar to a table' ('a table' is dative)
b. *ähnlich wie ein Tisch* 'similar to a table' (lit. 'similar like a table')
c. *tisch-ähnlich* 'similar to a table' (lit. 'table-similar')

However, *voll* has been considered to be something other than an ordinary adjective in some previous studies. Klaus (2004: 175–176) surveys 11 grammars of German, two of which indicate that the classification of *voll* may be problematic, being classified as an adjective in some environments and as a preposition in others (specifically Sommerfeldt and Starke 1998: 146 and Weinrich 2003; to these we may add Hentschel and Weydt 2003). The standard reference dictionary of German 'Duden' classifies *voll* and the alternative form *voller* together as an adjective (Müller 1985:727), though the Lexicon of German Prepositions (Schröder

[6] For multiple subtypes of postnominal adjectives in German and some semantic differences between the two constructions, see Dürscheid (2002).

1990: 194–195) also lists *voll* and *voller* together in the same entry as a preposition. According to Klaus (2004), it is primarily the following properties which lead to *voll* in the construction [(DP) *voll* DP] being regarded as a preposition:

1. It is indeclinable.
2. It governs the case of the following, subordinate DP.
3. It sets up a relationship between two things.

The point is not explained fully, but it appears that the idea is that what the first DP is 'full of' is information directly about that DP and not just a modification of *voll* (in frame semantic terms, they are members of a single frame together, cf. Section 5). At the same time, the adjectival characteristic of comparability (ibid: 177–178) is seen as evidence that *voll* is also an adjective, as in the following example:

(23) *Am Büffet lud er sich den Teller noch* ***voller*** *als sein Nachbar*
'at the buffet he loaded up his plate even **fuller** than his neighbor' (ibid. 2004: 177)

The form *voller*, by contrast, cannot form a comparative **vollerer*. Note that this restriction is not immediately obvious from the meaning of the construction: a comparative with an argument is quite conceivable with the appropriate meaning, cf. English 'a glass even fuller/more full of wine' etc.

With regard to the construction in which *voll* serves to modify another DP (as an adjunct or predicative) with a subsequent DP giving the 'filling' role, Hentschel and Weydt (2003: 220) raise a possible objection that unlike other prepositions, *voll* can also take a PP complement itself, as in the (24a). However this objection does not apply to *voller*, cf. (24b):

(24) a. *voll von/mit Wein* 'full of/with wine'
b. *voller (*von/*mit) Wein* 'full of wine'

*Voller* is therefore very similar in distribution to a preposition and much more so than *voll*.

Nevertheless, we can find one important deviation between the syntax of *voller* and that of other prepositions: the argument it takes must have the form of a bare noun, with possible adjuncts. In a DP analysis (following Abney 1987 etc.), this means that the argument of *voller* is an NP and not a DP, unlike with other German prepositions:

(25) a. *ein Handy voller* (**dem*/**deinem*/**diesem*) [*Schnickschnack*]$_{NP}$
'a cell phone full of (*the/*your/*these) bells and whistles'

b. *ein Handy mit* [(*dem*/*deinem*/*diesem*) *Schnickschnack*]$_{DP}$
'a cell phone with (the/your/these) bells and whistles'

As we can see, any determiner is compatible with an ordinary preposition, while *voller* categorically rejects any form of determination (though adjective attributes are possible, see Section 4.2 below). Note again that the restriction has no semantic or pragmatic explanation: it is perfectly conceivable to speak of something being full of 'my', 'your' or 'this wine', but the construction rejects these possibilities for no obvious reason. The construction is therefore provisionally better described as [(DP) *voller* NP], where the initial DP may be dropped if understood from context or appear elsewhere (non-adjacently) when the construction is used predicatively (e.g. *X ist voller Y* 'X is full of Y').

If we adhere to a strict interpretation of distributional criteria, as advocated by Croft (2001), we must see *voller* as something other than an ordinary preposition, which we can call

a quasi-preposition for the moment, for lack of a better term.[7] Taking an approach more like Goldberg's (2006: 45) 'lumpers' we may just decide to treat *voller* as a subtype of preposition that rejects determiners. But on some level, opting for a construction grammar analysis makes us 'splitters': in order to learn that *voller* is incompatible with determiners, the speaker must acquire idiosyncratic knowledge about this construction. It therefore seems that we must treat *voller* at least on some level of the analysis as a structural *sui generis*. In Section 5 I will attempt to solve this dilemma in an inheritance-based analysis within the framework of SBCG.

## 4. Case assignment

Having seen that the [(DP) *voller* NP] construction is most like a prepositional one (though not quite), it is reasonable to ask whether it adheres to PP government patterns elsewhere in the language. Klaus (2004) already notes that *voll* has a mixed, rather odd profile of government, allowing dative, genitive and even accusative government under different conditions (though as we shall see below, these vary in acceptability among speakers, as does usage data). Since the case for *voller* is somewhat more complex than for *voll*, and some of the case tests involving determiners cannot be repeated for it, I will not repeat her analysis in detail, referring instead to pertinent points as they arise. Hermann Paul notes that aside from various canonical case forms, *voller* is accompanied by what he terms 'an inflectionless form' ("*flexionslose Form*"), as in (26a), or even forms designated a 'strange mixture' ("*merkwürdige Mischung*") in (b) and (c), which combine apparently dative adjective forms (the *-n* suffix in this case) with non-dative noun forms (plural forms with no case suffix, which can be anything *but* a dative):

| | | |
|---|---|---|
| (26) a. | *voller Duft* | 'full of fragrance' |
| b. | *voller ander**n** Fehler* | 'full of other errors' |
| c. | *voller rachsüchtige**n** Anschläge* | 'full of vengeful attacks' |

Paul's examples are limited to older literary attestation, which may give some credence to a possible acceptability of these forms (especially (26a), which is probably acceptable to most German speakers). But they do not give us any quantitative information – are these just single aberrations or systematic phenomena? When do they occur and how often? Also, as some of the problematic forms can only be detected in the presence of an adjective (b and c above would appear to be normal genitive complements, if not for the adjective forms in *-n*), it may be worth considering the two configurations separately at first. The next two subsections therefore survey empirical data on bare objects and objects with attributive adjectives respectively. The third subsection adds qualitative corpus data from German speaking children to give a perspective on the difficulties in acquiring a consistent interpretation of the *voller* construction.

### 4.1 Bare noun objects

To get some empirical data on the forms occurring as arguments of *voller* we require a rather large and ideally unedited source which is less likely to edit away or paraphrase questionable forms consciously. The construction is rather rare and tends not to occur in literary language (at least of some corpora examined by this author), but is quite frequent on the Internet. I therefore use data from the deWaC Web corpus (1.63 billion tokens of German from the Web, see Baroni et al. 2009), searching for the form *voller* following any noun (based on the STTS part-of-speech tag NN as tagged with the freely available TreeTagger; see Schiller et al. 1999

[7] I make no claims for cross-linguistic applicability for this term, and we may treat this as an *ad hoc* proper name for now. I will forgo a special proper name notation as in Radical Construction Grammar, *pace* Croft.

for the tagset and Schmid 1994 for the tagger).[8] The search resulted in around 21,000 hits, which were then manually filtered based on the form of the nearest noun which follows *voller*. Over 5,600 argument types were filtered manually in this way, resulting in the elimination of 181 types with 230 tokens of spurious hits which were then discarded (an error rate of only about 1%). The arguments were tagged with the RF tagger (Schmid and Laws 2008) for gender and number, and the output was manually corrected and enriched with manually assigned inflectional classes during the error filtration process. Of the entire remaining dataset, which contains some 20,500 tokens and 5,350 types, around 17,900 tokens or over 87% of the data were bare nouns, immediately following *voller* and not modified by an adjective. These will be the subject of the current section; for the remaining cases with modified nouns see the next section.

Looking at the distribution of gender and number in the attested bare arguments, we can get a first idea about the ways in which the construction is used. As shown in Figure 1, the bare argument tokens are divided rather equally into singular nouns (48%), likely to be non-count or mass nouns, and plural (count) nouns (the remaining 52%). However, the type counts (in grey) tell a different story: there are almost twice as many types of plural nouns (about 65% to 35%), meaning the singular nouns tend to be more common and repetitive, whereas the plural nouns may form a more productive class of arguments.[9]

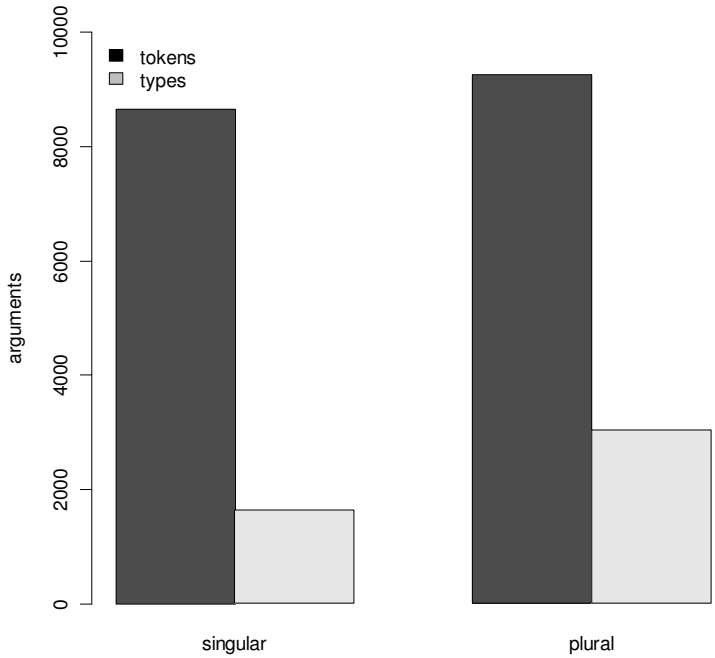


*Figure 1.* Distribution of bare singular and plural argument types and tokens for *voller*.

The plural lexemes cover a wide variety of meanings, but the singulars tend to follow two main patterns: substances in the broadest sense such as ‘water’, ‘lead’, ‘garbage’ etc. and abstractions like ‘courage’, ‘hate’ and others. Table 1 gives the top arguments in each class together with their frequencies in the sample.

[8] The search therefore only includes adnominal and adverbial cases in non-verb-final clauses, though predicative cases are also found in subordinate clauses. Finding all cases where there is no noun immediately preceding *voller* is difficult, since the surface form *voller* is most often an inflected form of *voll* in those contexts, and does not represent the *voller* construction.

[9] Generally speaking, a high type count and a high proportion of rare items are indicative of a productive construction, cf. the overview in Baayen (2009) for word formation and Zeldes (2012) for syntactic argument selection.

*Table 1.* Top 5 singular (substance / abstract) and plural arguments of *voller*.

| *singular* | | | | *plural* | |
|---|---|---|---|---|---|
| *'substance'* | | *'abstraction'* | | | |
| *Geld* 'money' | 134 | *Freude* 'happiness' | 230 | *Überraschungen* 'surprises' | 174 |
| *Energie* 'energy' | 90 | *Liebe* 'love' | 174 | *Menschen* 'people' | 156 |
| *Blut* 'blood' | 80 | *Spannung* 'suspense' | 156 | *Widersprüche* 'contraditions' | 139 |
| *Wasser* 'water' | 73 | *Stolz* 'pride' | 150 | *Rätsel* 'riddles' | 123 |
| *Musik* 'music' | 70 | *Hoffnung* 'hope' | 141 | *Geheimnisse* 'secrets' | 122 |

In a 'substance' class which can be interpreted rather liberally we can find not only the expected liquids like 'water' or 'blood', but also other more or less concrete quantities such as 'money', 'energy' (which can perhaps also be interpreted as abstract) and 'music' (though not tangible it is non-abstract in some sense). The abstractions typically include emotions and mental states. Interestingly, these are substantially more frequent than the corresponding top substance arguments. Finally the plurals include more or less tangible concepts, but all are of course countable: if something is full of 'riddles' it contains multiple singular riddles, etc.

Looking at the forms of the objects in Table 1 we can already observe the lack of case marking of the forms. Both the singular and the plural nouns all lack any case suffixes where these are possible: no genitive *-s* on singular masculine or neuter nouns and no dative *-n* in the plurals (except nouns whose plural already contains *-n* in all cases). Looking at all bare noun arguments together, we can observe the following distribution of case markings (token and type bars have been juxtaposed to save space):

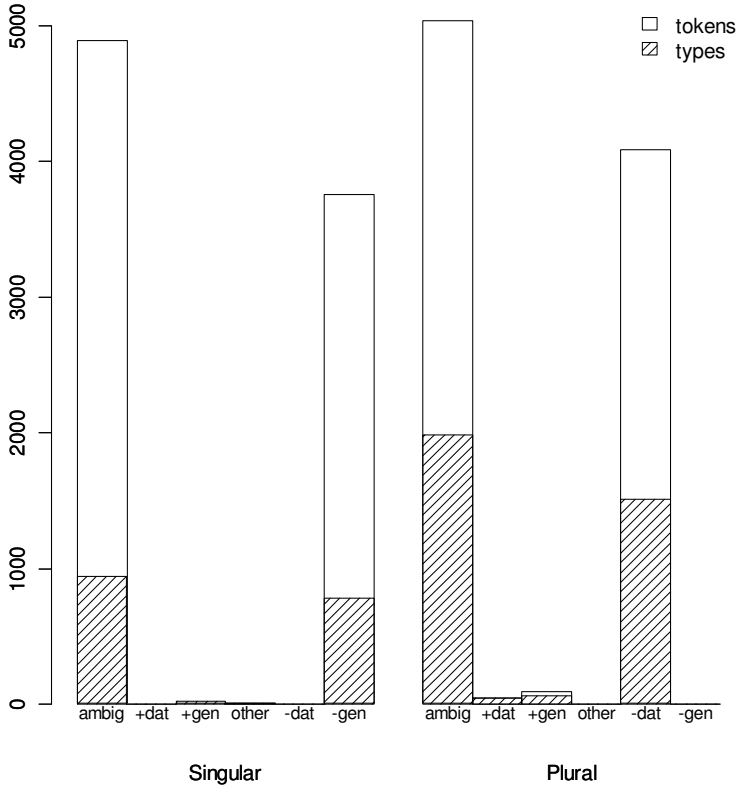


*Figure 2.* Case marking on bare noun arguments. Bars represent token counts, shaded areas give the type counts.

As we can see, most bare noun arguments are completely ambiguous, giving no indication of the case governed by *voller* whatsoever. But in both singular and plural, somewhat less than half the cases (in both tokens and types) give one negative hint: either that the object is not genitive (last column in the singular) or that it is not dative (the penultimate column in the

plural). Taking these two groups together and notwithstanding the remaining small (almost invisible) groups of exceptional cases to be discussed below, the vast majority of arguments happen to be noun forms that carry no case suffixes: the argument simply has the form of the noun's uninflected lemma in the singular, or the form with the plural suffix only (but no additional case marking) in the plural.

What can we make of this distribution? Coupled with the evidence from the tall bars, the Case Theory assumption that overt arguments carry exactly one abstract case leads to the possible conclusion that *voller* governs either the nominative or the accusative, two cases which take no overt marking for the vast majority of singular and plural nouns in German. Neither genitive nor dative is compatible with the second-tallest bars on both sides at once. However a young German speaker learning the language has additional knowledge about the behavior of case in their language that does not fit with this conclusion: nominative is generally not governed by prepositions, remaining reserved for verbal subjects and nominal predicates of copula verbs, and accusative usually carries a dynamic directedness towards the object as mentioned in Section 2. If the hearer is disinclined to accept these options, they might come to the following alternative rule based on the evidence: "use dative forms in the singular and genitive forms in the plural." This would certainly be unusual behavior, as no preposition (or adjective) in German has such a rule – generally a certain sense corresponds to only one case, or there is variation that corresponds to a register distinction across both number categories (genitive versus dative in singular and plural, as discussed in Section 2).

Some evidence for this conflict, or at the least 'inconvenient situation', is given by the exceptional cases not belonging to either bar. The dative plural has an unambiguous marking *-n* in almost all nouns whose plural form does not end in *-n* to begin with. This translates to most masculine and neuter nouns, as feminines are generally pluralized with *-(e)n*. In bare nouns we conspicuously find occurrences of unambiguous plural datives only with non-feminines and feminines with non-*n* plurals (e.g. *Hände* 'hands'), as illustrated in the following examples. Dative forms of feminine plurals ending with *-n* can only be identified in the presence of attributive adjectives (see the next section).[10]

(27) *Zum "Unterricht" liest ein Arzt im weißen Kittel einem Saal* ***voller Männern*** *politische Nachrichten aus der Zeitung vor.*
'For the "class", a doctor in a white coat reads political news out of the newspaper to a hall **full of men.DAT**' [deWaC, position 682192145]

(28) *Warum haben wir dann nicht eine ganze Stadt* ***voller Insektenleuten****?*
'So why don't we have a whole city **full of insect-people.DAT**?'
[deWaC, position 55748421]

Such cases are a tiny minority (only 48 bare token cases, but spread out across 41 types, suggesting the form is not limited to a few lexicalized exemplars). The amount of examples like the above suggests that this is no accident or collection of typos (there are no occurrences with a letter other than *-n* in this position). As I will argue below using evidence from accompanying adjectives, this may be the analogical extension of a dative interpretation of the singular forms, which were only identifiable as non-genitive.

A second group of cases has a clear genitive case marking. The genitive plural case is not marked on ordinary nouns, but it is on adjectives, and therefore also on deadjectival nouns. There are 94 hits belonging to 51 types of bare plural nominalized adjectives, which have a distinct genitive plural form with the suffix *-r*. The following examples give the two most common types and a hapax legomenon, which is not likely to be lexicalized in this form.

[10] In (27) it is worth noting that the modified noun *Saal* 'hall' is itself in the dative, so that attraction or even an appositional reading may be called upon to explain the form (I thank Berry Claus for commenting on this point). However there are many examples where this is not the case, as shown e.g. in (28). See also Section 4.3 for similar examples produced by children.

(29) a. *in einer dunklen stinkenden Herberge voller Fremder*
in a dark smelly hostel full-of strangers.GEN
'in a dark smelly hostel full of strangers' [deWaC, position 941120582]

b. *Ein Land voller Krimineller?*
A country full-of criminals.GEN?
'A country full of criminals?' [deWaC, position 14902733]

c. *Ein Viertel voller Hyperengagierter*
A neighborhood full-of hyper-dedicated.GEN
'A neighborhood full of hyper-dedicated people' [deWaC, position 223879763]

However there are also exceptions to this rule, with some nominalized plural adjectives showing a seemingly nominative/accusative form ending with *-e*, even though the same lexemes are also attested with unambiguous genitive *-r*:

(30) a. *in einer Welt voller Verrückt**er***
in a world full crazy.GEN.PL
'in a world full of crazy people' (lit. 'crazies') [deWaC, position 595738544]

b. *Da ist dann aber noch der Auftragskiller das "Biest", zwei weitere Killer, der Hof voller Verrückt**e**, die taffe Vermieterin und und und...*
'But then there are also the hit man the "beast", two more killers, the yard full of crazies.NOM/ACC?, the tough landlady, and so on' [deWaC, position 1199532242]

Taken alone, such cases may be suspected as typos, but as we shall see in the next section, it is possible to find cases of NPs with full nominative/accusative congruence (including adjectives and nouns) and some speakers defend such forms explicitly in grammar forums.

Finally, there are some non-deadjectival nouns belonging to the special class of so called *n*-stems or weak masculines, which show an *-n* suffix in all forms except the nominative singular (see Köpcke 1995 for a detailed discussion). These can be found both with the non-nominative *-n* or in forms without the *-n*, which at least formally appear to be nominative:

(31) a. *Eine Zeit voller Aberglaube*
a time full-of superstition.NOM
'a time full of superstition' [deWaC, position 1266294482]

b. *ein buntes Land voller Lebenswille*
a colorful country full-of will-to-live.NOM
'a colorful country full of will to live' [deWaC, position 834121522]

There is only a handful of cases, as *n*-stems are relatively few, and fewer still represent non-count nouns that can plausibly appear in the singular after *voller*. In total, only 10 tokens from 5 lexical types are attested, all having one of two morphological heads: *Glaube* 'belief, faith', also forming *Aberglaube* 'superstition'; and *Wille* 'will', also found in *Lebenswille* 'will to live' and *Widerwille* 'aversion'. While it is difficult to draw conclusions from such a small sample, it is worth noting that 8 cases occur without *-n*, but only 2 with *-n*, despite the fact that *any* case other than the nominative should require the *-n*. In the case of *Glaube* it should also be noted that there is an alternative form *Glauben* 'belief, faith', which has the *-n* suffix in the nominative as well (with no difference in meaning), yet clearly some speakers prefer the form without the suffix in the environment following *voller*, despite the alternative way of eschewing the problem. Although the lack of the *-n* suffix may seem unusual in this environment, it does have one thing in common with the vast majority of cases above: it represents a form of the noun with no case suffixes attached.

To sum up, it seems that speakers are very systematic about the 'easy' cases: they choose a form that is not genitive in the singular and not dative in the plural almost all of the time. But when forced to make a clear, unambiguous choice by the morphology of an unusual noun, such as deadjectival nouns or *n*-stems, variation crops up. All other things being equal, two interpretations seem possible: either the argument is accusative all of the time (or nominative, as suggested by some of the *n*-stems), or it is (strangely) dative in the singular but genitive in the plural. The occasional marked dative plural and genitive singular forms, as well as the general prepositional semantics of these two cases, may lead us to believe the latter option. But if singulars are really dative and plurals are really genitive, then speakers should have no qualms about modifying the object with an adjective in the appropriate case: dative singular and genitive plural. With this in mind, we can now turn to objects modified by adjectives, where ambiguity is strongly reduced even for regular nouns.

## 4.2 Objects with attributive adjectives

The situation for disambiguating the case of the object of *voller* becomes considerably simpler once an attributive adjective is used to modify the head noun. The reason is that case is only rarely marked on German nouns themselves, though it is marked on articles (which, as we have seen, are precluded for the object NP in the *voller* construction) and attributive adjectives. Even better, adjectives carry a more easily identifiable case marking if no article is used, i.e. the strong vs. weak adjective inflection distinction. Thus an adjective like *gut* 'good' has accusative, dative and genitive singular masculine/neuter *gut**en*** if it follows an article, but distinguishes *gut**em*** for dative if no article precedes. Table 2 gives an overview of the relevant forms for the singular and plural with the masculine noun *Wein* 'wine' (the masculine gender shows the most overt case distinctions).

Table 2. Case endings for masculine singular attributive adjectives depending on article use.

| *number* | *case* | *definite (weak)* | *indefinite (mixed)* | *bare (strong)* |
|---|---|---|---|---|
| singular | Nom | der gut**e** Wein | ein gut**er** Wein | gut**er** Wein |
| | Acc | den gut**en** Wein | einen gut**en** Wein | gut**en** Wein |
| | Dat | dem gut**en** Wein | einem gut**en** Wein | gut**em** Wein |
| | Gen | des gut**en** Wein**s** | eines gut**en** Wein**s** | gut**en** Wein**s** |
| plural | Nom | die gut**en** Wein**e** | gut**e** Wein**e** | |
| | Acc | die gut**en** Wein**e** | gut**e** Wein**e** | |
| | Dat | den gut**en** Wein**en** | gut**en** Wein**en** | |
| | Gen | der gut**en** Wein**e** | gut**er** Wein**e** | |

As we can see, the noun itself only distinguishes the genitive case with the suffix *-s* in the singular (genitive *Weins*, all other cases *Wein*), and the dative case with the suffix *-en* in the plural (*Weinen* : *Weine*). In the weak and mixed declensions of any adjective modifiers, which occur for example after definite and indefinite articles respectively, the presence of the adjective allows us to make a further distinction in the singular: non-nominative forms have a suffix *-en*, while the nominative has a distinct form (*-e* or *-er*). However, since *voller* is not compatible with articles, adjectives will necessarily occur with bare nouns in the strong declension, so that we may also get a distinct form in the dative (*-em*), for masculine or neuter nouns. The result is a possible distinction of genitive and dative in the singular thanks to the presence of an adjective, except in feminine nouns, for which dative and genitive strong adjectives both take the suffix *-er*. In the plural, indefinite and bare nouns are identical (the null article is the plural indefinite marker, just as in English *wines*), and dative and genitive are again distinct.

Despite various syncretisms, it appears that between the adjective and the noun, it should be easy to discover the case governed by *voller* if we find some adjective modifiers in our sample. Fortunately adjective attributes do in fact occur before the object noun some of the

time. However before examining their forms it is worth noting that such adjectives occur unexpectedly rarely, as shown in Table 3 using data from deWaC:

*Table 3.* Frequencies for bare and adjective modified nouns after *voller* compared with some other environments.

| *adjective* | *voller* | *voll + mit* | *mit + article + noun* | *mit + bare noun* | *all nouns* |
|---|---|---|---|---|---|
| no | 17910 | 3111 | 436253 | 372157 | 45274442 |
| yes | 2581 | 721 | 131188 | 191826 | 12402922 |
| total | 20491 | 3832 | 567441 | 563983 | 57677364 |
| % adjective | 12.59 | 18.81 | 23.11 | 34.01 | 21.5 |

Only a little over 12.5% of *voller* constructions have an attributive adjective before the object noun. For comparison, a preposition like *mit* 'with' has about 23% of objects with an adjective after the article, a highly significant difference ($p<2.2e-16$ in a two sample $\chi^2$ test of equal proportions, and an odds-ratio of 2.086). It could be argued that the bare nouns that accompany *voller* are less likely to be qualified (for example since they are often mass nouns). But searching for *mit* with bare nouns actually shows an increase in the proportion of qualified nouns: some 34% have an attributive adjective ($p<2.2e-16$, odds-ratio 3.576). The proportion of nouns preceded by adjectives in general is about 21% ($p<2.2e-16$ and odds-ratio 1.9 compared to *voller*).

These differences can all easily be explained by differences in semantics: it is possible that *voller* is so rarely followed by adjectives because its meaning is not conducive to their use: for example, people might rarely feel the need to qualify the substances etc. with which something is full. If this were the case, we would expect an alternative like *voll mit* 'full with', which has a clear, simple case assignment behavior (always dative), to have as many attributive adjectives in its objects as *voller*. This is however not the case: *voll mit* has 18.81% objects qualified by adjectives, quite significantly more than voller (12.59%, $p<2.2e-16$, odds-ratio 1.608). In other words, the difference in the likelihood of adjectives between *voller* and *voll mit*, which are semantically interchangeable, is larger than the difference between either *voller* or *voll mit* and nouns at large. It therefore seems fair to say that *voller* is quite conspicuously avoided when adjectives are used, suggesting the beginning of a quantitative suppletion (if an adjective is to be used, prefer *voll mit* rather than *voller*).

The difficulty in incorporating adjectival modifiers into phrases serving as objects to *voller* can also be observed if we look at language forums.[11] For example, the discussion reproduced below was started by the question how the adjective *warm* 'warm' can be added to the argument *Wasser* 'water' after *voller* (in fact, the question itself is already a sign of the difficulty). As far as I can tell, all participants use correct native German, with the possible exception of D, who uses one form that conforms to no accepted case pattern (D otherwise uses fluent German though). My own comments and additions are in square brackets, and the translation is my own; the participants' user names have been replaced with letters for identification:[12]

[Topic:] Badewanne voller warmen Wassers [=Bathtub full of warm water.GEN]
A: […] I'd like advice on the following expression. Is it right to write/say "Eine Badewanne voller warmen Wassers" [=genitive]?

[11] One reviewer has objected to the inclusion of forum data as relevant evidence. However I feel that it makes several unique contributions as a source of data, which will be shown below: it establishes that some aberrant forms are not merely typos, but are actually defended explicitly by some speakers; it makes it clear that speakers do not have a clear view of what the 'correct' form is (this would look very different for less controversial constructions); and it shows us some examples for speakers' attitudes to the different forms under the singular and plural conditions, together with some of the reasons why they prefer one form over the other.

[12] Translated from http://forum.pons.eu/en/forum-german-english/german-grammar/badewanne-voller-warmen-wassers-t2729.html, last accessed 31.3.2013.

B: Hm, I'm not sure. I would say "Eine Badewanne voll mit warmem Wasser" [=*voll* + *mit* + dative]. Without the adjective it would be "Eine Badewanne voller Wasser" [=non-genitive base form]. But how one gets the adjective in there – no idea.
C: I would say: voll warmen Wassers. [=*voll* + genitive]
[…]
D: […] I think the following: Eine Badewanne voll warmen Wassers. [=*voll* + genitive] [or] ...voll Wasser [=non-genitive base form] [or] ...mit warmen Wasser [=??]. I see "voller" as a comparative form. Too full. What does fuller than full mean?
E: My suggestion: Eine Badewanne voll warmem Wasser. [=*voll* + dative]
F: No, they're both wrong. Either: Eine B. voll warmen Wassers. (more literary version) [=genitive] Or: ... voll mit warmem Wasser. (more colloquial) [=*voll* + mit + dative]

B's grammar seems to accept *voller* arguments without the adjectival modifier, but not with it ('no idea' how to form the requested phrase). B instead resorts to the (quantitative) suppletion strategy outlined above, using *voll* + *mit* (which clearly governs the dative, by virtue of the argument structure of *mit* 'with'). C also chooses an avoidance strategy, choosing *voll* + genitive. D's grammar doesn't contain the *voller* construction at all, interpreting it as a comparative of *voll*. This raises questions about D's native speaker status, though some 'scholarly' normative attitudes also reject it, as another website would have it:[13]

> [A viewer] wants to know, how you use *voll* correctly in a predicate. Which of the following sentences is correct?
>
> Sie war voller Tatendrang. [=she was full of the urge to act, *voller* with no suffix on noun]
> Sie war voll Tatendrang. [=she was full of the urge to act, *voll* with no suffix on noun]
>
> [The correct answer is] Sie war voll Tatendrang. Where *voll* occurs in the sentence doesn't matter […] like all predicate nouns it stands in the nominative. Adjectives have no ending here.

The same site also continues to prescribe that the object noun's form (with *voll*) should be in the genitive. If we return to the forum discussion above, we find that E, who also avoids the construction with an adjective, contradicts this recommendation: unlike C and the writer of the website above, he chooses dative instead of genitive with *voll* as the construction of choice once an adjective is used. Finally forum user F avoids *voller* with an adjective as well and accepts either genitive complements with *voll* or else *mit* 'with' with the dative, again the suppletive strategy, which F labels as 'colloquial'.

On another forum we find a much higher acceptability of adjectives and a tendency to prefer genitive in all cases, possibly as a result of the genitive's status as prescriptively superior in other dubious cases in German grammar (cf. the high register of *wegen* + genitive in Section 2). Note that comments in round parentheses are in the original:[14]

[Topic:] voll / voller -> case?
G: Hello, Suppose someone wanted to write that there is a suitcase in which many evil horrors are hidden (whatever that may mean). Must it be called "Koffer voller böser Gräuel"? [=suitcase full evil horrors, genitive form]. If yes, why? If no, why not? How else? Thanks
H: It doesn't have to [be called that], but it can. […] Because it sounds better, for my ears anyway. "voll" would probably be the less common alternative, I only know that from "eine Handvoll Dollar", [=a handful of dollars] which has degenerated to "eine Hand

[13] My translation from http://www.belleslettres.eu/artikel/genitiv-adjektiv-voll-eingedenk-bar.php, last accessed 31.3.2013.
[14] My translation from http://www.wer-weiss-was.de/theme143/article4659734.html, last accessed 31.3.2013.

voll Dollar" in the meantime. [This etymology is incorrect, *voll* has existed independently from compound forms as an adjectival modifier]

I: […] I would see it as a partitive genitive. For example in the European Cup in Vienna there was a "Stadion voller Nackter" [=stadium full of naked (people), genitive adjective inflection]

J: The term 'voller' means 'voll der' [full + genitive singular/plural(?) article], 'filled (with)' and is an undeclined adjective (!), which also cannot form the comparative; the noun following it is also not declined:

Maria ist voll der Gnade [=Mary is full of grace, genitive with article after *voll*]
Maria ist voller Gnade [=Mary is full of grace, *voller* and 'undeclined' argument]

Maria is who or what? Voll der Gnade. Voller Gnade. (= Predicative)

Der Koffer war voll der bösen Gräuel. [Genitive plural article and adjective after *voll*]
Der Koffer war voller böse Gräuel. [*voller* and an 'undeclined' nom./acc. adj. + noun]

The opinions are remarkably heterogeneous, but one thing is clear: attributive adjectives do not sit well in this construction with many speakers. It seems that people like A or G who hypothesize that *voller* should also be usable with an adjective, are responsible for the 12.5% of examples we did find above (and quite possibly some come from speakers denying the possibility as well). Some people, like H and I, find them fine or even recall attestations of the construction that they have seen. Nevertheless, people like B–F, who actively avoid the construction with adjectives, are the reason for the paucity of such examples. Finally, people like J believe that the argument following *voller* is 'not declined', leading to a nominative/accusative-like form in *böse Gräuel*. This behavior seems odd, but is actually consistent with the evidence from the overwhelming majority of bare noun cases and also fits with the evidence from the aberrant *n*-stems.

Returning to the corpus data, we may now examine the adjective forms that do occur after *voller* quantitatively. As syncretisms make it impossible to tell case unambiguously in all cases, we may begin by looking at the suffix forms that adjectives take. In the singular the possibilities are *-m* for dative non-feminine, *-n* for genitive or accusative non-feminine and *-r* for dative-genitive feminine (ambiguous) or nominative singular masculine. The conceivable suffix *-e* for nominative/ accusative feminine singular is not attested. The suffixes exhibit the frequencies in Table 4, which shows a strong preference for *-r* in both numbers. Since *-r* is the feminine suffix for both dative and genitive, it could be expected to be half as frequent as *-m* and *-n* together (two cases of two genders), but in fact it is over three times as common.

*Table 4.* Frequencies for adjective suffixes in arguments of *voller*.

| | *singular* | | *plural* | |
|---|---|---|---|---|
| *suffix* | *tokens* | *types* | *tokens* | *types* |
| *-m* | 65 | 53 | - | - |
| *-n* | 27 | 23 | 23 | 23 |
| *-r* | 314 | 190 | 2138 | 1025 |
| *-e* | - | - | 2 | 2 |

This is even more striking if we consider that *-m* and *-n* come from two separate genders (masculine and neuter), so that the strong preference for *-r* also suggests that feminine objects qualified by adjectives outnumber the other genders very strongly. This could be due to general facts of morphology (if there are more feminine nouns in German), or due to semantics (things that fill other things happen to be signified more often by feminine nouns in German). But what we would not expect, all other things being equal, is that arguments with adjective attributes should have a higher proportion of feminine lexemes than bare arguments.

Yet this is very clearly the case, as seen in the overview of the distribution of object genders with and without adjectives in Figure 3.

Two facts seem particularly striking in the data in Figure 3. Firstly, singular objects exhibit a dramatic drop in relative frequency compared with plural objects as soon as adjectives occur.[15] Secondly, feminine nouns are proportionally less affected by this drop, corresponding to the prevalence of the *-r* suffix in Table 4.[16] This suggests that the forms being asked about by forum user A above are the most problematic (*Wasser* 'water' is singular and non-feminine). The question posed by G is less problematic (*Gräuel* 'horrors' is plural). It may therefore be more than coincidence that the respondents to G's question are less reluctant to accept adjectival modification in general.

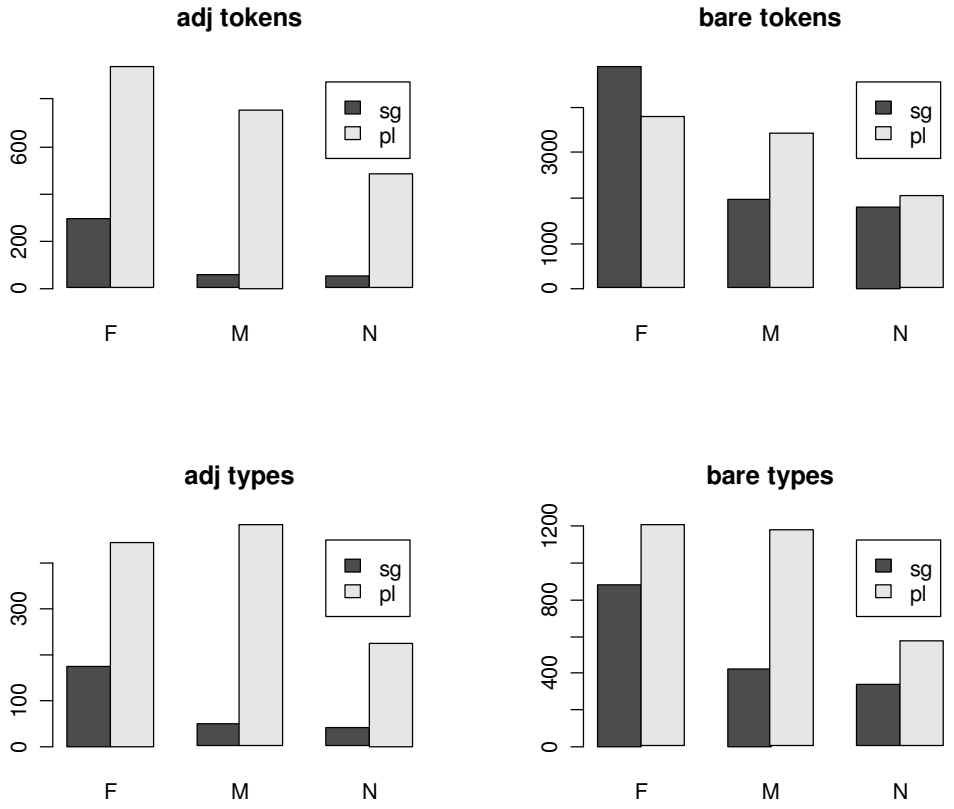


*Figure 3.* Type and token frequencies for objects of *voller* in each gender with and without attributive adjectives.

But why are plural arguments less problematic? One possibility is that the genitive-compatible plural forms sound more correct because of the higher register associated with the genitive in prepositional phrases. This explanation is however not entirely convincing, since non-feminine singular forms in general are recognizable as non-genitive even without an adjective, so the problem should occur with bare nouns as well. A second possibility which I would like to suggest here is that singular arguments are less productive than plural ones in this construction, which leads to conservatism or an unwillingness to innovate or vary the

[15] Note that the absolute numbers for adjective-qualified objects on the left is much lower than for the bare objects on the right, but the issue here is the shape of the distribution: on the left hand side the singular bars are substantially smaller in relation to the plural bars.

[16] An anonymous reviewer has suggested that phonetic parallelism may also be a factor in the preference of *-er* adjectives, since the preceding *voller* itself ends in *-er*. This possibility exists and is hard to disentangle from the morphosyntactic explanation offered here, though this would imply the perhaps surprising suggestion that speakers should generally disprefer prepositional object phrases that are dissimilar to a given preposition. I am not aware of such results having been reported yet, but it is certainly an interesting suggestion which merits further study.

form of the argument. We have already seen that there are fewer lexical types of bare singular objects. Figure 4 gives more detailed information on the productivity of *voller* arguments using a vocabulary growth curve (VGC, see Baayen 2001, Evert & Baroni 2007).

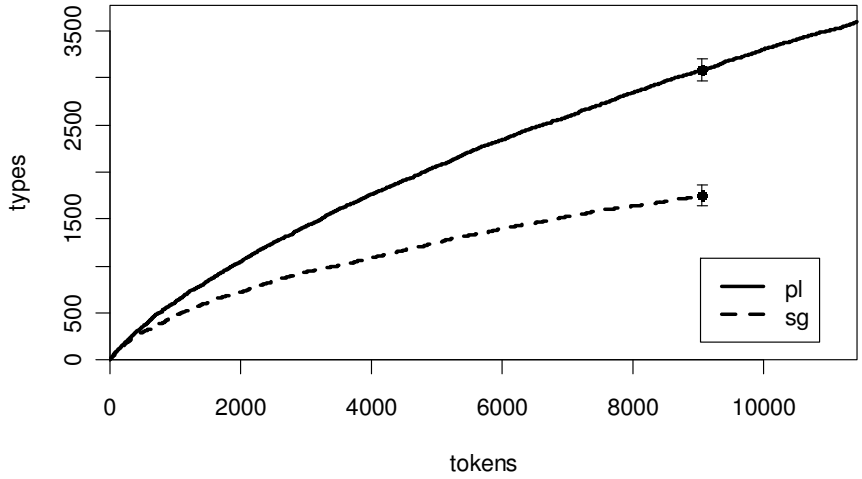


*Figure 4.* Vocabulary growth for singular and plural arguments of *voller* with 95% confidence intervals for the largest common sample size.

The x-axis gives the size of the sample of *voller* arguments which we observe, with one curve for singular arguments and another for plural arguments. Each curve rises along the y-axis each time a previously unseen argument noun is encountered, which becomes progressively less likely as more and more nouns are seen in the sample. As we can see, there is more data for plural arguments (the curve is longer). But a fair comparison between curves can only be performed at an equal sample size, since it gets progressively more difficult to find novel arguments the more data we have seen (cf. Gaeta & Ricca 2006, Säily 2011). The error bars shown in the figure give 95% confidence intervals for the difference between the two curves at the largest common sample size of 9061 items. At this point there are 3086 different plural arguments, but only 1751 singular ones, a highly significant and rather large difference in vocabulary ($p<2.2e-16$, odds ratio = 1.762). Argument distributions that are more repetitive and exhibit fewer unique items lead to speakers preferring alternative constructions when a novel argument is to be used (see Zeldes 2012 and to appear in detail). This may be at least partly responsible for the lower acceptability of adjectives in singular argument phrases.

## 4.3 Data from first language acquisition

A final point worth considering before moving on to a theoretical discussion of the data is how the odd behavior of *voller* witnessed above is acquired, and why speakers come to exhibit variation at all given the overwhelming prevalence of the largest group of cases found in Section 4.1. To do so, we may consult a further source of data: corpora of children's writing. As the *voller* construction is quite rare, it is difficult to find spontaneous cases in the smaller corpora of child speech that are available. The earliest attestation I have been able to find in a spoken corpus is the following from a six year-old girl:

(32) (discussing why Wiener Street is called that)
*oder is da alles um nur* ***voller metzger****?*
'or is everything there- around- only full of butchers?'
[DGD2 Folk corpus, FOLK_E_00011_SE_01_T_02][17]

[17] For the corpus see the IDS Datenbank für Gesprochenes Deutsch (DGD2), accessible online from http://dgd.ids-mannheim.de/. Full lowercase transcription is from the original data.

Notwithstanding the preceding disfluency (change from *um* to *nur* 'only'), this is a classic example of the suffixless bare noun plural that characterizes the largest group of types for the construction. Treating the form as a genitive plural is likely unwarranted at this stage, as studies show that children up to the age of 7 are unreliable in recognizing case marking on non-pronominal NPs even for coding the very common categories of subject and direct object (e.g. Dittmar et al. 2008). Nevertheless, the construction is used correctly by placing an unmarked plural form after *voller*: the child does not need to know which case is present in order to use the construction just like adults.

In order to find more examples we must turn to larger, written corpora. A suitable corpus has been collected within the KESS project,[18] containing texts written by German school children of various ages. One of the assignments given to the fourth grade children's group (KESS4) was to write a story beginning with the sentence 'the children have found a mysterious suitcase', which fortunately lends itself to the appearance of the *voller* construction to describe the contents of the suitcase. Of 40 examples found in the corpus, 34 adhere to one of the common bare patterns (singular or plural bare objects). Two examples have adjectives with *-r*, one for a feminine singular (dative or genitive) and one for a feminine plural (genitive). The remaining examples contain accusatives and something like Hermann Paul's 'strange mixtures', three of which are given verbatim below (with errors).

(33) *Der Koffer lag in einer Ecke die voller Spinnetze und anderen ekligen gruseligen Sachen*
'The suitcase lay in a corner which full of cobwebs [non dative] and other yucky gross things [dative]'
[KESS4, KF10110214]

(34) *da waren ales voller altes Geld* 'everything there were full of old money [nom./acc.]'
[KESS4, KF10170116]

(35) *in diesen Koffer war alle foller Gold, Platin, Diamanten und Silber, Juwelen und noch vieles mehr.* 'in this suitcase everything was full of gold, platinum, diamonds and silver, jewels [all unmarked, non-dative] and much more [nom./acc.]' [ KESS4, KF11600113]

All of the examples contain grammar and spelling errors, and as a handful of qualitative examples they have limited relevance. But next to the evidence we have seen so far they illustrate how unclear a picture the data can give language learners, even at the relatively late fourth grade level.

In (33) we find a genitive-like (suffixless) *Spinnetze* 'cobwebs' coordinated with an apparently dative phrase headed by *Sachen* 'things'. Note however that *Sachen* ends in *-n* in all cases, meaning it is the bare unmarked form; it is possible that the dative adjective endings *-n* are chosen by way of attraction or subconscious consonance (in the literary sense). In (34), the noun *Geld* 'money' is unmarked but a nominative/accusative adjective form is chosen for *alt* 'old'. This can either be due to the understandable inference that *voller* governs the accusative, or simply a preference for a more frequent or entrenched 'chunk' form *altes Geld*. The latter explanation could equally apply to the final coordinated argument in (35), *vieles mehr* 'much more', commonly seen in this nominative/accusative form in the frequent phrase *und vieles mehr* 'and much more, etc.'. As is stands, the data cannot be evaluated unequivocally, but it suggests that the case governed by *voller* is less than obvious for native speakers even in the late stages of first language acquisition.

[18] Kompetenzen und Einstellungen von Schülerinnen und Schülern 'Competences and Attitudes of Schoolgirls and Schoolboys', Landesinstitut für Lehrerbildung und Schulentwicklung, Referat Standardsicherung und Testentwicklung, Hamburg (http://www.liq-projekte.de/kess-korpus/). I thank Jasmine Bennöhr and Burkhard Dietterle for making the data available to me.

## 5. A Sign-Based Construction Grammar Analysis

As we have seen, there is considerable variation in usage and introspective acceptability for different variant constructions with *voller*, and deriving 'the right rule' is anything but simple for speakers. Within the domain of standard, Case Theory conforming methods, the simplest uniform description of the evidence for adult usage so far is probably this: *voller* takes an NP argument (including possible adjective modifiers) with no determiner, in the dative case in the singular and in the genitive case in the plural. Notwithstanding the oddness of such a singular/plural split in case assignment for German, this is the most economic deterministic rule covering the most cases.

However, a number of facts remain unexplained by this description: why should attributive adjectives be rare in this construction, but much less so in the synonymous one with *voll mit*? Why should the effect be mitigated for feminine singulars? If case is robustly defined for both numbers (dative singular, genitive plural), why are adjectives felt to be difficult or questionable ('no idea' how to get them into the construction, cf. Section 4.2)? Why do we find deviant case forms in both numbers, including ones which are neither dative nor genitive (*voller böse Gräuel* 'full of evil horrors', defended on a grammar forum as correct next to *voll* with genitive)? Why are there signs of a preference to use the explicitly nominative form of *n*-stem nouns, such as *(voller) Glaube* 'belief, faith', *Lebenswille* 'will to live' etc., and some attestation of nominative/accusative plural forms for deadjectival nouns? In the following I would like to suggest an analysis that accounts for these facts, making use of the additional mechanisms offered by the constructional approach and the formalism of Sign-Based Construction Grammar.[19]

The analysis hinges on the idea that the most important rule for the object of *voller* is based on prototypes such as the common *voller Freude / Wasser / Kinder* 'full of joy / water / children' etc., where the argument is identical to the uninflected lemma form or else the unmarked plural form, without additional case suffixes. These forms lead to the acquisition of the informally expressed constraint in (36).

(36) The argument of *voller* should carry no suffix except for possible plural marking.

This rule can be made responsible for a wide range of facts: the choice of singular form (the apparently dative form is unmarked in all genders) and plural form (genitive plural carries no suffix beyond the plural suffix); the derivation of adjective forms compatible with other cases, as long as these are not marked (unusual examples like *böse Gräuel*); and the preference for the *n*-stem form without the accompanying suffix. As long as no adjective is used to qualify the nominal object, and in the absence of a determiner (which is impossible in the construction), I suggest that the argument noun is in fact unmarked for case, resulting in a 'caseless' prepositional construction. This is certainly a break with the assumptions of Case Theory, but it allows us to explain how one and the same head, *voller*, can require two different cases based on the number of its object, which in most non-constructional theories should not be visible to *voller* at all. In the present analysis, the argument of *voller* is not marked for case, resulting in the 'barest' possible form being preferred, without any stipulations about case assignment being made depending on properties of the object.

The suggestion that there may be some nominal phrases in German which have no case is also by no means new, going back at least as far as the historical grammar of Erdmann & Mensing (1898). Some of the cases discussed include 'formulaic' expressions resisting

[19] An anonymous reviewer has questioned the usefulness of a formalization in SBCG on the grounds that it does not capture the quantitative and prototypical usage-based aspects of the analysis above. This is without a doubt a *prima facie* limitation of many formalisms, though of course probabilistic models and data-driven grammar induction techniques can be applied to most formalisms all the same. Regardless of such endeavors, I believe that formalizations are a useful way of making our analysis explicit and comparable to other analyses, and that they do not detract from, but rather complement the quantitative data-based account.

inflection, as in (37), or the partitive genitive in so called 'transparent nouns' (cf. Fillmore & Sato 2002) giving units or quantities as in (38)–(39). Sommerfeldt & Starke (1998: 101) also discuss similar cases involving temporal expressions, as in (40). Note that in most plural cases, the unmarked form of the noun is again ambiguous between all non-dative cases as in (38), but in the singular the fluctuation between genitive *-s* (usually only in high registers) and a lack thereof can be observed in non-feminine nouns (39).

(37) *zwischen Affe und Mensch* 'between monkey and man' (the nouns should be dative after the preposition *zwischen* and take a suffix *-n*, Erdmann & Mensing 1898: 118)

(38) *eine Menge Leute* 'a lot of people' ('people' is any case but dative)

(39) *[ein] Becher Wein/Weins* 'a cup of wine' (unmarked vs. archaic/literary genitive, see ibid.: 102)

(40) *Ende April /*??*Aprils* 'end of April' (the genitive *-s* is probably unacceptable to most speakers of German today`, though cf. the genitive with a determiner: *Ende diesen Aprils* 'end of this April').

The unmarked case forms found in all of these constructions are sometimes called *Gemeinschaftskasus* 'common case' or *monoflexiv* 'monoflexive' (cf. Sommerfeldt & Starke 1998: 101), though Admoni (2002 [1961]) discusses extensively the possibility that all of these cases exhibit special uses of the regular nominative. However this view does not explain all cases, as we can see in the alternations in (41)–(42). As soon as adjectives are introduced into the equation, explicit marking of the nominative is often avoided, especially in favor of the genitive which is missing in the unmodified case (Admoni 2002: 241 does not seem to feel that this undermines the analysis of the other cases as 'nominative') or else is restricted to poetic language (as in *Becher Weins* above).

(41) *und wir sehen* ***eine Menge junge Männer****, die schon vor uns dort zusammengekommen sind* 'and we see a lot of young men who already got together there before us' (nom./acc.-like adjective form *junge* 'young') [deWaC, position 767233879]

(42) *Diese Etablissements beschäftigen* ***eine Menge junger Mädchen*** 'These establishments employ a lot of young girls' (gen. form *junger* 'young') [deWaC, position 804176876]

This fact that did not escape Mensing either, who writes: "*The genitive is necessary when the substance specification is connected with an adjective*" (Erdmann & Mensing 1898: 102).[20] More recently it has been suggested that the presence of adjectives interacts in a similar way with the possibility of dropping a variety of 'weak' case endings, including in the case of the *n*-stem nouns discussed above (see Gallmann 1996; for criticism and an OT analysis of the facts see Müller 2002).

What happens when an adjective is admitted into the construction with *voller*? Is our case of *voller* similar to the ones above? Key differences between *voller* and the latter cases are firstly that *voller* is productive (not limited to 'formulaic' prepositional phrases discussed by Mensing and Admoni), secondly that it rejects determiners and thirdly that both singular and plural arguments follow it regularly, creating the clash between dative and genitive readings of the unmarked noun form. An attributive adjective forces case marking to be realized in the object NP; no matter which case is chosen, it can no longer remain unmarked for case. It is my suggestion that this is precisely the decisive factor for the difficulty of integrating an attributive adjective: reconciling the adjective's case marking with the unmarked nominal

[20] In German: "*Notwendig ist der Genitiv, wenn die Stoffangabe mit einem Adjectivum verbunden ist*". In fact one often finds non-genitive cases even with adjectives, as shown in the previous example above.

argument. If the difficulty in introducing an adjective is overcome and the construction including an inflected modifier is deemed acceptable, I suggest that the adjective form is chosen to accommodate the already pre-determined (bare) form of the noun. This is expressed informally in (43):

(43) Attributive adjectives take a form that is reconcilable with their nouns.

This constraint is not specific to *voller*, as adjectives generally agree with the nouns they modify. What is unusual is that in the absence of clear case marking on the noun, the adjectives are left to select a form that is more or less 'inoffensive'. While genitive fits this profile in the plural, in the singular it does not, causing the distribution of the case variation we have witnessed.

What the two rules thus far do not explain is why we do not see a preference for nominative/accusative forms in the adjectives (though certainly *voller böse Gräuel* 'full of evil horrors' embodies such a result). To answer this question we must return to a constraint already mentioned in the beginning of the discussion: German PPs (and other non-copular heads) do not generally govern the nominative, which is reserved for the marking of subjects and nominal predicates. The other option, the accusative, is governed by prepositions, but mostly with a lative sense of movement towards the object. The use of the genitive with *voll* in much the same sense as the partitive genitive in the archaic *Becher Weins* 'glass of wine' suggests that the semantics of filling may be at odds with the accusative. Additionally, if the bare form were more like the accusative and not just the form with the fewest possible suffixes, the appearance of bare *n*-stems, which are not compatible with the accusative, would be left unexplained. If the *voller* construction were a subtype of non-lative PP, we might therefore expect the following constraint to apply:

(44) Avoid nominative case marking in PP arguments and also accusative case marking in a non-lative PP.

With these constraints in mind it is time to ask how we may capture the facts in a formal way, given that the *voller* construction behaves like a PP in some ways but not in others. To represent the constraints I use Sign-Based Construction Grammar, which has several useful properties in the present context, beginning with the mechanisms of inheritance and unification. The first task is to explain the position of *voller* with regard to prepositions in general. Clearly, in some ways *voller* behaves very much like a preposition: it has an overt obligatory argument, it can be used predicatively, adverbially and adnominally and it expresses relational semantics between an internal argument and the external phrase it modifies. In the context of case marking I have also suggested that the dispreference of a nominative/accusative case interpretation for the internal argument may be motivated by the behavior of other (non-lative) prepositions. These facts can all be captured using inheritance from a general construction common to all of these lexemes. At the same time, there are some crucial differences: most importantly, determiners are completely ruled out for the internal argument NP, unlike in other German PPs. Additionally, the case assignment behavior is complex and unusual, somehow depending on the form of the object phrase. Figure 5 offers an SBCG analysis of the inheritance of *voller* from a generalized non-lative preposition, where the lack of object determiner is an additional feature specified for the *voller* construction. The volatility of object case is only addressed in the inherited constraint against nom./acc. forms at this point.

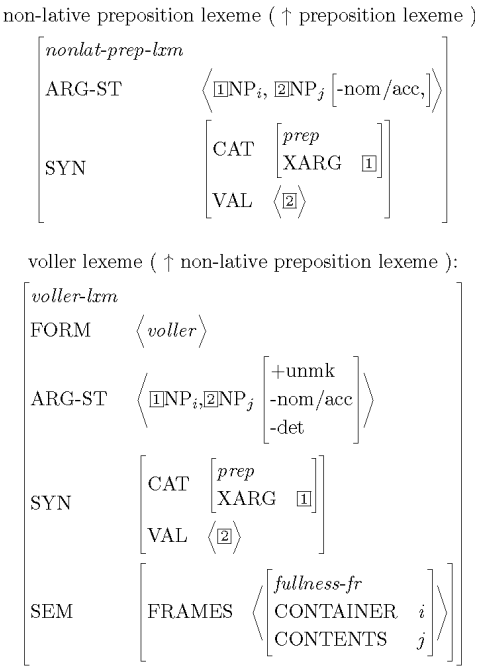


*Figure 5.* SBCG entry for *voller* and its inheritance from non-lative prepositions.

The entry for *nonlat-prep-lxm* is relatively simple, containing few constraints. It has two arguments: the internal argument $NP_j$ corresponding to the object of the preposition, and an external argument, $NP_i$, which is not saturated within the PP. The external argument codes an NP for the PP to modify, setting up typical relational semantics realized by prepositions, such as the 'locative relation' frame.[21] The internal argument must be overtly realized to produce a grammatical PP and forms part of the open valency list of the preposition. The preposition further constrains the case of its argument: it may not be nominative, a constraint inherited from the general preposition lexeme construction (not depicted), nor may it be accusative, a constraint more specific to German non-lative prepositions.

The *voller-lxm* matrix below inherits these constraints, which are repeated for convenience only, but adds specific information about its own lexical identity (a preposition of the form *voller*), the associated frame *fullness-fr*, and most importantly for the present discussion, two further constraints on the internal argument: a feature demanding the argument be 'unmarked' (+unmk) and a feature ruling out determiners.[22] The feature value specifying 'unmarked' marking has been put to different uses in SBCG as well as HPSG, relating mostly to definiteness marking and strong/weak adjective inflection (van Eynde 2006), but also comparative and equative marking (see Sag 2012: 86-87 for an overview). I will re-use this feature here to enforce the form of the noun discussed above: the head noun of the internal NP object is required to have no case marking affixes, such as the non-feminine genitive singular

[21] E.g. adnominal *A in B*, predicative *A is in B*, etc., where A corresponds to the frame-semantic FIGURE argument of the frame and B is the GROUND. Cf. the entry for the locative relation in FrameNet https://framenet2.icsi.berkeley.edu/fnReports/data/frameIndex.xml?frame=Locative_relation. See also Hole (2013) on some specific semantic properties of *voll/voller* and their arguments in German and some differences as compared to English.

[22] It would be equally possible to code the determiner constraint in the type hierarchy, by allowing *voller* to govern a different type of phrase. In a DP analysis following Abney (1987) etc., this would be an NP instead of the DP argument taken by most PPs. However SBCG, just as HPSG, generally opts for NP analyses (see van Eynde 2006, Sag 2012), and this is actually a better fit for the analysis of *voller*: the distinction between DP and NP arguments would make a direct inheritance from the PP construction problematic. In the analysis above it is therefore possible to reconcile the idiosyncratic syntax of *voller* with its identity as a special type of preposition, and get the avoidance of nom./acc. arguments in the bargain.

*-s* or dative plural *-n*.[23] To rule out determiners, a new feature will be required, which will be coded below simply as DET. This type of feature is non-trivial, since it allows us to 'look into' the NP from outside and check for determiners, but it is necessary if we maintain that *voller* is a type of preposition.[24]

With these constraints in place we may see what happens when we attempt to unify the features of *voller* with those of its argument NP, with and without an accompanying modifier. In the simple case of a bare noun argument, there is no conflict between the NP construction and the specification demanded by *voller*, as shown in Figure 6.

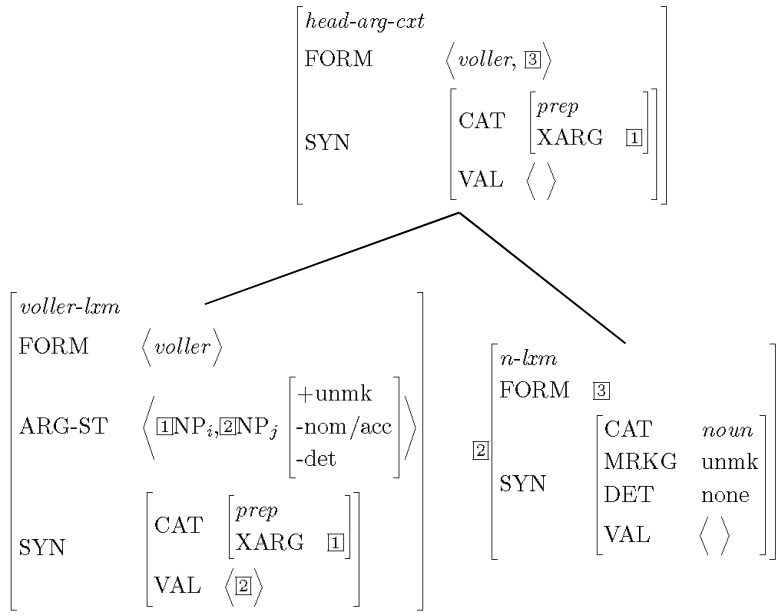


*Figure 6.* The *voller* construction with a bare argument.

At this point, the head noun simply complies with the requirement to carry no marking and reject determiners. Note that since there has been no positive case marking constraint imposed by *voller*, no actual case is being assigned by the argument structure. Case instead arises 'by elimination' from the ruling out of nominative, accusative, and either genitive or dative depending on the number of the noun. Hence, we are dealing with a special type of 'caseless PP construction' in which case emerges indirectly. This part of the analysis may seem controversial, but the alternatives are all problematic themselves: either the number feature of the object changes the case imposed by its governing construction, in direct opposition to the normal notion of case assignment (in general, and in German in particular); or we are dealing with a nominative/accusative object, a solution which will cause exactly the same problem

[23] The sense of 'unmk' is extended here to specifically exclude inflectional suffixes, and not just the absence of definiteness information as in van Eynde (2006). Alternatively it is possible to use a new value of MARKING to code exactly this sense. An anonymous reviewer has suggested that this feature, unlike van Eynde's and Sag's MARKINGs, would have to be housed in SYN|CAT|CASE and not in SYN in order to be allowed to determine case forms. That is however not the intention of the present analysis: 'unmk' is not a case value, but a morphological stipulation, much like weak/strong inflection marking. The argument of *voller* may receive any grammatical case not at odds with its CASE feature, but if this then leads to affixation (which depends on the gender and morphological class of the noun, not on case *per se*), the features clash and the form is ruled out.

[24] An alternative would be to postulate that *voller* itself saturates a determiner XARG of the noun, much like fused preposition + article forms of the type *zum* 'to the' < *zu+dem* (I thank Stefan Müller for commenting on this point). A problem with this analysis is that the resulting argument is not interpreted as definite: *voller Wasser* 'full of water' need not imply some specific quantity of water. It is nevertheless possible to adopt this analysis as a purely formal device, but bringing the construction in line with fused article forms seems to me to misrepresent the difference between the two cases.

once we introduce an adjective into the construction. In that case the existence of an NP internal modifier 'convinces' the governing construction to demand a different grammatical case based on the internal constituent structure of its object. The suggestion that *voller* assigns no exact case seems odd at first, but intuitively it is hard to say which case it governs otherwise, just as in the case of transparent nouns like *eine Menge Leute* 'a lot of people' and *Ende April* 'end of April' above. This also fits the intuitive explanation offered by forum participant J in Section 4.2 above to the effect that objects of *voller* are simply not declined. [25]

The final step of the analysis involves combining the noun with an NP internal adjective modifier, which is sketched out in Figure 7.

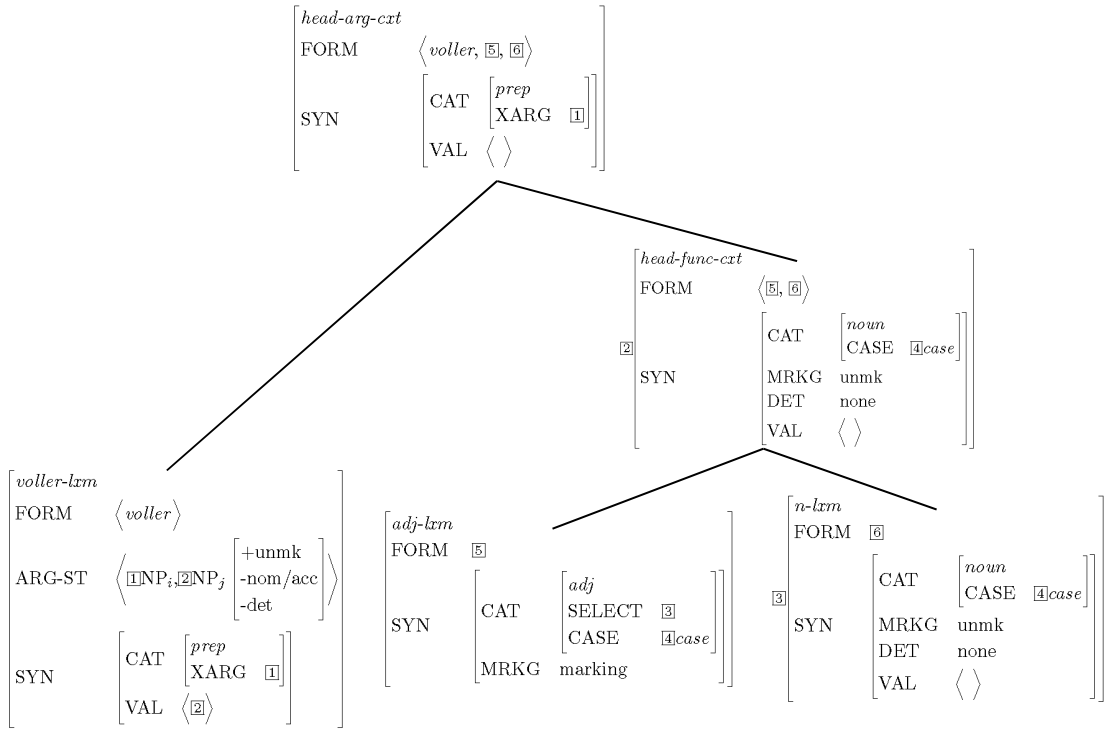


*Figure 7.* Fusion of *voller* and an NP argument with an adjective modifier.

The fusion of the adjective in *adj-lxm* causes the first major problem for *voller*, which may be seen as a reason for the lower acceptability of adjective modified arguments found in forum discussions and also the significantly lower frequency of adjectives as compared to semantically equivalent competitors in Section 4.2. An attributive adjective in a determinerless NP is forced to take one of the strong forms discussed above, which have an explicit case marked suffix; this is mirrored by the MRKG value 'marking'. An adjective's case must agree with that of its noun (the co-indexed value 4), and as it is no longer possible for there to be no case marking at all, a form must be found that accommodates both the need of the adjective for marking and the need of the noun for the lack of marking.[26] At the same time, the *voller* construction is incompatible with nominative and accusative forms, which were ruled out as a result of its inheritance from *nonlat-prep-lxm*. The only possible result

[25] In fact, though it seems possible that speakers have no idea of a specific case being in evidence after *voller*, in the formal representation case is already determined by the negotiation of constraints, at least for non-feminine singulars: the case is implicitly dative or genitive to avoid suffixation. In feminine singulars, dative and genitive both do not confer suffixes, meaning truly underspecified case is conceivable.

[26] There are sadly no cases of adjective-modified *n*-stem nouns; the analysis of syntactically determined case morphology drop found in Müller (2002) suggests that we can expect a prevalence of *n*-marking in such cases, since the adjective marking will correspond to a marking on the noun.

compatible with objects of all three genders is therefore dative in the singular and genitive in the plural, the distribution found in the overwhelming majority of cases.

As a final point for this analysis it is worth considering what happens in the unusual, minority cases. In those instances where a dative plural or genitive singular is marked on the noun as well, it seems reasonable to assume analogy to the other number category: speakers extend the case assignment inferred most often for plural or singular and apply it to singular or plural respectively. In these cases a usage-based account would postulate entrenchment of number-specific exemplars which are used as prototypes for a schema assigning specific case: *voller* comes to govern the dative or genitive consistently for some speakers. If a speaker varies between both models (variable assignment and analogical/consistent assignment), it may be said that the schemas compete for dominance. This account is probably uncontroversial from a usage-based perspective, but is harder to put into formal terms. In a formalism like SBCG, we will have to stipulate further constructions for each behavioral scenario in a somewhat ad hoc manner, but these would then be able to compete, e.g. in a probabilistic implementation of a grammar.

The more interesting cases are perhaps those of unusual inflectional classes, such as the *n*-stems and nominalized adjectives discussed in Section 4.1. In both cases, I do not believe that the variability in the data requires a different analysis than the one above as such. The nominative-like absence of *-n* in *voller Aberglaube* 'full of superstition' and *-r* in *voller Verrückte* 'full of crazy (people)' could be seen as a different interpretation of the generalization that the argument of *voller* should be 'unmarked' or suffixless. Some *-n* stems have generally developed alternative forms with -n (*Glaube(n)* 'belief, faith'), though in the nominative the contrast *-e*/*-en* is still used to distinguish number. It is also possible that a form like *Aberglaube* is preferred because it emphasizes the singular number of the argument ('full of superstition', as opposed to a plural number of 'superstitions'). For deadjectival nouns, the question may also be to what extent the argument lexeme is still processed as an adjective, as the overwhelmingly more common *-r* form implies that these continue to require morphological marking even after the nominalization process. In the present analysis these are seen as different views on what 'unmarked' means. Both of these classes of arguments deserve further study, though perhaps in experimental settings, seeing as they are produced so rarely even in large amounts of spontaneous corpus data.

## 6. Conclusion

This chapter has surveyed data on an unusual family of constructions in German, involving the word *voller* 'full of'. As it turns out, *voller* is most similar to a preposition, but has two anomalous properties with regard to the object it governs: it is incompatible with determiners of any kind, and it assigns a different grammatical case with differing frequency depending on properties of the object phrase itself: especially its number (dative singular vs. genitive plural) but to some extent also its morphological class and whether or not the head noun is modified by an adjective. We have seen both corpus data and introspective statements to the effect that adjectives do not 'sit well' in the construction, with some forms being clearly avoided. For example, even though non-feminine singular arguments are very frequent and compatible with a dative analysis for the most part, non-feminine nouns with dative adjectives are much rarer than they should be. This type of 'differential object marking' based on number is otherwise unknown in German and constitutes a substantial problem for traditional analyses of the Case Theory type. A constructional approach, by contrast, has fewer problems representing constructions with such a 'form' side, and a possible way of formalizing the analysis using the framework of SBCG has been suggested.

Section 4 above has also mentioned some other problematic German case phenomena briefly, which have been known for some time under the heading of *Gemeinschaftskasus* 'common case' or the term 'monoflexive', but have yet to receive sufficient attention from theoretical frameworks. These include especially the behavior of 'transparent nouns' or measure nouns for temporal and physical quantities. I believe that these cases all involve

reflexes of prototype based learning of constructions which, in a great majority of cases and in the absence of a determiner, do not mark any particular grammatical case on nouns. The behavior of both adult and child data in Section 4, and perhaps even more so the grammar forum discussions, suggest that speakers simply witness proportionally too many instances in which case is completely indiscernible to make a stable generalization of the type we might expect in a traditional analysis of the case-per-construction sort. Instead, case marking is only decided on once speakers are forced to choose a form, essentially almost only once adjectives come into play. The rest of the time, case marking is not required, and speakers presumably neither analyze it nor actively decide on it. They use the construction in a semantically appropriate way and use the generalization that the noun form should be its base form to generate output, which makes the construction productively available already to six-year-olds who have yet to master the case system of the language (Section 4.3).

As an explanation as to why usage consistently centers on the generalization 'dative singular : genitive plural', I have suggested that constraints imposed by the base-form nouns, strong adjective morphology and the semantics of case in German PPs coincide to produce a behavior which is reconcilable with the network of constructions available to the speaker. This type of analysis seems particularly suited to explaining why the accusative generalization is hardly ever made (though it is also in evidence in the data). At the same time, it is superior to saying simply that speakers acquire the dative singular / genitive plural split exclusively from the data (e.g. just by hearing some unambiguous singular and plural cases with adjectives), since it accounts for the fact that other forms are occasionally found in the data, for some of the introspective explanations found in grammar forums and for the fact that we see no diachronic trend for government to drift into the accusative form, despite the fact that this would make the construction simpler in a way that is consistent with most prototypes.[27] Additionally, there are quantitative reasons to prefer this analysis, such as the paucity of adjective modifiers as compared to alternatives such as *voll mit* and the much higher frequency of feminine singular objects with adjectives, for which dative and genitive inflection are identical. There are therefore some grounds to entertain the idea that there are non-case assigning or 'caseless' prepositional constructions in German, and this notion is both consistent with and can be analyzed by a constructional approach.

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[27] An anonymous reviewer remarks that the exact distribution of forms could very well be learnable from data alone using multifactorial methods. I fully agree that using enough data (including exceptional cases) a good approximation of speakers' behavior can be reached; the main issue from my point of view is that a coarse generalization compatible with the vast majority of data, i.e. a simple dative/genitive : singular/plural split, would have very good accuracy and still miss some important linguistic generalizations.

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