GERMAN QUANTIFIERS:
DETERMINERS OR ADJECTIVES?

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Abstract

In this paper, I address the categorial status of quantifiers and similar expressions in German. Traditionally, they are assigned either of two classes: determiners and adjectives. I argue that German quantifiers in principle are ambiguous and can be realized alternatively as determiners or adjectives. The categorial status is mirrored by the declension of attributive adjectives following these quantifiers. I present an LFG analysis that accounts for the categorial ambiguity. The analysis also covers multiple quantifiers.

1   Introduction

This paper discusses the categorial status of quantifiers and similar expressions in German, as exemplified in (1).

(1) a. Canonical quantifiers
       manche / viele / alle / zwei Frauen
       some   many   all   two women

   b. Definite and indefinite articles
       die / eine Frau
       the   a   woman

   c. Demonstrative, interrogative, and possessive determiners
       jene / welche / meine Frau
       that   which   my   woman

   d. Other quantifiers
       allerlei / solcherlei Leute
       various   such   people

In the remainder of this paper, I somewhat loosely use the term "quantifiers" to refer to the different kinds of expressions in (1).

The analysis presented here has been developed in the context of the Pargram Project (Butt et al., 2002) at the IMS Stuttgart. This project focuses on the c- and f-structural implementation of a German LFG grammar. Hence, what we are heading for is a *c-structural and f-structural analysis* of the quantifiers in the above examples that can serve as the base of a *robust and efficient implementation*.[1]

We will see below that German grammarians often assume that there are "determiner-like" and "adjective-like" quantifiers in German. In my analysis, I come to a similar conclusion in that I classify quantifiers as expressions of category D or A. The criteria that I apply in the classification, however, are different from the grammarians' criteria and, hence, quantifiers are grouped differently in my analysis.

The paper is organized as follows: In sec. 2, I survey the literature, focusing on categorial analyses of German quantifiers. I then introduce the notion of *declension* (sec. 3) and investigate this property with regard to our quantifiers (sec. 4). In sec. 5, I propose an analysis of German quantifiers, applying declension as the defining criterion for the categorial status D vs. A. Finally, I show how ambiguous and multiple quantiers are integrated in my analysis (sec. 6).

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[1]Further details on the implementation can be found in Dipper (2003), which includes all DP-relevant rules and lexicon entries of the implementation.

2   Previous Analyses of the German DP

In the literature outside of LFG, quite a lot of work can be found on DP analyses in general and the DP in German in particular (for the German DP, cf. Bhatt (1990); Netter (1994); Olsen (1991); Pafel (1994)). An issue that is often discussed in the literature is whether there is a full DP projection even if no specifier or determiner is overtly expressed, as in the case, e.g., of mass nouns or predicatives (cf. the discussion in Bhatt (1990, ch. 9)).

The question as to the categorial status of quantifiers in German is addressed rather rarely in formal analyses. In descriptive work, three types of quantifiers are usually distinguished: "Artikelwörter" (article words), e.g. *alle* 'all', "Zahladjektive" (numerals), and "indefinite Zahladjektive" (indefinite numeral adjectives), e.g. *viele* 'many' (e.g., Helbig and Buscha (1993, ch. 5)). If one wants to interpret this distinction in terms of categorial status, article words seem to correspond to expressions of category D, and numerals and indefinite numeral adjectives to expressions of category A. Then the question arises how to formally define the classes of article words vs. indefinite numeral adjectives.[2]

Often it is assumed (sometimes implicitly) that the following criteria indicate adjectival status: (i) modification by adverbs such as *sehr* 'very', which is typical of adjectives (assumed, e.g., by Bhatt (1990, p. 213ff)); (ii) co-occurrence with the definite article.[3]

Testing a first candidate, e.g., *mehrere* 'some', for the criteria above, the data show that *mehrere* neither cooccurs with the definite article, cf. (2), nor does it allow for modification by an adverb (3).

(2)   a. *mehrere Menschen*
          some   people

      b. * *die mehreren Menschen*
           the some   people

(3)   * *sehr mehrere Menschen*
           very some   people

In contrast to *mehrere*, *viele* 'many' is compatible with the definite article (4) and can be modified by an adverb (5).

(4)   a. *viele Menschen*
          many people

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[2]The classification of Eisenberg (1999) is somewhat different. Besides a highly restricted class of article words, he distinguishes between numerals, pronouns, and quantifying adjectives. In his approach, the question is how to tell pronouns from quantifying adjectives.

[3]For instance, Bhatt classifies quantifiers like *beide* 'beide' as an adjective in (ia) and as a determiner in (ib)—apparently based on the presence/absence of the definite article.

(i)   a. *die beiden jungen Frauen*
          the both   young women
          'both of the young women'

      b. *beide genannten Verfahren*
          both   mentioned methods
          'both methods mentioned'

b. *die vielen Menschen*
the many people
'the numerous people'

(5) *sehr viele Menschen*
very many people

Most of the quantifiers in German behave like *mehrere*, i.e. at first sight, the data seem to suggest that most of the quantifiers in German (including *mehrere*) are determiners, and that quantifying adjectives such as *viele* constitute an exceptional case.

However, the fact that a quantifier is incompatible with the definite article or with modifying adverbs may well be due to the semantics of the quantifier in question and need not be connected to its (syntactic) status as a determiner or adjective at all. Hence, the above criteria ought not to be applied to determine the categorial (adjectival) status of the quantifiers.[4]

In the context of LFG, details of the internal structure of nominal phrases are often left open. There is some literature about the analysis of the DP in Northern Germanic languages, cf. Börjars (1998); Börjars et al. (1999). They focus on the feature DEF, which in these languages can or must be expressed via a noun suffix.

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[4]Other properties that are attributed to quantifiers are:

1. They occur at the left periphery of the DP, cf. (i).

   (i) *die / alle / viele jungen Frauen*   vs.   * *jungen die / alle / viele Frauen*
        the   all   many young woman   young the   all   many woman

2. They "close" a DP, i.e., nouns that cannot represent a DP on their own form DPs when they are preceded by a quantifier, cf. (ii).

   (ii) * *Frau   lachte*   vs.   *die / welche / manche Frau   lachte*
         woman laughed   the   which   some   woman laughed

3. Semantically, they differ from (ordinary) adjectives in that they are not intersective, cf. (iii). Instead, they typically have little descriptive content and contribute information about the quantity or definiteness of the entities that are referred to by the head noun.

   (iii) a. *junge Frauen = λx [woman(x) & young(x)]*
             young women

          b. *alle / viele Frauen ≠ λx [woman(x) & all/many(x)]*
             all   many women

However, properties 1 and 3 do not help us in telling article words from indefinite numeral adjectives since all quantifiers behave uniformly in these respects. Property 2 clearly involves semantic properties of the DP's head noun and, moreover, does not hold for all quantifiers: due to their meaning, certain quantifiers cannot close arbitrary DPs but combine with mass or plural nouns only, compare (iva) and (ivb/c). Mass and plural nouns, however, can represent a DP on their own, in contrast to singular count nouns like *Frau* 'woman'.

(iv) a. * *einige Frau*
            some woman[SG]

      b. *einiges Geld*
         some   money[SG]

      c. *einige Frauen*
         many women[PL]

Among other things, this feature determines the declension of attributive adjectives within the DP: [DEF +] triggers so-called weak adjective agreement, [DEF −] triggers strong adjective agreement, cf. the Swedish example in (6).

(6) a. *en röd   bil*
    a   red[ST] car

   b. *den röda   bilen*
    this red[WK] car[DEF]

German, however, does not have a noun suffix that indicates definiteness. Furthermore, although German also has weak and strong adjective agreement, as we will see below, most (non-LFG) analyses of the German DP assume that definiteness plays no role in adjectival declension (for a different view, see Pafel (1994)). This is easily seen by the indefinite article *ein* 'a', which combines with strong or weak adjectival declension, depending on case, cf. (7).[5] So, clearly, the German DP differs from DPs in Northern Germanic languages in important aspects.

(7) a. *ein   süßer/*süße Wein*
    a   sweet   wine
    [NOM] [ST/*WK]

   b. *einem *süßem/süßen Wein*
    a   sweet   wine
    [DAT] [*ST/WK]

While in German, strong/weak adjective declension does not correlate with definiteness, I argue in the next sections that it mirrors the structure of a DP and, hence, can be used to determine the c-structural status of quantifiers.

3   Agreement Patterns in German

In a German DP, determiners, adjectives, and nouns show agreement relations with respect to different features. I distinguish two types of agreement: (i) adjective–noun and determiner–noun agreement, concerning the features gender, number, case; (ii) determiner–adjective agreement, concerning the strong-weak feature declension.

3.1   Adj–N and D–N agreement (gender, number, case)

In attributive position, a German adjective agrees in gender, number, and case with its head noun, cf. (8).[6]

(8) a. *süßer   Wein*
    sweet   wine
    [MASC,SG,NOM] [SG,NOM]

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[5]Below I classify the form *ein*, as in (7a), as uninflected rather than marked for case.

[6]German nouns are inherently/lexically marked for gender. Note that due to massive case syncretism, many of the nouns in the examples could be dative or accusative. I only mark the reading(s) that are valid in the given context.

b. *süßes*   *Bier*
   sweet   beer
   [NEUT,SG,NOM/ACC] [SG,NOM/ACC]

c. *süße*   *Weine*
   sweet   wines
   [PL,NOM/ACC] [PL,NOM/ACC]

Likewise, a determiner agrees with its head noun (and with attributive adjectives, if present), cf. (9).

(9) a. *der*   *Wein*
     the   wine
     [MASC,SG,NOM] [SG,NOM]

b. *das*   *Bier*
   the   beer
   [NEUT,SG,NOM/ACC] [SG,NOM/ACC]

3.2 D–Adj agreement (declension)

Besides gender, number, and case, a fourth parameter is involved, "declension". Both determiners and adjectives show declension, but in different ways.

Determiners   Determiners come in two declension types: they may be inflected or uninflected. Most determiners fall in one class only, i.e. they show declension in *all* cases, cf. (10), or they *never* inflect, cf. (11). Inflected determiners exhibit the so-called "strong" declension, indicated by 'ST' in the examples; the corresponding inflectional "strong" ending is printed in bold-face.[7] Uninflected determiners are marked by '∅'.[8]

(10) a. ***der***   / ***des***   / ***dem***   / ***den***   *Wein*
     the[NOM,ST] / [GEN,ST] / [DAT,ST] / [ACC,ST] wine

b. *jen**er***   / *jen**es***   / *jen**em*** / *jen**en***   *Wein*
   that[NOM,ST] / [GEN,ST] / [DAT,ST] / [ACC,ST] wine

(11)   *solcherlei Wein*
      such[∅]   wine

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[7]Traditional analysis assume that "weak" determiners exist as well, see fn. 11.
Note that a considerable number of quantifiers have an inflected as well as an uninflected variant, cf. (i). I consider these as two different lemmas, in contrast to, e.g., Pafel (1994). That is, I assume that declension type is an inherent property of determiners. However, the quantifier analysis argued for in this paper is compatible with the two-variant assumption as well.

(i) a. *manch**er***   / *manch**es*** / *manch**em*** / *manch**en*** *Wein*
     some[NOM,ST] / [GEN,ST] / [DAT,ST] / [ACC,ST] wine

b. *manch*   *Wein*
   some[∅] wine

[8]In the examples in this section, the head noun *Wein* 'wine' actually ought to be inflected in the genitive case: *Weins*. For ease of reading, I disregard this difference.

An exception are the indefinite article and possessive determiners: depending on case (and gender), they inflect or remain uninflected; compare the uninflected forms *ein*, *mein* in nominative singular with the other, inflected, cases (12).

(12) a. *ein* / *eines* / *einem* / *einen* Wein
       a[∅] / [GEN,ST] / [DAT,ST] / [ACC,ST] wine

   b. *mein* / *meines* / *meinem* / *meinen* Wein
       my[∅] / [GEN,ST] / [DAT,ST] / [ACC,ST] wine

The following table presents an overview of the three declension classes of determiners and their inflectional properties. All plural forms (column 'Pl') behave uniformly, whereas in the singular, case and gender matters for the "mixed" class (rows 'Nom, Gen, Dat, Acc' and columns 'Masc, Neut, Fem').

Class	Example		Sg	Pl
inflected	*der* 'the'		ST	ST
uninflected	*solcherlei* 'such'		∅	∅

			Masc	Neut	Fem	Pl
		Nom	∅	∅	ST	ST
"mixed"	*ein* 'a', *kein* 'no',	Gen	ST	ST	ST	ST
	mein 'my', etc.	Dat	ST	ST	ST	ST
		Acc	ST	∅	ST	ST

Adjectives   Similarly to determiners, attributive adjectives can be inflected or uninflected and, like for determiners, it is an inherent feature of adjectives what declension type they belong to.

However, in contrast to inflected determiners, which are always strong, inflected adjectives may be "strong" or "weak".[9] The declension (strong/weak) of an inflected adjective depends on the declension of its determiner, i.e., adjectival declension is an *agreement* phenomenon.

The tables below present all strong and weak adjectival endings. As can be seen from the tables, the endings *-er*, *-es*, and *-em* are clear indicators for strong declension; *-e* and *-en*, while predominantly weak, are ambiguous.[10]

		Masc Sg	Neut Sg	Fem Sg	Pl
	Nom	*-er*	*-es*	*-e*	*-e*
Strong:	Gen	*-en*	*-en*	*-er*	*-er*
	Dat	*-em*	*-em*	*-er*	*-en*
	Acc	*-en*	*-es*	*-e*	*-e*

		Masc Sg	Neut Sg	Fem Sg	Pl
	Nom	*-e*	*-e*	*-e*	*-en*
Weak:	Gen	*-en*	*-en*	*-en*	*-en*
	Dat	*-en*	*-en*	*-en*	*-en*
	Acc	*-en*	*-e*	*-e*	*-en*

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[9]Strong declension is also called "pronominal" declension, since it is similar to the declension of pronouns. Weak declension was restricted to nouns in older stages of the language, hence it is sometimes called "nominal" declension.

[10]In the plural, all genders exhibit identical inflection. Except for genitive singular, strong determiner endings are identical to strong adjectival endings.

Adjectival declension depends on the declension of a preceding determiner in the following way:

- If preceded by an inflected (= strong) determiner, the adjective comes in its so-called "weak" form, cf. (13).

  (13) a. *der   süße   Wein*
           the[ST] sweet[WK] wine   ([NOM])

       b. *einem süßen   Wein*
           a[ST] sweet[WK] wine   ([DAT])

  Multiple, successive adjectives show identical declension, cf. (14).

  (14) a. *der   süße   rote   Wein*
           the[ST] sweet[WK] red[WK] wine   ([NOM])

       b. *einem süßen   roten   Wein*
           a[ST] sweet[WK] red[WK] wine   ([DAT])

- If preceded by a non-inflected determiner or if no determiner is present, the adjective itself exhibits strong declension, cf. (15) and (16), respectively. (Note the similarity between the inflectional ending of the strong determiner in (13a) and the strong adjectives in (15) and (16).)

  (15) a. *solcherlei süßer   Wein*
           such[∅]   sweet[ST] wine   ([NOM])

       b. *ein süßer   roter   Wein*
           a[∅] sweet[ST] red[ST] wine   ([NOM])

  (16)   *süßer   Wein*
           sweet[ST] wine   ([NOM])

- Uninflected adjectives like *lila* 'purple' never inflect and are compatible with any declension type, cf. (17). They do not yield data relevant to our purposes and can be safely ignored.

  (17) a. *der   süße   lila   Wein*
           the[ST] sweet[WK] purple[∅] wine

       b. *ein süßer   lila   Wein*
           a[∅] sweet[ST] purple[∅] wine

       c. *süßer   lila   Wein*
           sweet[ST] purple[∅] wine

The following generalization emerges from the above data: In a DP, the feature "strong" is represented (i) on the head D if present and if inflected, (ii) on attributive adjectives otherwise (similarly assumed, e.g., by Bhatt (1990); Olsen (1991, ch. 9.4)). One important conclusion is: *Determiners and adjectives show complementary declension.*[11]

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[11]Consequently, attributive adjectives that follow the indefinite article or possessive determiners show a mixed declension: strong declension after (uninflected) *ein* 'a[∅]' (= MASC/NEUT,SG,NOM) and weak declension in all other cases, i.e. after *eines*

The table lists all possible combinations of declensions as predicted by the generalization:

Determiner	Adjective
strong	weak (or uninflected)
uninflected or no determiner	strong (or uninflected)

4   A New Criterion: Declension

The generalization presented in the previous section implies that a German DP can be partitioned according to declension, as shown in the tree in (18): the part above the dotted line belongs to the domain of D, the part below that line comprises adjectives and the head noun; the parts can be formally (i.e., by surface properties) identified by complementary declension.

(18)
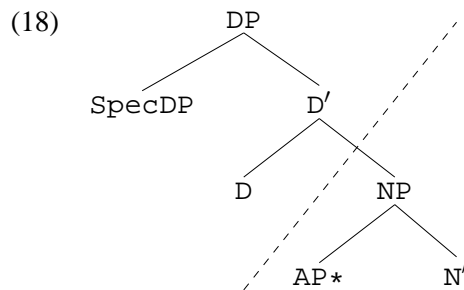
We now have a straightforward solution to our initial question as to how to identify the categorial status of quantifiers: by looking at their declensional properties. That is, we need to determine whether a quantifier parallels the declension of canonical determiners (such as the definite article) or whether it parallels the declension of ordinary adjectives. This is done by testing for the declension of a following attributive adjective. If the adjective shows the same declension as the quantifier in question (e.g., both show strong declension), then the quantifier is a quantifying adjective. Otherwise, if the adjective shows complementary declension, the quantifier must be a determiner.

The table summarizes the potential combinations of declension and the categorial status of the quantifier that emerges from the combinations.[12]

Quant candidate	Adjective	C-str class
strong	weak (or uninflected)	Dquant
strong	strong (or uninflected)	Aquant
uninflected	strong (or uninflected)	Dquant/Aquant

'a[MASC/NEUT,SG,GEN,ST]', *einem*, etc. Traditionally, this declension pattern is regarded as a declension type of its own, called "mixed declension" (see, e.g., Drosdowski (1995, p. 279) or Müller (1999, ch. 7.2)).

Authors who do not assume a mixed declension type fall in two classes: Some assume that (uninflected) *ein* (and *kein*, *mein*, etc.) are weak determiners (Pollard and Sag, 1994, ch. 2.2); others analyze *ein* as uninflected (Netter 1994) (as we shall do in our analysis). The first approach has the drawback that *ein* constitutes the only instance of a weak determiner, whereas within the second approach, *ein* behaves like any uninflected determiner.

[12]For uninflected quantifier candidates, nothing can be derived from this test: there are uninflected determiners as well as uninflected adjectives in German. Ordinary inflected adjectives that follow them have to exhibit strong declension in either case.

Applying this test, e.g., to corpus data of the quantifier *mehrere* 'some', reveals that *mehrere* behaves like an ordinary adjective in that it shows the same declension as a following adjective, cf. (19). Hence, *mehrere* is classified as a quantifying adjective and therefore analyzed as occupying an adjectival position, which I call the *Aquant* position.[13]

(19) *mehrere strittige   Punkte*
     some[ST] contestable[ST] points

In contrast, for the quantifier *alle* 'all' the test reveals that *alle* behaves like the canonical determiner *die* 'the': *alle* and the following adjective exhibit complementary declension, cf. (20). Hence, *alle* is classified as a determiner, occupying the *Dquant* position.

(20) *alle   politischen   Parteien*
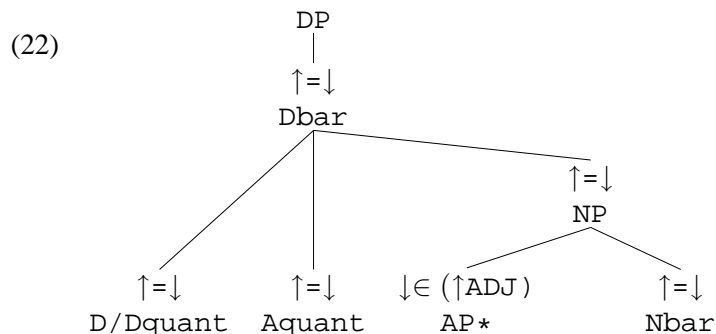   all[ST] political[WK] parties

5   Analysis

Having introduced the criteria as to how to determine the categorial status of quantifiers, I now present my c- and f-structure analysis of quantifiers in German.

Despite the variance in inflection, it seems sensible to represent quantifiers uniformly in f-structure, e.g., to facilitate subsequent semantic processing. That is, in my analysis a quantifier in the Aquant position— although inflecting like an ordinary adjective—functions as a specifier (contrary to ordinary adjectives). Hence, the c-structure distinction Dquant vs. Aquant does not correspond to an f-structure distinction.

Example lexicon entries for the canonical determiner *der* 'the', the Dquant determiner *alle* 'all', and the Aquant determiner *mehrere* 'some' are sketched out in (21).

(21) der   D   ($\uparrow$ SPEC DET PRED) = 'die'
      alle   Dquant   ($\uparrow$ SPEC QUANT PRED) = 'alle'
      mehrere Aquant   ($\uparrow$ SPEC QUANT PRED) = 'mehrere'

The schematic tree in (22), enriched by f-structure annotations, shows a slightly simplified version of my analysis.

(22)

```
                    DP
                    |
                   ↑=↓
                   Dbar
                  /    \
                 /      ↑=↓
                /       NP
               /       /  \
          ↑=↓    ↑=↓   ↓∈(↑ADJ)   ↑=↓
      D/Dquant  Aquant   AP*       Nbar
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[13]Remember that according to the "traditional" criteria, *mehrere* probably has to be classified as an article word, cf. examples (2) and (3) above.

Contrary to expectation, the c-structure position of Aquant—being an adjective according to its declensional behaviour—is not within the NP, in contrast to the position of ordinary adjectives. Instead, Aquant is dominated by DP, like determiners. There are two reasons for this: (i) Quantificational adjectives always precede all other adjectives; this is directly modeled by putting Aquant in the higher DP projection. (ii) More importantly, quantificational adjectives can be interrogative, cf. (23).

(23) *wieviele   deutsche   Aussiedler*
     how_many[ST] German[ST] emigrants

Treating *wieviele* as a quantifying adjective within NP would be in contrast to the generalization we otherwise observe: that the type of a DP is determined by elements of the D projection, never by some element within NP.[14]

Agreement with regard to declension is implemented by a feature DECL, which is projected by inflected expressions of category D, Dquant, Aquant, and A:

- D/Dquant vs. Aquant/A project incompatible feature values: ($\uparrow$ DECL) = ST-DET vs. ($\uparrow$ DECL) = ST-ADJ. This guarantees complementary declension of D/Dquant vs. Aquant/A.

- Weak Aquant/A introduce a constraining equation: ($\uparrow$ DECL) $=_c$ ST-DET. This has the desired effect that they may only occur after strong D/Dquant.

- Uninflected D, Dquant, Aquant, and A do not introduce any constraints on DECL, since they are compatible with any declension.

Outlines of example f-structures for (19) and (20) are displayed in (24) and (25), respectively.

$$(24) \begin{bmatrix} \text{PRED} & \text{`Punkt'} \\ \textbf{SPEC} & \begin{bmatrix} \textbf{QUANT} & \begin{bmatrix} \textbf{PRED} & \textbf{`mehrere'} \end{bmatrix} \end{bmatrix} \\ \text{ADJUNCT} & \left\{ \begin{bmatrix} \text{PRED} & \text{`strittig'} \end{bmatrix} \right\} \\ \textbf{DECL} & \textbf{st-adj} \\ \text{GEND} & \text{masc} \\ \text{NUM} & \text{pl} \\ \text{CASE} & \text{nom} \end{bmatrix}$$

$$(25) \begin{bmatrix} \text{PRED} & \text{`Partei'} \\ \textbf{SPEC} & \begin{bmatrix} \textbf{QUANT} & \begin{bmatrix} \textbf{PRED} & \textbf{`alle'} \end{bmatrix} \end{bmatrix} \\ \text{ADJUNCT} & \left\{ \begin{bmatrix} \text{PRED} & \text{`politisch'} \end{bmatrix} \right\} \\ \textbf{DECL} & \textbf{st-det} \\ \text{GEND} & \text{fem} \\ \text{NUM} & \text{pl} \\ \text{CASE} & \text{nom} \end{bmatrix}$$

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[14]Note that *wieviele* actually consists of two components: *wie* 'how' and *viele* 'many'. One could argue that the interrogative part *wie* is attached outside of NP while *viele* remains within the NP projection. However, *welche* 'which', which is not composed of such transparent components, can also be used as an interrogative Aquant.

6 Ambiguous and Multiple Quantifiers

In this section, I address two further aspects of quantifiers: (i) many quantifiers are ambiguous with regard to their categorial status; (ii) multiple quantifiers do occur in German.

6.1 Ambiguous quantifiers

In the preceding section, a clear line was drawn between determiners on one side and adjectives (including quantifying adjectives) on the other, based on inflectional properties. However, the borderline is not always that clear. Many quantifiers exhibit idiosyncratic declension.

Traditional grammars note that after certain quantifiers the declension of attributive adjectives varies. For example, quantifiers preceding weak adjectives (hence determiners, according to our analysis) comprise: *solche* 'such', *irgendwelche* 'any', and *manche* 'some'. But some of these expressions also tolerate strong adjectives (e.g. *irgendwelche*); some even prefer strong adjectives but only in plural forms (e.g. *manche*), etc.[15]

To get a clearer view of the data, I performed a corpus analysis on the Frankfurter Rundschau Corpus.[16] The tables below summarize the results I got from the FR corpus for a selection of quantifiers. The tables show the frequency of unambiguous instances for quantifiers; the first table lists expressions with predominantly determiner declension, the second lists expressions with predominantly adjectival declension.[17]

	Relative Frequency	Absolute Frequency
die 'the'	99.9 %	90,230
jede 'each'	99.8 %	2,087
diese 'this'	99.7 %	4,324
jene 'that'	98.9 %	369
welche 'which'	96.7 %	91
alle 'all'	95.8 %	1,781
wenige 'few'	92.5 %	721
manche 'some'	79.3 %	119

Quantifiers with predominantly determiner declension (D/Dquant)

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[15]Traditional grammars typically devote several sections to the problem of such idiosyncratic inflectional properties. Here is an example:

"[So wie nach dem definiten Artikel], aber mit bestimmten Einschränkungen werden die Adjektive flektiert nach den Artikelwörtern *mancher* (Plural überwiegend wie nach Nullartikel, *irgendwelcher* (durchgehend auch wie nach Nullartikel möglich), *solcher* (gelegentlich wie nach Nullartikel, nicht aber im Sg.Nom. und Akk. aller Genera und Gen.Mask. und Neutr.), *welcher* und *aller* (selten auch wie nach Nullartikel)." (Helbig and Buscha, 1993, p. 301)

Free translation: "After the following quantifiers, attributive adjectives show weak declension (with certain restrictions, listed in parentheses): *manche* 'some' (in plural predominantly strong), *irgendwelche* 'any' (strong declension equally possible), *solche* 'such' (sometimes strong, but not in [SG,NOM/ACC] and [MASC/NEUT,GEN]), *welche* 'which' and *alle* 'all' (rarely strong)."

[16]The FR corpus comprises about 40 million tokens and is delivered by the European Corpus Initiative, URL: `http://www.elsnet.org/resources/eciCorpus.html`.

[17]Due to case syncretism, only a subset of the corpus instances of a quantifier followed by an attributive adjective provide unambiguous evidence for determiner vs. adjectival declension. Only quantifiers with more than 50 unambiguous instances in the corpus were taken into account.

	Relative Frequency	Absolute Frequency
mehrere 'some'	98.0 %	50
einige 'some'	92.1 %	129
andere 'other'	91.2 %	249
viele 'much/many'	88.4 %	169
solche 'such'	60.4 %	81

Quantifiers with predominantly adjectival declension (Aquant)

Below we list some of the "counterexamples", i.e. examples exhibiting the unusual, more marked declension. The examples in (26) are at the margins of ungrammaticality; the examples in (27) are quite acceptable.

(26) a. *(*) bei jedem   mißglücktem Dribbling*
      on each[ST] bad[ST]   dribbling

   b. *(*) vor   diesem wirtschaftlichem Hintergrund*
      against this[ST] economic[ST]   background

   c. *(*) mit jenem   spektakulärem Triumph*
      with that[ST] spectacular[ST] triumph

   d. *(?) laut   mehrerer ärztlichen   Atteste*
      according_to several[ST] medical[WK] certificates

(27) a. *einiges   verschämte Kichern*
      some[ST] bashful[WK] giggling

   b. *(?) anderer hessischen Jugendzentren*
      other[ST] Hessian[WK] youth_centres

According to my analysis, (many of) the above quantifiers are ambiguous with respect to their categorial status. Hence, they are classified as both Dquant and Aquant in their lexicon entries. To encode idiosyncratic preferences, I use OT marks (Frank et al., 2001). An example entry is given in (28) for the quantifier *viele* 'many', which predominantly is an Aquant.

(28)   viele   Dquant   (↑ SPEC QUANT PRED) = 'viele'

               Aquant   (↑ SPEC QUANT PRED) = 'viele'
                           PreferVieleAsAquant ∈ o::*

6.2 Multiple quantifiers

Finally, the criterion proposed in sec. 4 reveals that multiple quantifiers do occur in German (also assumed by Bhatt (1990, p. 204ff) and Pafel (1994)). In DPs such as (29), both *alle* 'all' and *die* 'the' need to be classified as determiners due to their inflectional behaviour. Further examples are given in (30).

(29)   *alle   die   schönen Definitionen*
       all[ST] the[ST] nice[WK] definitions

(30) a. *alle   unsere schönen   Sprüche*
     all[ST] our[ST] pretty[WK] sayings

   b. *manch   einem wissenschaftlichen Assistenten*
      some[∅] (a[ST]) research[WK]   assistant

Only certain (probably semantically restricted) combinations of multiple determiners or determiners plus quantifying adjectives are grammatical in German. To avoid massive overgeneration, only quantifiers that are lexically assigned a specific category, Dpre ("predeterminers"), may precede other determiners in my implementation (i.e. the class of predeterminers is restricted c-structurally). In contrast, there is no restriction on multiple Aquants.

In f-structure, indefinite quantifiers project a set-valued feature QUANT, similar to the set-valued feature ADJUNCT, which is projected by (multiple) adjectives.

In contrast to the class of indefinite quantifiers, which can be iterated within in a DP, the definite and indefinite articles as well as other types of "quantifiers", such as demonstratives, interrogatives or possessives (see the examples in (1)), can occur only once within a DP. These quantifiers project specific, single-valued features such as DET, DEM, INT, or POSS in my analysis.

(32) displays an annotated c-structure analysis and the corresponding f-structure of the example in (31), featuring three quantifiers. Exemplary ϕ-projections are shown for the terminal node *all* and its mother node Dpre.

(31)   *all   die   vielen   Leute*
        all[∅] the[ST] many[WK] people
        'all these numerous people'

(32)
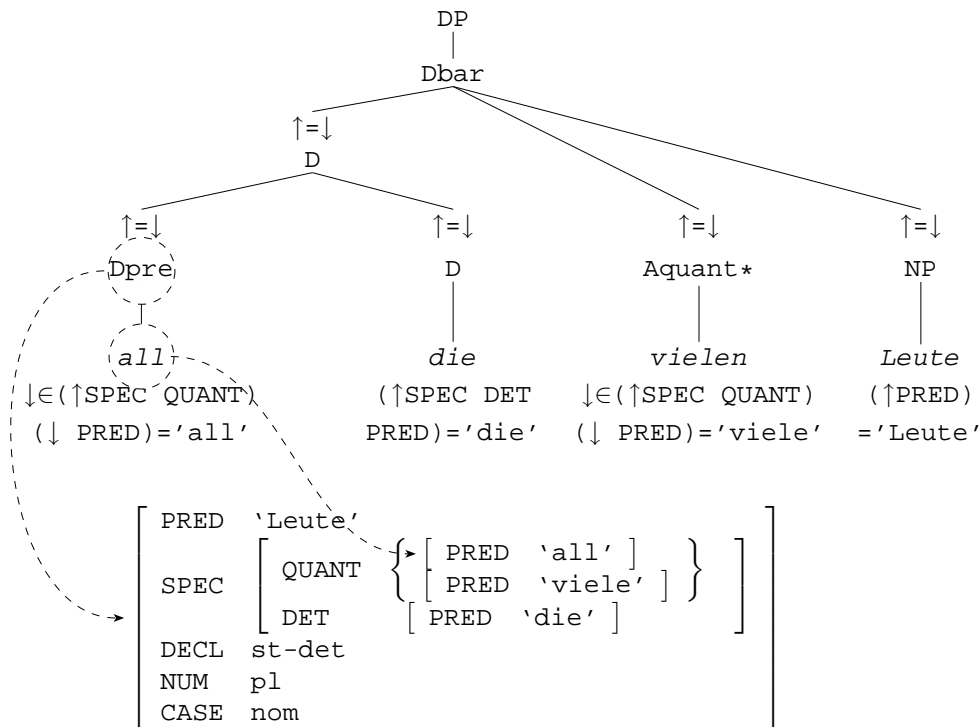
7 Conclusion and Open Questions

In this paper, I have argued for a formal, non-semantic criterion for distinguishing between determiner-like and adjectival quantifiers (and related expressions). I propose to determine the categorial status of quantifiers by *declension*: the quantifier either parallels the declension of an attributive adjective and is thus classified as a quantifying adjective. Or else, they show complementary declension, and thus the quantifier is classified as a determiner. The criterion also reveals that ambiguous and multiple quantifiers do occur in German.

In my implementation, I assume the category Dpre for predeterminers, D for canonical determiners, and Dquant and Aquant for determiner-like and adjectival quantifiers, respectively. These categories are dominated by DP and function as f-structure heads. Most of the quantifiers in German are ambiguous and are assigned both Dquant and Aquant in their lexicon entries. Idiosyncratic preferences are encoded by OT marks.

While the implementation presented here allows us to analyze ambiguous quantifiers, reasons for the observed ambiguous nature have still to be found. The rule of thumb that determiners have less descriptive content than adjectives does not carry over to Dquant vs. Aquant preferences of individual quantifiers. For instance, the descriptive content of the predominantly-Dquant quantifier *wenige* 'few' seems very similar to the predominantly-Aquant quantifer *viele* 'many/much'.

What my implementation does not account for is the fact that the idiosyncratic variance depends on case and number. For instance, *solche* 'such' sometimes inflects like a determiner but not in the cases of [SG,NOM/ACC] and [MACS/NEUT,GEN] (cf. fn. 15). Obviously the implementation does not model the variance in such detail. However, the factors that play a role in the observed variance are not yet understood; possibly phonetic factors are involved.

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