N + N Compounds in German: an Analysis within Role and Reference Grammar

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Abstract[9]

The aim of this paper is to analyze German N + N compounds consisting of nominal roots [hence N + N compounds] within the theory of Role and Reference Grammar [RRG] (Van Valin and LaPolla 1997, Van Valin 2005). The basis for this analysis of German N + N compounds is the Layered Structure of the Word [LSW] as developed in Nolan (2010). The LSW is analogous to the Layered Structure of the Clause [LSC] and the Layered Structure of the Noun Phrase [LSNP] as they are used in RRG. Besides the description of German N + N compounds, this paper investigates the role of the lexicon, the necessity of a semantic structure of lexemes - based on Pustejovsky's notion of qualia structures (Pustejovsky 1995) - and the use of inheritance hierarchies in a description of inflectional morphology and the use of interfixes. The paper also investigates the use of Constructional Schemas (CSs) as developed in Nolan (2010). These CSs are similar to the syntactic inventory in RRG. With help of CSs, which are part of the semantic representations of lexemes partially based on Pustejovsky's qualia structures, it will be possible to show how lexical entries for nouns are constructed. These lexical entries are stored in the lexeme store, which is part of the lexicon. The paper will show that the analysis of German N + N compounds based on the use of the LSW is compatible with the RRG-conception of the LSC and the LSNP.

1.0 Introduction

This paper has several goals. First, to give a detailed description of N + N compounds with nominal roots in German and second, to introduce a morphological theory for RRG based on this analysis. This work is based on Nolan's morphological analysis of the LSW of the Modern Irish word (Nolan 2010). I will propose situating the LSW within an RRG setting and motivate this by reference to N + N compounds in German and the processes which operate on them. When characterizing German N + N compounds I will constitute the part of RRG which is concerned with morphology and its relationship to the lexicon, thereby extending RRG to include a morphological part. The theory of RRG can be found in Van Valin and LaPolla (1997) and Van Valin (2005). here, the notion of the LSW and the LSNP are described in detail. Also, qualia theory is introduced (cf. Van Valin 2005: 51ff).

Throughout this paper I will assume that roots can have syntactic categories and that they are stored underspecified in the lexicon. I also assume that German N + N compounds basically consist of roots which are compounded. While the first argument constituent cannot bear any inflection, the head of a compound can have inflection. This is explained in detail in section 2.

This paper will basically deal with German compounds consisting of two constituents - although in German, N* compounds of infinite length are possible in general. The paper is organized as follows: In section 2 I will give a detailed description of German declension classes and the mechanisms of noun compounding in German. I will then concentrate on German N + N compounds. In the following, I will describe how noun inflection in German works and introduce the notion of compound markers based on Ralli (2008). In section 3 I

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will develop CSs for German N + N compounds and introduce a semantic description for nouns based on Pustejovsky's qualia theory (Pustejovsky 1995). I will also construct lexical entries for German nouns based on qualia theory and show how compounding operates on this semantic level. I will introduce inheritance mechanisms which explain how noun inflection operates in German. In section 4, the notion of LSW is introduced and a description of the LSW of German N + N compounds is given. Section 5 contains a summary of the paper's results.

2.0 Case Marking in German

German is a dependent marking language with a nominative-accusative case system. The German language has the cases nominative, genitive, dative and accusative. Case marking in German is realized with the help of articles. Additionally, inflection is used to mark case assignment. German has thirteen declension classes with three subclasses. An overview of these declension classes is given in table 2.0.1 – 2.0.13. German has a definite and an indefinite article. With respect to the indefinite article it shows inflection, too. German has a system of three genders: masculine, feminine and neuter and the two numbers singular and plural.

Table 2.0.1 declension class A

Case	class A (masc)	translation
nominative singular	der Fisch-Ø	fish
gentive singular	des Fisch-(e)s	fish
dative singular	dem Fisch-e	fish
accusative singular	den Fisch-Ø	fish
nominative plural	die Fisch-e	fishs
genitive plural	der Fisch-e	fishs
dative plural	den Fisch-en	fishs
accusative plural	die Fisch-e	fishs

(cf. Simmler 1998: 218)

Table 2.0.2 declension class B

Case	class B (fem)	translation
nominative singular	die Trübsal-Ø	misery
genitive singular	der Trübsal-Ø	misery
dative singular	der Trübsal-Ø	misery
accusative singular	die Trübsal-Ø	misery
nominative plural	die Trübsal-e	miseries
genitive plural	der Trübsal-e	miseries
dative plural	den Trübsal-en	miseries
accusative plural	die Trübsal-e	miseries

(cf. Simmler 1998: 218)

Table 2.0.3 declension class C

Case	Class C (neut)	translation
nominative singular	das Brett-Ø	plank
genitive singular	des Brett-es	plank
dative singular	dem Brett-e	plank
accusative singular	das Brett-Ø	plank
nominative plural	die Brett-er	planks
genitive plural	der Brett-er	planks
dative plural	den Brett-ern	planks
accusative plural	die Brett-er	planks

(cf. Simmler 1998: 218)

Table 2.0.4 declension class D

Case	Class D (neut)	translation
nominative singular	das Mittel-Ø	agent
genitive singular	des Mittel-s	agent
dative singular	dem Mittel-Ø	agent
accusative singular	das Mittel-Ø	agent
nominative plural	die Mittel-Ø	agents
genitive plural	der Mittel-Ø	agents
dative plural	den Mittel-n	agents
accusative plural	die Mittel-Ø	agents

(cf. Simmler 1998: 218)

Table 2.0.5 declension class E

Case	Class E (masc)	translation
nominative singular	der Besen-Ø	broom
genitive singular	des Besen-s	broom
dative singular	dem Besen-Ø	broom
accusative singular	den Besen-Ø	broom
nominative plural	die Besen-Ø	brooms
genitive plural	der Besen-Ø	brooms
dative plural	den Besen-Ø	brooms
accusative plural	die Besen-Ø	brooms

(cf. Simmler 1998: 218)

Table 2.0.6 declension class F

case	class F (fem)	translation
nominative singular	die Mutter-Ø	mother
genitive singular	der Mutter-Ø	mother
dative singular	der Mutter-Ø	mother
accusative singular	die Mutter-Ø	mother
nominative plural	die Mütter-Ø	mothers
genitive plural	der Mütter-Ø	mothers
dative plural	den Mütter-n	mothers
accusative plural	die Mütter-Ø	mothers

(cf. Simmler 1998: 218)

Table 2.0.7 declension class G

Case	Class G (masc)	translation
nominative singular	der Uhu-Ø	eagle owl
genitive singular	des Uhu-s	eagle owl
dative singular	dem Uhu-Ø	eagle owl
accusative singular	den Uhu-Ø	eagle owl
nominative plural	die Uhu-s	eagle owls
genitive plural	der Uhu-s	eagle owls
dative plural	den Uhu-s	eagle owls
accusative plural	die Uhu-s	eagle owls

(cf. Simmler 1998: 218)

Table 2.0.8 declension class H

Case	Class H (fem)	translation
nominative singular	die Mutti-Ø	mom
genitive singular	der Mutti-Ø	mom
dative singular	der Mutti-Ø	mom
accusative singular	die Mutti-Ø	mom
nominative plural	die Mutti-s	moms
genitive plural	der Mutti-s	moms
dative plural	den Mutti-s	moms
accusative plural	die Muti-s	moms

(cf. Simmler 1998: 218)

Table 2.0.9 declension class I

Case	Class I (fem)	translation
nominative singular	die Frau-Ø	woman
genitive singular	der Frau-Ø	woman
dative singular	der Frau-Ø	woman
accusative singular	die Frau-Ø	woman
nominative plural	die Frau-en	woman
genitive plural	der Frau-en	woman
dative plural	den Frau-en	woman
accusative plural	die Frau-en	woman

(cf. Simmler 1998: 218)

Table 2.0.10 declension class J

Case	Class J (masc)	translation
nominative singular	der Mensch-Ø	human
genitive singular	des Mensch-en	human
dative singular	dem Mensch-en	human
accusative singular	den Mensch-en	human
nominative plural	die Mensch-en	humans
genitive plural	der Mensch-en	humans
dative plural	den Mensch-en	humans
accusative plural	die Mensch-en	humans

(cf. Simmler 1998: 218)

Table 2.0.11 declension class K

Case	Class K (masc)	translation
nominative singular	der Staat-Ø	state
genitive singular	des Staat-es	state
dative singular	dem Staat-Ø	state
accusative singular	den Staat-Ø	state
nominative plural	die Staat-en	states
genitive plural	der Staat-en	states
dative plural	den Staat-en	states
accusative plural	die Staat-en	states

(cf. Simmler 1998: 218)

Table 2.0.12 declension class L

Case	Class L (masc)	translation
nominative singular	der See-Ø	lake
genitive singular	des See-s	lake
dative singular	dem See-Ø	lake
accusative singular	den See-Ø	lake
nominative plural	die See-n	lakes
genitive plural	der See-n	lakes
dative plural	den See-n	lakes
accusative plural	die See-n	lakes

(cf. Simmler 1998: 218)

2.0.13 declension class M

Case	Class M (masc)	translation
nominative singular	das Herz-Ø	heart
genitive singular	des Herz-ens	heart
dative singular	dem Herz-en	heart
accusative singular	das Herz-Ø	heart
nominative plural	die Herz-en	hearts
genitive plural	der Herz-en	hearts
dative plural	den Herz-en	hearts
accusative plural	die Herz-en	hearts

(cf. Simmler 1998: 218)

An overview of the declension of the indefinite article is given in the following table:

Case	masculine	translation	feminine	translation	neuter	translation
nom sg	ein-Ø Besen	broom	ein-e Frau-Ø	woman	ein-Ø Haus-Ø	house
gen sg	ein-es Besen-s	broom	ein-er Frau-Ø	woman	ein-es Haus-es	house
dat sg	ein-em Besen-Ø	broom	ein-er Frau-Ø	woman	ein-em Haus-Ø	house
acc sg	ein-en Besen-Ø	broom	ein-e Frau-Ø	woman	ein-Ø Haus-Ø	house

There are no declension classes for the indefinite article in German. However, the declension of the indefinite article is different for the three genders masculine, feminine and neuter. In the plural, the indefinite article is not assigned.

The classification of subclasses within a declension class is based on secondary criteria which take the following factors into consideration: first, the number of base morphemes is relevant, second, the internal phonological structure of the morphemes plays a role. Subclass (a) contains nouns with one single base morpheme. Subclass (b) contains nouns with a lenisfortis opposition and subclass (c) contains nouns with two base morphemes and a vowelumlaut alternation (cf. Simmler 1998: 216). Examples of the three subclasses are given in (2.0.14).

Table 2.0.14 subclass (a)

Subgroup	gender	A	C	K
1. base morpheme with final /t/, /s/, /š/	mask	Laut 'sound' Riss 'cleft, Fisch 'fish', Boot 'boat', Maß 'degree'	Geist 'ghost', Brett 'plank'	Staat 'state', Schmerz 'pain', Bett 'bed'
2. bas emorpheme with different final phonemes	neut	Aal 'eel', Jahr 'year'	Ei 'egg'	Fleck 'blotch', Ohr 'ear'
1. base morpheme with final /ə/, /əl/, /ər/		Gabe 'gift', Schatel 'box', Feder 'feather'	Hase 'rabbit'	
2. base morpheme with different final phonemes		Frau 'woman'	Mensch 'human'	

(cf. Simmler 1998: 219)

Table 2.0.15 subclass (b)

Subgroup	gender	A	C
1. /d/: /t/	m n	Grad 'degree' Pfund 'pound'	 Bild 'picture'
2. /b/: /p/	m n	Dieb 'thief'	Leib 'body'
3. /g/: /k/	m n	Tag 'day'	
4 /z/: /s/	m n	Greis 'old man' Gas 'gas'	

(cf. Simmler 1998: 220)

Table 2.0.16 subclass (c)

Subgroup	A 2 base morphemes	B 2 base morphemes	C 2 base morphemes	D 2 base morphemes	E 2 base morphemes	F 2 base morphemes
1. /a/: /ɛ/	Ball (m) 'ball'	Kraft (f) 'power'	Mann (m) 'man' Amt (n) 'agency'	Apfel (m) 'apple'	Garten (m) 'garden'	-
2. /a:/: /ä:/	Bart (m) 'beard'	Naht (f) 'seam'	Bad (n) 'bath'	Nagel (m) 'nail'	Faden (m) 'wire'	-
3. /o/: /ö/	Bock (m) 'buck'	-	Gott (m) 'god' Dorf (n) 'village'	-	-	Tochter (f) 'daughter'
4. /o:/: /ö:/	Sohn (m) 'son' Floss (n) 'raft'	Not (f) 'emergency'	-	Vogel (m) 'bird' Kloster (n) 'monastery'	Boden (m) 'ground	-
5. /u/: /ü/	Fuchs (m) 'fox'	Frucht (f) 'fruit)	Wurm (m) 'worm'	-	-	Mutter (f) 'mother'
6. /u:/: /ü:/	Hut (m) 'hat'	Schnur (f) 'string'	Buch (n) 'book'	Bruder (m) 'brother'	-	-
7. /ao/: /oi/	Traun (m) 'dream	Maus (f) 'mouse'	Kraut (n) 'herb'	-	-	-

(cf. Simmler 1998: 221)

The classification into thirteen different declension classes will be relevant for the development of inheritance mechanisms describing noun inflection in German and also for the design of the morpheme store which I will refer to later in this paper.

2.2 Gender in German: How to evaluate the gender of a German noun

The assignment of gender in German is a very arbitrary process. However, some regularities can be found. These regularities are described in table 2.2.1.

Table 2.2.1 Assignment of gender in German

masculine	translation	feminine	translation	neuter	translation
masculine persons der Mann	man	feminine persons die Frau	woman	letters das A	A
seasons der Frühling	spring	numbers used as nouns die Eins	one	nouns ending in -*lein* das Fräulein	miss
days der Montag	Monday	nouns ending in -*ung* die Endung	ending	nouns ending in *chen* das Mädchen	girl
month der Januar	january	nouns ending in -*schaft* die Mannschaft	team	nouns ending in -*ment* das Experiment	experiment
precipitations der Regen	rain	nouns ending in -*ion* die Diskussion	discussion	nouns ending in- *ma* das Thema	the topic
nouns ending in *ling* der Schmetterling	butterfly	nouns ending in-*heit* die Freiheit	freedom	nouns convered from verbs das Laufen	the run
nouns ending in *ich* der Teppich	carpet	nouns ending in -*keit* die Heiterkeit	amusement	nouns from English verbs ending in -*ing* das Timing	the timing
nouns ending in *ig* der Honig	honey	nouns ending in-*tät* die Identität	identity	Nouns conversed form adjectives das Neue	the new
		nouns ending in-*ik* die Musik	music		

2.3 Compounding in German: types of compounds with noun heads in German

The parts of speech [POS] in German are: noun, verb, adjective, adverb, preposition, pronoun, conjunction and interjection. Based on these eight POS it is possible to identify eight combination types of German compounds with a noun head (cf. Simmler 1998: 367):

morphological structure   lexemes   morphological connection type

(2.3.1)

a.	die Haustür the front door	das Haus, die Tür the house, the door	noun + noun = noun
b.	das Waschbecken the lavatory	inf waschen, das Becken inf wash, the bowl	verb + noun = noun
c.	das Hochhaus the multistory building	pred adj hoch, das Haus pred adj high, the house	adj + noun = noun
d.	die Auffahrt the driveway	prep auf, die Fahrt prep on, the drive	prep + noun = noun
e.	der Selbstzweck the self purpose	pron selbst, der Zweck pron self, the purpose	pron + noun = noun
f.	der Oder-operator the or-operator	konj oder, der Operator konj or, the Operator	konj + noun = noun
g.	das Aha-Erlebnis the aha experience	interj aha, das Erlebnis interj aha, the experience	interj + noun = noun
h.	der Innenraum the interior	adv innen, der Raum adv inner, the room	adv + noun = noun

(cf. Simmler 1998: 367)

Examples in (2.3.1) show the second constituent in a German compound determines the POS of the compound. In addition, the second constituent determines the gender of the compound, as can best be seen in example (2.3.1a). *Die Haustüre* 'the front door' is a compound of the constituents *das Haus* 'house', which has neuter gender, and *die Tür* 'the door', which has feminine gender. The gender of *die Haustüre* 'the front door' is feminine, so the compound takes on the gender of the second constituent of the whole compound. An example of a compound consisting of a constituent in neuter gender and one in masculine gender is *der Buchrücken* 'back of a book', consisting of the constituents *das Buch* 'book' in neuter gender and of *der Rücken* 'back' in masculine gender. The compound *der Buchrücken* 'back of a book' has masculine gender, like its second constituent *der Rücken* 'back'.

In this context Simmler mentions that the first constituent in N + N compounds shows no ability to bear an article. Also, the first constituent in such a compound is not inflected and has no paradigmatic structure. Normally the first constituent in a German N + N compound does not bear inflection (cf. Simmler 1998: 364). These findings indicate that German N + N compounds are right-branching and the head of the N + N compound is found on the right hand side of the compound.

2.4 Interpretation of interfixes in German compounds

Following Gallmann (1998), morphemes which are the head of a compound have special morphosyntactic properties. These properties are case, number and gender. There are two different morphosyntactic licensing features. These features are either internal or external (cf. Gallmann 1998: 2). Internal features are licensed by the feature bearing morpheme itself. An example for such an internal feature is gender, which is a purely internal licensed feature as this feature is never assigned based on syntactic relations. An example for an externally licensed morphosyntactic feature is case, since this feature is assigned by the morphosyntactic function of the noun. If in German a noun is the subject of a clause it always

has nominative case. If it is a direct or indirect object it has one of the oblique cases like genitive, dative or accusative.

Concerning number there is an internal and an external feature licensing. In pluralia tantums plural is an internal licensed feature. Examples for these are *die Ferien* 'vacation', *die Trümmer* 'ruins' and *die Abruzzen* 'Abruzzoes' (cf. Gallmann 1998: 3). However, external licensing is also possible, as in example (2.4.1).

(2.4.1) Mulder und Scully   sind   FBI-Agenten.
        Mulder and Scully   be.pl.PRES   FBI-agents.
        'Mulder and Scully are FBI-agents'

In (2.4.1) plural is an externally licensed morphosyntactic feature since it is licensed by the use of the two NPs 'Mulder' and 'Scully' and by the use of the plural form of the copula.

In German, constituents of morphological complex word forms can show morphosyntactic features, too. However, there are two constraints on these complex word forms: Within a complex word form there is no external licensing of morphosyntactic features. This means in such a construction it is not possible for the head to license a feature of the non-head and for the non-head it is not possible to license morphosyntactic features of the head. A non-head cannot project morphosyntactic features on the whole complex word form or compound. It is also not possible for a compound to percolate features of the whole word form on the non-head (cf. Gallmann 1998: 3).

(2.4.2)
a.   Mulder   iss-t   den   Rind-er-braten.
            Mulder   eat-3sgPRES   the.MsgACC   roast beef
            'Mulder eats the roast beef'
b.   Mulder   iss-t   die   Rind-er-braten.
            Mulder   eat-3sgPRES   the.MplACC   roast beefs
            'Mulder eats the roast beefs.'

As can be seen in example (2.4.1) the non-head *die Rinder* 'beefs' does not transfer its seemingly plural number to the whole compound *der Rinderbraten* 'roast beef'. These features indicate two different interpretations: first, the non-head does not transfer its features to the head of the head or the compound as a whole, but is still a plural marker. The second interpretation is that the plural marker *–er* in *der Rinderbraten* 'roast beef' is not a plural marker at all. In this case, one would talk of an interfix. The second interpretation seems reasonable from an epistemic point of view, too, since a roast beef does not consist of several beefs but of only one single beef.

However, the analysis of interfixes in German is not as straight forward as it seems. There are different interfixes in German, some of which appear to be plural markers, as in example (2.4.2), and some of which appear to be genitive markers. This is the case in the following example (2.4.3):

(2.4.3)
Apollo   mach-t   ein-e   Tag-es-reise.
Apollo   make-3sg.PRES   a.Fsg.ACC   day-interfix-journey
'Apollo does a day's journey.'

In (2.4.3) it is possible to interpret the *–es* in *die Tagesreise* 'day's journey' as either an interfix or a genitive marker. As example (2.4.4) shows, it is possible to paraphrase the compound *die Tagesreise* 'day's journery' (it is not important that the dative case is used instead of the genitive).

(2.4.4)

Starbuck	mach-t	ein-e	Reise	von	ein-em	Tag
Starbuck	make3sg.PRES	a.FsgACC	journey	of	a.MsgDAT	day

'Starbuck does a journey of a day'

Example (2.4.4) could indicate that the *–es* in *die Tagesreise* 'day's journey' is a genitive, as it could be paraphrased as in (2.4.4), but there are also cases of interfixes used in a compound which are no grammatical genitive marker in German. This is the case in *der Schmerzensschrei* 'cry of pain', consisting of the elements *der Schmerz* 'cry' the interfix *–ens*, which is not a case marker in German, and *der Schrei* 'cry'. One other fact indicating the morpheme used in such a compound is not a case marker is that there are compounds in German with the same non-head but with different interfixes:

(2.4.4)
a.   Tag- esreise
        day-interix   journey
        ,day`s journey'
b.   Tag-e   werk
        day-interfix   task
        daily task
c.   Schmerz-ens   geld
        pain-interfix   money
        'damages'
d.   Schmerz   patient
        pain   patient
        pain patient

There are several interpretations of the use of interfixes in German. Simmler (1998) suggests that some interfixes are frozen genitive or plural forms and belong to a younger class of compounds in German. The other interpretation is that interfixes are used to ease pronunciation. However, this analysis is quite controversial.

Löbner (personal communication) holds the view that interfixes have neither lexical meaning nor grammatical function. Following Löbner, there are slots in the lexical entry of the noun which indicate the lexeme, when used in a compound, needs the compound form of it.

Gibbon takes a point of view similar to Löbner (cf. Gibbon 1992). He claims interfixes are morphologically relevant in composition rather than being conditioned phonologically, as Simmler (1998) suggests (cf. Gibbon 1992). Gibbon differentiates the following basic types of interfixes in German: zero-interfixes, as in der Schmerzpatient 'pain patient', regular /s/ or /es/ genitive of masculine or neuter argument constituents, as in *das Mannsbild* 'man' - consisting of the elements der Mann 'man', the interfix /s/ and the head *das Bild* 'picture'. The third class of interfixes seems like a regular plural, as /er/ in *der Rinderbraten* 'roast beef' or in *der Frauenchor* 'female choir' - consisting of the elements *die Frau* 'woman', the

interfix /en/ and *der Chor* 'choir' (cf. Gibbon 1992: 44f). There are a few exceptions with respect to interfixes which need to be specified, like the /ens/ in der Schmerzensschrei /cry of pain/. In general I will adopt Gibbons position but I will not assume zero-interfixes.

In her typological analysis of interfixes, Ralli (2008) suggests interpreting interfixes as compound markers. She has analyzed several languages, for example Modern Greek, and notices that the interfix /o/ is used as default in all compounds. However, if the initial phone of the second constituent is one of the following vowels the interfix is not inserted:

(2.4.5)   a´ >>> a >>> é >>> e >>> ó >>> o >>> í >>> i >>> ú >>> u
                (Ralli 2008: 3)

(2.4.6)
    a.   agriánthropos <   agri-   ánthropos
            wild man   wild   man
            *agri-o-ánthropos
    b.   ladémboros   <   lad-   émboros
            oil merchand   oil   merchand
            *lad-o-émboros

            (Ralli 2008: 3)

Based on her typological research Ralli suggests that fusional languages with an overt paradigmatic inflection bear what she calls compound markers (Ralli 2008: 5). Agglutinating languages such as Turkish do have compound markers, too, but these compound markers do not appear between the compound but as suffix of the second constituent of the compound:

(2.4.7)
    a.   okul kitab-ı   <   okul   kitap
            locust (tree)   goat   horn
    b.   keçibonynuz-u<   keçi   boynuz
            school book   school   book
    c.   anadil-I   <   ana   dil
            mother tongue   mother   tongue
    d.   taşk^mür-ü   <   taş   k^mür
            carbone stone   stone   carbone
        (Ralli 2008: 12)

Due to the fact that there is no consistent way to determine if interfixes have a grammatical function or not, Ralli calls these elements compound markers with the function of marking compounds. She sums up her analysis with the following observations: an overtly realized paradigmatic inflection triggers the presence or absence of the marker, depending on the case. If a stem based compounding is found, then it is related to the systematic form of a compound marker, while word-based compounding triggers form variation and the absence of a systematic pattern (Ralli 2008: 15).

With respect to an RRG-based analysis of N + N compounds in German I will adopt both Ralli's position that interfixes are in fact compound markers as well as Gibbon's (1992) and Löbner's (p.c) position that such compound markers only have morphological function, but neither semantic meaning nor phonological function (cf. Gibbon 1992: 44).

3.0 Development of Constructional Schemas

In this section I will develop Constructional Schemas [CSs] for German N + N compounds and introduce a semantic description for nouns based on Pustejovsky's qualia theory (Pustejovsky 1995). I will also construct lexical entries for German nouns based on qualia theory and show how compounding operates on this semantic level. I will introduce inheritance mechanisms which explain how noun inflection operates in German.

The development of CSs is based on Nolan's approach for CSs in Modern Irish (cf. Nolan 2010: 4). Following Nolan, derivation of a category is regarded to be a morphological construction device. It provides the POS-category type of the word it creates. For composition this means it has an input and an output. Lexemes and derived lexemes as compounds have semantics. These semantics are recorded in the lexical entry of the lexeme and are connected to the linking system of RRG. For composition the assumption is that each lexeme has a structure where the two input lexemes are morphologically fused to produce a new lexeme as output. In general, derivation creates new lexemes. Usually in German the head of a compound determines the POS of the whole compound. This was already shown in section 2. Inflection on the other hand creates different forms of the same lexeme for grammatical purposes (cf. Nolan 2010: 3). In German these are case, gender, agreement and number. With regard to N + N compounds, these grammatical purposes are case, gender and number. As explained in section 2, the grammatical form of the head determines the form of the whole compound. Nolan proposes the following assumptions regarding derivational morphology which are also true for composition:

(3.0.1)
1. The derivational category affix may be considered as a construction that contains skeletal structure (a 'slot') for an input lexeme in a sort changing derivation. By sort changing we mean that the 'part of speech' is usually changed from one category *type* to another.
2. Derivation operates over one argument 'slot' per derivation, while allowing for multiple derivations.
3. Compounds can be treated as equivalent to derivation (including both endocentric and exocentric compounds)
4. A general working assumption is that affixes that are not inflectional must be derivational.
(Nolan 2010: 4)

CSs as developed in Nolan (2010: 4) have the following form:

(3.0.2)
$$[\alpha_{argument\_lexeme}] \oplus [\beta_{category\_lexeme}]\varphi_{Type}$$
(Nolan 2010: 4)

In the CS in (3.0.2) the symbol $\oplus$ is used to denote some morphological template with the function of changing the type of the lexeme input as an argument to a specific type. This morphological CS takes two lexemes as input and produces a new compound lexeme with typically a new category type as output. In this framework a lexeme is a morpheme that is semantically meaningful. It has a lexical entry which uses a morphologically relevant version of a logical structure. It is represented with the use of qualia structures (cf. Nolan 2010: 4).

The first input argument lexeme [$\alpha_{argument\_lexeme}$] may occur in pre- or –post position, in fact in any affix position possible in the language under study. The operator $\oplus$ in the CS in (3.0.2) represents the morphological fusion of the input argument with the category lexeme. This yields a composed output lexeme as a type (cf. Nolan 2010: 4).

From a cross-linguistic viewpoint both derivational and inflectional affixes are applied according to a fixed order where the attachment order is significant (cf. Nolan 2010: 4). In (3.0.3) a generalized representation is given:

(3.0.3)
    a. Derivation: [prefix-lexeme$_1$-[[[ROOT]-suffix-lexeme$_1$]-suffix-lexeme$_2$]]
    b. Inflection: [prefix-morpheme$_1$[[[Lexeme]-suffix-morphe$_1$]-suffix-morpheme$_2$]]
    (Nolan 2010: 4)

For German compounds the following generalized CSs can be proposed:

(3.0.4)
a. [Root] $\oplus$ [Root]φ_N
b. [Root] $\oplus$ [[Root] $\oplus$ [suffix-morpheme$_1$]]φ_N
c. [[Root] $\oplus$ [compound marker]] $\oplus$ [Root]φ_N
d. [[Root] $\oplus$ [compound marker]] $\oplus$ [[Root] $\oplus$ [suffix-morpheme$_1$]]φ_N

The CSs in (3.0.4) should be understood as follows: In (3.0.4a) two roots are compounded. The operator $\oplus$ fuses compound elements within the CSs. The head of a German compound is the constituent of a compound bearing inflection, which in German is realized as a suffix. Consequently, a suffix morpheme can attach to the root as in (3.0.4b) and (3.0.4c). In (3.0.4c) and (3.0.4d) a compound marker is involved, too.

After having introduced the notion of CSs and how they are used in connection with N + N compounds in German I will describe the semantic representation of nouns based on Pustejovsky's qualia structures (Pustejovsky 1995) and the use of CSs as they were described in this section. Via this approach I will first yield lexical entries for nouns within a framework of RRG and then describe how composition can be described on a semantic level.

3.1 Development of lexical entries for nouns in RRG

Morphological elements in grammar, which are language specific, have internal structure. This internal structure can be divided into the areas of the lexeme store and the morpheme store, both of which are parts of the lexicon. The morphemes which are conceptually meaningful and are therefore interpreted as lexemes are stored in the lexeme store, those which provide grammatical function only are stored in the morpheme store (cf. Nolan 2010: 6). Both lexemes and morphemes have lexical entries. However, these entries appear very different. In the following I will concentrate on lexical entries for lexemes. As shown in figure 3.1.1, the two parts of the lexicon are both via the merger connected with the morphological inventory, where the CSs for words, derived and inflected, are stored. In the merger, semantic structures of lexemes and morphemes are fused. CSs are filled with material from the lexicon via a linking algorithm and then the filled CSs are inserted into the grammar. The basic assumption with respect to the morphological inventory is that CSs - as

in (3.0.4) - are stored in the morphological inventory. The same is true for LSWs. I will refer to this fact in section 4.
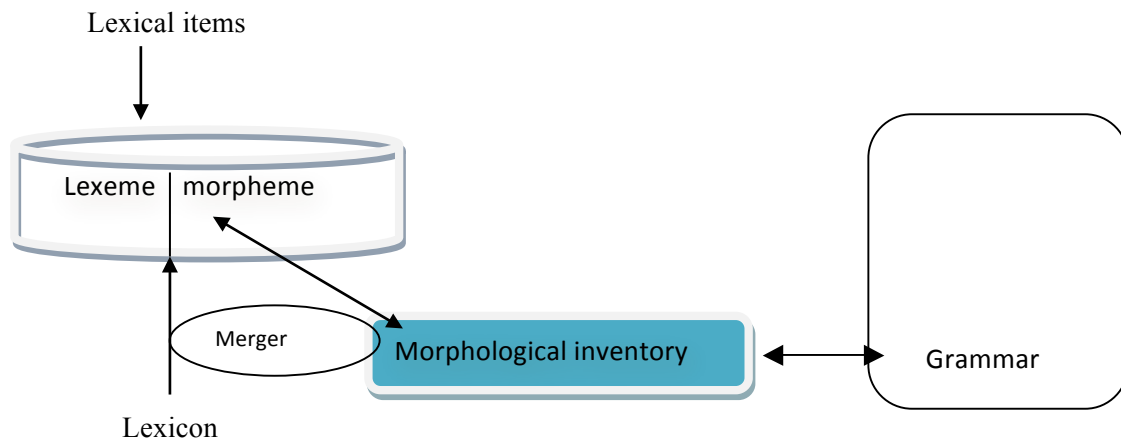

Lexical items

Lexeme | morpheme

Merger

Morphological inventory

Grammar

Lexicon

Figure 3.1.1 Architecture of the morphological part of RRG

Lexical entries for nouns in RRG are based on Pustejovsky's qualia structures (cf. Pustjejovsky 1995, Van Valin 2005: 51). Following Van Valin, a sentence like *Commander Adama began the novel* can be understood in different ways. First, it could mean *Commander Adama began to read a novel* or *He began to write a novel*. The question is: Where does this meaning come from? How does one know this sentence does not mean *Commander Adama began to eat a novel* as in the sentence *Starbuck started the hamburger*? The answer is the interpretation can be derived from the use of different object NPs in the two sentences. To capture these facts Pustejovsky (1995) developed the qualia theory of the semantics of nominals (cf. Van Valin 2005: 50). Pustejovsky summarizes qualia theory as follows:

(3.1.1) Qualia theory (Pustejovsky 1991: 426-7)
   a. Constitutive Role: the relation between an object and its constituents, or proper parts
     1. Material
     2. Weight
     3. Parts and component elements
   b. Formal Role: that which distinguishes the object within a larger domain
     1. Orientation
     2. Magnitude
     3. Shape
     4. Dimensionality
     5. Color
     6. Position
   c. Telic Role: purpose and function of the object
     1. Purpose that an agent has in performing an act
     2. Built-in function or aim that specifies certain activities
   d. Agentive Role: factors involved in the origin or "bringing about" of an object
     1. Creator
     2. Artifact
     3. Natural kind
     4. Causal chain

In an RRG-fashion and based on qualia theory a lexical entry for a noun like *novel* looks as follows:

(3.1.2)   **novel** (y)
        a. Const: **narrative′**(y)
        b. Form: **book′**(y), **disk′**(y)
        c. Telic: **do′**(x, [**read′**(x, y)])
        d. Agentive: **artifact′**(y), **do′**(x, [**write′**(x, y) & INGR **exist′**(y))
        (Van Valin 2005: 51)

Based on (3.1.2) the interpretation of the *sentence Commander Adama began a novel* is now clear. The first reading is based on the telic role of novel, while the other reading is derived from the agentive role.

My construction of lexical entries is based on the use of qualia theory in RRG. However I will extent these entries to some further slots, which contain further lexical knowledge. This insertion of further lexical slots is based on Chomsky's (1965) and Bloomfield's (1933) assumption that the lexicon contains all unusual and unpredictable word features (cf. Jackendoff 2002: 153).

These lexical slots are <gender>, <declension class>, <declension subclass>, <compound marker>. Although there are some regularities with respect to gender in German, it would be reasonable to insert the slot <gender> since, following Gallmann (1998), gender is an internal licensing feature which is not restricted by external syntactic features. This is the same with respect to declension class. Although declension is an external licensing feature, following Gallmann (1998) no regularity can be detected explaining which of the thirteen German declension classes is used. The slot <declension subclass> is optional since not every German noun belongs to a subclass.

With respect to the slot <compound marker> things are more difficult. The slot <compound marker> contains all compound markers which are used when the noun is part of a compound in German. This slot contains a set of compound markers the specific noun in German could have, connected with the distribution according to which the specific compound marker is used. An example of a lexical entry of a German noun is given in (3.1.3):

(3.1.3) Tag
     day (y)
     Const: **time′**(y)
     Form: **timeline′**(y), **formless′**(y)
     Telic: PROC **pass by′**(x)
     Agentive: **abstract kind′**(y)
     <gender>: masculine
     <declension class>: A
     <compound marker>: {[/es/: - reise, - geld, …], [/e/: - blatt, - werk, …]}

The idea is that lexemes like *der Tag* 'day' are stored in the lexeme store. However, morphemes, like the compound markers, are stored in the morpheme store. In both the lexeme store and the morpheme store elements are stored in neighborhood clusters, where lexical entries of lexemes are stored in inheritance networks. Neighborhood clusters as they are introduced in Gottschalk (2010) contain lexemes which share some lexical meaning. So a

lexeme like *der Tag* 'day' would be stored in a neighborhood cluster together with *die Minute* 'minute' or *die Sekunde* 'second'. The development of the neighborhood cluster to which *der Tag* 'day' belongs is out of the scope of this paper and would be a topic for future research.
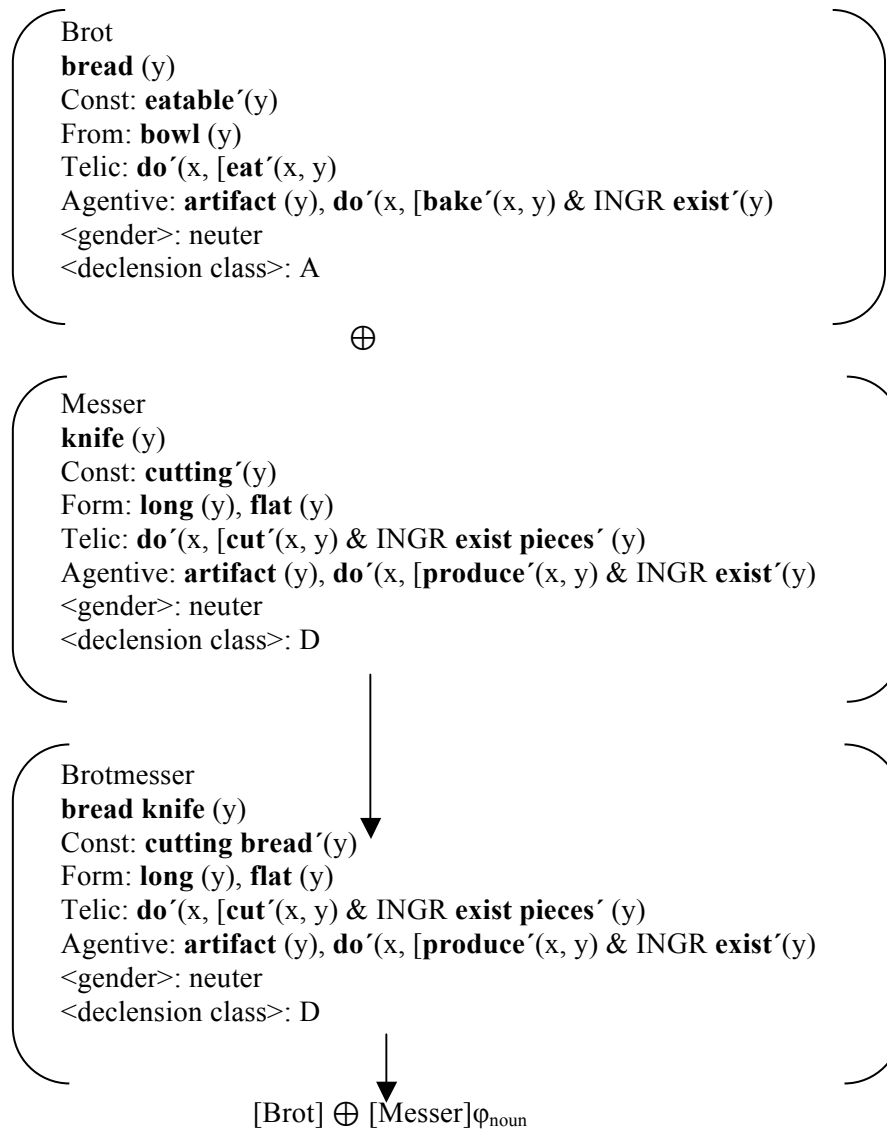
For a lexical structure as in (3.1.3), the framework proposed in Gottschalk (2010) has some further consequences: the assumption is that the lexemes in an inheritance network are stored in an underspecified way. This means the most basic lexeme or primitive of a neighborhood cluster is the root of the inheritance network which forms a neighborhood cluster. This root contains all relevant lexical information and inherits this information to its daughter nodes in the inheritance network by non-monotonic inheritance. Daughter nodes do not contain the specific information they have inherited form their mother node, but they contain slots displaying that this information is inherited from the mother node. Only features which are specific to the lexeme in question are added to the lexical entry of the lexeme. In most cases these are information like <gender>, <declension class>, or <compound marker>, which are specific to each lexeme in the neighborhood cluster. In fact lexical entries can only be viewed in the context of the whole neighborhood cluster and a lexical entry like (3.1.3) is the abstract of some inheritance processes for a specific noun as it is used in morphological processes. So a lexicon is a holistic system and all lexical entries are in dependency of each other. This entails: a lexeme in the lexeme store is always stored underspecified and receives all its information from its mother nodes, but if information from the lexical entry of a lexeme is inserted into the grammar, the different inherited information is combined to a structure as in (3.1.3).

Also, all morphemes with grammatical function only are stored in inheritance networks in the morpheme store. However, an exact description of the design of the morpheme store is out of the scope of this paper. So it must be sufficient to suppose the morpheme store has a structure similar to the lexeme store and to assume that, based on inheritance processes, a lexical structure as in (3.1.3) is inserted into the grammar, which is then immediately connected with its functional morphemes, which have lexical entries similar to the ones of lexemes. The lexical structure of morphemes is the result of inheritance processes in the morpheme store.

3.2   Composition: a semantic perspective
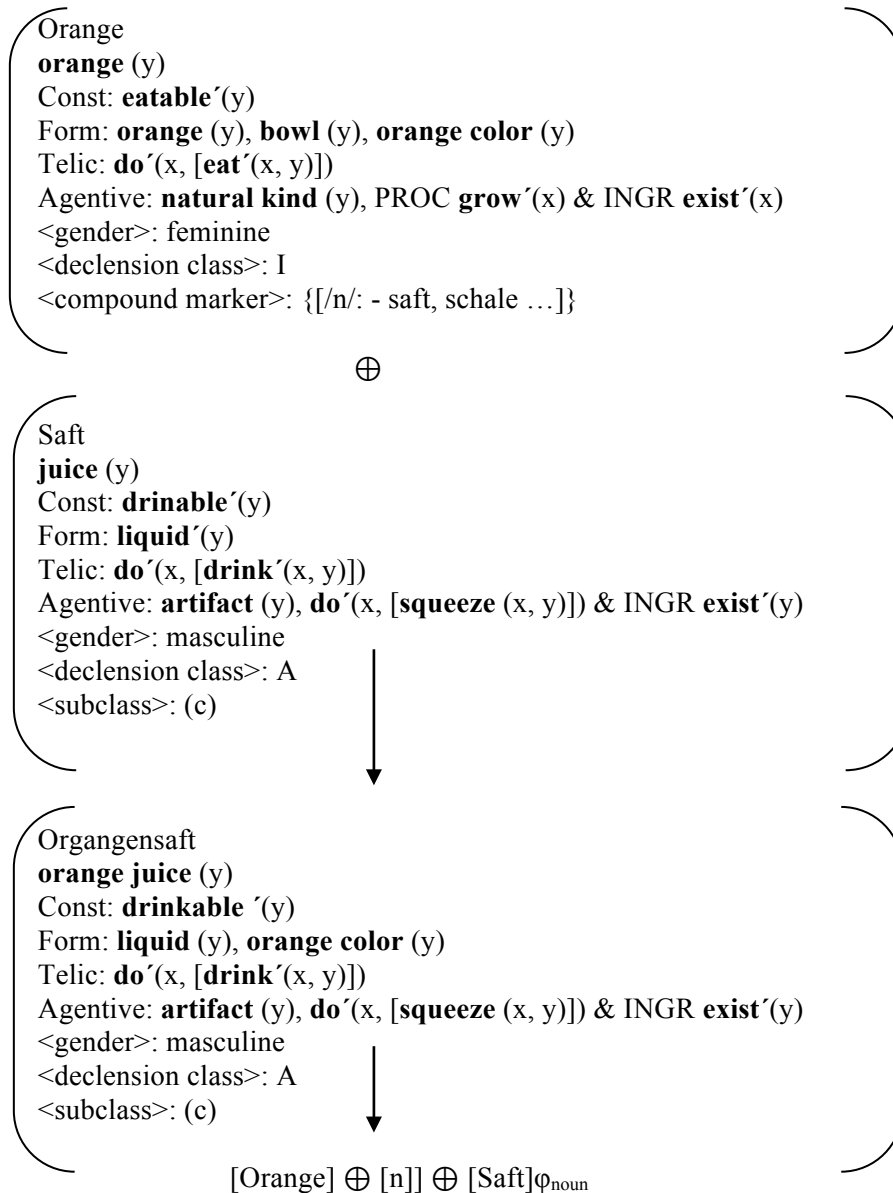
In this paragraph I will show how composition on a semantic level works, based on the description of lexical structures, which are the result of inheritance processes both in the lexeme store and the morpheme store. Example (3.2.1) shows how the German N + N compound *Brotmesser* 'bread knife' is constructed based on qualia structure and the lexical slots I introduced in paragraph 3.1:

(3.2.1) Brotmesser 'bread knife'

> Brot
> **bread** (y)
> Const: **eatable´**(y)
> From: **bowl** (y)
> Telic: **do´**(x, [**eat´**(x, y)
> Agentive: **artifact** (y), **do´**(x, [**bake´**(x, y) & INGR **exist´**(y)
> <gender>: neuter
> <declension class>: A

$$\oplus$$

> Messer
> **knife** (y)
> Const: **cutting´**(y)
> Form: **long** (y), **flat** (y)
> Telic: **do´**(x, [**cut´**(x, y) & INGR **exist pieces´** (y)
> Agentive: **artifact** (y), **do´**(x, [**produce´**(x, y) & INGR **exist´**(y)
> <gender>: neuter
> <declension class>: D

> Brotmesser
> **bread knife** (y)
> Const: **cutting bread´**(y)
> Form: **long** (y), **flat** (y)
> Telic: **do´**(x, [**cut´**(x, y) & INGR **exist pieces´** (y)
> Agentive: **artifact** (y), **do´**(x, [**produce´**(x, y) & INGR **exist´**(y)
> <gender>: neuter
> <declension class>: D

$$[\text{Brot}] \oplus [\text{Messer}]\varphi_{noun}$$

(3.2.1) is an example of a German ATAP compound. This classification is based on Scalise and Bisetto (2009). What can be seen with respect to the semantic representation of the whole N + N compound is that the qualia structure (as developed in Van Valin (2005: 51) contains mostly the semantic features of the compounds' head. As most German compounds, *Brotmesser* 'bread knife' is right headed and most of the features of the modifier *Brot* 'bread' are overwritten. So the formal role, which is bread (y) in the qualia structure of *Brot*, is overwritten in the qualia structure of *Brotmesser*. Here, *Brotmesser* has the formal role of *Messer* 'knife'. Also, the telic role of *Brot* is overwritten in the qualia structure of the compound and the same is true for the agentive role *of Brotmesser*, which is identical to the agentive role of Messer. Such an overwriting can also be recognized with respect to the declension class of the compound. So the resulting N + N compound has the declension class of the compound's head, which is class D. With regard to the constitutive role, a case of conflation can be detected. Here the modifying element is apparent. To achieve a better view on the domain it might be helpful to have a look on a further example of a German N + N compound. This time I chose a subordinate compound based on Scalise and Bisetto's classification of compounds (cf. Scalise and Bisetto 2009).

(3.2.2) Orangensaft 'orange juice'

> Orange
> **orange** (y)
> Const: **eatable**′(y)
> Form: **orange** (y), **bowl** (y), **orange color** (y)
> Telic: **do**′(x, [**eat**′(x, y)])
> Agentive: **natural kind** (y), PROC **grow**′(x) & INGR **exist**′(x)
> <gender>: feminine
> <declension class>: I
> <compound marker>: {[/n/: - saft, schale …]}

$$\oplus$$

> Saft
> **juice** (y)
> Const: **drinable**′(y)
> Form: **liquid**′(y)
> Telic: **do**′(x, [**drink**′(x, y)])
> Agentive: **artifact** (y), **do**′(x, [**squeeze** (x, y)]) & INGR **exist**′(y)
> <gender>: masculine
> <declension class>: A
> <subclass>: (c)

> Organgensaft
> **orange juice** (y)
> Const: **drinkable** ′(y)
> Form: **liquid** (y), **orange color** (y)
> Telic: **do**′(x, [**drink**′(x, y)])
> Agentive: **artifact** (y), **do**′(x, [**squeeze** (x, y)]) & INGR **exist**′(y)
> <gender>: masculine
> <declension class>: A
> <subclass>: (c)

$$[\text{Orange}] \oplus [n]] \oplus [\text{Saft}]\varphi_{noun}$$

In this subordinate right-headed compound, similar mechanisms as in (3.2.1) are at work. What can be seen in (3.1.2) is that the constitutive role, the telic role and the agentive role of *Orange* 'orange' are overwritten. In case of the formal role of *Orangensaft* 'orange juice' a formal element from *Orange* conflates with the formal role of *Saft* 'juice'. Here, the color feature conflates with the feature liquid (y) and forms a new formal role. Also, *Orangensaft* inherits the gender of Saft, its declension class and also the lexical feature of having a subclass, in this case (c). Also, the lexeme *Orange* 'orange' has a compound marker, in this case /n/, which is activated when connected to a lexeme like *Saft* 'juice'. The resulting N + N compound does not have such a slot in its newly formed lexical entry. This is because the lexeme *Saft* does not have a compound marker. If it had a compound marker, this marker would be part of the resulting lexical entry, since in German it is in principle possible to form compounds with an infinite length.

What can be seen in (3.2.1) and (3.2.2) is that the qualia structure of the head is stable and only some features of the modifying elements conflate with one or more formal role to constitute the qualia structure of the compound. In both example (3.2.1) and (3.2.2) the semantic composition process, which is a generative process that can be described with the use of a linking algorithm, results in a filled CSs. One could figure this process as follows: After a lexical inheritance process, the lexical structures for the two nouns are inserted into the merger, where the semantic structures of the two nouns are fused. In the morphological inventory, the CS is filled with the information from the fused semantic structure and is inserted to the grammar.

4.0   Layered Structure of the German word

After having developed CSs for German N + N compounds, lexical entries for nouns and the semantic description of N + N compounds, I will develop generalized LSWs of German N + N compounds both with and without compound markers in this section. My description of the LSW is based in Nolan (2010).

In figure 4.0.1 I suggest an initial conceptualization of the structural representation of the LSW of a German N + N compound. This generalized LSW describes a compound without interfixes, since I will describe more complex cases of the LSW in the remainder of this section. The LSW is important for both derivation and composition and consists of an argument lexeme and a head lexeme (cf. Nolan 2010: 5). The assumption is that each lexeme has a core and a nucleus, represented by the nodes CORE and NUC. A compound has two cores and two nuclei in its LSW since it consists of two lexemes. In this framework, the term nucleus denotes the root of a lexeme while core denotes the stem of a lexeme, which might be identical with its root, as is normally the case in N + N compounds.

A LSW as in 4.0.1 can be supposed for German N + N compounds which neither contain a compound marker nor a suffix morpheme denoting case or number. Such a LSW could be supposed for simple German N + N compounds in nominative case for example, since I do not assume that syntactic zero markers for suffixes exist in German.
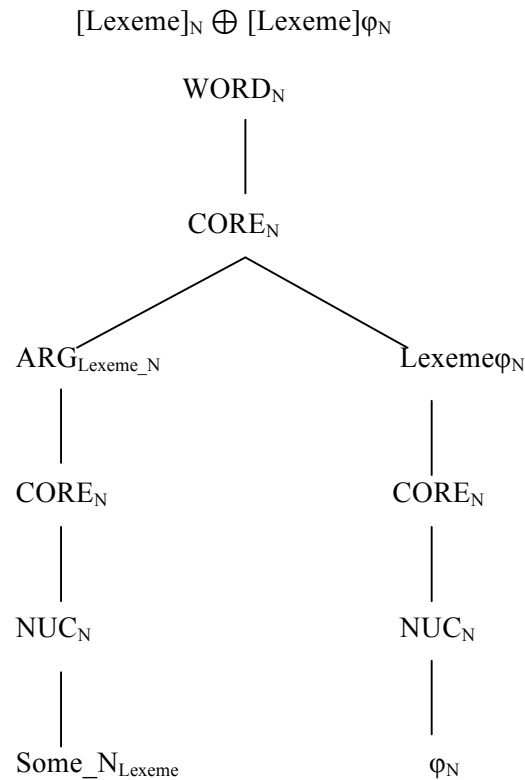
$$[\text{Lexeme}]_N \oplus [\text{Lexeme}]\varphi_N$$

$$\text{WORD}_N$$

$$\text{CORE}_N$$

$$\text{ARG}_{\text{Lexeme\_N}} \qquad\qquad \text{Lexeme}\varphi_N$$

$$\text{CORE}_N \qquad\qquad \text{CORE}_N$$

$$\text{NUC}_N \qquad\qquad \text{NUC}_N$$

$$\text{Some\_N}_{\text{Lexeme}} \qquad\qquad \varphi_N$$

Figure 4.0.1 Generalized LSW of a German N + N compound

4.1 The operator description of German N + N compounds

The use of inflection expresses morphosyntactic information including the abstract syntactic categories tense, number and case in German N + N compounds. In this paragraph I will have a look at these. Figure 4.1.1 gives a schema of a structural representation of the LSW as it might occur in inflection of a German N + N compound. Figure 4.1.2 is a variation of this representation, but this time a circumfix occurs. In these figures, the symbol • denotes some lexeme of a particular type that is the host of the inflectional changes. This lexeme receives a morpheme in the inflectional modification, which could involve a suffix or circumfix as they occur in German (cf. Nolan 2010: 13).

(4.1.1)
$[[\text{lexeme}\varphi_{\text{Type}}] \oplus [\alpha]]$
where: α is a morphological suffix
and $\quad \varphi$ is a lexeme of some category type from the lexicon.
And $\quad \oplus$ denotes a process of morphological fusion (in this case of inflection)
(cf. Nolan 2010: 14)

The illustration in (4.1.1) describes the prototype of an inflected German lexeme. In German inflectional suffixes are used. The only exceptions are past participle and perfect tense where circumfixes are used. The schematic illustration of a German past participle looks as follows:

(4.1.2)

$[[\alpha_1] \oplus [\text{lexeme}\varphi_{\text{Type}}] \oplus [\alpha_2]]$

where: α_1 and α_2 form a morphological circumfix

and φ is a lexeme of some category type from the lexicon.

And $\oplus$ denotes a process of morphological fusion (in this case inflection)

(cf. Nolan 2010: 14)

Based on Nolan (2010) I will indicate a constituent projection and an operator projection. Constituent projection is important for derivation and composition and the operator projection as indicated here is a service of syntax. Because of this, operator projection is related to inflectional morphology (cf. Nolan 2010: 13). CSs as in (4.1.1) and (4.2.2) are stored in the morphological inventory of the language in question. Complex CSs as in compounds or derived forms are constructed via inheritance in the morphological inventory. The model of the morphological inventory parallels the conception of the syntactic inventory as proposed in Van Valin (2005: 15). Following Nolan (2010: 14) inflection in morphology relates to the encoding of operators on the lexeme within the LSW. Depending on the type of the lexeme the operators vary. Based on Nolan's framework there are two types of operators which are summarized in

(4.1.3) NP, Core_N and Nuclear_N operators

Nuclear_N operator

- Nominal aspect (count-mass distinction, classifiers in classifier languages)

Core_N operators

- Number
- qualification (quantifiers)
- Negation

NP operators

- Definiteness
- Deixis

(4.1.4) Verbal operators

Nuclear_V operator

- Aspect
- Negation
- Directionals (predicate)

Core_V operators

- Directionals (participant)
- Event quantification
- Root modality
- Negation (internal/narrow-scope=

V operators

- Tense
- Evidentials
- Illocutionary force

(Nolan 2010: 14)

This model of operators, which is proposed by Nolan (2010), is based on the notion of operators in Van Valin (2005). The operations on a noun in a NP include the operators which

are indicated in (4.1.3). The operators which operate on a verb include operations which are indicated in (4.1.4) (cf. Nolan 2010: 14).

As already mentioned in section 2, there are internal and external licensing processes on nouns (cf. Gallmann 1998), so one needs to distinguish between inherent and assigned inflections. Nouns have a particular gender. As explained in section 3, the assignment of gender is stored in the lexical entry of the noun in question (cf. Nolan 2010: 14). However, for any other lexical category, adjectives in case of German, gender is not an inherent category since it is a result of agreement and cannot be an inherent property (cf. Nolan 2010: 14). As also mentioned in section 2, number can either be inherent or externally licensed. In pluralia tantum number is licensed internaly. Therefore, it is a property of the lexical entry of the noun in question, but in general number is externally licensed and hence is not marked in the lexicon. Because of this, it has the status of a $CORE_N$ operator in the Layered Structure of the Noun phrase (LSNP) in RRG.

An example of assigned inflection in German morphology is case. In the lexicon nouns do not have case (only the declension class is assigned in the lexical entry of the noun). Instead, case is assigned within the syntax. This is a consequence of the RRG linking system of syntax (cf. Nolan 2010: 14).

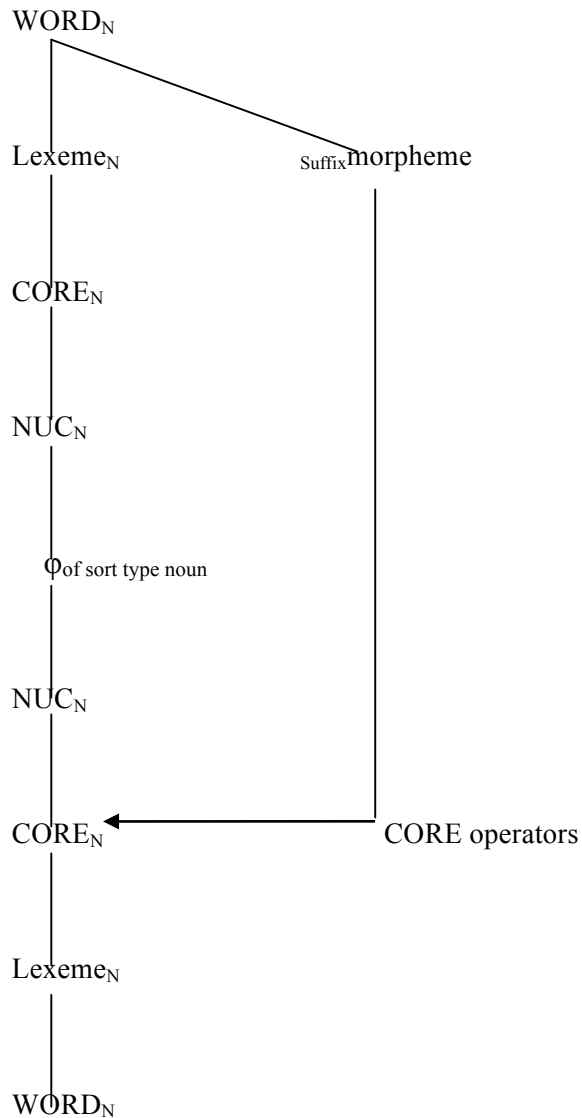Figure 4.1.1 gives an example of a generalized LSW for a suffixed German noun.

WORD$_N$

Lexeme$_N$ $_{Suffix}$morpheme

CORE$_N$

NUC$_N$

φ$_{of\ sort\ type\ noun}$

NUC$_N$

CORE$_N$ ◄————————— CORE operators

Lexeme$_N$

WORD$_N$

Figure 4.1.1 Generalized LSW of a suffixed German noun

In German, number and case are fused to one single morpheme. Based on (4.1.3), they form a core operator of the operator projection of the LSW. All the other cross-linguistically possible operators of the LSW do not occur in German.

I suppose that compound markers are nuclear operators. This assumption is based on the findings in section 2, where I suppose the argument lexeme of a compound receives a special compound marker when it occurs with specific heads. One might ask of course why compound markers do not belong to the constituent projection of the LSW as they seem not to be in service of syntax. The reason why I suppose compound markers to be part of the operator projection of the LSW is because they do in fact not have any lexical meanings. The constituent projection of the LSW however only contains those elements of a complex word which do have a lexical meaning. This is true for example for all German affixes which are used in derivation, since they have a special lexical meaning which in case of verbs changes the Aktionsart of the specific verb. The question which projection of the LSW those morphemes which just change the syntactic category of the lexeme belong to will be left open

in this context and is a topic for future research. Assignment of compound markers is, as I suppose in section 2, contained in the lexical entry of the lexeme in question. The reason why I suppose that compound markers are nuclear operators is based on the fact that in N + N compounds the argument lexeme is identical with a root which is in this framework identical with the nucleus in the LSW. Figure 4.1.2 shows a generalized LSW of a German N + N compound with a compound marker and a suffix morpheme with a generalized operator projection of the:

$$[[\text{Lexeme}]_N \oplus [\text{compound maker}]] \oplus [[\text{Lexeme}] \oplus [\text{suffix}_{number\,/\,case}]]\ \varphi N$$

WORD

CORE_N

Lexeme_N compound marker Lexeme_N $_{\text{Suffix}}\text{Morpheme}$

CORE_N CORE_N

NUC_N NUC_N

$\text{Some\_N}_{\text{Lexeme}}$ φ_N

$\text{NUC}_N \longrightarrow$ NUCoperator NUC_N

CORE_N $\text{CORE}_N \longrightarrow$ COREoperator

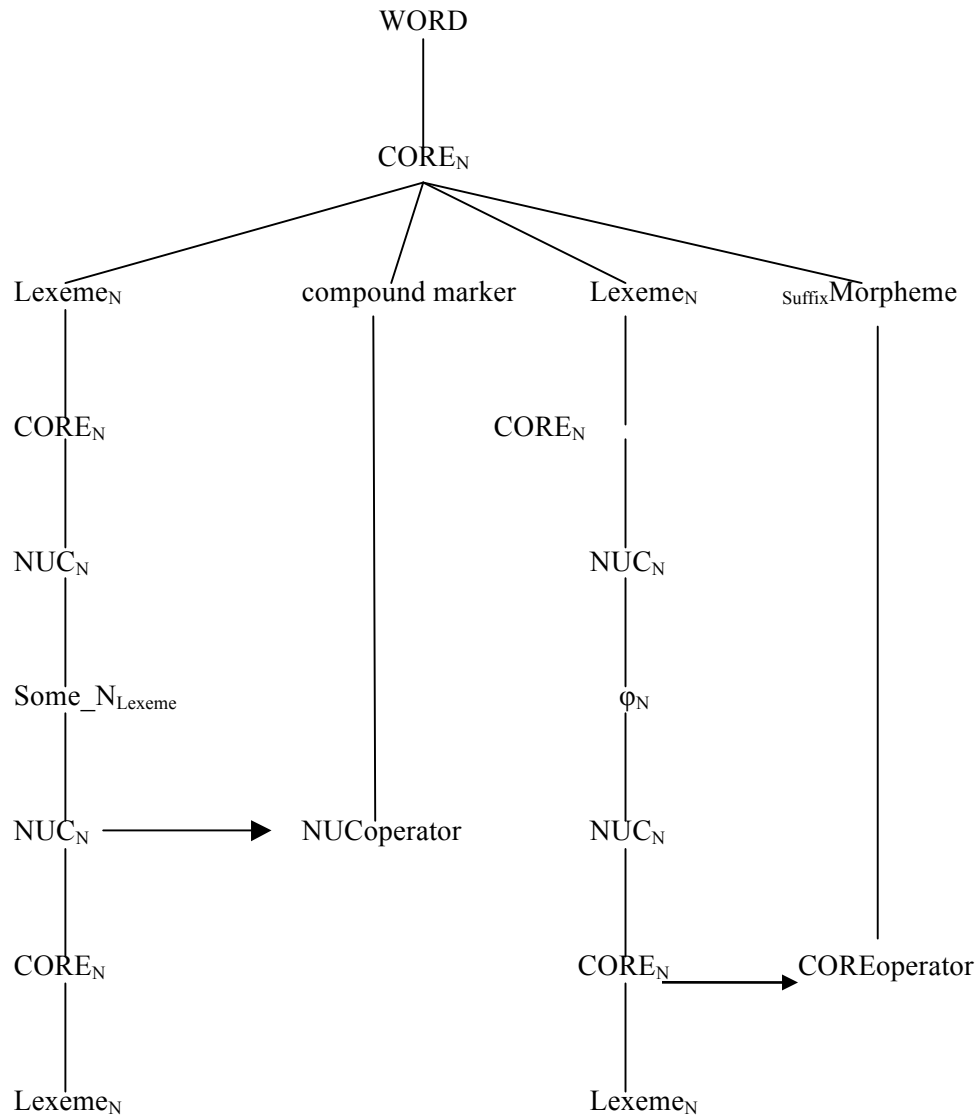Lexeme_N Lexeme_N

Figure 4.1.2 generalized LSW of a German compound with compound marker and suffixed head

Based on these findings it is now possible to describe the content of the morphological inventory in more detail. As the syntactic inventory in RRG, the morphological inventory contains blueprints, respectively generalized LSWs, of all possible LSWs which can be found in the language under discussion. These LSWs are constructed via inheritance processes. Also, CSs are stored in the morphological inventory and are constructed via inheritance processes. If one takes this perspective on the morphological inventory it shows two parts just

like the lexicon which consists of a lexeme store and a morpheme store. Both the architecture of the lexicon and the architecture of the morphological inventory are topics for further research in this area.

5. Conclusion

In the previous sections I gave a detailed description of German N + N compounds and I have outlined some considerations which are applicable to a characterization of German N + N compounds within the RRG LSW. I considered the use of compound markers in German compounds and described how inflection operates on German N + N compounds. I have constructed four types of CSs for German N + N compounds and explained how the lexicon and the morphological inventory might be constructed within an RRG framework of language I have also touched on the important use of inheritance processes, which operate within the lexicon to construct morphologically complex words. Additionally, I have constructed lexical entries for nouns based on Pustejovsky's qualia theory (Pustejovsky 1995) and extended the way lexical entries for nouns are constructed in RRG (cf. Van Valin 2005: 51) to some further lexical slots, which play a role in inheritance processes which operate in the lexicon. I also introduced the merger as a component of the morphological part of RRG, where the structures of lexical entries of nouns and grammatical morphemes are fused to form an output structure on which the LSW operates before the word is inserted into grammar. Based on Nolan's framework (Nolan 2010) it was thereby possible to develop an account of a morphological part of RRG that is compatible with the syntactic part of RRG.

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