Braucht niemanden zu scheren: A survey of NPI licensing in German

Frank Richter
University of Tübingen

Jan-Philipp Soehn
University of Tübingen

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Abstract

In this contribution we will argue that negative polarity is a collocational phenomenon that does not follow from other properties of the respective lexical elements. With German data as evidence, we will follow a proposal by van der Wouden and treat Negative Polarity Items (NPIs) as collocates which must be licensed by abstract semantic properties of their contexts. Using a collocation module for HPSG, which has been independently motivated for bound words and idioms, we will show how to restrict the occurrence of NPIs to legitimate environments, starting from the negativity hierarchy of licensing environments by Zwarts. Besides a more fine-grained semantic licenser hierarchy, we will establish syntactic licensing domains and general collocational restrictions of NPIs.

1 Introduction

Negative polarity items (NPIs) are words or idiomatic phrases that prototypically occur in an appropriately characterized negative environment. Two classical examples are *any* and *ever*.

(1) I *(**don't**) think we have any French fries.

(2) I **haven't/*have** ever been to Torino.

NPIs have been studied intensely in several linguistic frameworks since Klima (1964). Since they may occur both in the scope of negation as well as in a variety of other semantically or pragmatically related environments, one very active and controversial research area is the detailed description of possible licensing contexts.

The purpose of the present paper is twofold. First, we will present new representative data from German which highlight the kinds of distributional restrictions NPIs exhibit within and beyond the broader range of licensing domains known from the literature, and second, we will propose a multi-dimensional architecture for a lexical NPI licensing theory in HPSG.

2 Characteristics of NPIs

It might be surprising at first that negative polar elements are not a small, negligible class of lexical elements. The number of NPIs is known to be quite large in languages such as Dutch and German. Hoeksema (2005) for instance presents about 700 Dutch NPIs. NPIs occur in any part-of-speech, as we illustrate with the following examples from German.

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- **Adverbs**: *jemals* (‘ever’), *beileibe* (‘by no means’)
- **Nouns**: *Deut* (‘farthing’), *Menschenseele* (‘soul’)
- **Adjectives**: *geheuer* (‘mysterious/scary’), *gefeit* (‘immune’)
- **Verbs**: *brauchen* (‘need’), *ausstehen können* (‘can stand’), *wahrhaben wollen* (‘want to see the truth’)

They even can be syntactically complex and clearly idiomatic:

- *einen Finger rühren* (‘to lift a finger’)
- *seinen Augen trauen* (‘to believe one’s eyes’)
- *(nicht) alle Tassen im Schrank haben* (‘not to have all cups in the cupboard’ - to have lost one’s marbles)

In a similar way, the licensers of NPIs constitute a very broad and seemingly fuzzy class of lexical elements and syntactic constructions. It comprises n-words (negative particles, negative quantifiers), conditionals, questions, the restrictor of universal quantifiers and superlatives, non-affirmative verbs (*doubt*, *be surprised*), neg raising verbs (*believe*), downward-entailing contexts in general (*few, hardly, before, without*, the restrictor of universal quantifiers), comparative *than*-sentences, *too*-comparatives, and negative predicates (*improbable*). This broad variety of NPIs and licensing contexts notwithstanding, there have been several attempts at establishing a unified licensing theory. As we will argue in the next section, the problem with these approaches is that they often focus only on a subset of NPIs and licensers, rather than on the whole range of negative polar elements and licensing contexts.

3 Overview of NPI Licensing Theories

3.1 Licensing in Downward-Entailing Contexts

One of the first steps towards a general NPI licensing theory was taken by Ladusaw (1980), who established that NPIs can only occur in downward-entailing (DE) contexts, building on an idea from Fauconnier (1975). In the face of a number of open questions concerning the standard Fauconnier-Ladusaw theory of NPIs, there has been further elaboration on this theory, as well as alternative analyses.

3.2 Semantic Approaches

According to the theories proposed in (Kadmon and Landman, 1993; Krifka, 1995; Chierchia, 2005), NPIs have the lexical properties of domain widening and strengthening. For example, the use of *any* leads to a stronger utterance and the denotation of the modified NP contains more elements (even marginal or unexpected items):

(3) There are no birds in this zoo, there aren't even penguins.
– No, there aren't any birds in this zoo.

NPIs are banned from semantically non-licensing contexts such as affirmative or upward-entailing contexts. They may introduce alternatives to the foreground information which induce an ordering relation of specificity. The NPI itself denotes the most specific element on this scale. This idea works well for indefinite NPIs and minimizers such as *a drop* or *a wink*, and even for modal verbs such as *brauchen* ('to need') in German. However, it remains unclear how this idea can be applied to NPIs in general, e.g. *sonderlich* ('particularly') or *scheren* ('to care').

Zwarts (1996; 1997) argues for a hierarchy of NPIs in which three classes of NPIs are licensed by certain increasingly restrictive logical properties of their respective contexts. He distinguishes between superstrong NPIs (licensed in anti-morphic contexts), strong NPIs (licensed also in anti-additive contexts), and weak NPIs (licensed in all downward-entailing contexts).[1] This quite fine-grained hierarchy is empirically motivated with Dutch data and works for German as well (strong: *überhaupt* ('at all'), weak: *im entferntesten* ('remotely')). However, the negation occurring with German superstrong NPIs (*nicht jedermanns Sache* ('not everyone's cup of tea')) may be considered idiomatic, i. e. the negative particle is an integral und inalterable part of the expression. Therefore, we assume that there are no NPIs in German which are licensed exclusively by anti-morphic contexts, and we classify German NPIs as either strong or weak for the time being.

Krifka (1995) uses different concepts for a similar distinction between strong and weak NPIs. For example, he restricts strong NPIs to emphatic contexts. It is an open question whether one can mimic a more fine-grained hierarchy such as the one presented by Zwarts using Krifka's analysis.

A further problem for purely semantic characterizations of NPI licensing domains arises from what Linebarger (1987) calls an "immediate scope constraint", forbidding any quantifier to intervene between an NPI and its licensing (negative) quantifier.

(4) Hans gab Wohltätigkeitsorganisationen keinen roten Heller.
Hans gave charity not-a red cent
'John didn't give a red cent to charity.'

(5) * Jeder Wohltätigkeitsorganisation gab Hans keinen roten Heller.
every charity gave Hans not-a red cent
Intended: 'John didn't give a red cent to every charity.'
(This is ungrammatical in English as well.)

It is not obvious exactly which semantic approach could implement this essentially syntactic constraint. In a similar vein, Sailer (t.a.) argues for a decomposition

[1] For precise definitions of anti-morphic, anti-additive, and downward-entailing contexts, cf. Zwarts 1996.

analysis of *few*. The reading that licenses NPIs is described as $\mathsf{many}'x(\phi)(\neg\psi)$, the idea being that NPIs are licensed if their semantic contribution to an utterance containing *few* ends up as a subterm of ψ. Purely semantic approaches are indifferent concerning the exact syntax of LF structure, which is necessary in both Linebarger's and Sailer's proposals.

3.3 Pragmatic Approaches

Even though Krifka (1995) already takes pragmatic factors into consideration, there are approaches which may be even better relegated to the "pragmatic corner". For example, de Swart (1998) argues that the possibility or impossibility of inverse scope configurations in which an NPI precedes its negative licenser can be explained by taking the pragmatic implicatures triggered by the NPI into account. With this idea she is able to explain the contrast between the impossibility of bare NPI subjects preceding clause-mate negation and legitimate NPIs embedded in indefinite nominal or sentential constituents preceding the negative licenser on pragmatic grounds.

(6) * Auch nur irgendetwas wurde nicht gestohlen.
even only anything was not not stolen
Intended: 'Anything hasn't been stolen.'
(This is ungrammatical in English as well.)

(7) Dass er auch nur irgendetwas gestohlen hat, wurde nie bewiesen.
that he even only anything stolen has, was never proved
'That he has stolen anything was never proved.'
Implies: Some of his deeds could be proved, but not that he had stolen anything.

3.4 Shortcomings

The purely semantic and pragmatic theories of NPIs raise a number of open questions. Firstly, not all licensing contexts have DE properties. Ladusaw's theory cannot be generalized to all licensing environments. Take the following examples (a question, an imperative and a comparative[2]):

(8) Schert sie sich um ihre Angestellten?
cares she herself about her employees
'Does she care about her employees?'

(9) Scheren Sie sich um Ihren eigenen Kram!
care you yourself about your own stuff
'Mind your own business!'

[2]This last example is from Oberösterreichische Nachrichten, 01-11-1996.

(10) Urlauber ändern ihre Ansprüche schneller als jemals zuvor.
vacationers change their demands faster than ever before.
'Vacationers are changing their demands faster than ever before.'

Secondly, a drawback of semantic approaches is that not all NPIs introduce a domain widening (e. g. *scheren*, 'care'). As far as pragmatic implicatures are concerned, it is far from clear which ones are triggered by which NPI. Moreover, the question of how implicatures can be modelled in a comprehensive mathematical theory of grammar has to be answered first in order to integrate this kind of theory into a formal grammar framework.

4 A Collocational Approach

The theory of van der Wouden (1997) conceptualizes the basic property of polarity sensitivity in natural languages differently. In van der Wouden's view, polarity sensitivities are collocational restrictions. He regards NPIs as collocates which have a meaning of their own and exhibit idiosyncratic restrictions on their contexts. Put differently, NPIs must be triggered by an appropriate context – their collocate. This perspective predicts lexical idiosyncrasies in NPIs which are related to those we observe in other lexicalized elements with a varying degree of frozenness, such as idiomatic expressions. We will now investigate four German NPIs which support van der Wouden's assumptions.

4.1 Data from German

The data we will present in this section illustrate NPIs from different syntactic categories, with different kinds of lexical semantics and with different collocational licensing requirements. These requirements are even beyond those that stem directly from those which constitute defining properties of NPIs in the traditional sense of Ladusaw-Fauconnier-type theories.

1. *sich um etw. scheren* ('to care about sth.') is a verbal NPI which is licensed by DE contexts, questions and even imperatives. The example shows a prototypical case, in which *scheren* is licensed by a clause-mate negation:

   Die Helden, wenn man sie denn so nennen will, scheren sich nicht
   the heroes if one them then so call wants, care themselves not
   um Moral - es geht ihnen einfach nur ums Geld.
   about morality - it goes them simply only about money.

   'These heroes, if one might call them that, don't care about morality - it's all about money.' (taken from DEREKO: *taz* 1998/1, s166)

2. *keinen Hehl aus etw. machen* ('to make no secret of sth.') is a nominal NPI, which is licensed by DE contexts and questions. A negation can either occur

in the NP (as in 'make no secret'), in the VP (as in 'without making a secret'), or may be contributed by another argument of the verb (as in 'nobody makes a secret of sth.'). In the following case the negation is contained in *never*. The noun *Hehl* is part of an idiomatic expression, which means that the verb *machen* and the PP must co-occur as well.

Daraus hat er nie einen Hehl gemacht.
Out-of-it has he never a secret made.

'He never made a secret of it.' (taken from DEREKO: *taz* 1998/3, s92921)

3. *von ungefähr* ('by chance') is an adverbial NPI which is licensed in questions, anti-morphic (*not*), anti-additive (*nothing*), and DE contexts. The adverb *nicht*, if present, has strong tendencies to attach to the *von*-PP. This is illustrated by the example below, in which the NPI is topicalized.

   Nicht von ungefähr sollen deshalb die neuen Medien eine wichtige Rolle
   not by chance shall therefore the new media an important role
   spielen.
   play.

   'For these obvious reasons the new media shall play an important role.' (taken from the *St. Galler Tagblatt*, 04-30-1997)

4. *beileibe* ('really') is an adverbial NPI which is licensed in anti-morphic and anti-additive contexts. It serves to emphasize the negation in a sentence, as illustrated in the following example.

   Es geht ihm beileibe nicht schlecht, er hat eine Stereoanlage und einen weit
   it goes him really not bad, he has a stereo and a far
   größeren Fernseher als ich zu Hause.
   bigger TV set than I at home.

   'He is really not bad off, he has a stereo and a much bigger TV at home than I have.' (taken from DEREKO: *taz* 1998/2, s7951)

4.2 NPI-hood as Idiosyncrasy

The fact that NPIs are sensitive to negativity does not follow from their grammatical properties. There are (near-)synonyms for the above examples (*kümmern* (1), *Geheimnis* (2), *durch Zufall* (3), *wirklich* (4)) whose distribution does not reveal any idiosyncrasies. Van der Wouden (1997) compares this fact to the case of idioms. For instance, he shows (p. 23) that there are cognate idioms in closely related languages such as Dutch and German, one being an *Affirmative Polarity Item* (API) and the other an NPI:

(11) Met grote heren is het (*niet) kwaad kersen eten. (API)
with big gentlemen is it (*not) bad cherries eat
'It is best not to tangle with the superiors.'

(12) Mit hohen Herren ist *(nicht) gut Kirschen essen. (NPI)
with big gentlemen is *(not) good cherries eat.
'It is best not to tangle with the superiors.'

4.3 Restrictions on Different Levels

Collocations exhibit their idiosyncrasies on different levels. There are morphological anomalies (in the German expression *gehupft wie gesprungen* ('either way') the first participle is anomalous), syntactic anomalies (there are bound words which are only acceptable in specific environments) or semantic restrictions (idiom parts in their idiomatic meaning can only occur together with the "rest" of the idiom). Van der Wouden mentions the Dutch equivalent of the German NPI *jdn. ausstehen können* ('can stand sb.'), which accepts suffixation of *-lich* ('-able') only in its negated form *unausstehlich*. Moreover, the antonym of the Dutch positive-polar adjective *verdienstelijk* ('meritorious') is an NPI.

Idiosyncrasies of collocations are not limited to the co-occurrence of specific lexemes or morphemes. Even their ability to be modified is subject to restrictions. Take, for example, the modifiability of *kick the bucket*. *Kick the proverbial bucket* or *kick the bucket unexpectedly* is impeccable, but one cannot *kick the bucket far away* or *with great determination* and keep the meaning 'to die'. In German something can *fröhliche/heitere Urstände feiern* ('celebrate a merry revival') but not *glückliche Urstände*, even though the semantics of the latter adjective ('happy') is closely related to the former ones. In analogy to these observations about idiomatic phrases, we want to argue with van der Wouden that occurrences of NPIs have abstract restrictions on their contexts as well. They require the presence of specific triggers such as negation, questions, etc. Conversely, some expressions can have more subtle collocation properties in addition to those which come with their status as an NPI: There are adverbs (e. g. Dutch *moeilijk*, 'difficultly') which license only a subset of NPIs (those with a meaning aspect of ability or possibility). Once we accept the fact that NPIs are collocations, it is no longer surprising that a considerable number of idiomatic phrases are NPIs. Their NPI-hood is just another facet of their idiomatic behavior in general.

4.4 Different Licensing Domains

Whereas early research postulated c-command as a necessary condition on the structural relationship between each legitimate NPI and its licenser, subsequent research has shown that the c-command condition cannot be maintained (Hoeksema, 2000). It has been replaced by a number of morpho-syntactic and semantic-pragmatic conditions which have proven very recalcitrant to a unified theory. Here we mention just a few of the most prominent properties involved in NPI licensing.

The licensing conditions of NPIs depend on their lexical category and on whether or not they are scopal elements. Indefinite NPIs are often impossible to topicalize in English (unless they are embedded in a topicalized constituent), which distinguishes English from Dutch. For adverbials such as *for the life of me* topicalization is impeccable even in English. In general, the possibility that an NPI can precede its licenser through topicalization varies widely across as well as within languages.

For example, the German NPI *auch nur* ('not even'), among others, can only be topicalized in embedded position:

(13) Ein rebellischer oder auch nur bemerkenswert undisziplinierter Soldat bin
a rebellious or even notably undisciplined soldier am
ich nie gewesen.
I never been
'A rebellious or even a notably undisciplined soldier I have never been.' cited in Hoeksema and Rullmann (2001)

(14) *Auch nur ein Bier habe ich nicht getrunken.
even one beer have I not drunk
'Even one beer I haven't drunk.'

In constrast, *Hehl* ('secret'), among others, can be topicalized alone:

(15) Einen Hehl hat Hans aber noch nie daraus gemacht, dass er...
a secret has Hans but still never of-it made, that he...
'John never made a secret of the fact that he...'

This variation excludes both simple cross-linguistic semantic generalizations and syntactic generalizations based on properties such as syntactic category or type of quantificational expression. Topicalization can be further differentiated into long and short topicalization, with some NPIs being restricted to short topicalization, while others permit unbounded extraction.

Some idioms reveal similar behavior. For instance, in the following example, the idiom part *Bauklötze* can be topicalized to the Vorfeld (16) but not extracted out of a subordinate clause (17).

(16) Bauklötze staunt man bei Daimler-Chrysler.
building bricks googles one at Daimler-Chrysler
'They are flabbergasted at Daimler-Chrysler.'

(17) *Bauklötze glaube ich, dass Peter gestaunt hat.
building bricks believe I that Peter goggled has
'I believe that Peter was flabbergasted.'

In the case of (18), both idiom parts must be in the Vorfeld. If only *Öl* were extracted, the expression would lose its idiomatic meaning.

(18) [Öl] [ins Feuer] goss gestern die Meldung über das Tankerunglück.
oil in-the fire poured yesterday the news about the tankship disaster.
'The news about the tankship disaster added fuel to the fire yesterday.'

Other well-known facts concern quantificational barriers for the licensing relationship. Many NPIs require licensing in the immediate scope of a negation (or another appropriate) operator such as a negative quantifier ($\neg\exists$), cf. (4) vs. (5). Intervening quantifiers or intervening definiteness may block their licensing, with the ban on intervening definiteness having long been taken for a strict constraint. Unfortunately, there are uncontroversial counterexamples even to the blocking effect of definiteness, and their nature is not at all understood yet (cf. Hoeksema, 2000, p. 136f). Similarly, the felicity of an NPI is determined by semantic and syntactic properties of a predicate whose dependent an NPI is, the type of argument of the NPI or the semantic class of an NPI adjunct. Some authors distinguish strict and weak NPI licensing depending on whether an NPI is licensed by a clause-mate negation or by negation in a superordinate clause. Many NPIs such as temporal perspective adverbs in English require local licensing (modulo licensing in neg raising contexts, see Sailer (t.a.)), whereas others are more liberal and are satisfied with a non-local lexical or non-lexical licenser. Van der Wouden discusses cases of NPIs which require licensing by a negation outside of a more local syntactic domain in which they behave like Affirmative Polarity Items (van der Wouden, 1997, p. 134).

4.5 Summarizing the Facts

In this section we observed a number of properties of NPIs which our theory will need to capture. They can be summarized as follows:

- NPIs are lexicalized and behave idiosyncratically to a certain extent. Showing idiosyncratic behavior means that the context requirements of each NPI cannot be fully predicted from the fact that it is an NPI, the strength of negative environment that it requires, the domain in which the licensing condition must be fulfilled, or its lexical semantics.
- NPIs cannot be reduced to contributing a particular kind of meaning. Languages often have expressions which are semantically equivalent to an NPI but are not NPIs themselves. Moreover, not all NPIs convey a meaning which lies at a bottom of a scale.
- NPIs are not licensed by a uniform type of licensers (cf. section 2).
- The distance between the licenser and the licensee can vary in the same way as do collocates in idiomatic expressions.
- NPIs can have syntactic constraints of the type known from idiomatic expressions on their environments.

In the next section, we will sketch an HPSG analysis of representative data from above (for *scheren*, *beileibe*, and *Hehl*) using the semantic framework of LRS (Lexical Resource Semantics, cf. Richter and Sailer, 2004) and, in addition, a collocation module along the lines of Soehn 2004.

5 Analysis

An analysis of NPI licensing domains minimally presupposes a framework in which negative environments of various strengths (anti-morphic, anti-additive, downward-entailing), the relative scope of quantificational expressions, and other semantically relevant properties such as comparatives or conditionals can be characterized. Moreover, the data indicate that we must minimally be able to refer to the following features of signs: Inherent lexical properties of quantificational expressions; morpho-syntactic properties of lexical and phrasal signs; syntactically determined domains in which NPIs may occur; and idiosyncratic lexical context requirements of the NPIs themselves. These context requirements may in turn be syntactic, semantic or pragmatic in nature. In a fine-grained analysis, we should ultimately be able to capture pragmatic notions such as presuppositions or conversational implicatures and their relationship to the truth conditions of utterances.

In this section we will ignore pragmatics and concentrate on the core syntactic and truth-conditional factors. The conditions on licensing domains will be expressed in terms of Soehn's (2004; 2006) theory of the attribute COLL (Context of Lexical Licensing, defined on signs), which provides the foundations of a theory of syntactic domains while eschewing some of the problems of the unrestricted expressiveness of its precursor, Sailer 2003. Collocationally restricted items have a non-empty COLL value, which contains one or several *barrier* objects indicating the syntactic domain in which their context requirements must be satisfied. Possible barrier objects are *vp* (used for the smallest VP dominating a given element), *complete-clause* (used for the smallest complete clause dominating a given element), *utterance* (the utterance in which an element occurs), and others. Barrier objects have attributes which are used to specify (local) syntactic or semantic properties that the relevant barrier must have. For NPI licensing *per se*, we will exclusively be concerned with the LF-LIC value of barriers. Some NPIs, however, come with orthogonal syntactic restrictions on their contexts which will be imposed through appropriate LOC-LIC specifications of the barrier. These concern the LOCAL value of their licensing domain.

Following Richter and Sailer 2004, our semantic interpretations will be couched in terms of LRS. The crucial property of LRS for us is the fact that it uses expressions of Ty2 for logical representations of the meaning of natural language expressions. In LRS the semantic information of a sign is encoded in its L(OGICAL-) F(ORM) value. The value of this attribute crucially contains the following two attributes:[3] PARTS lists all subexpressions that are contributed by a sign. The

[3]LRS uses additional attributes, which, however, will not be considered in this paper.

EX(TERNAL-)C(ONTENT) is the logical form of a phrase. The combinatoric principles determine that the PARTS list of a phrase is the concatenation of the daughters' PARTS lists. Furthermore, the EXC value of an utterance consists exactly of the expressions on the utterance's PARTS list. The traditional CONTENT attribute of HPSG houses local (or lexical) aspects of the semantic representation of a sign. Among these we will only need the MAIN attribute, whose value is the non-logical constant signalling the nuclear semantic contribution of a lexical sign.

5.1 Structure of the Theory

We assume that the licensing environments of NPIs are essentially semantic in nature. NPIs are lexical elements (in the sense of Sailer 2003, i.e. comprising certain phrasal idioms belonging to the lexicon) which impose collocational conditions on their environments. While the defining property of NPIs is the presence of negation, they exhibit collocation requirements along several dimensions. The simultaneous presence of these dimensions makes NPIs a seemingly heterogeneous collection of items which is recalcitrant to a uniform general theory. Once we distinguish carefully between the different dimensions, each of the independent modules will exhibit a systematic internal behavior.

The main dimensions of lexical variation of German NPIs are, (1) the required minimal strength of a (negative) licenser, (2) the syntactic locality domain in which the licenser must occur, and (3) additional collocational restrictions which may concern extraction, lexical collocates, or scope intervention conditions. Semantic licensing is the defining factor of negative polarity items among these licensing conditions. In other words, a lexical item is a negative polarity item if and only if (1) it has collocation requirements and (2) among these collocation requirements we find that its context of licensing includes anti-morphic contexts. Note that a particular occurrence of an NPI might not be in an anti-morphic context; the realization of the NPI in a given utterance might be licensed by a question context or by an imperative.

The licenser hierarchy With our hierarchy of licensers we extend Zwarts' (1996; 1997) theory of weak, strong, and superstrong NPIs which are licensed in contexts which are at least DE, anti-additive, or anti-morphic. To these we add questions, comparatives and imperative constructions as licensing contexts for even weaker NPIs. Our working hypothesis is that imperatives constitute the weakest possible licensing environment, and any NPI which is licensed (within a given licensing domain) by imperatives, will also be licensed by all other licensing environments. The class of questions, conditionals and comparatives is the second weakest class. This class may include further licensing environments yet to be explored, and it may be possible to establish a more fine-grained hierarchy even between the current members of our second class. Due to the subtleness of the judgements on this

kind of data, we leave this issue to further research.[4]

Fig. 1 schematically illustrates a feature logical characterization of our licenser hierarchy. The figure shows only Zwarts' top elements of the hierarchy, anti-morphic, anti-additive and DE environments. It can easily be extended to cover our two additional classes at the bottom end of the hierarchy.

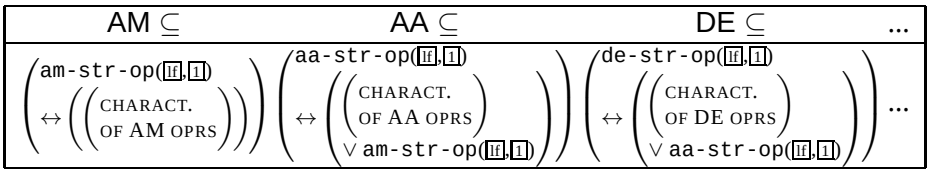

Figure 1: Sketch of a feature logical characterization of the licenser hierarchy

The idea of Fig. 1 is to use HPSG relations to say when a Ty2 expression, 1, is in the scope of a minimally DE, anti-additive or anti-morphic operator within a Ty2 expression lf. Consider the relation `de-str(ength)-op(erator)` as an example. We say that two Ty2 expressions, 1 and lf, are in the `de-str-op` relation if and only if there is a downward entailing operator in lf which scopes over 1 (expressed in CHARACT. OF DE OPRS), or 1 and lf are in the relation `a(nti-)a(dditive)-str(ength)-op(erator)`. In the latter case this means that 1 will be in the scope of an anti-additive operator within lf, or, alternatively, in the scope of an anti-morphic operator (since this is a disjunctive possibility in the definition of the relation `aa-str-op`). It should be clear from this that whenever we will use the relation `de-str-op` to characterize the licensing requirement of an NPI, this will mean that the NPI must be licensed by an operator which is *at least* of the strength of a DE operator. It should also be noted that in light of the syntactic nature of scope intervention conditions imposed by certain NPIs (see the discussion in section 3.2 above), our choice of logical representations as the level of expressing the licenser hierarchy is deliberate. A direct semantic characterization of the relevant operators would not give us a straightforward handle on expressing the immediate scope conditions we observe for certain NPIs. On the other hand, a characterization of logical operators in the feature logic can employ the standard mechanisms of the feature logic for generalizing over entire classes of objects in order to obtain a satisfactory degree of generality of the theory.

Fig. 2 illustrates for the relation `de-str-op` how the characterization of classes of logical operators proceeds in the feature logic. For the sake of simplicity, we do not try to give a compact characterization of entire classes of DE operators here. Instead, we give a transparent description of a few standard DE operators and their relevant scope. Informally speaking, Fig. 2 says the following: Two Ty2 expressions, lf and 1 are in the `de-str-op` relation iff there is an operator 2

[4]The methodological limits of introspective judgements and the sparsity of the relevant data in corpora suggest that psycholinguistic experiments are needed in order to obtain conclusive results.

in [lf] (which, in our small example, is either every, few, at_most_n or hardly) such that the expression [3] is a DE argument slot of the operator and [1] is a subterm of [3]; or, alternatively, [lf] and [1] are in the `aa-str-op` relation. The remaining four relations, including `aa-str-op`, are defined analogously, with one relation, `quest-cond-comp-op`, treating the class of question operators, conditionals and comparatives simultaneously, and `imp-op` defining imperative environments.

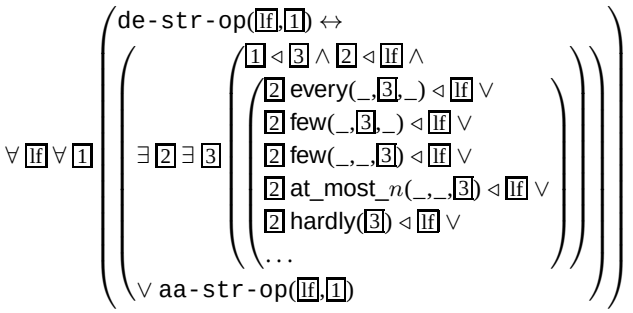

Figure 2: `de-str-op` for *few, at most n, hardly*, restrictor of *every*

In Section 5.2 we will illustrate the use of our hierarchy of relations defining the licensing environments of NPIs.

Licensing domains The second important ingredient of our theory of NPIs are the barriers of the COLL module. Barriers are phrases of a certain kind (*utterance*, *complete-clause*, *np*, ...) which are identified as nodes in the syntactic configuration above the sign in question. The LICENSING PRINCIPLE guarantees that a barrier dominates the sign and meets all the criteria mentioned in the sign's lexical entry.

(19) LICENSING PRINCIPLE:

For each *barrier* object on the COLL list of a sign x and for each phrase z:
the LOCAL *value of* z *is identical to the* LOC-LIC *value and*
the LF *value of* z *is identical to the* LF-LIC *value*
if and only if

1. z dominates x,
2. z can be identified as the barrier specified and
3. z dominates no sign y which in turn dominates x and forms an equivalent barrier.

The conception of barriers provides a "window" in which collocation restrictions must be satisfied. This is necessary in the specification of NPIs, as there are various licensing domains. The licenser of a given NPI must occur within

(20)
- the same AdvP or NP as with *überhaupt*:

  (i) Eine Torchance hatten sie [überhaupt nicht].
  a scoring chance had they at all not

  'They had no scoring chance at all.'

  (ii) Es bot sich ihnen [überhaupt keine Torchance].
  it arose itself them at all not-a scoring chance

  'They had no scoring chance at all.'

- the same clause as with *scheren*:

  Während der WM scherte sich niemand um die
  during the World Cup bothered himself nobody about the
  Reformpläne der Regierung.
  reform plans of-the government.

  'During the world cup nobody bothered about the government's plans for reforms.'

- the same utterance as with *Hehl*:

  Niemand hätte gedacht, dass Hans daraus einen Hehl machen würde.
  nobody had thought that Hans thereof a secret make would

  'Nobody would have suspected that John would make a secret out of this.'

To capture the different licensing domains, we will specify different *barrier*-objects as values for the feature COLL in the lexical entries of NPIs (see the examples in Fig. 3 and 4 below). The relevant feature of the elements on COLL is LOGICAL-FORM-LICENSER, abbreviated as LF-LIC. The values of this attribute will require that the logical form of the barrier above the NPI meet certain semantic criteria.

Idiosyncratic behavior It should be obvious from the architecture of our collocation theory of NPIs that our theory is prepared to integrate the syntactic collocation conditions known from the literature on idiomatic expressions and treated in Soehn 2006. In particular, such conditions subsume restrictions on short or long topicalization of NPIs, the distinction between bare NPI subjects and NPIs embedded in subjects, idiomatic phrases as NPIs, and Linebarger's immediate scope constraint, which forbids the occurrence of another quantifier (of a certain type) between the logical form representing the NPI and its licensing operator. To be more precise, let us look at our example of the licensing relation `de-str-op` in Fig. 2: An immediate scope constraint strengthens the subterm condition between the contribution of the NPI, [1], and the relevant argument slot of the operator, [3], to a subterm configuration in which no other quantificational operator intervenes. The strengthened condition can be added as an idiosyncratic requirement to the

lexical entries of the relevant NPIs.

With all components of our theory in place, we can now turn to the analysis of a few exemplary German NPIs in the next section.

5.2 Lexical Specifications

Verbs A lexical entry of a verb such as *scheren* ('to care') is sketched in Fig. 3. The collocational restriction which indicates that it is an NPI, is contained in the value of COLL. The only element on this list is a *barrier*-object which demands the smallest complete clause in which the verb *scheren* occurs as licensing barrier. The LICENSING PRINCIPLE (19) guarantees that this barrier meets all the criteria mentioned in the lexical entry: The value of the feature LF-LICENSER (LF-LIC) is identical to the value of the barrier's LF feature. Here, the EXTERNAL-CONTENT (EXC) of the clause in which *scheren* occurs must be such that the semantic content of *scheren*, i.e. its MAIN value, $\boxed{1}$, is in the scope of an operator defined in the hierarchy of licensing operators. Any licensing operator will do, since the lexical entry demands only the weakest type, an imperative operator. To make our examples more readable, we write the licensing relations from our licenser hierarchy of relations (here `imp-op`) in functional notation behind the attribute whose value they specify. In Fig. 3, the notation `imp-op`($\boxed{1}$) following the EXC attribute means that the implicit first argument of the `imp-op` relation, $\boxed{\text{lf}}$, is the LIF-LIC EXC value of the *complete-clause* object on the COLL list of *scheren*.

$$\left[\begin{array}{l} \textit{word} \\ \text{PHON} \left\langle \textit{scheren} \right\rangle \\ \text{SS} \quad \left[\text{LOCAL} \left[\begin{array}{ll} \text{CAT HEAD} & \textit{verb} \\ \text{CONTENT MAIN} & \boxed{1}\,\text{scheren}' \end{array}\right]\right] \\ \text{COLL} \left\langle \left[\begin{array}{l} \textit{complete-clause} \\ \text{LF-LIC} \left[\text{EXC } \texttt{imp-op}(\boxed{1})\right] \end{array}\right] \right\rangle \end{array}\right]$$

$$\left[\begin{array}{l} \textit{word} \\ \text{PHON} \left\langle \textit{beileibe} \right\rangle \\ \text{SS} \quad \left[\text{LOCAL} \left[\begin{array}{ll} \text{CAT HEAD} & \textit{adverb} \\ \text{CONTENT MAIN} & \boxed{1}\,\text{beileibe}' \end{array}\right]\right] \\ \text{COLL} \left\langle \left[\begin{array}{l} \textit{complete-clause} \\ \text{LF-LIC} \left[\text{EXC } \texttt{aa-strength-op}(\boxed{1})\right] \end{array}\right] \right\rangle \end{array}\right]$$

Figure 3: Sketches of the lexical entries of *scheren* and *beileibe*

Particles The lexical entry of *beileibe* ('really') is analogous to the entry of *scheren* in many ways and the mechanism is exactly the same (see again Fig. 3). However, *beileibe* is not licensed by imperatives, DE contexts and questions, which causes the restriction on the EXC value of the licensing barrier to be stronger than

for *scheren*: The entry of *beileibe* demands that anti-additive and anti-morphic operators take scope over it. As the licensing element must occur in the same clause as the particle itself, the barrier is defined accordingly.[5] We consider it an advantage of the collocation module used here that restrictions can be imposed in a scalable way. As the restrictions are again local, there is no need to check the semantic representation of the entire utterance to guarantee that they are met.

Nouns With *Hehl* ('secret', see Fig. 4), we have chosen a final example which illustrates the interaction between polarity-related and idiomatic restrictions. The first *barrier*-object on the COLL list is now of sort *utterance*, restricting the semantic content of *Hehl* to DE environments and to the scope of questions (or stronger licensers). The second element on the COLL list is of sort *complete-clause* and comes with a different kind of restriction: The value of the attribute LOCAL- LICENSER is identical to the LOCAL value of the clause in which *Hehl* appears. The head verb of this clause must be *machen*, which is expressed by means of the attribute LISTEME (cf. Soehn, 2004). In Soehn's analysis, there is a special version of *machen* that subcategorizes for the noun *Hehl*, and a PP, thus ensuring the co-occurrence of all parts of the idiomatic expression *einen Hehl aus etw. machen*.

$$\left[\begin{array}{ll} \textit{word} & \\ \textsc{phon} & \langle \textit{hehl} \rangle \\ \textsc{ss} & \left[\textsc{local} \left[\begin{array}{ll} \textsc{cat head} & \textit{noun} \\ \textsc{content main} & \boxed{1}\ \mathsf{hehl}' \end{array}\right]\right] \\ \textsc{coll} & \left\langle \left[\begin{array}{l} \textit{utterance} \\ \textsc{lf-lic}\left[\textsc{exc}\ \texttt{quest-cond-comp-op}(\boxed{1})\right] \end{array}\right], \left[\begin{array}{l} \textit{complete-clause} \\ \textsc{local-licenser}\left[\textsc{cat head listeme}\ \textit{machen}\right] \end{array}\right] \right\rangle \end{array}\right]$$

Figure 4: A sketch of the lexical entry of *Hehl*

This example also demonstrates that the combinatorial system of LRS alone is not strong enough to handle the context restrictions of NPIs, and a treatment in terms of COLL is called for. An occurrence restriction which is formulated purely in terms of restrictions on the EXCONT of NPIs would not be sufficient for the following reason: With a semantic EXCONT restriction, the noun *Hehl* in *kein Hehl* ('no secret') would only constrain the semantics of its maximal projection to contain a negation. However, if the negation were outside of the NP and inside the VP (as in 'nobody makes a secret of sth.') the maximal projection of the noun would not contain a licensing negation, but that of the verb (of which the NP is an argument) would. Thus, the occurrence restriction of *Hehl* would have to be different in two

[5] In addition, *beileibe* has the syntactic restriction that it always modifies the licensing element (all n-words basically), which we omit in our sketch of the lexical entry. The fact that *beileibe* can be topicalized alone ("Beileibe zahlen nicht alle Konzerne, die in ihrer Bilanz einen Gewinn ausweisen, auch Gewerbesteuer." in *Mannheimer Morgen*, 09-03-2002) is compatible with this analysis.

uses of one and the same expression, semantic for the NP domain and collocational for the VP domain and beyond. This would be conceptually unsatisfying.

6 Open Questions

We showed that our analysis can model complex cases of NPI licensing in German, taking into account inherent lexical properties of quantificational expressions and of NPIs. Morpho-syntactic properties and various syntactic domains in which NPIs may occur were accommodated in the analysis.

However, the analysis of Section 5 left a number of questions open. To begin with, many licensers may not introduce a licensing operator which belongs to the class of operators often discussed in the literature such as negation or certain generalized quantifiers. The question arises whether there is a systematic way to capture *too*-comparatives or licensing predicates such as *be surprised*. At this point it is unclear exactly how their lexical meaning should be specified in a systematic way to account for their licensing property.

Even more challenging are cases of NPIs without a licenser as in (21).

(21) Israel schert sich einen Pfifferling um UNO Resolutionen.
Israel bothers itself a chanterelle about UN resolutions
'Israel doesn't bother at all about UN resolutions.'

We assume that such cases include one expression which is covertly negative (*einen Pfifferling*) which licenses the NPI (*scheren*). This particular expression has a non-negative counterpart, which is a strong NPI (*keinen Pfifferling*), unlike similar cases such as *einen Dreck* or *einen Teufel*, which are covertly negative as well. Thus, there is no "mutual licensing" of NPIs without a licenser.

As pointed out in Section 2, pragmatic effects of presuppositions or conversational implicatures also play a role in NPI licensing, e. g. the licensing of *beileibe* in non-negated phrases which are used to deny their implied negative counterpart:

(22) Es gab beileibe genug Streitpunkte.
It gave certainly enough controversial issues
'There were certainly enough controversial issues.'

A possible idea for this kind of construction could be to assume that there is a presupposition in the discourse context which denies the existence of "enough controversial issues". Conversely, *beileibe* may introduce such a presupposition. This idea is expressed in the revised sketch of our lexical entry for *beileibe*, which is shown in Fig. 5. There is a new feature BGR-LIC putting a restriction on the BACKGROUND of the utterance, thus expanding the COLL module: There must be a presupposition (a *psoa*), and what is presupposed is that the (MAIN value of the) modified element is in the scope of an anti-morphic operator. Future research will have to address the question of to what extent the basic HPSG architecture can be revised to accommodate these presupposition phenomena.

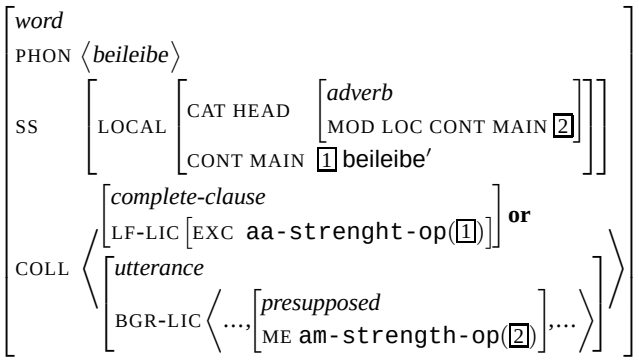

Figure 5: Revised lexical entry of *beileibe*

In general, and most importantly, we believe that much more research is necessary to secure the empirical base of a general theory of NPIs. It is possible that there are many new NPIs yet to be discovered even in well-researched languages such as German. Due to the diverse properties of NPIs and their idiosyncratic behavior, finding them in corpora is tedious and time-consuming work. Attempts at automating the process of finding NPIs have produced promising results (cf. e. g. Lichte, 2005) but are still in need of refinement. With our ongoing research, we aim at improving the empirical base of research on NPIs in German.

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