Modelling Typological Markedness in Semantics: The Case of Negative Concord

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Negative concord (NC) can be explored from two perspectives: Either the general pattern of negation is investigated from a typological perspective or the negation system of a particular language is presented in considerable detail. In this study we attempt to combine these two approaches. With HPSG we choose a surface-oriented framework without abstract syntactic nodes or invisible categories which drive the semantic interpretation. It is important to note that languages which are predominantly NC languages often contain lexical exceptions to this tendency, i.e. words which do not enter into a concord relationship. Similarly, languages in which multiple negative expressions are obligatorily interpreted as separate negative quantifiers ($\neg\exists$) may contain words which prefer a negative concord interpretation.

We will present a grammar architecture for expressing the difference between optional, obligatory and impossible NC as a consequence of different realizations of cross-linguistic properties of language. Our typological approach, illustrated here with data from French and German, aims at modeling NC across languages as a consequence of different basic principles of the semantic combinatorics and of idiosyncratic lexical properties. This lexicalist view will be supported with lexical items in languages with predominantly obligatory concord or predominantly impossible concord which break the general pattern and can only be described as lexicalized exceptions. This will lead to a theory which is prepared to accommodate exceptions without imposing mutually inconsistent constraints. We will argue that the basic principles should be expressed in terms of agreement requirements, the lexical idiosyncrasies as collocational restrictions.

1 Data: French and German

Negation in French, which is a standard example of an NC language, has been studied thoroughly (Gaatone, 1971; Cristea, 1971; Muller, 1991; Grevisse and Goosse, 1993; Wilmet, 1997). It is famous for the peculiar behavior of the lexical elements that are associated with negation. The most prominent ones are the pre-verbal negation particle *ne*, the negative adverb *pas*, and so-called n-words such as *personne* (*nobody*) and *rien* (*nothing*). We will follow the syntactic analysis of French negation as proposed in Kim (1996). With Rowlett (1998) we suppose that the pre-verbal negation particle *ne* does not carry semantic negation in any register of modern standard French, but the negative adverb *pas* always does. On the basis of these two assumptions, we investigate the distributional properties of n-words. N-words can express sentential negation (1-a). In combination with other n-words a single negation reading (SN) is possible (b). With a clause-mate *pas*, n-words trigger a DN reading (c).

(1) a. Jean n'a parlé à **personne**.
Jean NE has talked to nobody
'Jean hasn't talked to anyone.'

b. **Personne** n'a **rien** dit. [SN,DN]
nobody NE has nothing said
'Nobody said anything.' [SN] or: 'Nobody said nothing.' [DN]

c. **Personne** n'est pas venu. [DN]
nobody NE is not come 'Nobody did not come.'

In German the negation particle *nicht* and n-words (*niemand* (*no none*)) always express negation and never enter an NC relation. The data in (2) are parallel to those in (1).

(2) a. Hans sprach mit **niemandem**.
Hans talked with no one

b. **Niemand** sprach mit **niemandem**. [DN]
no one talked with no one

c. **Niemand** kam nicht. [DN]
no one came not

In addition to these core data, both French and German have a number of exceptional n-words. French *mot* expresses negation (3-a). In contrast to *personne* a DN reading is not possible in combination with n-words (b) and the combination with *pas* is ungrammatical (c). Surprisingly the German n-word *Dreck* behaves in exactly the same way in (4-a) and (4-b).

(3) a. Jean n'a dit **mot**.
Jean NE has said word
'Jean said nothing.'

b. **Personne** n'a dit **mot**. [SN]
nobody NE has said word
'Nobody said anything.' [SN]

c. *Il ne dit pas **mot**.
he NE says not word

(4) a. Das geht dich **einen Dreck** an.
this concerns you a dirt PART 'This is none of your business.'

b. Das geht **niemanden einen Dreck** an. [SN]
this concerns no one a dirt PART 'This is no one's business.'

c. Das geht dich k**einen Dreck** an. [SN]
this concerns you no dirt PART 'This is none of your business.'

Notice that while *mot* and *Dreck* behave like n-words with respect to the truth conditions of the respective sentences, they are severely constrained with respect to the verbs they can combine with. In French the original lexical meaning of these specialized n-words is the decisive factor: *mot* (literally: *word*) can only combine with verbs of saying, *goute* (literally: *drop*) only with verbs of drinking.

(5) a. Jean n'a dit rien du tout/ mot
Jean NE has said nothing at all/ word

b. Jean n'a acheté rien du tout/ *mot
Jean NE has bought nothing at all/ word

Similarly, German *Dreck* only combines with a restricted number of verbs, verbs of intellectual concern such as *kümmern*, *scheren* (both meaning *care* or *concern*), *interessieren* (*interest*).

(6) a. Das schert/ interessiert mich einen Dreck/ gar nicht
this concerns/ interests me a dirt/ not at all 'I don't care about this at all.'

b. Das gefällt mir *einen Dreck/ gar nicht.
this pleases me a dirt/ not at all 'I don't like this at all.'

2 Previous Approaches

de Swart and Sag (2002) provide an HPSG analysis of NC in terms of the lexical retrieval of quantifiers. Lexical retrieval is combined with the option of forming a polyadic quantifier, i.e. merging a sequence of expressions of the form $\neg\exists x_i$ into a single quantifier $\neg\exists x_1 \ldots x_n$. A language-specific parameter will determine whether or not such an absorption is possible. de Swart (t.a.) uses this syntactic framework to provide an optimality theoretic account of the characteristic interpretation strategies in a number of languages. This theory captures the general patterns (NC/ non-NC) of the languages, but it remains unclear how to incorporate lexical idiosyncrasies which contradict the general pattern of a language in this analysis.

Richter and Sailer (1999) discuss a set of data similar to those we investigate here. Their analysis, formulated in terms of a traditional Ty2 semantics using the lambda calculus and type shifting rules for the semantic combinatorics, focuses on the idiosyncrasies of the French data and models all of French negation in terms of a lexical ambiguity of n-words and idiosyncratic collocational restrictions for each reading of the n-words. While this approach describes both the general pattern and the idiosyncratic data, it fails to capture typological generalizations and a distinction between the general case and exceptions. This distinction is, however, clearly present in the data.

Richter and Sailer (2004) present an analysis of NC in Polish, a strict NC language. The analysis uses Lexical Resource Semantics (LRS) and exploits the possibility that two items may contribute the same negation to the logical form of a clause. They enforce strict NC by a language-specific principle saying that, in Polish, every verbal projection may have at most one negation in its logical form. This analysis accounts for one particular general pattern of NC in a fairly elegant way. However, it has not been shown how different NC patterns ranging from obligatory to impossible concord can be accommodated.

3 Technical Prerequisites

3.1 Lexical Resource Semantics

The semantic interpretations will be couched in terms of Lexical Resource Semantics (LRS, Richter and Sailer (2004)). LRS crucially allows us to use (1) a semantic combinatorics different from the lambda calculus, (2) techniques of scope underspecification, (3) identity constraints for (pieces of) semantic representations, and (4) expressions of Ty2 as logical representations.

In an LRS the semantic information of a sign is encoded in its L(OGICAL-)F(ORM) value. The value of this attribute contains the following two attributes:[1] PARTS lists all subexpressions that are contributed by a sign. The 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.

3.2 A Collocation Module

Richter and Sailer (1999) use a collocation module to account for n-words in general. Soehn (2006) modifies this module in a theory of idiomatic expressions and integrates it with an LRS semantics. A sign has a list-valued attribute COLL. Collocationally restricted items have a non-empty COLL value, which may contain various *barrier* objects indicating the syntactic domain in which their context requirements must be satisfied. For our data, this will always be the smallest complete

[1] LRS uses some more attributes, which, however, do not play a role in this paper.

clause containing a given lexical item. Barrier objects have several attributes which are used to specify (local) syntactic or semantic properties that the relevant barrier must have, such as LOC-LIC for its *local* value and LF-LIC for properties of its logical form.

4 Analysis I: The General Pattern

It has been argued in the literature that the conceptually most attractive analysis of the data is one which assumes a single lexical entry for any given n-word and characterizes their occurrence restrictions in terms of entailment properties of the admissible contexts of the n-word (see for example Giannakidou (1997)). The data above permit a treatment with a single lexical entry for each n-word only under the assumption of negation agreement. Consider sentences with the n-word *mot* but without another n-word. Then the only potential overt source of a negation in the clause is the n-word *mot*. Negation must, thus, be part of its semantic contribution, which in turn must be licensed by the lexical entry of the word. If *mot* occurs together with *personne*, we would erroneously predict the absence of an SN reading unless we assume negation agreement. The same observation holds for the other n-words. Clearly negative instances like the (a) examples above force us to assume that negation is part of the semantic contribution of n-words. In (7) we state the common properties of all n-words considered in the present paper.[2]

(7) $\left[\begin{array}{l}\text{PHON } \langle \textit{personne/niemand/nikt} \rangle \\ \text{SYNSEM NP} \\ \text{LF} \left[\begin{array}{ll}\text{EXC} & \boxed{1}\ \exists x(\alpha \wedge \beta) \\ \text{PARTS} & \left\langle x, \boxed{1}, \mathsf{human}'(x), (\alpha \wedge \beta), \neg\gamma \right\rangle\end{array}\right]\end{array}\right]$ & $\mathsf{human}'(x)$ is a component of α & $\boxed{1}$ is a component of γ

Given the characteristics of LRS mentioned in the introduction, optional negation agreement is available as a basic option of the semantic combinatorics: Each n-word contributes negation ($\neg$), but n-words can agree, i.e. they may contribute the same semantic negation to an utterance.

To account for the differences between optional and impossible NC in sentences with more than one n-word, we can assume general principles: For French n-words of the *personne*-type nothing needs to be said, as LRS allows for negation agreement but does not enforce it. In German, the principle in (8) prohibits negation agreement.[3]

(8) No-Negative Concord Constraint (German, Dutch, English):

a. In every phrase: there is no element of the form $\neg\alpha$ which is on the PARTS list of both the head-daughter and the nonhead-daughter.

b. $\textit{phrase} \Rightarrow \left(\left[\begin{array}{l}\text{H-DTR LF PARTS } \boxed{A} \\ \text{N-DTR LF PARTS } \boxed{B}\end{array}\right] \right.$ $\left. \&\ {\sim}\mathbf{E}\boxed{1}\ \mathbf{E}\alpha\ (\ \boxed{1} = \neg\alpha\ \&\ \texttt{member}(\boxed{1},\boxed{A})\ \&\ \texttt{member}(\boxed{1},\boxed{B})) \right)$

In the present framework, optional NC is the simplest case, which is typologically correct. Strict NC can be enforced and might even be preferred because it leads to less complex logical forms. For the rare cases of non-NC languages a principle like (8) can account for the general pattern. Thus, these languages have more complex grammars than NC languages, which may explain their typological markedness.

[2]We will only specify lexical entries since the only question of interest here is how many items contribute a negation in a given sentence and how many negations occur in the interpretation. Greek letters in the descriptions refer to subterms which are not specified in more detail.

[3]For Polish, Richter and Sailer (2004) assume a general principle that enforces NC. To distinguish clearly between the HPSG description language and the semantic representation language we use $\sim$, & and $\mathbf{E}$ for negation, conjunction and existential quantification in the former.

5 Analysis II: Exceptional N-Words

While the agreement behavior of *personne*/*niemand*-type n-words is principle-based, we will provide a lexical account of the idiosyncratic items, the n-words in (3) and (4), and *pas*. The lexical entries of these items specify collocational restrictions, i.e. they exclude some of the readings we expect to find.

The lexical entry of *pas* specifies that no other item in the sentence may agree with it. This enforces the DN reading in (1-c).

(9) Sketch of the lexical entry of *pas*:

$$\left[\begin{array}{ll} \textsc{phon} & \langle \textit{pas} \rangle \\ \textsc{synsem} & \textsc{Adv} \\ \textsc{lf} & \left[\textsc{parts}\ \langle \neg\delta \rangle\right] \\ \textsc{coll} & \left\langle \left[\begin{array}{l} \textit{complete-clause} \\ \textsc{lf-lic}\ \left[\textsc{parts}\ \boxed{\text{A}}\right] \end{array}\right] \right\rangle \end{array}\right] \ \&\ \neg\delta \text{ occurs exactly once in } \boxed{\text{A}}.$$

The lexical entry of *mot* in (10) is consistent with (7). In addition, it contains a non-empty COLL value expressing that: (i) the collocational restrictions must be satisfied in the smallest complete clause containing *mot*; (ii) in this clause, *mot* must combine with a verb of saying (note that we use the attribute LISTEME from Soehn (2006) to express this); (iii) while *mot* contributes a negation, this negation may not be distinct from other negations in the same clause. Under this analysis, the incompatibility of *pas* and *mot* in (3-c) is a consequence of contradictory collocational requirements of the two items.

(10) Sketch of the lexical entry of the exceptional n-word *mot*:

$$\left[\begin{array}{ll} \textsc{phon} & \langle \textit{mot} \rangle \\ \textsc{synsem} & \text{NP} \\ \textsc{lf} & \left[\begin{array}{ll} \textsc{exc} & \boxed{1}\ \exists x(\alpha \wedge \beta) \\ \textsc{parts} & \left\langle x, \boxed{1}, \mathsf{thing}'(x), (\alpha \wedge \beta), \neg\gamma \right\rangle \end{array}\right] \\ \textsc{coll} & \left\langle \left[\begin{array}{ll} \multicolumn{2}{l}{\textit{complete-clause}} \\ \textsc{loc-lic} & \left[\textsc{cat head listeme}\ \textit{saying}\right] \\ \textsc{lf-lic} & \left[\textsc{parts}\ \boxed{\text{A}}\right] \end{array}\right] \right\rangle \end{array}\right]$$

$$\begin{array}{ll} \& & \mathsf{thing}'(x) \text{ is a component of } \alpha \\ \& & \boxed{1} \text{ is a component of } \gamma \\ \& & \left(\text{if there is an element in } \boxed{\text{A}} \text{ of the form } \neg\delta, \text{ then } \delta = \gamma\right) \end{array}$$

The pattern of German *Dreck* in (4) is analogous to that of *mot* at the surface. We must, however, take into account that the negation systems of French and German are fundamentally different. French has optional NC, in German NC is impossible. We assume that *Dreck* is lexically specified as optionally introducing a negation. Collocationally, it is just like *mot*. A clause-mate negation may not be distinct from the negation contributed by *Dreck*. This leads to the effect that *Dreck* does not contribute a negation in the context of a negative marker or an n-word.

(11) Sketch of the lexical entry of the exceptional n-word *Dreck*:

$$\begin{bmatrix} \text{PHON} \ \langle \textit{Dreck} \rangle \\ \text{SYNSEM NP} \\ \text{LF} \begin{bmatrix} \text{EXC} & \boxed{1}\ \exists x(\alpha \wedge \beta) \\ \text{PARTS} & \big\langle x, \boxed{1}, \mathsf{thing}'(x), (\alpha \wedge \beta) \big\rangle \big(\oplus \ \langle \neg\gamma \rangle \big) \end{bmatrix} \\ \text{COLL} \left\langle \begin{bmatrix} \textit{complete-clause} \\ \text{LOC-LIC} \ \big[\text{CAT HEAD LISTEME } \textit{intell-concern} \big] \\ \text{LF-LIC} \ \big[\text{PARTS } \boxed{A} \big] \end{bmatrix} \right\rangle \end{bmatrix}$$

& $\mathsf{thing}'(x)$ is a component of α
& $\boxed{1}$ is a component of an expression $\neg\delta$ in $\boxed{A}$
& (if there is an element in $\boxed{A}$ of the form $\neg\delta$, then $\delta = \gamma$)

6 Summary

Our analysis covers the full range of data while distinguishing clearly between (i) the overall type of the language and (ii) lexical items with principle-governed versus idiosyncratic behavior. Previous approaches have not been able to combine these two aspects.

The analysis makes the following predictions: (1) We expect that functional items in a language show fewer or no collocational properties. This is attested for French *pas*. Historically, *pas* was collocationally as restricted as *mot*. Its collocational restrictions today are more general than those of the *mot* type. However, the incompatibility of *mot* and *pas* still follows from their respective collocational requirements alone. In non-standard variants, *pas* does not have a collocational restriction, i.e. it behaves according to the general principle and permits optional NC. (2) For non-NC languages, items which enforce "NC-like" interpretations have complex semantic contributions and collocational requirements. Thus, they are highly marked. In fact, we only find very few of them in German. They have not been noticed in the literature, and we conjecture that their overall frequency in languages is very low.

At the heart of our analysis is the technique of enforcing, forbidding or permitting structural identity between (components of) signs in complex structures. In HPSG this is *the* single most important device of linguistic description. It is used to model agreement in the nominal domain, coindexation in Binding Theory and subject-verb agreement in the sentential domain. In LRS analyses of semantic phenomena structural identity of semantic representations has been used before to model tense agreement in Afrikaans and interrogative agreement in multiple wh-questions in German (see Richter and Sailer (2004) for references). In the present contribution we argued that a typologically oriented analysis of NC can exploit negation agreement to account simultaneously for, (1) the dominance of NC or multiple negation in a given language and, (2) the occurrence of lexically marked exceptions to each pattern. We integrated lexical exceptions in such a way that they are distinguished as special cases which need to be learned individually.

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