On the syntactic flexibility of formal features

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Abstract: In this paper I argue that the set of formal features that can head a functional projection is not predetermined by UG but derived through L1 acquisition. I formulate a hypothesis that says that every functional category F is realised as a semantic feature [F] unless there are overt doubling effects in the L1 input with respect to F; this feature is then analysed as a formal feature [i/uF]. In the first part of the paper I provide a theoretical motivation for this hypothesis, in the second part I test this proposal with a case study, namely the cross-linguistic distribution of Negative Concord (NC). I demonstrate that in NC languages negation must be analysed as a formal feature [i/uNEG], whereas in Double Negation languages this feature remains a semantic feature [NEG] (always interpreted as a negative operator), thus paving the way for an explanation of NC in terms of syntactic agreement. In the third part I argue that the application of the hypothesis to the phenomenon of negation yields two predictions that can be tested empirically. First I demonstrate how this hypothesis predicts negative markers Neg° can be available only in NC languages; second, independent change of the syntactic status of negative markers, can invoke a change with respect to the exhibition of NC in a particular language. Both predictions are proven to be correct. I finally argue what the consequences of the proposal presented in this paper are for both the syntactic structure of the clause and second for the way parameters are associated to lexical items.

Keywords: Negation, Negative Concord, Doubling, Formal Features, Functional Projections, Redundancy

1. Introduction

A central topic in the study of the syntax-semantics interface concerns the question what exactly constitutes the set of functional projections, or more precisely, what constitutes the set of formal features that are able to project. Since Pollock's (1989) work on the split-IP hypothesis many analyses have assumed a rich functional structure, consisting of a UG-based set of functional heads that are present in each clausal domain (Beghelli & Stowell (1997) for quantifier positions, Rizzi (1997) for the CP domain, Zanuttini (1997a,b) for negation or Cinque (1999) for the IP domain). This approach has become known as the *cartographic* approach (cf. Cinque (2002), Rizzi (2004), Belletti (2004) for an overview of recent papers). Under this approach the set of functional projections is not taken to result from other grammatical properties, but is rather taken as a starting point for grammatical analyses.

An alternative view on grammar, standardly referred to as *building block grammars* or the *what you see is what you get* (*wysiwyg*)[i] approach (cf. Iatridou (1990), Grimshaw (1997), Bobaljik & Thrainsson (1998), Koeneman (2000), Neeleman & Van der Koot (2002)), takes syntactic trees to be as small as possible. Apparently, in many cases there is empirical evidence for the presence of a functional projection in a particular clause, e.g. due to the presence of an overt functional head. The main difference, however, between the building block grammar approach and the cartographic approach (in its most radical sense) is that in the first approach the presence of a particular functional projection in a particular sentence in a particular language does not imply its presence in all clauses, or all languages, whereas this

is the basic line of reasoning under the latter approach (cf. Cinque (1999), Starke (2004)). However, the question what exactly determines the amount and distribution of functional projections remains open.

An intermediate approach between *cartography* and *building block / wysiwyg grammars* is Giorgi & Piranesi's (1997) *feature scattering approach*. Giorgi & Piranesi argue that the set of formal features is universal and hierarchically ordered. All formal features may in principle project a head. Cross-linguistic differences are then accounted for by allowing different features to syncretise on one formal head, as long as their hierarchical ordering is kept intact. Under this approach, a universal set of formal features is reconciled with cross-linguistic differences in the clausal architecture. It should however be acknowledged that the differences between the approach and cartographic approach are not as clear as it seems. Only in the most radical cartographic analyses (Cinque (1999), Starke (2004)) each formal feature corresponds to a separate functional projection. Rizzi (1997) also allows feature scattering, e.g. in the case of English [Force] and [Fin(iteness)] when there is no morphosyntactic argument to assume that they must host different head positions.

Ultimately, both the cartographic and Giorgi & Piranesi's approach take the set of formal features to be determined by UG. In the present paper I propose a radically different perspective on the set of formal features, namely that UG does not contain any formal feature at all, but that the set of formal features (and consequently, the set of functional projections) is created during language acquisition. This paper thus breaks with the idea that the set of formal features represents the set of substantive universals or the set of semantic operators. Such an has been attractive since it links cross-linguistic variation to ways of realising these semantic operators, but, as I propose in the present paper, such a connection does not have to depend on the stipulated uniformity of the set of formal features. In this paper I also argue that these operators form the basis for the set of formal features, but I argue that formal features are derived from them, and I provide empirical and theoretical motivations for this claim. As a result it remains possible to connect cross-linguistic variation to the different ways of expressing particular semantic operators without stipulating a set of formal features that is uniform across languages.

The question of what constitutes functional projections and thus the set of formal features that are able to project is not only important for a better understanding of the syntax-semantics-interface, but is also of acute interest to the study of parameters. This is due to Borer's (1984) assumption that parametric values are associated with properties of functional heads, a view on parametric variation that has been adopted in the Minimalist Program (cf. Chomsky (1995, 2000)). For instance, the *Wh (fronting / in situ)* parameter follows from the presence of a [WH] feature on C° that either triggers movement of *Wh* terms to a sentence-initial position or allows them to remain in situ. However, once it is assumed that the pool of formal features in a language is not cross-linguistically identical, it becomes questionable whether parametric variation can still be tied down to properties of functional heads. Under a flexible approach the fact that in *Wh* languages *Wh* terms do not move to sentence-initial position can be said to result from a lack of a formal [Wh] feature that would trigger such movement. Under such an analysis the *Wh* parameter can no longer be reduced to properties of C° (note that the availability of C° is also subject to cross-linguistic variation; languages may lack a CP at all, if there is no proper trigger/cue for it during L1 acquisition). Hence a flexible approach to the question whether the set of formal features is uniform across languages may have strong consequences for the status of theories of parametric variation.

In the following section I provide some theoretical background and present my proposal, the Flexible Formal Feature Hypothesis (FFFH), arguing that a particular feature (a negative feature or a tense feature) is analysed as a formal feature able to create a functional

projection FP if and only if there are (substantial) instances of doubling effects with respect to F present in language input during first language acquisition. After that, in section 3, I present a case study that illustrates how the FFFH works: negation and Negative Concord. In this section I demonstrate that negation is a syntactically flexible functional category: in Negative Concord languages negation is realised as a formal feature, in Double Negation languages it is not. In section 4, I argue that if the FFFH is correct, Negative Concord should be analysed as a form of syntactic agreement. I present the outline of such an analysis and show how it solves some problems that other approaches of analysing NC have been facing. In section 5, two more consequences of the application of the FFFH to negation are discussed: (i) the syntax of (negative) markers and (ii) patterns of diachronic change. Here I show that the FFFH makes correct predictions, thus providing empirical evidence for it. Section 6 concludes.

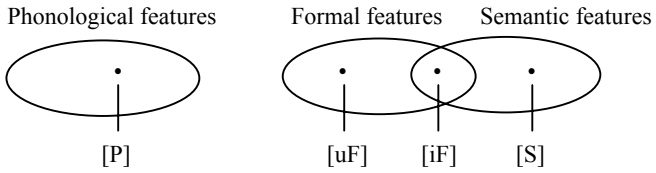
2. Formal features result from doubling effects

In the Minimalist Program (Chomsky (1995, 2000, 2001)) Lexical Items (LIs) are assumed to be bundles of three kinds of features: phonological features, semantic features and formal features. In the present paper the distinction between formal features and semantic features is of particular interest. First, I focus on the question as to what exactly the differences are between formal and semantic features. Second, the question rises of how these differences can be acquired during L1 acquisition.

2.1 Formal features

As LIs consist of three different kinds of features, three different sets of features can be distinguished: the set of phonological features, the set of formal features and the set of semantic features. Following standard minimalist assumptions on the architecture of grammar, the set of formal features and the set of semantic features intersect, whereas the set of phonological features does not intersect with any of the two other sets. The relations between the sets are illustrated in (1).

(1)



As the sets of formal and semantic features intersect, formal features come in two kinds: formal features that have semantic content and formal features that do not. Therefore every formal feature (i.e. every formal feature on a lexical element) has a value ±interpretable: interpretable formal features can be interpreted at LF, the interface between grammar and the (semantic) Conceptual-Intentional system; uninterpretable features do not carry any semantic content and should therefore be deleted in the derivation before reaching LF in order not to violate the Principle of Full Interpretation (Chomsky (1995)). Uninterpretable features ([uF]'s) can be deleted by means of establishing a checking relation with a corresponding interpretable feature [iF].

A good example of a formal feature is the person feature (a so-called φ-feature). It is interpretable on DP's, but uninterpretable on verbs. Therefore finite verbs must enter a relation with a subject, so that the uninterpretable person feature on the verb is checked against the interpretable feature on the subject and is deleted. An example of a proper

semantic feature is *sex* (as opposed to *gender*), which does not trigger any syntactic operation. No feature has to be deleted, as sex can always be interpreted.

Now the following question arises: how can one distinguish an interpretable formal feature [iF] from a semantic feature [F]? From a semantic perspective the two are indistinguishable, as they have identical semantic content:

(2) $||X_{[iF]}|| = ||X_{[F]}||$

Syntactically, there is however a major distinction between an element carrying [iF] and an element carrying [F]. The first, but not the latter is able to check uninterpretable features ([uF]'s). Checking of uninterpretable features thus forms a diagnostic test to distinguish interpretable formal features from purely semantic features. Suppose that a sentence containing a Lexical Item Y carries a feature [uF] is grammatical. Due to the Principle of Full Interpretation (Chomsky (1995)) this feature must have been checked against a feature carrying [iF]. Now suppose that a lexical Item Z is the only element in the proper licensing domain of Y that has an interpretation such that its feature must be either [iF] or [F]. In this case it must be that Z carries [iF] and not [F], since otherwise the sentence could not have been grammatical. In other words, if a Lexical Item A is able to check a feature [uF] on B, A must carry [iF].[ii]

Hence, the occurrence of elements carrying uninterpretable features in grammatical sentences, forms the only diagnostic to distinguish elements carrying interpretable formal features from elements carrying purely semantic features. However, this immediately raises the question how it can be determined whether a particular Lexical Item carries an uninterpretable formal feature.

2.2 Uninterpretable features and doubling effects

So, the question how to determine whether an LI carries a formal feature [iF] or a semantic feature [F] reduces to the question how to determine whether there is an LI visible that carries a feature [uF]. This question is much easier to address: LIs carrying [uF]'s exhibit (at least) two properties that can easily be recognised (which already have been mentioned above) and are repeated in (3).

(3) a. A feature [uF] is semantically vacuous.
b. A feature [uF] triggers syntactic operations Move and Agree in order to be deleted.

At first sight there are three properties that form a test to recognise a feature [uF]: its semantic uninterpretability, the triggering of an operation Move and the triggering of an operation Agree. Below I argue that all of these three properties reduce to one single property: doubling. First, although a feature [uF] is meaningless, it must establish a syntactic relationship with an element that carries [iF] and that therefore must have semantic content. This is illustrated in the following example with the person feature [i/u2SG]:

(4) a. Du komm-st German
You come
b. $[_{TP}\ Du_{[i2SG]}\ kommst_{[u2SG]}\ ]$

In (4) it is shown that the information that the subject is a 2nd person singular pronoun is encoded twice in the morphosyntax: first by the choice of the subject *du*, second by the person marker *–st* on the verbal stem. Since there is only one 2nd person singular subject in the semantics of the sentence, the subject marker on the verb is meaningless.

At this stage the question emerges why a certain morpheme is semantically vacuous. In cases of overt doubling, such as (4), the fact that the presence of one semantic operator is manifested twice in the morpho-syntax forms evidence that at least one of the two elements must carry no semantic content. But how to analyse cases in which an inflectional morpheme is the only overt marker of a semantic operator? This is for instance the case with pro-drop:

(5) Canta Italian
sings.3SG.SING
'He/she sings'

According to Rizzi (1986) among many others, sentences such as (5) are considered to contain an abstract subject whose presence is marked by the subject marking on the verb. Following this line of reasoning the subject marking on the verb is then no longer the carrier of the semantics of the 3rd person singular subject.

Now, let us discuss the expression of English past tense:

(6) You walked

In (6) it is unclear whether the morpheme *–ed* on *walk* is the phonological realisation of the past tense operator. Although this may look like a natural assumption, nothing a priori forbids an analysis where the inflectional morpheme is semantically vacuous and the past tense operator is an abstract adverbial operator (whose presence is marked by the tense marker on the verb). This latter option is available since nothing requires that a Lexical Item that carries an interpretable formal feature must be phonologically realised. In the previous section it has only been argued for that [iF] is carried by a visible Lexical Item. If for instance the dependent (the element carrying a [uF]) is phonologically realised (and the sentence is grammatical) the presence of the element carrying [iF] has already been made visible and therefore does not necessarily have to contain phonological material.

Here I Follow Ogihari (1995) and Von Stechow (2005), who on the bases of their analyses of sequence-of-tense effects and the interaction between tense and (distributive) quantifiers have convincingly shown that it is imposible to analyse the past tense morpheme as the past tense operator. The first option, in which *-ed* is the relisation of a semantic past tense operator, is ruled out. Hence *-ed* must be considered to carry a [uPAST] rather than an [iPAST] feature. Consequently, (6) contains a covert past tense adverbial.

The examples in (4)-(5) are already an example of the syntactic operation Agree. In (4) at some point in the derivation the verb's [u2SG] feature is checked against a corresponding [i2SG] feature. Without an Agree relation between *du* and *kommst*, the sentence would be ungrammatical; if *kommst* did not have any uninterpretable person features at all, it could not have triggered an Agree relation in the first place. The same holds *mutatis mutandis* for the relation between the abstract subject and the finite verb in (5) and the relation between the past tense operator and the tensed verb in (6). In (4) the semantic operator is overtly manifested more than once, a phenomenon that is known as *doubling*. In (5) and (6) there is only one overt marker of the subject pronoun or the past tense respectively, but there are again multiple elements in the morpho-syntax visible that correspond to a single semantic operator. Therefore, although in (5) and (6) only one marker

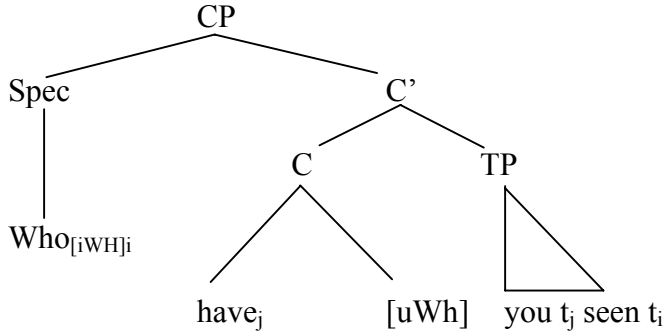
has been realised phonologically, these sentences also exhibit *doubling*. Agree is always a result of a doubling effect.

Such an Agree relation is not restricted to two elements (one [iF], one [uF]), also multiple [uF]'s can establish a relation with a single [iF]. Ura (1996) and Hiraiwa (2001, 2005) refer to this phenomenon as *multiple Agree*. This is illustrated in (7) below for Spanish, where the gender and number features on the noun are also manifested on the determiner and the adjective.[iii,iv]

(7)	Las	chicas	guapas	Spanish
	The$_{[uFEM][uPL]}$	girls$_{[iFEM][iPL]}$	pretty$_{[uFEM][uPL]}$	
	'The pretty girls'			

Now, let us have a look at the operation Move. Checking requirements of uninterpretable features always trigger movement. It follows immediately that Move should follow from doubling properties, since Move is a superfunction of Agree (Move = Agree + Pied-piping + Merge). It has been argued that *Wh* fronting is triggered by an uninterpretable *Wh* feature [uWH] on C.[v] By moving the *Wh* word, which carries an [iWH] feature, to Spec,CP, the [uWH] feature in C° can be checked against this [iWH]. This is illustrated in (8).

(8)



In (8) the *Wh* feature is present three times in total in the structure: as [iWH] on the Wh word, as [uWH] on C° and as a deleted [iWH] on the trace. Given that the *Wh* term had to be fronted, it can be determined that C° must contain an uninterpretable feature [uWH]. In other words, Move makes the presence of an uninterpretable feature [uWH] visible although this feature itself has not been spelled-out. Hence Move, too, results from a double manifestation of the Wh feature in the sentence.

It remains of course an open question why in (8) the checking relation cannot be established by Agree as well. Much debate is going on about this question. In some recent minimalist versions it is assumed that in English C° has an additional EPP feature that is responsible for the movement. For the moment I will not engage in this discussion. It suffices to say that Move is a superfunction of Agree and since doubling is a triggering force behind Agree, it is behind Move too. Consequently, Move cannot take place without being triggered by uninterpretable features.

As we have seen, doubling is the driving force behind the existence of uninterpretable features. Without any doubling in natural language no uninterpretable formal features would exist, and thus no formal features. This immediately rises the question why there should be doubling in natural language in the first place? In this paper I do not address this issue, since this question would require a paper on itself, but ultimately the existence of doubling should follow from interface conditions, as (ideally) every grammatical property. Since there does not seem to be any semantic advantage to doubling, the question calls for a phonological explanation. In Zeijlstra (2006) I analyse doubling as a result of a phonological desideratum

to spell-out as many functional markers on one Lexical Element. For a survey of the arguments and explanation, the reader is referred to that paper.

A second question that waits to be answered is why doubling should lead uninterpretable material. After all, could there not be some semantic device that is responsible for the proper readings if very morpho-syntactic marker did have semantic content? Take as example the minimal pair in (9).

(9) a. John walked
b. Yesterday John walked

I have argued that *–ed* on walked does not contain an interpretable past tense feature, and that past tense in (9a) is induced by an abstract adverbial operator, call it Op_{PAST}. Is past tense also induced by Op_{PAST} in (9b)? The answer to this question depends on the featural make-up of *yesterday*. Does it contain a feature [iF] or not? Arguably not, since yesterday is perfectly compatible with present perfect constructions, as shown below. Thus if yesterday were the element responsible for the checking of the uninterpretable tense feature in (9b), (9a) would lead to a feature checking mismatch and be ruled out.

(10) Yesterday John has walked

Hence it makes more sense to adopt common analyses on these semantics of *yesterday* and say that it somehow relates to the topic time. This implies that in (9b) Op_{PAST} is also part of the sentence. But Op_{PAST} and yesterday do not give rise to an iterative past tense reading. Why is this not a case of doubling either? This is due to the fact that *yesterday* modifies on Op_{PAST} and that for instance in neo-Davidsonian event semantics a conjunction of *yesterday* operating on an event variable and past tense doing the same thing also leads to the correct interpretation of (9b).

(11) ...∃e.[**yesterday'**(e) & **past'**(e) & ...]

As there are two semantic operators (yesterday and Op_{PAST}) available in the interpretation of (9b), there is no doubling. Doubling is only the case if a morpho-syntactic marker expressing the presence of a semantic operator cannot have the lexical semantics of this operator as well. In the literature this has been proposed for many instances of marking, such as tense marking, perfect marking, modality marking, person marking, etc. (cf. von Stechow (2006) for an exhaustive overview of this literature, see also Zeijlstra (2006) for an argument why all inflectional morphology must involve redundant material).

Markers of a semantic operator Op_F that cannot be the realisation of this semantic operation must carry [uF]. Thus, whenever there is 'real' doubling with respect to F, there is a [uF] present, and whenever a [uF] feature is present in a syntactic structure, there is doubling with respect to F.

Before continuing the discussion, a few words need to be said about the following problem: the fact that [uF] is semantically vacuous seems to be at odds with the fact that it contains the information that it must be checked with a feature ([iF]) that encodes particular *semantic* information. This problem (an instance of Look Ahead, since apparently the properties that are visible on LF already play a role during the derivation) has been accounted for in terms of feature valuation (cf. Chomsky (2001)). The difference between interpretable and uninterpretable features would be rephrased in terms of lexically valued versus unvalued features. Valued features are then interpretable at LF, whereas unvalued features are not. Under Agree, unvalued features are valued (without proper valuation the derivation would

crash at LF). After valuation they are deleted, deletion being a by-effect of Agree. However, the idea that features that are valued during syntax are uninterpretable at LF as opposed to the idea that features that are valued in the lexicion are LF interpretable is pure stipulation, and therefore it does not really solve the problem.

I argue that the problem disappears under a closer look to what counts as syntax and what counts as semantics. In order to keep [uF] semantically vacuous, [uF] may contain only syntactic information. This information encodes that a lexical item carrying [uF] must stand in an Agree relation to an element that carries a feature [iF]. Although [iF] has semantic content, it also has syntactic content. This follows immediately from the architecture of grammar: if [iF] would lack any syntactic content, it could not have been a formal feature in the first place and it would be a purely semantic feature [F]. It is this syntactic content of [iF] that checks [uF] and causes its deletion. Since [iF] is not only a syntactic feature, but also a semantic feature (it is an element of the intersection of the two sets of features), its syntactic part does not have to be deleted: [iF] has semantic content as well and therefore it does not violate the principle of Full Interpretation at LF.

Finally, a word on purely semantic features. Although I adopt the architecture in (1), I am not strongly committed to the existence of semantic features in the model of grammar. A particular element is asigned a particular semantic feaature [F], if it contains a semantic operator Op_F in its lexical semantics and it does not get formalised (i.e. it cannot be analysed as [iF]). A negative quantifier (in a Double Negation language) is said to carry a feature [NEG] since its lexical semantics carries a logical negation ($\lambda P \lambda Q \neg \exists x[P(x) \ \& \ Q(x)]$ for English *no*, for instance). Under a strong lexical feature approach, the Lexical Item *no* is composed out of a semantic feature [NEG] and many other features, such as quantificational features. A more model-theoretical semantics approach would take [NEG] to count as a label encoding that the Lexical Item is semantically negative. Under such an approach purely semantic features do not have an ontological status anymore. Interpretable formal features would then be purely syntactic features that also label the presence of a particular semantic operator. In this paper I will restrict myself to the feature approach, but the analysis can be perfectly implemented in theories without semantic features.

Now we can reformulate the answer to the question asked in the beginning of this subsection: how can an [iF] be distinguished from a [F]? The answer is that whenever there is doubling with respect to F, there are (only) formal features ([iF]/[uF]). Two features [iF] or two features [F] would result in an iterative reading that contains two semantic operators Op_F.[vi] Following this line of reasoning, if there is no doubling with respect to F, there is no reason to assume that F is a formal feature. In those cases, every instance of F always corresponds to a semantic feature [F]. Therefore I put forward the following hypothesis:

(12) *Flexible Formal Feature Hypothesis (FFFH)*
   a. If and only if there are doubling effects with respect to a semantic operator OP_F in the language input, all features of F are formal feature [i/uF].
   b. If there are no doubling effects with respect to a semantic operator OP_F in the language input, all features of F are semantic features ([F]).

This hypothesis, if correct, has consequences for the architecture of grammar. It rejects the idea that the set of formal features is fixed by UG, and states that every semantic operator[vii] in principle can be part of the syntactic vocabulary (i.e. the set of formal features) or remains within the realm of semantics. Before elaborating the proposal and its consequences in abstract terms, I first provide a case study, which shows that this hypothesis based on the idea

that the set of formal features is not predetermined by UG makes correct predictions when applied to a particular empirical phenomenon.

3. Case study: Negation and Negative Concord

The case study to test the FFFH presented above concerns negation. Doubling with respect to negation is clearly detectable, since two semantic negations always cancel each other out. If two negative elements do not cancel each other out, but yield one semantic negation, at least one of the two negative elements must be uninterpretable. This phenomenon is well described and known as Negative Concord (NC).[viii]

One can distinguish three different types of languages with respect to multiple negation: (i) Double Negation (DN) languages, in which two negative elements always cancel each other out; (ii) Strict NC languages, in which multiple (clause-internal) negative elements (both negative markers and n-words[ix]) yield only one semantic negation; and (iii) Non-strict NC languages, where either a preverbal n-word or a preverbal negative marker establishes an NC relation with a postverbal n-word. However, a negative marker in this type of language may not follow preverbal n-words. An example of a DN language is Dutch, an example of a Strict NC language is Czech and an example of a Non-strict NC language is Italian, as is illustrated in (13)-(15) below.

(13) a. Jan ziet *niemand* — Dutch
Jan sees n-body
'Jan doesn't see anybody'
b. *Niemand* zegt *niets*
N-body says n-thing
'Nobody says nothing'

(14) a. Milan *(*ne*-)vidi *nikoho* — Czech
Milan NEG.saw n-body
'Milan doesn't see anybody'
b. Dnes *(*ne*-)volá *nikdo*
Today NEG.calls n-body
'Today nobody calls'
c. Dnes *nikdo* *(*ne*-)volá
Today n-body NEG.calls
'Today nobody calls'

(15) a. Gianni *(*non*) ha telefonato a *nessuno* — Italian
Gianni NEG has called to n-body
'Gianni didn't call anybody'
b. Ieri *(*non*) ha telefonato *nessuno*
Yesterday NEG has called n-body
'Yesterday nobody called'
c. Ieri *nessuno* (**non*) ha telefonato (a *nessuno*)
Yesterday n-body NEG has called to n-body
'Yesterday nobody called (anybody)'

In Dutch, two negations cancel each other out, and thus the sentences in (13) contain only one negative element. This is either the negative marker *niet* or a negative quantifier, as illustrated

below in (16)-(18). Note that the locus of the negative operator at LF does not coincide with its relative position at surface structure, but this is due to quantifier raising (independent from negation) in (16) or V2 in (18). Hence there are no doubling effects with respect to negation. As a result from the FFFH it follows that negation in Dutch is not formalised (or grammaticalised): the only negative feature [NEG] in Dutch is a semantic feature.

(16) Jan doet *niets* $\neg\exists x.[\textbf{thing'}(x) \,\&\, \textbf{do'}(\textbf{j}, x)]^x$
[NEG]
Jan does n-thing

(17) *Niemand* komt $\neg\exists x.[\textbf{person'}(x) \,\&\, \textbf{come'}(x)]$
[NEG]
N-body comes

(18) Jan loopt *niet* $\neg\textbf{walk'}(\textbf{j})$
[NEG]
Jan walks NEG

Things are different, however, in NC languages. Let us start by discussing the Non-strict NC language Italian. In Italian postverbal n-words obligatorily need to be accompanied by the negative marker *non* or a preverbal n-word. This means that a large part of negative sentences in the L1 input consists of sentences such as (19).

(19) Gianni *non* ha visto *nessuno* $\neg\exists x.[\textbf{person'}(x) \,\&\, \textbf{see'}(\textbf{g}, x)]$
[iNEG] [uNEG]
Gianni NEG has seen n-body

Since (19) contains more than one negative element, but only one negation in its semantics, only one of the negative elements can be semantically negative and the other one must be semantically non-negative. The latter element must therefore carry an uninterpretable formal negative feature [uNEG], and, negation being formalised in this language, the negative operator carries [iNEG] and not [NEG]. Negation scopes from the position occupied by *non*.[xi] *Non* thus carries [iNEG] and *nessuno* carries [uNEG]. This distribution cannot be reversed, since otherwise a sentence such as (20) is expected to be grammatical, contra fact.

(20) *Gianni ha visto *nessuno*
Gianni has seen n-body
'Gianni hasn't seen anybody'

Non's [iNEG] feature also enables it to express sentential negation. This is shown in (21) where *non* functions as the negative operator.

(21) *Non* ha telefonato Gianni $\neg\textbf{call'}(\textbf{g})$
[iNEG]

The fact that *non* is the carrier of [iNEG] and n-words carry [uNEG] seems to be problematic in one respect, namely that Italian also allows sentences such as (22). Here *non* is absent (and may not even be included). Hence, all overt negative elements carry [uNEG].

(22) *Nessuno* ha telefonato a *nessuno* $\neg\exists x\exists y[\textbf{person'}(x) \,\&\, \textbf{person'}(y)$
[uNEG] [uNEG] $\&\, \textbf{call'}(x, y)]$

However, given the grammaticality and the semantics of the sentence, one element must carry the feature [iNEG]. Basically, there are two ways out. One possibility is to analyse n-words as being lexically ambiguous between negative quantifiers and non-negative indefinites (cf. Herburger (2001)), but this would render (20) grammatical. The other way is to assume that negation is induced by a (phonologically) abstract negative operator (*Op*¬), whose presence is marked by the overt n-words. Then (22) would be analysed as follows:

(23) *Op*¬ *nessuno* ha telefonato a *nessuno*
[iNEG] [uNEG] [uNEG]

This analysis is supported by the fact that if the subject n-word is focussed and the negative marker *non* is included, the sentences achieves a DN reading. Hence, apart from the presence of *non*, a second negative operator must be at work.

(24) *Op*¬ *nessuno non* ha telefonato a *nessuno*
[iNEG] [uNEG] [iNEG] [uNEG]

Consequently, given the fact that in Italian not every instance of negation is semantically negative, negation is formalised and every negative element carries a formal negative feature: n-words carry [uNEG] and the negative marker *non* and *Op*¬ carry [iNEG].

In Czech, the application of the FFFH leads to slightly different results. First, since Czech is an NC language, negation must be formalised and n-words are attributed a feature [uNEG]. However the (default) assumption that the negative marker carries [iNEG] cannot be drawn on this basis yet. The negative operator could also be left abstract. Hence, the value of the formal feature of the negative marker in (25) cannot be determined on the basis of this example.

(25) Milan *ne*-vidi *nikoho* ¬∃x.[**person**'(x) & **see'**(**m**, x)]
[?NEG] [uNEG]

In Italian we saw that *non* must be the negative operator, since negation takes scope from the position that it occupies. Consequently, no n-word is allowed to surface left of this marker (with the exception of constructions like (24)). However, in Czech n-words are allowed to occur both to the left and to the right of the negative marker. This means that negation cannot scope from the surface position of *ne*, since otherwise the negative operator would be (asymmetrically) c-commanded by the semantically non-negative n-word, and, contrary to fact, yield a reading in which the indefinite outscopes negation. The only way to analyse *ne* then, is as a negative marker that carries [uNEG] and which establishes a feature checking relation (along with the n-words) with a higher abstract negative operator:

(26) *Op*¬ *Nikdo* *ne*-volá ¬∃x.[**person'**(x) & **call'**(x)]
[iNEG] [uNEG] [uNEG]

As a final consequence, single occurrences of *ne* cannot be taken to be realisations of the negative operator, but markings of such an operator. In (27) the negative marker indicates the presence of *Op*¬, which in its turn is responsible for the negative semantics of the sentence.

(27) Milan *Op*¬ *ne*-volá ¬**call'**(**m**)
[iNEG] [uNEG]

Hence, in Czech even the negative marker is semantically non-negative. Czech and Italian thus differ with respect to the formalisation of negation to the extent that the negative marker in Italian carries [iNEG], whereas the negative marker in Czech carries [uNEG]. Note that this corresponds to the phonological status of the two markers: in Czech the negative marker exhibits prefixal behaviour, thus suggesting that it should be treated on a par with tense/agreement morphology. Italian *non* is a (phonologically stronger) particle that can be semantically active by itself.

4. NC is syntactic agreement

4.1 Analysis

The application of the FFFH calls for an analysis of NC as a form of syntactic agreement. Such an approach has been initiated by Ladusaw (1992) and adopted by Brown (1999) and Zeijlstra (2004). It should be noted however that these are not the only accounts for NC. Other accounts treat NC as a form of polyadic quantification (Zanuttini (1991), Haegeman & Zanuttini (1996), De Swart & Sag (2002)) or treat n-words as Negative Polarity Items (Laka (1990), Giannakidou (1997, 2000)).
In this section I present the outlines of a theory of NC in terms of syntactic agreement. First, I demonstrate how such a theory predicts the correct readings of NC constructions. Second, I show that this approach solves several problems that other theories of NC have been facing. Although space limitations prevent me here from addressing these issues at full length, I argue that these arguments present robust evidence in favour of the syntactic agreement approach. Note that such an approach follows from the FFFH. Hence, I take the advantages of the syntactic agreement approach to support the FFFH as well. (Apart from this support, in the next section I discuss two consequences that follow from the syntactic agreement approach that is driven by the FFFH, thus providing additional evidence for both.)
In accordance with the observations presented above, n-words are taken to be semantically non-negative indefinites that are marked syntactically by means of a feature [uNEG]. Such a feature needs to stand in an Agree relation with a negative operator that carries [iNEG]. Since a single negative operator may license multiple n-words, NC is thus nothing more than an instance of multiple Agree. The semantic representation of an n-word is thus as in (28).

(28) $||\text{n-Q}|| = \lambda P.[Q(x) \,\&\, P(x)]$, where $Q \in \{$**Person'**, **Thing'**, **Place'**, …$\}$

The semantics of the negative operator is then as in (29), where (∃) indicates that this negative operator is able to bind free variables.[xii]

(29) $||Op_{\neg[\text{iNEG}]}|| = \neg(\exists)$[xiii]

A final assumption to be made here is that I allow checking relations between higher [iF]'s against lower [uF]'s, an assumption made by Adger (2003) (amongst many others over the past years).

On the basis of the above-mentioned assumptions, most of them directly following from the FFFH, one is already able to analyse NC as an instance of Agree: multiple elements carrying [uNEG] check their feature against a single negative operator that carries [iNEG]. However, such an analysis would be overgeneralising as the use of the abstract negative operator is unconstrained. One cannot simply put as many abstract negative operators in the sentence as one likes. In essence, the abstract negative operator $Op_{\neg}$ is a regular lexical item, only with

zero phonology. This zero phonology can easily be explained as a result from phonological economy conditions. Hence, the following phonological economy condition is adopted.

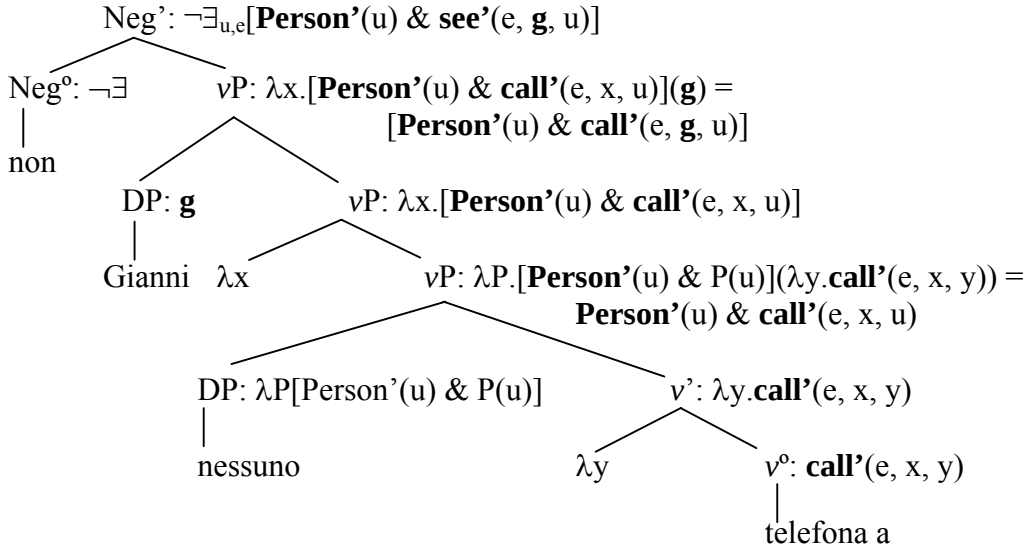
(30) *Phonological Economy*:
A phonologically empty negative operator may be assumed iff it prevents a derivation from crashing (Given multiple agree no second $Op_{\neg}$ may be assumed if the first one is able to check all present [uNEG] features).[xiv]

Now, the analysis enables explaining NC as a form of syntactic agreement and making correct predictions, both of the readings of NC constructions and their possible occurrences.
Let us first discuss Italian, where *non* is the phonological realisation of the negative operator. A sentence such as (31) has a syntactic form as in (32). Under syntactic Agree all [uNEG] features are deleted and as a result the correct semantic reading falls out immediately, as shown in (33).[xv]

(31) Gianni *non* telefona a *nessuno* Italian
Gianni NEG calls to n-body
'Gianni doesn't call anybody'

(32) $[_{Neg^o}$ non$_{[iNEG]}$ $[_{vP}$ Gianni a nessuno$_{[\sout{uNEG}]}$ telefona]]

(33)

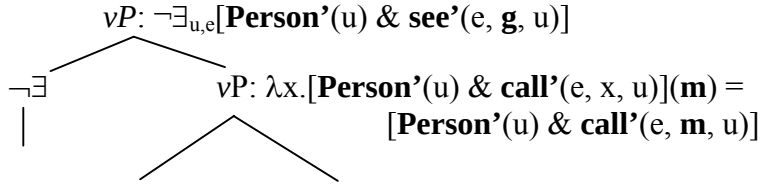


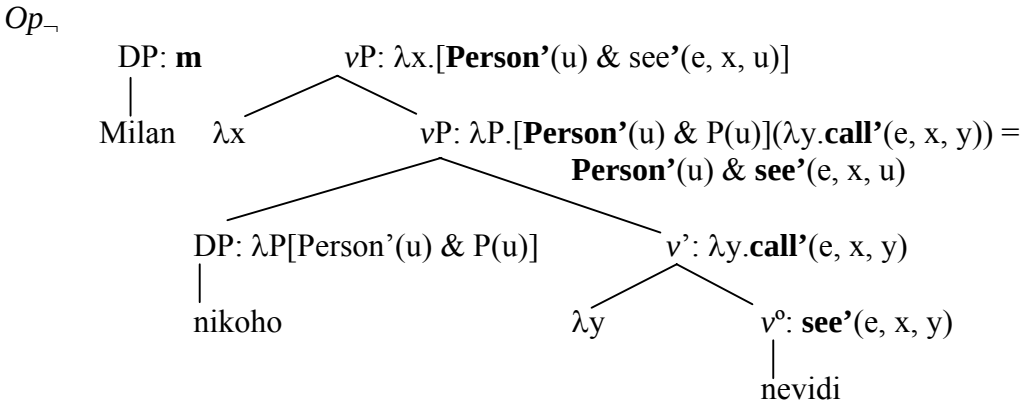
In a slightly similar way the correct syntax and semantics can be provided for Czech NC constructions, where negation is introduced by $Op_{\neg}$ and where both the n-word and the negative marker *ne* are checked against this negative operator, as shown in (34)-0.

(34) Milan *ne*-vidi *nikoho* Czech
Milan NEG.sees n-body
'Milan doesn't see anybody'

(35) $[_{vP}$ $Op_{\neg[iNEG]}$ $[_{vP}$ Milan *ne*vidi$_{[\sout{uNEG}]i}$ *nikoho*$_{[\sout{uNEG}]}$ $t_i]]$[xvi]

(36)





The reader will notice that in principle all NC readings can be analysed likewise. Negation is induced either by a negative marker that carries [iNEG] or by the abstract negative operator, whose presence is licensed by the economy conditions in (30).

4.2 Advantages of the syntactic agreement analysis

I now demonstrate that the analysis presented above has some strong advantages over the previous analyses that take n-words either as negative quantifiers or that take n-words to be NPIs. Although I realise that I cannot do full justice to these approaches in this small amount of text I find it necessary to illustrate how the syntactic agreement approach tackles several of the problems that these approaches have been facing.

4.2.1 N-words as negative quantifers

Zanuttini (1991), Haegeman & Zanuttini (1996) and De Swart & Sag (2002) argue that n-words are semantically negative unary quantifiers. NC is obtained through a process of polyadic quantification where *k* n-words turn into one *k*-ary quantifier (a mechanism that these scholars also adopt for multiple questions). A strong prediction of such theories is that isolated n-words always keep their negative reading. The question is then why examples such as (20), repeated as (37), are ruled out.

(37) *Gianni ha visto *nessuno*
Gianni has seen n-body
'Gianni hasn't seen anybody'

Note that the syntactic agreement analysis does not rule out these constructions either. In principle *nessuno* could be licensed by an abstract negative operator. However, given the economy conditions in (30), this *Op¬* must precede *nessuno* immediately, i.e. in its VP in situ position. The reading that is yielded then is one in which sentential negation cannot result, as the event variable (introduced in the highest V position (cf. Chung & Ladusaw (2004) amongst others) is not bound by an operator that falls under the scope of negation. Such readings are pragmatically very odd and therefore hardly available. Herburger (2001) presents some examples of such sentences which can be uttered felicitously.

(38) El bébé está mirando a nada[xvii]
The baby is looking at n-thing
'The baby is staring at nothing'
∃e[**look'**(e) & Agent(e, **b**) & ¬∃x[**thing**'(x) & Patient(e, x)]]

The prediction, which the syntactic agreement proposal but not the negative quantifier approach makes, namely that sentences such as (37) are most often semantically infelicitous rather than syntactically ungrammatical is thus borne out.

Note that under the negative quantifier approach the parametric variation between NC and DN languages disappears. De Swart & Sag (2002) argue that this distinction is not a matter of grammar, but of language usage and they base their arguments on examples from English and French, in which often both readings can be available (in English NC is substandardly available in many dialects). However, these languages are known to be in change with respect to the DN/NC distinction and therefore do not count as proper examples. In other languages such ambiguity hardly exists.

Finally, De Swart & Sag argue that resumption may only take place if two quantificational terms share a particular feature. In the case of resumption of *Wh* terms, this is the feature [Wh]; in the case of negative terms, this feature is [Anti-Additive]. This feature system prevents resumption of quantifiers of different types. A problem for the negative quantifier analysis is that many n-words may also occur in non-anti-additive downward entailing contexts.

(39) Dudo que vayan a encontrar *nada*[xviii] Spanish
Doubt.1SG that will.3pl.SUBJ to find n-thing
'I doubt that they will find anything'

Such examples can however be explained, once it is assumed that, despite the fact that it is not anti-additive, *doubt* can obtain an [iNEG] feature during L1 acquisition, which is predicted by the FFFH.[xix]

4.2.2 The Negative Polarity Item approach

Another approach takes n-words to be Negative Polarity Items (NPIs), which are licensed by a (possibly abstract) negation (cf. Laka 1990, Giannakidou (1997, 2000)). However, these analyses, although much closer to the syntactic agreement approach as they both take n-words to be semantically non-negative, also face several problems.

The first problem is that the distribution of standard NPIs and n-words differs. N-words may only be licensed in syntactically local domains, whereas the licensing conditions for NPIs depends more on their semantic context. NPIs, as opposed to n-words, can be licensed across the clause boundary, as shown in (40) for Greek.

(40) I Ariadne *dhen* ipe oti idhe {**TIPOTA*/tipota}[xx] Greek
The Ariadne NEG said that saw.3SG n-thing / anything(NPI)
'Ariadne didn't say she saw anything'

Since feature checking obeys syntactic locality constraints, this difference is immediately accounted for. It should be remarked though that n-words may be licensed across the clause boundary as shown in (39). This results from the fact that the verb in subordinate clauses has a subjunctive form and subjunctive clauses are generally much weaker with respect to locality effects.[xxi]

A final issue to be discussed in this section[xxii] concerns fragmentary answers, taken as evidence by Zanuttini in favour of the negative quantifier approach. Watanabe (2005) argues against Giannakidou's (2000) analysis in terms of fragmentary answers. Since Giannakidou (2000) argues that n-words in Greek are semantically non-negative, she has to account for the fact that n-words in fragmentary answers yield a reading that includes a negation. She argues that this negation, expressed by *dhen*, is deleted under ellipsis. Hence, the assumption that n-words are semantically non-negative can be maintained. Watanabe (2005) argues that this

analysis violates the condition that ellipsis may only take place under semantic identity (cf. Merchant's (2001a) notion of e-GIVENness). However, as the question does not contain a negation, it may not license ellipsis of the negative marker *dhen*.

Under this syntactic agreement analysis *dhen* is taken to be semantically non-negative (carrying [uNEG]), and thus the identity condition is met again. The abstract negative operator then induces the negation in the answer. Note that in Non-strict NC languages the negative marker never follows an n-word, and therefore no negative marker can be deleted under ellipsis in the first place.

(41) a. Q: Ti ides? A: [*Op*¬ [*TIPOTA* [~~*dhen*~~$_{[uNEG]}$ ~~ida~~]]] Greek
What saw.2SG? N-thing NEG saw.1SG
'What did you see?' 'Nothing!'

b. Q: ¿A quién viste? A: [*Op*¬ [A *nadie* [~~vió~~]]] Spanish
To what saw.2SG? To n-thing saw.1SG]
'What did you see?' 'Nothing!'

It follows that the syntactic agreement approach, which is derived directly from the FFFH, accounts correctly for NC, and solves many of the problems that the other approaches struggling with. In the following section I discuss several more predictions that the FFFH makes, which turn out to be correct.

5. Consequences

The FFFH and the exact analysis of NC in terms of syntactic agreement make several predictions that I discuss in this section. First, I argue that the status of the negative feature (formal or semantic) has some consequences regarding the appearance and distribution of the negative projection (NegP after Pollock (1989)). Second, I show that the FFFH makes correct predictions about the consequences of diachronic change with respect to the obligatoriness or optional occurrence of the negative marker.

5.1 Negative features and projections

Now let us have a look at the relation between the formal status of negative features and the syntactic status of negative markers. Negative markers come about in different forms. In some languages (e.g. Turkish) the negative marker is part of the verbal inflectional morphology; in other examples the negative marker is a bit stronger. Italian *non* is a (phonological) strong particle, and the Czech particle *ne* is (phonologically) weak.[xxiii] German *nicht* on the other hand is even too strong to be a particle and is standardly analysed as an adverb. Examples are in (42)-(44).

(42) John elmalari ser-*me*-di[xxiv] Turkish
John apples like.NEG.PAST.3SG (affixal)
'John doesn't like apples'

(43) a. Milan *ne*-volá Czech
Milan NEG.calls (weak particle)
'Milan doesn't call'

b. Gianni *non* ha telefonato Italian
Gianni NEG has called (strong particle)
'Gianni didn't call'

(44) Hans kommt *nicht* — German
Hans comes NEG — (adverbial)
'Hans doesn't come'

Note also that it is not mandatory that a language has only one negative marker. Catalan has a strong negative particle *no* and an additional optional negative adverbial marker (*pas*) whereas in West Flemish the weak negative particle *en* is only optionally present, next to the standard adverbial negative marker *nie*. Standard French even has two obligatory negative markers (*ne … pas*), as demonstrated in (45).

(45) a. *No* serà (*pas*) facil — Catalan
NEG be.FUT.3SG NEG easy
'It won't be easy'
b. Valère (*en*) klaapt *nie* — West Flemish
Valère NEG talks NEG
'Valère doesn't talk'
c. Jean *ne* mange *pas* — French
Jean NEG eats NEG
'Jean doesn't eat'

I adopt the standard analysis that negative affixes and weak and strong negative particles should be assigned syntactic head (X°) status, whereas negative adverbials are specifiers/adjuncts, thus exhibiting XP status (cf. Zanuttini (1997a,b), Rowlett (1998), Zanuttini (2001), Merchant (2001b), Zeijlstra (2004)).

The difference between X° and XP markers has influence on functional structure. X° negative markers must (by definition) be able to project themselves, yielding a clausal position Neg°. On the other hand, XP negative markers may occupy the specifier position of a projection that is projected by a (possibly abstract) negative head Neg°, Spec,NegP (as is the standard analysis for most adverbial negative markers), but this is not necessarily the case. It could also be an adverbial negative marker that occupies an adjunct/specifier position of another projection, for instance a *v*P adjunct position. In that case it is not necessary that there is a special functional projection NegP present in the clausal structure (it is not excluded either).

Now the question follows: when is a negative feature able to project? Giorgi & Pianesi (1997) addressed this problem in terms of their feature scattering principle, arguing that each feature can project a head. However, given the modular view of grammar in which features are divided into different classes, the question emerges which kind of features can head a projection. One would not argue that every lexical semantic feature or every phonological feature might have its own projection. Feature projection is a syntactic operation, and should thus only apply to material that is visible to syntax. Hence, the most straightforward hypothesis is that only formal features can project. This means that a feature can only head a projection if it is a formal feature [i/uF].

Consequently, it follows immediately that the availability of a negative projection NegP in a particular language depends on the question whether negation has been a formal feature [i/uNEG] in this language. This leads to the following prediction: only in languages that exhibit doubling effects with respect to negation (i.e. only in NC languages) may NegP be available. This prediction can easily be tested, as it has been argued above that X° negative markers occupy a Neg° position, whereas adverbial negative markers do not have to occupy a Spec,NegP position. Therefore we expect that only in the set of NC languages can one find negative markers X° (see (46)).

(46) a. NC: [u/iNEG]/[X] b. Non-NC: [X]

In Zeijlstra (2004) this prediction has been tested for a threefold of empirical domains (a sample of 267 Dutch dialectal varieties, a sample of 25 historical texts, and a set of 25 other languages from different families) and been shown to be correct.[xxv] Thus empirical evidence for the FFFH has been provided.

5.2 Negation and diachronic change

Since Jespersen (1917) it has been known that a large majority of languages underwent changes with respect to the expression of negation. These changes concern both the syntax of the negative marker and the occurrence of NC. As follows from the previous subsection, these two phenomena are not unrelated. In this subsection, I first discuss how the FFFH applies to the Spanish development from a Strict NC into a Non-strict NC language. Second, I exemplify the change from Dutch from an NC language into a DN language.

5.2.1 Spanish: from Strict NC to Non-strict NC

Old Spanish was a Strict NC language, where a subject n-word was allowed to precede the negative marker *no*, as is shown for 11th century Spanish in (47).[xxvi]

(47) Qye a myo Cid Ruy Diaz, que *nadi no* diessen posada 11th Cent.
That to my Lord Ruy Diaz, that n-body NEG gave lodging Spanish
'that nobody gave lodging to my lord Ruy Diaz'[xxvii]

Given the fact that the language input during L1 acquisition contained expressions of the form in (47) the negative marker was assigned a formal feature [uNEG]. However, at some point speakers began to omit the negative marker *no* in constructions such as (47), analysed as (48). This change is not surprising, since the negative marker in these constructions did not contribute to the semantics of the sentence (the fact that there is an abstract negative marker located in a higher position than *nadi* follows from the presence of this subject n-word). Hence, the L1 input had the form of (49) with an increasing relative frequency of instances of (50). At a certain point the absence of cases of *no* following *nadi* was thus sufficiently robust for the cue that forces the language learner to assign *no* the feature [uNEG] to disappear. As a result if *no* appeared in an NC construction, it was always the highest element. Therefore *no* got reanalysed as [iNEG] leading to the judgements in (51). Following standard semantics of negation, the scope of negation is c-command. Therefore it is always the highest negative (overt or covert) element that must carry [iNEG]. This reinterpretation of *no* is thus correctly predicted by the FFFH.

(48) *Op¬* nadi no
[iNEG] [uNEG] [uNEG]

(49) *Op¬* nadi (no)
[iNEG] [uNEG] [uNEG]

(50) *Op¬* nadi
[iNEG] [uNEG]

(51) a. *No* vino *nadie* Modern Spanish
NEG came nobody
'Nobody came'
b. *Nadie* (**no*) vino
NEG came nobody
'Nobody came'

5.2.2 Dutch: from NC to DN

Similar observations can be made for Dutch. Middle Dutch was a language that used two negative markers *en/ne … niet* to express sentential negation, as shown in (52). However, in most cases which contained an n-word only the preverbal negative marker *en/ne* was present, as in (53).

(52) Dat si *niet en* sach dat si sochte[xxviii] Middle Dutch
That she NEG NEG saw that she looked.for
'That she didn't see what she looked for'

(53) Ic *en* sag *niemen* Middle Dutch
I NEG saw n-body
I didn't see anybody

As in most languages exhibiting two negative markers, one of them disappears in the course of time. 16th and 17th century Holland Dutch in most cases left out the preverbal negative marker *en/ne*, and only exhibited *niet*. As a consequence of this development, the presence of *en/ne* also lost ground in constructions with n-words, resulting in expressions like (54).

(54) Ic sag *niemen* 17th Cent. Dutch
I saw n-body
I didn't see anybody

Hence, the language input contained fewer and fewer constructions like the ones in (55) and more and more expressions in which an n-word was the only negative element in the sentence. As the cue to assign n-words a [uNEG] feature gradually disappeared, n-words were no longer analysed as carrying [uNEG], but got reanalysed as carrying [NEG] (56).[xxix]

(55) a. *Op*¬ en niemen
[iNEG] [uNEG] [uNEG]
b. *Op*¬ niemen en
[iNEG] [uNEG] [uNEG]

(56) Ic sag *niemen*
[NEG]

To conclude, the two developments described above show exactly how a change in the syntax of negative markers leads to a change in the interpretation of multiple negative expressions. Note that these latter changes follow directly from the FFFH and no other additional account has to be adopted.

6. Conclusions

In this paper I first argued on theoretical grounds that the set of formal features, i.e. the set of features that can head a functional projection, is not provided by UG, but is a result of L1 acquisition. Only those semantic features that exhibit visible doubling effects are formalised (or grammaticalised). This has been formulated in the FFFH. Consequently, as only formal features can project, the number of functional projections FP that a particular grammar has at its disposal is limited by the FFFH. Each grammar, based on the language input during L1 acquisition, makes a particular choice of semantic operators that can be realised as FP's. Thus clausal structure is subject to cross-linguistic variation and not a uniform UG-based template.

In the second part of this paper I applied the FFFH to the domain of negation. Negation is a semantic operator that differs cross-linguistically in the way it surfaces in morphosyntax. Languages differ with respect to whether they exhibit doubling effects (known as NC) and thus the result of this application is that only in NC languages is negation formalised. In DN languages negation is not realised as a formal feature.

The consequences of the flexible formal status of negation are empirically testable. Not only do they call for an analysis of NC in terms of syntactic agreement (cf. Zeijlstra (2004), where I show that such an analysis solves many problems that other analyses have been facing). They also make correct predictions about the syntactic status of negative markers and the diachronic relation between the syntax of negative marker(s) and the occurrence of NC. First, it is shown that only NC languages may exhibit a negative marker Neg°. Second, it follows that if the (optional) negative marker for independent reasons ceases to occur in particular contexts, this may influence the visible doubling effects and therefore alter the status of the language as a (Strict) NC language.

Furthermore, the proposal presented above allows formulating predictions in terms of typological implications, which can be tested empirically. This is an interesting result, as it has been questioned whether typological implications count as linguistic evidence.[xxx] I hope to have shown in this paper that typological implications can be used as a testing mechanism for different proposal concerning the status of formal features.

Finally, as mentioned in the introduction, the adoption of hypotheses such as the FFFH has serious consequences for the conjecture that parametric variation can be reduced to different properties of (functional) heads. In the sections above, strong evidence has been put forward that the negative feature is only formal in a number of languages. DN languages lack such a formal feature [i/uNEG] and therefore can never produce a negative head Neg°. Consequently the NC parameter (±NC) can never be tied down to a value of the formal feature [NEG] associated to Neg°. The parametric variation with respect to multiple negation lies one level higher, namely whether or not the semantic operator *negation* is formalised. Hence, the NC parameter can be reduced to a semantic feature, but not to a syntactic feature. The NC parameter is thus a result of the fact that negation may but does not have to be formalised, a result of the FFFH. Note that not all parameters follow directly from the FFFH. The Strict vs. Non-strict NC parameter can still be reduced to the i/u value of the formal feature [i/uNEG] on Neg°. However, the very existence of such a 'subparameter' again follows from the FFFH (without its application no Neg° is available in the first place). If this line of reasoning turns out to be correct many parameters can be derived from the FFFH, removing these out of UG, much in the same way as the set of formal features. Obviously such a prediction needs to be evaluated for a large number of parameters, but even if it turns out to be incorrect for a number of parameters, it still holds for the NC parameter that it can be derived from L1 acquisition and thus should not be thought of as a linguistic primitive.

Of course, the FFFH is still programmatic in nature. It seems to make correct predictions for negation, but it should be evaluated for a number of other functional categories in order to determine its full strength. I think that the evidence provided in this paper sheds more light on how the syntactic vocabulary is created.

[i] The term *wysiwyg* is adopted from Roberts & Roussou (2003); the term *building block grammars* from Ad Neeleman (p.c.).

[ii] *Visible* means that the presence of this LI must be clear. This does not mean that this element must have phonological contents. It suffices that its presence must be evident. This evidence can be provided by overtness, but also by triggering of syntactic operations or changing the grammatical status of a sentence.

[iii] In this example I analyse *chicas* as carrying [iPL]. However, I want to keep the option open that the plural morphology on the noun is also uninterpretable and that an abstract operator is responsible for the plural semantics.

[iv] The example may yield some questions about the semantics of numerals. In an example like *las dos chicas guapas* (the two girls pretty) the numeral *dos* requires a semantically plural complement. Informally speaking, I suggest, without commiting myself, that its semantics must be something like 'taking two of ...' Under such an approach *dos* itself has not a plural (semantic or formal) feature. Number mismatches in those cases simply follow from mismatches between the lexical semantics of *dos* and the plural operator (regardless whether it ishosted on the noun or left abstract).

[v] The question is of course why [uWH] on C° cannot be checked under Agree. This requires an additional explanation. Either one assumes the presence of an [EPP] feature on C° that requires C°'s Spec position to be filled, or one assumes that Agree is in fact always an instance of Move (feature movement or other movement). Nothing in this paper relies crucially on what motivates Move in this example.

[vi] The reason why one semantic opertor cannot correspond to multiple features [(i)F] is that this leads to a violation of compositionality. Each feature [(i)F] corresponds to a semantic operotor OpF, and two elements carrying [(i)F] must give rise to an iterative reading. In order to avoid uninterpretable features, some scholars (Haegeman & Zanuttini (1995), De Swart & Sag (2002)) have introduced absorption rules for multiple *Wh* words or negative quantifiers. However, these mechanisms introduce non-compositionality in the model, a step which should only be taken if it is absolutely unavoidable. This is however not the case, since one still finds lots of instances of uninterpretability in natural languages, such as subject marking on verbs. Hence adopting mechanism does not lead to abolishing uninterpretable material.

[vii] For a discussion about what exactly constitutes the class of semantic operators the reader is referred to von Fintel (1995), Keenan & Stabler (2003) and Roberts & Roussou (2003: ch. 5).

[viii] For a more detailed decription of NC effects see Zeijlstra (2004).

[ix] The term *n-word* is due to Laka (1990) and defined in Giannakidou (2006) as elements that seem to exhibit semantically negative behaviour in some contexts, but semantically non-negative behaviour in other contexts.

[x] For reasons of readability tense is neglected in all these readings.

[xi] Following Aristotle/Horn that negation is not a propositional but a predicative operator.

[xii] In this analysis I take n-words to be indefinites in the Heimian sense. However, this is not required for this analysis. If n-words are taken to be existential quantifiers the readings that come out are identical.

[xiii] In the previous section I used the notion $Op_{\neg}$ in order to represent the abstract negative operator. Strictly speaking, (29) only represents the semantics of this abstract negative operator. However, as I have discussed before, the semantics of the covert and overt negative operator must be identical.

[xiv] It is unclear how such a condition can be implemented as a rule in a derivational syntactic system. The presence of a [uNEG] feature requires the presence of an element carrying [iNEG] in the numeration; otherwise the derivation will crash. However, nothing prevents an abstract operator $Op_{\neg}$ carrying [iNEG] to enter a numeration without any features [uNEG] present. Such sentences should of course not be expected. This is not a problem for this particular analysis; it is a general problem for the inclusion of covert material. It can be solved in two different ways. Either (25) follows from a general licensing constraint on PF that allows covert operators only if their presence has been made visible somehow. Such an account, however, is problematic since $Op_{\neg}$ does not contain any phonological features, and is thus not legible at LF. A more promising account would be to think of (27) as a parsing rule. A hearer needs a trigger to parse the presence of $Op_{\neg}$. If such a trigger is absent, there is no possibility to include $Op_{\neg}$ in the sentence. Such an account is much in line with Ackema & Neeleman's (2002) and Abels & Neeleman's (2006) parsing accounts for the ban on rightward movement.

[xv] Neglecting all tense effects.

[xvi] I assume that Czech *ne* is base-generated on V° by means of head adjunction (cf. Zeijlstra (2004) for a more detailed analysis). Therefore a functional projection NegP is not required and therefore excluded.

[xvii] Example taken from Herburger (2001).

[xviii] Example taken from Herburger (2001).

[xix] One could ask why downward entailing elements that are not strictly negative may still get assigned an [iNEG] feature. In theory, this would enable the learning mechanism to assign [iNEG] to a large number of LIs, many of them being semantically non-negative. However, I argue that this is a relic of previous stages of the language. Spanish n-words developed from regular NPIs, which were allowed in such contexts. This analysis is supported by the fact that languages in which n-words have not developed from NPIs (several Slavic languages) do not allow such constructions.

[xx] Example taken from Giannakidou (2000): 470. The emphasised *TIPOTA* is an n-words, and the unemphasised *tipota* is a plain NPI.

[xxi] Giannakidou (2000) takes n-words (in Greek) to be universal quantifiers and derives the locality effects from the locality effects of Quantifier Raising.

[xxii] Another argument often used against the approach that takes n-words to be indefinites/existentials is the fact that n-words may not be modified by *almost*. See however Penka (2006) who presents a number of arguments that invalidate this test.

[xxiii] I refrain from the discussion whether Czech *ne* should be analysed as a clitical, prefixal or as a real particle. It will become clear from the following discussion that the outcome would not be relevant for the final analysis in terms X°/XP status.

[xxiv] Example from Ouhalla (1991), also cited in Zanuttini (2001).

[xxv] Two kinds of exceptions have been found. First, Standard English, being a non-NC language, allows for the negative marker *n't* ,which behaves like a negative head. Possibly this is related to the fact English is on its way to transforming itself into an NC language (cf. Zeijlstra (2004)). English negation can be said to exhibit doubling effects, as it may trigger movement (negative inversion). Alternatively, Williams (1994), Zwicky & Pullum (1983) have suggested that the combination of an auxiliary + *n't* is lexicalised. Then *n't* does not behave like a syntactic head (thanks to an anonymous reviewer for pointing this out to me).

Second, a number of Southeast Asian languages lack n-words. In those languages however, it can be shown that negative markers trigger Move, thus exhibiting a doubling effect as well.

[xxvi] For an overview of the development of Spanish negation, see Herburger (2001) and references therein. See Martins (2000) on negation in Old Romance in general.

[xxvii] Example taken from Herburger (2001).

[xxviii] Lanceloet 20042.

[xxix] Similarly, the negative marker *niet* also got analysed as having a [NEG] feature.

[xxx] See Newmeyer (2004) who recently reopened the debate.

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