

# An HPSG Approach to Negative Inversion Constructions

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## 1. Introduction

In this paper we will look at the negative inversion (NI) constructions. The sentences in (1) are typical examples.

- (1) a. *Under no circumstances* will he eat raw spaghetti.  
 b. *No race* could Lewis win.  
 c. *With no job* would Mary be happy.

The most plausible approach to NI constructions in major current syntactic theories is to analyse the initial negative expression as a sister of the rest of the clause: negative expressions can be a modifier of the rest of the clause, as in (1a), or they can be a sister of a constituent containing a gap/trace, as in (1b,c). In the latter case the relationship between the negative expression and the gap/trace is represented in terms of movement (Minimalist/Principles-and-Parameters approaches), in the same way as in *wh*-interrogatives (2a) and topicalisation sentences (2b) (Culicover 1991; Haegeman 2000a,b; Rizzi 1997; etc).

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- (2) a. *What* did they handed to the baby?  
 b. *That toy*, they handed to the baby.

I will compare the analyses of negative preposing in NI constructions within Minimalist/Principles-and-Parameters approaches and Head-driven Phrase Structure Grammar (HPSG). I will argue that there is a body of data which are problematic for Minimalist/Principles-and-Parameters approaches but HPSG can provide a fairly straightforward account of the facts.

The organisation of this paper is as follows. In the next section we will outline the Minimalist/Principles-and-Parameters approach to NI constructions, and then we will look at data that is problematic for this approach. Section 3 introduces the framework of HPSG. Section 4 presents an analysis of NI constructions within HPSG. In Section 5 we will see how our HPSG analysis can deal with the problematic data for the Minimalist/Principles-and-Parameters approaches. The final section summarises the discussion and gives concluding remarks.

## 2. Minimalist/Principles-and-Parameters approach

In much previous work it has been argued that the initial negative expression is in a specifier position of a certain functional category and establishes a spec-head configuration with an auxiliary that moves to the head position (Culicover 1991; Haegeman 1995, 2000a,b; Haegeman and Gueron 1999; Haegeman and Zanuttini 1991; Rizzi 1996, 1997; Rizzi and Roberts 1996; and Roberts and Roussou 2002). In this section we consider how this type of approach might work. We will then provide pieces of data which are problematic for the Minimalist/Principles-and-Parameters approach.

### 2.1 The outline

Rizzi (1997) proposes the following articulated structure for the left periphery of clause structure.

- (3)  $[_{\text{ForceP}} \text{Force}^0 [_{\text{TopP}^*} \text{Top}^0 [_{\text{FocP}} \text{Foc}^0 [_{\text{TopP}^*} \text{Top}^0 [_{\text{FinP}} \text{Fin}^0 [_{\text{IP}} \dots]]]]]]]$

The traditional CP is first decomposed into two functional projections, ForceP and FinP: ForceP encodes the illocutionary force of the clause, and FinP is a projection whose head carries the features for (non-)finiteness.<sup>1</sup> He also argues for the existence of other functional heads and projections between these two: FocP and (recursive) TopP. The specifier of FocP hosts a focalised constituent and its head hosts the focus feature. The specifier of TopP hosts the fronted topic and its head hosts a topic feature. Within this view, *wh*-questions are given something like the following analysis.

- (4)  $[_{\text{FocP}} \text{which book}_i [_{\text{Foc}} \text{will}_j [_{\text{IP}} \text{you } t_j \text{ read } t_i]]]]]$

The *wh*-phrase moves out of IP to the specifier of FocP. The movement of the auxiliary to Foc is then triggered by the WH-criterion, which checks a feature of the *wh*-expression with a verb in a spec-head configuration (see, e.g., Rizzi 1996, 1997; Haegeman 2000a,b).

The positioning of negative expressions and the accompanying subject-auxiliary inversion in NI are seen as parallel to the positioning of *wh*-expressions and the accompanying subject-auxiliary inversion in interrogatives. It is assumed that the initial negative expression is in [Spec,FocP] of a functional head Foc (Rizzi 1997: 317; Haegeman 2000a: 126; Haegeman 2000b: 26; see also Culicover 1991: 12, 15).<sup>2</sup> NI constructions are given something like the following representation.

- (5) [FocP Not a single paper<sub>i</sub> [Foc did<sub>i</sub> [IP he t<sub>i</sub> finish t<sub>i</sub> on time]]]

In (5) the negative expression is in [Spec,FocP], and the auxiliary verb carrying the NEG-feature has moved to Foc<sup>0</sup> to satisfy the Negative Criterion (Haegeman 1995, 2000a,b; Haegeman and Zanuttini 1991; Rizzi 1996: 73-74; Rizzi 1997: 315-318).<sup>3</sup> Thus, NI constructions are analysed in the same way as *wh*-questions: the *wh*-phrase in (4) and the negative expression in (5) are in [Spec,FocP] and they are in a spec-head configuration with the auxiliary in Foc.

Unlike main clauses, NI constructions do not look so much like *wh*-questions in subordinate clauses. Compare the following examples.

- (6) a. \*I wonder what did Robin see.  
 b. I said that not once had Robin raised his hand.

(6) shows that *wh*-questions do not involve subject-auxiliary inversion in subordinate clauses while NI constructions do. Since the subordinate questions are selected by a matrix predicate, the highest head of the CP domain, Force, is associated with the *wh*-feature (Culicover 1991; Rizzi 1997; Haegeman 2000a,b). In embedded *wh*-questions, therefore, the *wh*-element moves to [Spec,ForceP] to establish a spec-head relation with the *wh*-feature. This makes the auxiliary inversion unnecessary. On the other hand, the embedded NI clauses are not selected by a matrix predicate, so Force is not associated with the NEG feature (Haegeman 2000a: 135). As is the case for main clauses, the negative expression occupies [Spec,FocP], and the Negative Criterion triggers movement of the auxiliary to Foc<sup>0</sup>. The complementiser *that* can cooccur with the element in [Spec, FocP] since the former is in Force<sup>0</sup>.

To summarise, the Minimalist/Principles-and-Parameters analysis outlined above gives a parallel analysis to main *wh*-questions and NI sentences: the initial *wh*- and negative expression occupy [Spec,FocP].<sup>4</sup>

- (7) a. *Wh*-question: [FocP which book<sub>i</sub> [Foc will<sub>i</sub> [IP you t<sub>i</sub> read t<sub>i</sub>]]]  
 b. NI: [FocP Not a single paper<sub>i</sub> [Foc did<sub>i</sub> [IP he t<sub>i</sub> finish t<sub>i</sub> on time]]]

In the following three subsections, we will look at a body of data which are problematic for this analysis.

## 2.2 Contrasting behaviour of *wh*- and negative expressions

The analysis outlined above predicts that initial negative expressions in NI constructions always behave like *wh*-expressions in *wh*-interrogatives. However, a body of data illustrates the contrasting behaviour of *wh*-expressions and negative expressions.

First, *wh*- and negative expressions can co-occur in main clauses, as long as the former precedes the latter.

- (8) a. What under no circumstances would John do for Mary?  
 b. \*Under no circumstances what would John do for Mary?  
 c. Where under no circumstances would John go for a holiday?  
 d. \*Under no circumstances where would John go for a holiday?

The assumption that they are in a single position [Spec,Foc] leads to the prediction that they should not co-occur (Haegeman 2000a: 134; Haegeman 2000b: 46). This is not borne out, however, as the examples cited above illustrate.<sup>6</sup>

Second, there is individual variation about the possibility of unbounded extraction of a negative phrase. Some examples of extracted negative phrases cited in the literature are given below.

- (9) a. Nothing did the doctor say the baby must eat. (Cormack and Smith 2000)  
 b. No such chemicals did he know that there were in the bottle.  
 c. No such car did they ever ask whether I had seen.  
 d. No such car would they have preferred it if I had bought.  
 e. No other colours did he think they had ever painted their car.  
 f. No theory did Ernie interview any natives who accepted or contact any foreigners who rejected. ((b)-(f), Postal 1998)

For example, the initial negative phrase *nothing* in (9)a is a complement of the verb *eat*, which belongs to the embedded clause. For some speakers, however, unbounded extraction of a negative phrase is unacceptable (Sobin 2003: 184-185). Let us consider the following pair.

- (10) a. *What* did you say [that Mary will eat *t*]?  
 b. *Never again* did I say [that Mary will eat clams]. ((b) from Sobin 2003: 184)

The sentence in (10)a has a *wh*-phrase, which is extracted out of the embedded clause. For Rizzi (1997), it should be possible to give the same analysis to (10)b, where the initial negative phrase is extracted out of the embedded clause. However, if the unbounded extraction of a

negative expression were grammatical, *never again* should be able to modify the lower clause, and (10)b should have the same meaning as (11).

(11) I said [that never again will Mary eat clams] . (Sobin 2003: 184)

For the speakers who do not accept extraction of negative phrases, however, (10)b does not have the same meaning as (11). For such speakers, *never again* in the former modifies only the matrix clause while in the latter it modifies only the embedded clause. The contrast in (12) may illustrate the same point.

(12) a. *What* did Bill say that Mary remembered to bring.  
 b. ?? *Not a penny* did I say that Mary remembered to bring. (Sobin 2003: 185)

The unbounded extraction of *wh*-phrases, as in (12)a, is grammatical, but for some speakers the unbounded extraction of a negative phrase, as in (12)b, is very difficult. If *wh*-interrogatives and NI constructions have parallel analysis, there should be no such individual variation about unbounded extraction of negative phrases.

These pieces of data show that there is no reason to think that negative preposing in NI should be given a parallel analysis with *wh*-fronting, and that the Minimalist/Principles-and-Parameters analysis of NI outlined in section 2.1 is dubious. This suggests that an alternative analysis is needed in which NI sentences and *wh*-interrogatives are treated rather differently.

### 2.3 Information structure in NI

We saw above that in the Minimalist/Principles-and-Parameters approach, the initial negative expression in NI occupies the specifier position of a functional head *Foc*. Many proponents of this approach assume that the preposed element in the sentences of the following type occupies the same position (Culicover 1991; Rizzi 1997; Haegeman 2000a,b).

(13) To ROBIN I gave a book. (Culicover 1991: 34)

The preposed element with focus stress (in capitals) is assumed to be in the [Spec,*FocP*] position. It is important to note the fact that (13) can be used to answer the question (14)a, but cannot be used to answer (14)b.

(14) a. To whom did you give a book?  
 b. What happened?

The question in (14)a requires an answer with constituent focus on a recipient PP, and (14)b requires an answer with the whole-sentence focus. The fact that (13) can only answer (14)a indicates that the initial constituent in [Spec,*FocP*] is the only possible scope of focus.

If the initial negative expression in NI sentences occupies the position [Spec,FocP], it is expected to have the same scope of focus as the preposed element in (13). The following data, cited by Culicover (1991: 34) and Haegeman (2000b: 34), might appear to give evidence to this.

- (15) a. Did you see anyone?  
 b. No, not a single person did I see. (Culicover 1991: 34)

An answer to a *yes-no* question serves as a test for focushood of a constituent (e.g., Chomsky 1971; Jackendoff 1972; Rochemont 1986). The fact that an NI sentence serves as an answer for the *yes-no* question (15)a indicates that the initial negative expression is focused and has new information.

However, there is also evidence that NI sentences as a whole can convey new information (Sobin 2003: 205ff). Let us consider the following examples from Sobin (2003: 206).

- (16) a. \*Because never again will I endure such a speech, I left.  
 b. I left because never again will I endure such a speech  
 c. \*That rarely does Mary eat seafood will surprise everyone.  
 d. It will surprise everyone that rarely does Mary eat seafood.  
 e. \*That never again would Mary eat seafood was inferred by everyone.  
 f. Everyone inferred that never again would Mary eat seafood.  
 g. \*Since never does Mary eat seafood, Bill served chicken.  
 h. (?) Bill served chicken, since never does Mary eat seafood.

In English, an element with new information normally follows old information. Thus, if a subordinate clause comes before a main clause, it means that the subordinate clause is associated with old information; if a subordinate clause comes after the main clause, it means that the subordinate clause provides new information. In ungrammatical sentences in (16) a,c,e,g, an embedded NI clause comes before a main clause. The ungrammaticality of these sentences is due to the fact that an NI construction is not compatible with an old information position. In the sentences in (16) b,d,f,h, an NI clause is in a new information position. They are grammatical since NI constructions convey new information.

To summarise, NI sentences are ambiguous with respect to the domain of focus: they have either a narrow focus on the initial negative expression as in (15)b, or a wide focus on the whole sentence as in (16) b,d,f,h. This fact is problematic for the Minimalist/Principles-and-Parameters approach since it predicts that only the constituent in [Spec,FocP] is focused; it does not predict the wide focus pattern.

#### 2. 4 Preposing of preverbal adverbials

There is another problem for the assumption that both the initial negative expression in NI

and the preposed focus as in (13) occupy the specifier position of a functional head *Foc*.

The following pair might appear to show that the adverb *never* moves to the [Spec,Foc] position from the preverbal position in NI constructions.

- (17) a . I have *never* seen a ghost.  
 b . *Never* have I seen a ghost.

If the movement from the preverbal position to [Spec,Foc] were possible, nothing would prevent other preverbal adverbs, such as *merely* and *almost* in (18), from moving to the same position, in the form of focus movement as in (13).

- (18) a . Kim *merely* opened the door.  
 b . Kim *almost* found the solution.

(19) shows, however, that preverbal adverbs cannot be preposed (Jackendoff 1972; Bouma et al. 2001; Kim and Sag 2002).

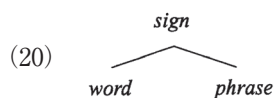
- (19) a . \**Merely* Kim opened the door. (Kim and Sag 2002: 386)  
 b . \**Almost* Kim found the solution. (Adapted from Bouma et al. 2001: 45)

This contrasting behaviour of *never* and other preverbal adverbials means that the assumption that both the initial negative expression in NI and the preposed focus move to [Spec,FocP] is problematic.

### 3. HPSG

Head-driven Phrase Structure Grammar (HPSG; Pollard and Sag 1987, 1994) is a monostratal and nonderivational grammatical framework. It is termed ‘head-driven’ because heads contain information about the non-heads with which they combine. We will first provide theoretical assumptions of the general framework of HPSG.

In this framework, each linguistic object belongs to certain types and those types are organised in the form of hierarchies. The type *sign*, for example, has the immediate subtypes of *word* and *phrase*.



Lexical entries are descriptions of feature structures of the type *word*, while phrases of various kinds are described by a feature structure of the type *phrase*. Linguistic expressions are represented as a complex of phonological, syntactic, and semantic information in terms of typed feature structures. The following shows an example of a feature structure of a *sign*.



$$(21) \quad sign \rightarrow \left[ \begin{array}{l} PHON \\ SYNSEM \\ SLASH \end{array} \left[ \begin{array}{l} phon \\ synsem \\ LOC \\ SLASH \end{array} \left[ \begin{array}{l} HEAD \\ SUBJ \\ COMPS \end{array} \left[ \begin{array}{l} part-of-speech \\ ( ) \\ ( ) \\ \{ \} \end{array} \right] \right] \right] \right]$$

The value of the feature PHONOLOGY (PHON) is of type *phon*, which represents phonological information of a sign. The value of SYNTAX-SEMANTICS (SYNSEM) is of type *synsem*, a feature structure containing syntactic and semantic information. The value of LOCAL (LOC) contains the subset of syntactic and semantic information shared in long-distance dependencies. The CATEGORY (CAT) feature encodes the syntactic properties of a sign. The HEAD value contains information shared between a phrase and its head, information such as parts of speech. As stated earlier, heads contain information about the non-heads with which they combine. This information is specified in valence features. Valence features include the COMPS feature, which indicates what kind of complements a head takes, and SUBJ feature, which indicates what kind of subject a head takes.

The type hierarchies allow properties shared between different types to be spelled out just once: generalisations that hold for subtypes can be just specified for the supertype. Thus, the constraint on *sign* is also imposed on *word* and *phrase*. In addition to the constraint inherited from the supertype, subtypes are also constrained by their own constraints. (22) is a constraint for *phrase*.

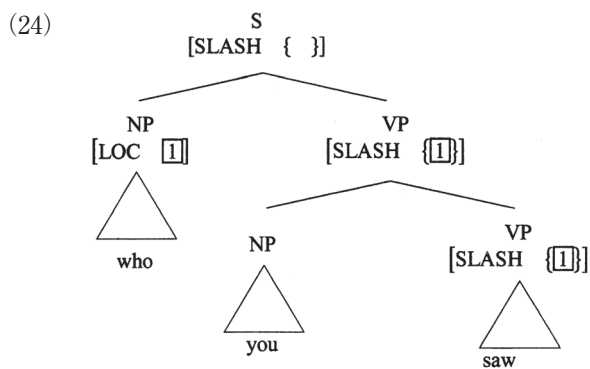
$$(22) \quad phrase \rightarrow \left[ \begin{array}{l} HD-DTR \\ NON-HD-DTRS \end{array} \left[ \begin{array}{l} sign \\ list(sign) \end{array} \right] \right]$$

This constraint states that phrases are composed of the head daughter and some non-head daughters. The non-head daughters of a phrase are represented as the value of NONHEAD-DAUGHTERS (NON-HD-DTRS) feature. The head daughter is referred to by the HEAD-DAUGHTER (HD-DTR) feature.

The feature SLASH is utilised for treating constructions with unbounded dependency. A typical example of such constructions is the bracketed string in (23).

$$(23) \quad I \text{ wonder } [ \text{who you saw} ] .$$

This is a case of an embedded *wh*-question. Its tree diagram is sketched in (24).



Such constructions have the fronted element as its first non-head daughter and a phrase with missing elements as the head daughter. The SLASH feature encodes information about the elements missing within the phrase and passes the information up to successively larger phrases. The SLASH value (indicated by the tag 1 in (24) thus passed up the tree is bound off or discharged by identification with the LOC value of the filler.

Having introduced some relevant features and constraints of HPSG, we will now see how NI constructions are analysed in this framework.

#### 4. Constraints for NI constructions

In this section we look at how our HPSG approach deals with NI constructions. We propose that NI constructions are constrained by the following constraint.

(25) *negative-inversion-ph* →

SUBJ	{ }										
SLASH	{(3)[NEG -]}										
HD-DTR	<table style="border: none;"> <tr> <td style="padding-right: 5px;"><i>word</i></td> <td></td> </tr> <tr> <td>INV</td> <td>+</td> </tr> <tr> <td>AUX</td> <td>+</td> </tr> <tr> <td>SUBJ</td> <td>(1)NP</td> </tr> <tr> <td>COMPS</td> <td>(2)VP[SLASH {(3),...}]</td> </tr> </table>	<i>word</i>		INV	+	AUX	+	SUBJ	(1)NP	COMPS	(2)VP[SLASH {(3),...}]
<i>word</i>											
INV	+										
AUX	+										
SUBJ	(1)NP										
COMPS	(2)VP[SLASH {(3),...}]										
NON-HD-DTRS	{[NEG +], (1), (2)}										

The type *negative-inversion-ph* is a subtype of *phrase*, given in (22). The feature INVERTED (INV) distinguishes verbs heading inverted phrases from all other verbs (Gazdar et al. 1985: 23; Ginzburg and Sag 2000: 29). NI sentences have the auxiliary verb and the subject inverted, and the [INV +] specification in constraint (25) accommodates this fact. The following sentence, in which the subject and the auxiliary are not inverted, is ungrammatical.

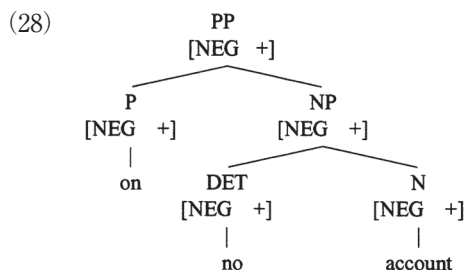
(26) \*Under no circumstances he will eat raw spaghetti.

Auxiliaries which are a head of inverted constructions are specified as [AUX +]. Other verbs are [AUX -], and this is why non-auxiliary verbs cannot head NI constructions.

(27) \**At no time* went John to London.

As encoded in the SLASH feature, the NI sentences might have a dislocated element which is not negative.

In addition, we follow Borsley and Jones (2005: 195) in marking negative words (n-words), such as *no, nobody, nothing*, etc., as [NEG +].<sup>7</sup> We also assume the following: (i) if non-n-words have n-words as their specifiers, they have the same value for NEG; (ii) prepositions and their complement has the same value for NEG (Borsley and Jones 2005: 198); and (iii) the value for NEG is inherited from the head to its mother. The PP *on no account* becomes [NEG +] in the following way.

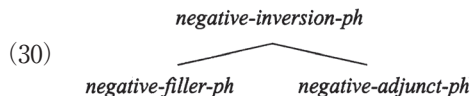


The n-word *no* is [NEG +] by definition. The noun *account* is [NEG +] because of its specifier *no*. The mother NP inherits [NEG +] from its head noun. The preposition *on* is [NEG +] because it must have the same value for NEG as its complement *no account*. Finally, the mother PP inherits [NEG +] from its head preposition.<sup>8</sup>

Let us now consider how the above constraints work for characterising NI constructions.

(29) *No race* could Lewis win.

We assume that the type *negative-inversion-ph* has at least two subtypes, *negative-filler-ph* and *negative-adjunct-ph*.

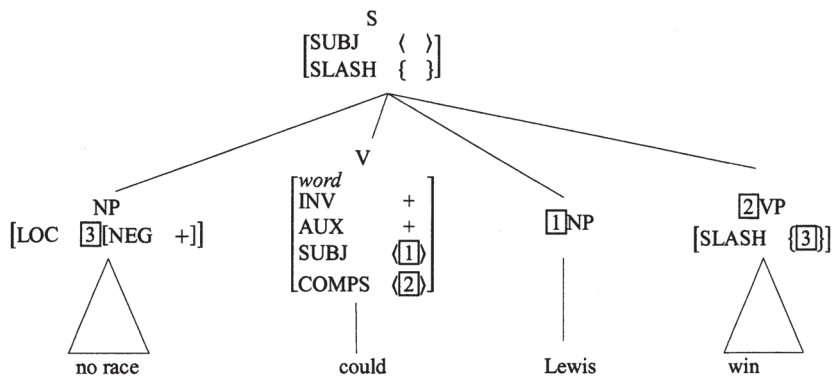


The type *negative-filler-ph* is given in (31).

(31) *negative-filler-ph* → [NON-HD-DTRS ⟨[LOC  $\boxed{3}$ ][NEG +], NP, VP[SLASH {(…), $\boxed{3}$ }]⟩]

This states that in negative-filler phrases the first non-head is a negative constituent and its LOC value is identified with an element in the SLASH set of the third non-head VP. The structure of an NI sentence in (29) is given in (32).

(32)



In (29) the object NP of the verb *win* is missing from the VP and in the structure in (32) encodes the information about the missing element as the SLASH value. The SLASH value is passed up the tree and discharged by identification with the LOC value of the negative filler *no race*. The NP *no race* is [NEG +] according to our assumption that if non-n-words have n-words as their specifiers, they have the same value for NEG, and the value for NEG is inherited from the head to its mother.

The second subtype of *negative-inversion-ph* is *negative-adjunct-ph*.

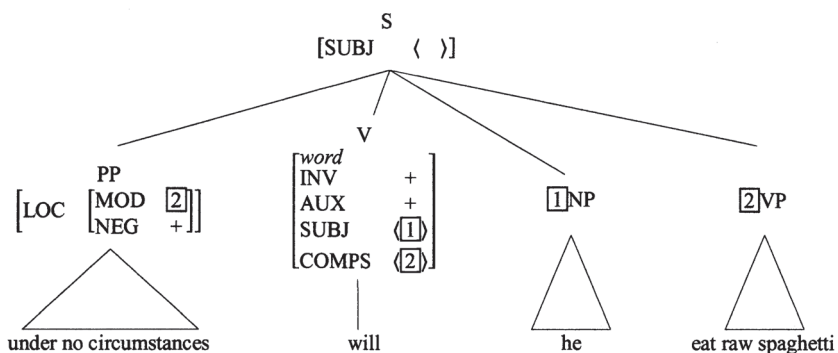
(33) *negative-adjunct-ph* → [NON-HD-DTRS ⟨ [MOD (2)], NP, (2)VP ⟩, [NEG +]]

This constraint is imposed on the type of NI construction in which the first negative constituent is an adjunct. Modifiers have a non-empty MODIFIED (MOD) value, which is identical to the SYNSEM value of the modified element. Sentence (34) is an example of this type.

(34) *Under no circumstances* will he eat raw spaghetti.

The structure for sentence (34) is given in (35).

(35)



In (35) the MOD value of the negative adjunct *under no circumstances* is identical to the VP *eat raw spaghetti*.

It is well known that NI sentences always have a sentential negation (Klima 1964: 271ff,

306ff; Haegeman 1995: 72ff, 2000a,b; Rudanko 1982). First, the NI sentence in (36)a admits *neither* tags, while the constituent negation sentence in (36)b does not.

- (36) a. *Not often* does Jack attend parties and neither does Jill.  
 b. \**Not long ago* Jack attended a party and neither did Jill. (Rudanko 1982: 350)

Second, the NI sentence in (37)a takes non-negative tags, while the constituent negation sentence (37)b takes negative tags.

- (37) a. *Not often* does Jack attend parties, does he/\*doesn't he?  
 b. *Not long ago* Jack attended a party, didn't he/\*did he? (Rudanko 1982: 350)

Third, the initial negative expression *not often* in the NI sentence in (38)a licenses the negative polarity item *any*. (38)b shows that constituent negation does not license *any*.

- (38) a. *Not often* does Jack attend any parties.  
 b. \**Not long ago* Jack attended any parties. (Rudanko 1982: 350)

Fourth, the NI sentence cannot be coordinated with tags introduced by *so*, while the constituent negation sentence can.

- (39) a. \**Not often* does Jack attend parties, and so does Bill.  
 b. *Not long ago* John bought a house, and so did Bill. (Haegeman 1995: 73)

These pieces of data show that NI sentences have a sentential negation. We can formalise the requirement of sentential negation in NI as an additional constraint to the type *negative-inversion-ph*.

$$(40) \text{ negative-inversion-ph} \rightarrow \left[ \begin{array}{ll} \text{QUANTS} & \langle \boxed{1} \rangle \\ \text{NON-HD-DTRS} & \langle \{ \text{STORE } \{ \boxed{1} [\text{neg-quant}] \}, \dots \} \rangle \\ \text{STORE} & \{ \ } \end{array} \right]$$

Following de Swart and Sag (2002) and Borsley and Jones (2005) we assume that negative expressions have a negative quantifier in storage. It is assumed that the quantifiers in storage are retrieved from storage at a clausal node which determines their scope. (40) states that in a *negative-inversion* clause, the negative quantifier in storage in the initial negative expression should be structure-shared with one of the elements in the QUANTS list at the immediately containing clause.<sup>9</sup> Let us see how this constraint works. We assume that the negative phrase such as *not often* has a negative quantifier as the CONTENT value, which is in storage (i.e., identical to the STORE value). This quantifier is retrieved at the S level and incorporated into the value of QUANTS, following the constraint in (40). Thus, the whole sentence constitutes the scope of the negative phrase.

## 5. An account of the facts

We will now look at how the constraints introduced above can accommodate the properties of the NI construction outlined in section 2, which are problematic for the Minimalist/Principles-and-Parameters analysis.

### 5.1 NI with fronted *wh*-phrases

Let us look at the set of data discussed in section 2.2. The data in (8), which is repeated in (41), shows that the fronted *wh*-element and negative expression do not show a complementary distribution.

- (41) a. What under no circumstances would John do for Mary?  
 b. \*Under no circumstances what would John do for Mary?  
 c. Where under no circumstances would John go for a holiday?  
 d. \*Under no circumstances where would John go for a holiday?

This fact would be surprising if the fronted *wh*-element and negative expression occupied one and the same position, as the Minimalist/Principles-and-Parameters analysis assumes.

Constraint (25), which is repeated in (42), states that the SLASH value of *negative-inversion-ph* is  $\{([\text{NEG } -])\}$ .

$$(42) \quad \textit{negative-inversion-ph} \rightarrow \left[ \begin{array}{l} \text{SUBJ} \quad \langle \quad \rangle \\ \text{SLASH} \quad \{([\text{3}][\text{NEG } -])\} \\ \text{HD-DTR} \quad \left[ \begin{array}{l} \textit{word} \\ \text{INV} \quad + \\ \text{AUX} \quad + \\ \text{SUBJ} \quad ([\text{1}]\text{NP}) \\ \text{COMPS} \quad ([\text{2}]\text{VP}[\text{SLASH } \{([\text{3}], \dots)\}]) \end{array} \right] \\ \text{NON-HD-DTRS} \quad \langle [\text{NEG } +], [\text{1}], [\text{2}] \rangle \end{array} \right]$$

This SLASH value indicates that the NI constructions may have a non-negative filler. This accommodates the grammaticality of (41)a and (41)c. The ungrammaticality of (41)b and (41)d can also be accounted for by this constraint; the NON-HD-DTRS list only contains the first negative expression, the subject and the VP, and it cannot accommodate a filler daughter.

### 5.2 Information structure of NI

Let us turn to the ambiguity of NI sentences discussed in 2.3: they may have a narrow focus on the initial negative expression as in (43)b, or they may have a wide focus on the whole sentence as in (44)b. We argued that the Minimalist/Principles-and-Parameters approach can capture only the narrow focus pattern.

- (43) a. Did you see anyone?  
 b. No, not a single person did I see.

- (44) a. \*Because never again will I endure such a speech, I left.  
 b. I left because never again will I endure such a speech

In the present approach this ambiguity can be accommodated quite easily. We propose the following as an additional constraint on the *negative-inversion-ph* type.

$$(45) \quad \textit{negative-inversion-ph} \rightarrow \boxed{1}[\text{FOC } \boxed{1}] \vee \left[ \begin{array}{l} \text{FOC} \quad \boxed{1} \\ \text{NON-HD-DTRS} \quad (\boxed{1}\text{XP}, \dots) \end{array} \right]$$

The FOCUS (FOC) value encodes the part of the focused element in the sentence. (45) states that the FOC value of *negative-inversion-ph* is structure-shared with either the sentence itself or the first constituent of the sentence. The value of the FOC feature is structure-shared with the focused part of the sign. In the first disjunct of constraint (45), the FOC value of the clause is structure-shared with the clause itself, and this captures the wide focus pattern in (44)b. In the second disjunct, the FOC value of the clause is structure-shared with the first non-head. This captures the situation where the first negative expression is the focus of the sentence, and accommodates the narrow focus pattern in (43)b.<sup>10</sup>

### 5.3 Preposing of preverbal adverbials

As we saw in 2.4, preverbal adverbials normally cannot be preposed, as illustrated by (46), but a preverbal adverbial never can be in the initial position of an NI sentence, as shown in (47).

- (46) a. (\**Merely*) Kim (merely) opened the door.  
 b. (\**Almost*) Kim (almost) found the solution.  
 c. (\**Never*) I have (never) seen a ghost.

- (47) *Never* have I seen a ghost

As we have already discussed, this fact cannot be handled by Rizzi's (1997) approach. Let us consider how our analysis might deal with it.

- (48) a. They [never [read the book]].  
 b. They will [never [read the assignment]].  
 c. They have [never [been left alone]].  
 d. \*I [left never the town]. (Kim 2000: 96)

The above data shows that *never* is a VP modifier. It can appear before any VP, but it cannot appear within the VP, as (48)d shows. Thus, the lexical information of *never* is something like the following.

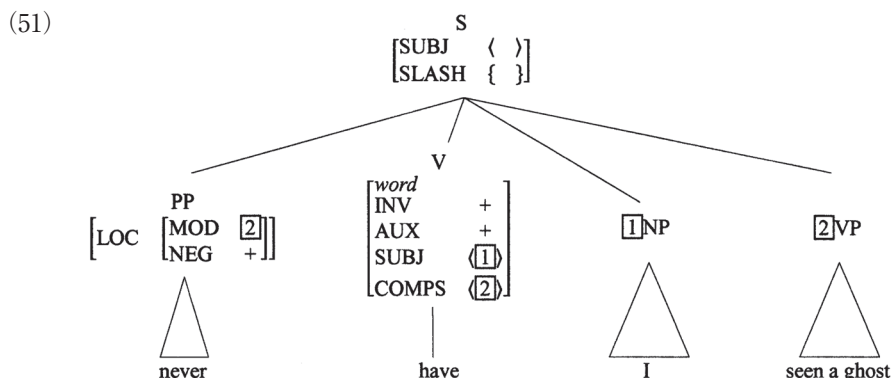
(49)  $\left[ \text{HEAD} \left[ \begin{array}{l} \textit{adv} \\ \text{MOD VP}[\text{SUBJ} \langle \text{NP} \rangle] \end{array} \right] \right]$

Adverbs with this information select a VP via the MOD specification, and the SUBJ value of the VP is non-empty. This specification of the modified VP guarantees that *never* combines with a VP and not with a sentence. This excludes (46)c, in which *never* combines with a saturated sentence, not with a VP.

Now let us have a look at how our approach can account for (47). We deal with the initial negative adverb in (47) as an adjunct, not a filler. Thus, (47) is an example of a negative adjunct phrase. The constraint for *negative-adjunct-ph* in (33) is repeated below.

(50)  $\textit{negative-adjunct-ph} \rightarrow \left[ \text{NON-HD-DTRS} \left\langle \left[ \begin{array}{l} \text{MOD} \text{ [2]} \\ \text{NEG} \text{ +} \end{array} \right], \text{NP}, \text{ [2]VP} \right\rangle \right]$

The constraint in (50) states that the initial adjunct of a negative adjunct phrase is a modifier of the VP. The following is our analysis of example (47).



In (51) the MOD value of the negative adjunct *never* is identical to the VP *seen a ghost*, as ordinary preverbal adverbials do. This is compatible with the lexical information of *never*, given in (49).

#### 5.4 Individual variation about unbounded extraction of negative phrases

In this subsection we will give an account to the fact that negative preposing in NI is clause-bound for some speakers (2.2). The relevant data is repeated here.

(52) *Nothing* did the doctor [VP say the baby must eat]. [= (9)a]

Our HPSG analysis proposed in Section 4 can accommodate the unbounded extraction of negative phrases in terms of the constraint on negative-filler phrases quite naturally: the VP has an element missing, which corresponds to the fronted negative phrase.



(53) *negative-filler-ph* → [NON-HD-DTRS ⟨[LOC  $\boxed{3}$ [NEG +]], NP, VP[SLASH {(…), $\boxed{3}$ }]

However, unbounded extraction of negative expressions is less acceptable for some native English speakers.

(54) ?? *Not a penny* did I [say that Mary remembered to bring]. [= (12)b]

We assume that speakers who do not accept unbounded extraction of negative expressions have the following extra constraint on sentences in general.

(55) 
$$\left[ \begin{array}{ll} \textit{phrase} & \\ \text{HEAD} & \textit{verb} \\ \text{SUBJ} & \langle \ \rangle \\ \text{QUANTS} & \langle \boxed{1} \rangle \\ \text{NON-HD-DTRS} & \langle [\text{STORE } \langle \boxed{1}[\textit{neg-quant}] \rangle], \dots \rangle \\ \text{STORE} & \{ \ \} \end{array} \right] \rightarrow [\text{SLASH } \{ \langle [\text{NEG -}] \rangle \}]$$

Constraint (55) states that if clauses with wide negation have an extracted element, it should be non-negative. This constraint captures the fact that extraction of a negative phrase out of clauses with sentential negation (e.g., *Mary remembered to bring* in (54)) is ungrammatical for such speakers.

## 6. Summary and concluding remarks

Let us summarise this paper. We first looked at how the analysis within Minimalism/Principles and Parameters theory deals with NI constructions, and then provided some pieces of data that are problematic for the approach. Then we provided an HPSG approach to NI. We proposed that NI sentences are of the clause type *negative-inversion-ph*, which is a subtype of a type *phrase*. The former has subtypes, *negative-filler-ph* and *negative-adjunct-ph*. It was shown that this approach can accommodate all the data problematic for the Minimalist/Principles-and-Parameters approach.<sup>11</sup>

The present analysis accommodates not just the construction-specific properties of NI sentences but also the regularities that they share with other constructions. The use of hierarchically organised network of clausal types allows us to have constraints of any level of generality. The present approach can thus capture the distinctive properties of NI sentences without missing any generalisations.

\* This paper is a revised version of Maekawa (2006) and Chapter 6 of Maekawa (2007), and some portions have already appeared therein.

<sup>1</sup> What Force really deals with is sentence type, such as declarative, interrogative, and so on (Bob Borsley, p.c.).

<sup>2</sup> Haegeman (2000a: 126) assumes that a focus feature associated with the negative expression triggers preposing.

<sup>3</sup> The Negative Criterion is defined as follows (Haegeman 2000a: 123; Haegemann 2000b: 23):

(a) A NEG-operator must be in a Spec-Head configuration with an X-[NEG]

(b) An X-[NEG] must be in a Spect-Head configuration with a NEG operator.

<sup>4</sup> Culicover (1991) assumes the following clause structure.

(i)  $[_{CP} C^0 [_{PolP} Pol^0 [_{IP} I^0 \dots$

NegP moves into the specifier position of PolP.

(ii)  $[_{PolP} [_{Spec} NegP] [_{Pol} Neg] [_{IP} \dots I \dots]]$

He assumes that Neg is a morpheme that must cliticise to another head. However, the configuration in (ii) does not have such a head for Neg to cliticise to. This induces the raising of the head of IP to Pol.

(iii)  $[_{PolP} [_{Spec} NegP] [_{Pol} Neg] +I_i [_{IP} \dots t_i \dots]]$

The configuration in (iii) represents subject-auxiliary inversion. In embedded clauses, the complementiser is in the  $C^0$  position.

(iv)  $[_{CP} C [_{PolP} [_{Spec} NegP] [_{Pol} Neg] +I_i [_{IP} \dots t_i \dots]]$

Neg can still appear in Pol, and embedded NI is possible. This analysis is similar to Rizzi's (1997): Culocover's C and Pol correspond to Rizzi's Force and Foc, respectively. Therefore, all the criticisms to Rizzi discussed below can be applied to Culicover as well.

<sup>5</sup> I would like to thank Bob Borsley and Neal Snape for the grammaticality judgements of these sentences.

<sup>6</sup> Haegeman (2000a,b) cites the following examples as evidence that the wh-phrase and the negative expression compete for the same position [Spec,FocP].

(i) a. \*In no way, why would Robin volunteer?

b. \*Why, in no way would Robin volunteer? (Haegeman 2000a: 134)

(ii) a. \*On no account where should I go?

b. \*Where on no account should I go? (Haegeman 2000b: 46)

However, my informants do not find the (b) examples ungrammatical.

<sup>7</sup> We assume that *seldom*, *rarely* and *only* in the following example are also [NEG +].

(i) *Seldom/rarely/only* on two occasions have I heard anything like that.

<sup>8</sup> The mother VP of the PP *on no account* does not share the NEG value with the PP because the PP is not the head of the mother VP.

<sup>9</sup> This constraint is compatible with quantifier retrieval either at lexical or phrasal level.

<sup>10</sup> Which disjunct of the constraint (45) is appropriate for the interpretation of a particular NI sentence depends on which context the sentence occurs. We do not address this issue in this paper.

<sup>11</sup> The present approach is somewhat similar to Sobin's (2003) analysis within Minimalism in that the initial positioning of the negative expression does not involve movement. Sobin (2003) posits the clause structure shown below, which includes a simpler CP layer.

(i)  $[_{CP} \dots [_{AgrP} \dots [_{NegP} \dots [_{TP} \dots [_{VP} \dots$

The negative expression associated with NI constructions is located in [Spec,NegP]. Thus, an NI construction is given an analysis such as (ii).

(ii)  $[_{CP} [_{AgrP} [_{NegP} \text{ never again } [_{Neg} \emptyset_{Neg}] [_{TP} [_{T} \text{ will}] [_{VP} \text{ he } [_{V'} \dots$

There is no attraction of the verb to the negative expression (i.e., no Negative Criterion). The apparent inversion is impeded movement where the elements involved (verb and subject) fail to arrive at the normal declarative surface positions. There are two problems, empirical and conceptual. First, this approach predicts a full grammaticality of sentences like (iii).

(iii) % Beans, never in my life will I eat.

Secondly, in this approach, [Spec,AgrP] in NI constructions is empty, which violates the Extended Projection Principle. Sobin provides a couple of possible solutions, but the mechanisms involved require further development.

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[Abstract]

## An HPSG Approach to Negative Inversion Constructions

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In major current syntactic theories it has been argued that the initial negative expression in negative inversion (NI) constructions, such as *Under no circumstances will he eat raw spaghetti*, is in a specifier position of a certain functional category and establishes a spec-head configuration with a verb that moves to the head position. This paper compares the analyses of negative preposing in NI constructions within Minimalism/Principles-and-Parameters theory and Head-driven Phrase Structure Grammar (HPSG). It is argued that there is a body of data which is problematic for Minimalist/Principles-and-Parameters approaches but that HPSG can provide a fairly straightforward account of the facts.

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Key words : Head-driven Phrase Structure Grammar, Negative Inversion, Constructions