Negation, VP Ellipsis, and VP Fronting in English: A Construction-HPSG Analysis

Jong-Bok Kim
School of English & Center for the Language and Information
Kyung Hee University
1 Hoegi-dong, Dongdaemoon-gu
Seoul, Korea, 130-701
Email: jongbok@khu.ac.kr

Abstract

It is well-known that the English auxiliaries are sensitive to the so called NICE (Negation, Inversion, Contraction, and Ellipsis) phenomena. Based on these empirical properties of auxiliaries, this paper argues for the existence of the construction *aux-head-ph(rase)* whose subtypes include *negation-ph*, *inversion-ph*, *ellipsis-ph*, *vp-filler-ph*, and the like. Each of this subtype has its own construction-specific constraints as well as those inherited from its supertypes. The present analysis uses grammatical constructions with declarative constraints and posits a rich network of inheritance relations among them. This enables us to provide a clean analysis for some of the puzzling phenomena in English such as negation, VP ellipsis, and VP fronting, while capturing new levels of generalizations among these seemlingly unrelated phenomena.

1 Introduction

The English auxiliaries are sensitive to the so called NICE (Negation, Inversion, Contraction, and Ellipsis) phenomena, as seen from the contrast with main verbs in (1) and (2):

(1) a. John may not leave Seoul.
b. Will John leave Seoul?
c. John can't leave Seoul.
d. Mary will leave Seoul, and John will, too.

(2) a. *John not left Seoul.
b. *Left John Seoul?
c. *John leftn't Seoul.
d. *Mary wants to leave Seoul, and John wants.

Based on these empirical properties of auxiliaries, this paper argues for the existence of the construction *aux-head-ph(rase)* whose subtypes include *negation-ph*, *inversion-ph*, *ellipsis-ph*, and *vp-filler-ph*. Each of this subtype has its own construction-specific constraint as well as those inherited from its supertypes. The paper[1] shows that if we accept this view of the English auxiliary system in terms of construction types and declarative type constraints on them, we can offer a more straightforward and explicit explanation for English negation, VP ellipsis, and VP fronting phenomena. This paper starts with an analysis for English negation. Following Kim and Sag (1995), Kim (2000), and Warner (2000), this paper assume that the English negative marker *not* leads two lives – one as an adverbial modifier (as constituent negation) and the other as the complement of a finite auxiliary verb (as sentential negation):

[1]The theory this paper assumes is Construction-HPSG, roughly Head-driven Phrase Structure Grammar, augmented with a theory of constructions as in Ginzburg and Sag to appear.

(3) a. John [[will] [not] [leave Seoul]]. (Sentential negation)
b. John wants [not [to leave Seoul]]. (Constituent negation)

Clear support for this position lies in VP deletion (VPE) phenomena, as we will see in due course. Such a system also provides a simple analysis for Verb Phrase Fronting (VPF) phenomenon. The analysis provided here for these two constructions is built upon grammatical constructions with declarative constraints and a rich network of inheritance relations among them.

2 Negation

2.1 VP constituent Negation

The English negator *not*, like an adverb *never*, can function as a modifier of a phrasal element like a nonfinite VP as in (4).

(4) a. Kim regrets [never/not [having seen the movie]].
b. We asked him [never/not [to try to call us again]].
c. Duty made them [never/not [miss the weekly meeting]].

This modifier property can be represented by a partial lexical description represented in the feature structure system of HPSG:

(5) *not*

$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} adv & \\ \text{MOD} & \text{VP}[nonfin]:\boxed{1} \end{bmatrix} \\ \text{CONT} & \text{NOT}\ (\boxed{1}) \end{bmatrix}$$

This simple lexical information in (5) specifies that *not* modifies only a nonfinite VP and takes the modified VP's meaning as its semantic argument. This will be enough to capture the positional possibilities of the modifier *not* in nonfinite clauses:

(6) a. [Not [speaking English]] is a disadvantage.
b.*[Speaking not English] is a disadvantage.
c.*Lee likes not Kim.

(7) a. Lee is believed [not $_{VP[inf]}$[to like Kim]].
b.*Lee is believed to $_{VP[inf]}$[like not Kim].

Independent principles guarantee that modifiers of this kind precede the elements they modify, thus ensuring the grammaticality of (6)a and (7)a, where *not* is used as a VP[*nonfin*] modifier. But the examples (6)b, (6)c and (7)b are ungrammatical since the modifier *not* fails to appear in the required position—i.e. before all elements of the nonfinite VP.

In addition to these distributional properties, there is further evidence that *not* modifies a nonfinite VP. Given the general assumption that modification is recursive, our treatment predicts the possibility of double occurrences of negation in infinitival phrases. This prediction appears to be correct:

(8) (Everyone's turning the offer down, but I'm wavering...)
?I can't believe you would consider [not [not [taking advantage of the offer]]].

It is an important semantic fact that a VP modifier never outscopes a higher verb. Thus in examples like (9) and (10), the finite verb always outscopes the adverb.

(9) a. Kim seems [never [to be alone]].
b. Kim seems [not [to like anchovies]].
c. Pat considered [always [doing the homework assignment]].
d. Pat considered [not [doing the homework assignment]].

The lexical entry for *not* must therefore include the information that the modified element (which corresponds to the element that the negation adjoins to) be within the scope of the negation.

This lexical property of *not* also explains the interaction of coordination and negation:

(10) a. Dana will [[not [walk]] and [talk]].
b. Dana will [not [[walk] and [talk]]].
c. Dana will [[walk] and [not [talk]]].
d. You can [[walk for miles] and [not [see anyone]]].

In each of the examples in (10), the negation modifies a base-form VP, satisfying the *nonfinite* specification given above. Because *not* is a VP modifier, it may modify either the coordinate VP or one of its conjuncts, thus allowing for the various scopings sketched in (10)a and (10)b.[2]

2.2 Sentential Negation

As we have observed so far, when considering the distributional possibilities of *not* as VP constituent negation in nonfinite clauses, *not* behaves much like negative adverbs *never*. However, *not* distinguishes itself from adverbs like *never* in finite clauses. Unlike the negative adverb *never*, *not* cannot precede a finite verb as in (11). When it serves as sentential negation, it should appear right after a finite auxiliary verb as in (12).

(11) a. Lee never/*not left.
b. Lee never/*not would leave.
c. Lee never/*not has left.

(12) a. Lee did not leave.
b. Lee may not leave.
c. Lee will not leave.

Various phenomena illustrate that the negator modifying a nonfinite VP is constituent negation whereas the one right after a finite auxiliary is sentential negation. For example, (13) could have two interpretations: When *not* is a VP modifier as in (14)b, it has a narrow scope but it has a wide scope reading when serving as sententional negation as in (14)a.

(13) The president could not approve the bill.

(14) a. It would not be possible for the president to approve the bill.
b. It would be possible for the president to approve the bill.

Such a scope difference could also be found in wh-cleft sentences. In (15)a, the sentential negation has only a wide scope whereas in (15)b the modifier *not* takes a narrow scope.

[2]Notice, by contrast, that if we accept the general assumption that only categorially identical constituents can be coordinated, then these same facts pose a dilemma for the NegP hypothesis: the examples in (10) would be coordinations of NegP and VP or VP and NegP. And even if these nonidentical constituents are somehow allowed, we still lack an explanation for the impossibility of other cross-categorial coordinations, e.g. CP and IP. One solution to this dilemma might be to posit an additional functional projection such as PolP (Polarity Phrase, Culicover 1991) or Σ Phrase (cf. Laka 1990). This would of course entail generating a phonetically unexpressed element as the head of such a phrase in every nonnegative sentence, a consequence that lacks independent justification.

(15) a. What the president could not do is ratify the treaty.
b. What the president could do is not ratify the treaty.

A more clear difference is observed in VP deletion (VPE) phenomena. A VP after the sentential negation *not* can be elided as in (16)a, but this kind of ellipsis process is not possible after a VP modifier negation as in (16)b.

(16) a. Though his supporters asked him to approve the bill, the president could not __ .
b. *Though his supporters had asked him to ratify the treaty, the president could have not __ .

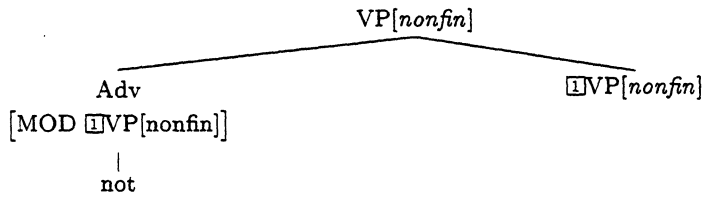
The most economical way to differentiate sentential negation from constituent negation seems to assume that the sentential negation is a syntactic complement of a finite auxiliary verb (cf. Kim and Sag 1995, Kim 2000, Warner 2000). I claim that this English specific property comes not from lexical properties but from construction constraints on the type *negation-ph*, which is a subtype of *aux-head-ph*, as represented in (17).

(17) *negation-ph*

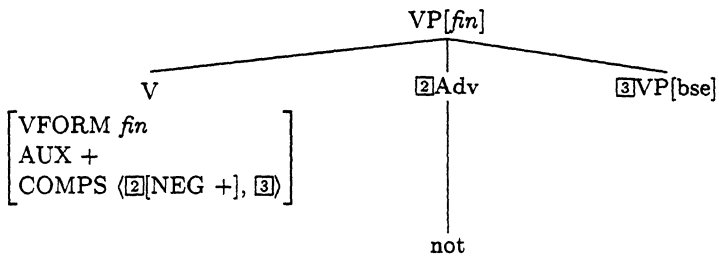
$$[\ ] \rightarrow \begin{array}{c} \text{H} \\ \begin{bmatrix} \textit{word} \\ \text{HEAD} \begin{bmatrix} \text{VFORM} & \text{fin} \\ \text{AUX} & + \\ \text{NEG} & + \end{bmatrix} \\ \text{COMPS} \quad \langle \boxed{2}\text{ADV} \begin{bmatrix} \text{NEG} + \\ \text{MOD} \mid \text{KEY} \ \boxed{1} \end{bmatrix}, \boxed{3}\text{VP[bse]} \rangle \\ \text{CONT} \mid \text{NOT} \ (\boxed{1}) \end{bmatrix} \end{array} \ \boxed{2}[\ ] \quad \boxed{3}[\ ]$$

The construction *negation-ph* in English is thus peculiar in that it selects an adverbial element such as *not* and a VP[base] as its complement.[3] The present analysis will then generate the following two structures for constituent negation and sentential negation respectively:

(18) a. Constituent Negation:



b. Sentential Negation:



[3]The constraint also specifies that in terms of semantics the negation *not* takes the meaning of the VP as its argument, as represented by the feature KEY. KEY is the semantic relation introduced by the lexical head of the phrase and is passed up from the head of a phrase to the mother. See Copestake et al. 1999.

In the syntactic structure (18)b that the analysis generates, the finite auxiliary and the following negator do not form a constituent. This nonconstituent property of the two elements predicts the impossibility of examples like (19)a.[4]

(19) a. *[Would not] he leave the city?
b. Wouldn't he leave the city?

As we have seen in (8), the treatment of *not* as VP constituent negation predicts the recursive modification by *not* in nonfinite clauses. But since the system allows only one sentential negation, the second *not* in (20)b is correctly analyzed as constituent negation.

(20) Kleptomaniacs [will] [not] [NOT [steal]].

The introduction of the feature NEG for the verbal lexemes that select *not* as a complement accounts for the constraint that English allows only one sentential *not* per clause.

The two scope patterns discussed earlier are analyzed in terms of two lexical classes with differing scope constraints lexically encoded.[5] A further property of such *not*-selecting forms is that they cannot be focused (see Kim 2000 for some discussion.):

(21) a. *They WÍLL not be there.
b. *Leslie CÁN not do that.
c. *Leslie CÁN so/too do that.

This is supported by tag questions. As noticed in (22), the negation following the stressed auxiliary does not function as sentential negation:

(22) a. He CAN not go to school tomorrow, (can't he/*can he)?
b. He MAY not go to school tomorrow, (mayn't he/*may he)?

This 'antifocus' property of sentential negation is presumably also lexically registered, as a constraint either on the lexical type, or else a condition on relevant constructions (see Kim 2000 for some discussion).

3 VP Deletion

More clear support for this construction-based analysis comes from the explanation of VPE. The standard generalization that VPE is possible only after an auxiliary verb as represented in the following contrast:

(23) a. Kim can dance, and Sandy can __ , too.
b. Kim has danced, and Sandy has __ , too.
c. Kim was dancing, and Sandy was __ , too.

[4]Following Zwicky and Pullum (1983), we take *n't* to be an inflectional suffix. Under this inflectional analysis, partial formal regularities can be accomodated, exceptional forms (e.g. *won't*, *don't*) can be listed, and anomalies like **amn't* and **mayn't* can be treated as paradigmatic gaps. In addition, dialectal variants (e.g. %*usen't*, %ain't) are treated as simple lexical differences.

[5]There are cases with no ambiguity:

(i) a. Kim must not drink the wine on the table.
b. Kim may not drink the wine on the table.

The deontic *must* and the epistemic *may* here do not induce scope ambiguity with the sentential negation. One solution to this lies in positing a lexical restriction: when they take the negator as a complement, they must take wider scope over the negator. See Warner 200 for detail.

(24) a. *Kim considered joining the navy, but I never considered __ .
b. *Kim got arrested by the CIA, and Sandy got __ , also.
c. *Kim wanted to go and Sandy wanted __ , too.

These illustrate that VPE is also sensitive to the presence of an auxiliary verb. This leads to postulate the existence of the construction *ellipsis-ph* as a subtype of *aux-head-ph* with the following constraint (cf. Sag 2000).[6]

(25) *ellipsis-ph*

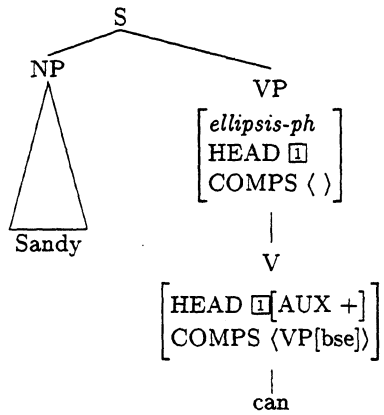
$$[\ ] \rightarrow \begin{array}{c} \text{H} \\ \begin{bmatrix} \textit{word} & \\ \text{AUX} & + \\ \text{COMPS} & \boxed{A} \oplus \text{nelist(XP)} \end{bmatrix} \end{array} \boxed{A}[\ ]$$

What this constraint allows is an instance of *ellipsis-ph* whose head is an auxiliary selecting a list of complements (represented by $\boxed{A}$ and an XP. It is this phrasal XP element that is missing in syntax. For example, the auxiliary *can* would have the following lexical information.

(26) [COMPS ⟨VP[bse]⟩]

When this element is instantiated in an *ellipsis-ph*, its VP[bse] complement need not appear in syntax, as represented in (27).

(27)



In the structure of (27), the head daughter's COMPS list (VP[bse]) is elided and is not realized in syntax.[7] The sentences in (23)b and (23)c are also such cases: the verbs such as *has* and *was* are all auxiliary verbs ([+AUX]) and subcategorize for a VP complement. Thus, the VP complement of all these verbs can be elided but not that of the main verbs in (24).

This analysis will easily generate examples like (28) in the same manner.

(28) Kim must have been dancing and
a. Sandy must have been __ , too.
b. Sandy must have __ , too.
c. Sandy must __ , too.

My analysis further predicts the possibility of VPE in infinitive clauses:

(29) a. Tom wanted to go home, but Peter didn't want to __ .
b. Lee voted for Bill because his father told him to __ .

[6]Boxed letters represent variables over lists and the function ⊕ is an 'append' function.

[7]I leave open the issue of obtaining the correct semantic interpretation for the elided VP. See Dalrymple et al. (1991) for a semantic equality solution without employing any mechanism for copying or reconstructing.

The infinitive marker *to* (following Pullum 1982) is an auxiliary verb selecting a VP[bse] complement. This fits the partial description for the *ellipsis-ph* constraint in (25).

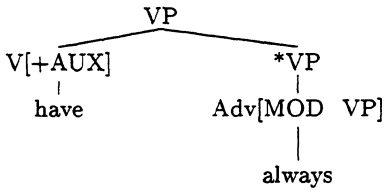
One important constraint on VPE is that it cannot apply immediately after an adverb, as as illustrated in (30).

(30) a. Tom has written a novel, but Peter never has __ .
b. *Tom has written a novel, but Peter has never __ .

One simple fact we can observe from (30) is that adverbs cannot modify an empty VP. In the framework of HPSG, VP modifying adverbs carry at least the lexical information given in (31).

(31)
$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} adv \\ \text{MOD VP:}\boxed{2} \end{bmatrix} \\ \text{CONTENT} & \begin{bmatrix} adv\text{-}rel \\ \text{ARG} \quad \boxed{2} \end{bmatrix} \end{bmatrix}$$

The lexical entry in (31) simply states that the adverb with this lexical information modifies a VP. The head feature MOD guarantees the fact that the adverb selects the head VP it modifies. This then entails that when the VP that an adverb modifies is not syntactically realized, as in (30)b, there is no VP for the adverb to modify. This explains the unacceptability of VPE after an adverb. Given Sag and Fodor's (1994) traceless theory, an ungrammatical example like (30)a would then have to have the structure given in (32).[8]

(32)


HPSG has a small set of schemata, analogous to X′ schemata, which specify partial information about universally available types of phrases. The adjunct schema is one of the universally available options for well-formed phrases. This adjunct schema roughly says that an adjunct and the head it selects through its modifier feature (MOD) forms a well-formed phrase. Now look at the structure in (32). In the present lexical theory where a VP modifier (e.g. *always* and *never* in (30)a,b) selects its head VP through the head feature MOD(IFIED), the absence of this VP then means that there is no VP the adverb can modify. And this results in an ill-formed structure: no universal schema in HPSG renders such a structure acceptable, thus explaining the ungrammaticality of (30)a,b.

This analysis then provides a clean anlaysis to the striking property of *not* with respect to VPE we have discussed: *not* can be stranded only after a finite auxiliary.

(33) a. Kim said he could have heard the news, but Lee said that he could not __ .
b.*Kim said he could have heard the news, but Lee said that he could have not __ .

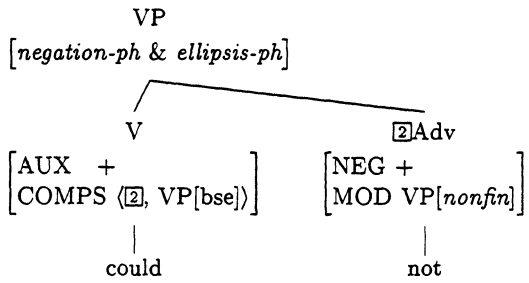
If the negator *not* in (33)a and (33)b were identically taken to be a modifier, we would predict both of these examples to be unacceptable since in both cases there is no VP for the negative marker to modify. Given the constructional constraint on *negation-ph*, the negator *not* in (33)a (but not the one in (33)b) is the complement of a finite auxiliary verb as represented in (34).

[8]Sag and Fodor (1994) reexamine empirical motivations for phonetically empty categories which have been important theoretical foundations in modern GB analyses. They show that all independent arguments for the existence of traces such as auxiliary contraction, *wanna* contraction, and position of floated quantifiers are neither satisfactory nor well-grounded. They also present positive arguments for terminating filler-gap dependencies by lexical heads, not by traces. See Sag and Fodor (1994) for details.

(34) [COMPS ⟨ADV[NEG +], VP[bse]⟩]

Once this auxiliary head is realized in an *ellipsis-ph*, then the rightmost element (VP[bse]) can be unrealized in syntax, yielding the following structure.

(35)



Notice that the phrase [*could not*] in (35) forms a well-formed head-complement structure where *not* is the complement of the head *could*. Nothing blocks this structure. One may ask whether it is acceptable not to satisfy the MOD feature of the adverb *not* in such a case. But note here that the structure (35) is not an adjunct structure, but a head-complement structure because the negator is now converted to a complement. The HPSG theory says nothing about what happens when a complement has a MOD value. Thus its presence in a complement does not affect the well-formedness of the given phrase. Under this analysis, the ungrammaticality of (34)b and (34)c also falls out naturally. The negators in (34)b and (34)c are just modifiers. They cannot be complements. We have seen that an adverb requires the VP it modifies to be present in order to form a well-formed structure. But the VPs that the adverbs modify are absent here.

The present construction and constraint-based analysis thus gives us a simple and explicit explanation for these VPE facts. The puzzle of the VPE with negation directly follows from our treatment of negation and ellipsis.

4 VP Fronting

Now, let us consider the phenomenon often referred to as VP fronting (henceforth, VPF).

(36) They swore that Lee might have been using heroin, and
  a. using heroin he might have been __ !
  b. *been using heroin he might have __ !
  c. *have been using heroin he might __ ! (Akamajian et al. 1979)

The first thing we can notice is that VPF cannot be identified with VPE because of the ungrammatical cases such as those given in (36)b and (36)c. If any constituent that can undergo VPE can also be VP-fronted, we would expect that VP's headed by *been* or *have* could not be elided. A simple generalization we can obtain from such data is that a fronted VP cannot be headed by an auxiliary element. This will block examples like (36)b and (36)c.

However, this simple approximation is counterevidenced by examples like the following (data from Gazdar et al. 1982):

(37) a.*... and [to go] he is
  b.*... and [be going] he will.
  c.*... and [have gone] he will.
  d. ... and [being evasive] he was.

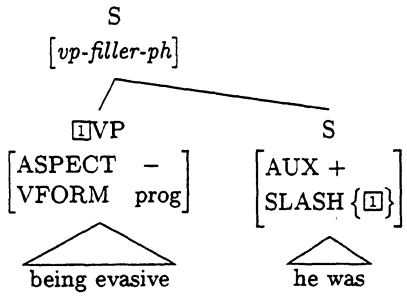
Notice here that though the fronted VP in (37)a-c carries the [+AUX] value inherited from the head (*to, be, have* and *being*), they are all unacceptable. To overcome this issue, we assume that the progressive *be* and perfective *have* are aspect verbs ([+ASP(ECT)]) (cf. Gazdar et al. 1982) together with the following constructional constraint:

(38) *vp-filler-ph*

$$[\ ] \rightarrow \begin{bmatrix} \textit{filler} & \\ \text{ASPECT} & - \\ \text{VFORM} & \neg\,\text{inf} \\ \text{LOCAL} & \boxed{1} \end{bmatrix} \overset{\text{H}}{\begin{bmatrix} \text{AUX} & + \\ \text{SLASH} & \{\boxed{1}\} \end{bmatrix}}$$

We thus accept the idea that VPF is different from VPE in that the former is a subtype of a *head-filler-ph* construction constituting a filler and a sentence with this filler as a gap. This would allow us to generate the following structure for (37)d.

(39)



The constraint in (38) also requires that the head phrase (sentence) be headed by an auxiliary verb. This restriction on the head verb's AUX value will block us from overgenerating cases such as given in (40).

(40) a. *I never thought that he would want to go, but [to go] he wanted __ .
b. *I never thought Lee would help move the chair, but [move the chair] Lee helped __ .
c. *I never thought Lee would stop feeding the dog, but [feeding the dog], Lee stopped __ .

The constructional constraint in (39) also imposes constraints on its filler. The slashed VP should be [−ASP], i.e., not headed by progressive *be* or perfective *have*.[9] By requiring such restriction on the filler VP, we can account for the grammatical contrast in examples like the following:

(41) a.*They said he would go, and $_{VP[+ASP]}$[be going] he will __ .
b.*They said he would have finished it, and $_{VP[+ASP]}$[have finished] he will __ .
c. They said he would be noisy, and $_{VP[-ASP]}$[being noisy] he was __ .

As assumed, the progressive *be* and perfective *have* in (41)a and b are [+ASP]. The lexical rule specifies that the VP headed by either of these aspect verb cannot undergo the fronting process.

Taking VP fronting to be a special case of topicalization, the analysis also allows unbounded examples like (42) (data from Gazdar et al. 1982).

(42) a. ... and [go], I think he will __ .
b. ... and [going], I believe Kim knew he was __ .
c. ... and [being evasive], I believe he knew he was __ .

[9]The filler also as the constraint that its should not be infinitive. Such a constraint will block examples like (38)a and (40)a.

Notice that this constructional analysis explicitly factors out the similarities and differences between VPF and VPE phenomena. VPF is relevant only to the phrase whose head is an auxililary. This restriction similarly holds in VPE too. But the restriction on the aspectual value of the gapped VP complement makes them different: the head of the VP that undergoes fronting should be nonaspectual. This accounts for the difference between VPF and VPE (relevant data repeated here).

(43) They swore that Lee might have been taking heroin, and
  a. taking heroin he might have been __ !
  b. *been taking heroin he might have __ !
  c. *have been taking heroin he might __ !

(44) Lee might have been taking heroin, and
  a. Sandy might have been __ too.
  b. Sandy might have __ too.
  c. (?)Sandy might __ too.

Then, what does this VP fronting analysis predict concerning negation? Recall that our treatment allows *not* to be either a VP modifier or a syntactic complement of a finite auxiliary, and that we permit the negator *not* to be stranded only if it becomes a complement of a finite auxiliary, i.e., only when it occurs immediately after a finite auxiliary. This prediction is borne out:

(45) a. They all said that John was not being followed, and [being followed] he was not __ .
  b. They all said that John was not being followed, and [not being followed] he was __ .

The negative marker *not* in (45)a is the complement of the auxiliary *be*, and its VP complement *being followed* is fronted. In (45)b, the same VP is fronted and *not* is modifying the fronted VP.

But notice a different behavior of the modifier *not*.

(46) Kim said she would be not eating spinach, and
  a. *[eating spinach] she will be not __ .
  b. [not eating spinach] she will be __ .

The negator *not* (46)a can be only a modifier. As noted in the previous section, the modifier *not* cannot be stranded, since the modifier *not* does not satisfy its MOD requirement. Meanwhile, nothing blocks (46)b in which *not* is a modifier.

Within the present analysis, examples like (47) will be predicted to be unacceptable in the present analysis:

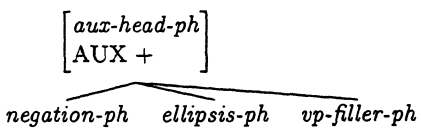
(47) Kim said she would not be eating spinach, and
  a. *[be eating spinach] she will not __ .
  b. *[not be eating spinach] she will __ .

The fronted VP is headed by the aspectual head, the progressive *be*. This violates the condition on the assumed *vp-filler-ph*.

5 Conclusion

The overall organization of the phrasal types we have posited and reviewed is sketched in (48).

(48)



Since each subtype inherits the constraints of its supertypes, we could minimize the constraints declared upon each subtype. This type inheritance mechansim allows us to avoid stating redundant information and to capture cross-classifying generalizations among constructions while at the same time accommodating the idiosyncratic properties of individual constructions.

This theory of grammar which uses grammatical constructions and posits a rich network of inheritance relations among them gives us a clean analysis for some of the puzzling phenomena in English such as negation, VP ellipsis, and VP fronting. It has been a common practice that the English negation phenomena is idiosyncratic in terms of its distributional properties. This has lead to adopt a English particular rule like *do*-support or introduce functional projections such as NegP (cf. Pollock 1989) together with empty categories. The construction, constraint-based analysis presented in this paper makes it unnecessary to resort to such abstract machinery and eventually enables us to find new levels of generalizations within the English auxiliary system that has often been regarded as a storehouse of peculiarities.

Acknowledgements

The idea developed in this paper was conceived from Kim (2000) and discussions with many people. In particular, I would like to thank Chung Chan, Byung-Soo Park, Ivan Sag, Peter Sells, among others. All errors remain mine. I gratefully acknowledge the support of Kyung Hee University Research Fund in the program year of 2000.

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