

Subject–Auxiliary Inversions in English

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The English auxiliary system is certainly one of the most frequently analyzed facets of any of the worlds grammatical systems. One of the characteristic properties of the English auxiliaries is the so–called NICE Properties (Negation, Inversion, Contraction and Ellipsis). In this paper I will focus on the phenomenon of English subject–auxiliary inversions. I will present three well–recognized analyses of subject–auxiliary inversions: the analysis based on inversion lexical rules following Sag and Wasow (1999), the analysis founded on no lexical rules following Warner (2000), and the analysis grounded on no default specifications following Green and Morgan (1995). Particularly this paper will partially revise a multiple inheritance sort hierarchy which was originally suggested by Green and Morgan (1995). It will also make a comparison between "*Will not they...?*" and "*Will they not...?*", and provide two ways to block inversions when finite negation is applied simultaneously with subject–auxiliary inversions: morphologically and by changing the valence membership of head 'will'. My suggestions will be supported by some empirical data.

Keywords: subject, auxiliary, inversion, negation, NICE properties, multiple inheritance hierarchy

1. Introduction

Inversions of a subject and a finite auxiliary occur in main clause interrogatives, in some conditionals and comparatives, after a fronted negative, etc. We will take a brief look at previous analyses of subject-auxiliary inversions either with lexical rules or without lexical rules and try to analyze subject-auxiliary inversions(SAI) within the framework of HPSG. We'll bring some changes to a partial multiple-inheritance sort-hierarchy presented by Green & Morgan (1995) and provide a more detailed description of a multiple inheritance hierarchy. Finally we'll touch on some peripheral phenomena in SAI such as the acceptability of "*Will not they...?*" and "*Will they not...?*".

2. Previous Analysis

2.1 Basic Properties of Auxiliaries

Consider the following data taken from Sag and Wasow(1999).

- (1) Pat tap-danced.
- (2) a. Pat can tap-dance.
 - b. *Pat can tap-danced.
 - c. Pat is tap-dancing.
 - d. *Pat is tap-dance.
- (3) a. Pat could have been dancing.
 - b. *Pat has could tap-danced.
 - c. *Pat is having tap-dancing.
- (4) a. *Pat could will dance.
 - b. *Pat has had tap-danced.

From these examples we draw the following generalizations.

- A. Auxiliaries are optional(see 1).

- B. Auxiliaries determine the FORM of the following verb(see 2b).
- C. Auxiliaries can co-occur with each other, but only in a fixed order (M)(PERF)(PROG) (see 3a).
- D. Auxiliaries cannot iterate(see 4a).

Treating auxiliaries as verbs that take VP complements provides the tools for restricting the FORM value of the head of the following VP. In (2b), the verb form value of the complement VP of the auxiliary verb should be restricted to VP[inf], thus rendering (2b) ill-formed. The fact that modals must come first in any string of auxiliary follows from the fact that they only have finite entries as shown in all the above examples. Since the complements to the auxiliaries *have* and *be* must have some FORM specification other than finite, modals cannot head complements to *have* or *be* (see 3b). Furthermore, their obligatory finiteness along with the requirement that the head of the complement to a modal should be [FORM inf] keeps them from iterating (see 4a). Besides, the fact that perfective *have* cannot follow progressive *be* is due to the fact that not all verbs can appear in the progress, particularly when they are stative verbs (see 3c). Finally, the failure of perfective *have* to iterate stems from the fact that *have* doesn't have a past-participle entry, so it could not appear as the head of the VP complement to another occurrence of perfective *have* (see 4b). What distinguishes English auxiliary verbs from other verbs are the so-called NICE properties: Negation, Inversion, Contraction, and Ellipsis.

- A. Negation: They can be immediately followed by *not* as a way of negating the sentence.

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(5) a. Pat should not leave.

b. *Pat raked not leaves.

B. Inversion: They can precede the subject in questions.

(6) a. Has Pat left town?

b. *Left Pat town?

C. Contraction: They have contracted forms created with the suffix *n't*.

(7) a. They haven't cut the price.

b. *They cutn't the price.

D. Ellipsis: The complements can be omitted when the meaning of the missing complement can be reconstructed from the surrounding linguistic context.

(8) a. If anybody is spoiling the children, Pat is.

b. *If anybody keeps spoiling the children, Pat keeps.

Sag and Wasow (1999) present the NICE properties using the lexical rule, only the Lexical Inversion Rule of which I rewrote here in the following section.

2.2 Analysis based on subject-auxiliary inversion lexical rule

The outputs of this rule are finite auxiliaries that take no specifier (i.e. subject). Hence, in any well–formed lexical SD that these outputs bring about, all members of the ARG–ST list will also appear on the COMPS list as illustrated in (10).

Because such a lexical SD has the first ARG–ST member on the COMPS list, that element will be realized as a complement, to the right of the lexical head in a phrasal SD constructed in accordance with the HEAD–Complement Rule. Because the first element of the ARG–ST list is the first complement, all words formed from the outputs of this lexical rule specify the appropriate CASE and AGR constraints not on the SPR value but rather on the first COMPS member, as shown in (10).

This lexical entry of *will* will produce the following example.

(11) Will he come back?

Moreover, since auxiliaries are raising verbs, their first

argument is identical to the element on the SPR list of their VP argument. Hence, in the so-produced inverted auxiliary's entry, the first complement will also function as the second complement's subject. We therefore predict data like the following:

- (12) a. Will there be children in the audience?
b. *Will there win the game?

2.3 Analysis of SAI based on English Auxiliaries without Lexical Rules

The following analysis is based on Warner (2000).

Inversions of a subject and a finite auxiliary occur in main clause interrogatives, in tag questions, after a fronted negative with scope over the auxiliary, in *and neither* and *and so* tags, and restrictedly in conditionals and comparatives as shown in (13).

- (13) a. Could you see the horizon?
b. At no point could I see the horizon.
c. I could see the horizon, and so could Harry.

Such clauses are best analyzed within the framework adopted here as having a flat structure in that the finite auxiliary, the subject phrase, and the complement phrase are all sisters, as in (14). Of course this flat structure can also be derived from the inversion lexical rule dealt with in the previous section.

The most satisfactory way of generating this flat structure is to change the valence list membership of its head by placing the first member of the ARG–ST list on the COMPS list *so that the head auxiliary has its subject as the first item on its COMPS list*, and is consequently
SUBJ *elist*, as in (14), and to use Schema 2, the HEAD–COMPLEMENT SCHEMA, which is also used to specify the structure of VPs. The case of the subject, and the subject–verb agreement will be specified by reference to the initial member of the auxiliary's ARG–ST list. The information which will appear in a type inverted, a subtype of finite *aux lex*, will be as follows:

The definition of *inverted* in (15) identified the initial members of the ARG-ST and COMPS lists, and leaves the specification of SUBJ as *elist* to the Argument Realization constraint of (16), which defines the ARG-ST as the append of the valence of lists.

On this account, finite auxiliaries must meet one of the two constraints *inverted* and *not inverted*. *Inverted* assigns [+INV], and it identified the first item on the ARG-ST list with the first item on the COMPS list. Unification with Argument Realization will specify the value of SUBJ as *elist*. *Not inverted* assigns [-INV, SUBJ <[]>] and auxiliaries of this type will be SUBJ <[]>, ARG-ST <[], ...> in accordance with the Argument Realization constraint. Both constraints will be subsorts of finite *aux lex* within the lexical hierarchy.

This analysis of subject–auxiliary inversions without using lexical rules increases the possibility that lexical rules could be abandoned from the formalism of HPSG in favor of mechanisms of lexical inheritance. The interrelationships proposed between structures are radically different since they are constrained by the need to state them within a hierarchy of unifiable information, whereas lexical rules permit what looks to the practicing grammarians like a more potent ability to manipulate relationships between feature structures.

2.4. Analysis without the notion default specification

The following analysis is based on the Green and Morgan(1995)'s *Analysis on auxiliary inversions and the notion default specification (1995)*.

It is thought that (1) the description of English auxiliary inversions requires a feature with a default value, (2) that

non-default values must be stipulated and learned as exceptions and (3) that when languages exhibit different values for a feature in different contexts learning theory requires grammars to stipulate a default value. But Green and Morgan (1995) suggests that a comprehensive account of inverted structures is entirely possible in constraint-based grammar with monotonic multiple-inheritance and no overridable default specifications. In HPSG, sort specifications defined in a non-default inheritance hierarchy unify with lexical specifications in multiple inheritance networks, subject to the relevant constraints.

GKPS(1985), identifying typicality with the notion DEFAULT, and markedness with its opposite, proposed that a GPSG description of English required [INV] to have a negative default specification ([- INV]). The fact of the matter is, however, that while the uninverted structure is supposedly the typical, unmarked one for clauses as a whole, the inverted structure is the typical, unmarked one in clauses with the illocutionary force of questions, which means that if DEFAULT is to be identified with unmarked, default stipulations cannot be made relative to a grammar, but only relative to a subset of the structures it defines. Furthermore, in filler-gap sentences with statement force, inversions are in some cases obligatory, as in (18), sometimes optional, as in (19), and sometimes impossible, as in (20), depending, apparently, on the semantic character of the filler constituent.

- (18) a. Not a bite would he admit that he ate.
 b. *Not a bite he would admit that he ate.
- (19) a. Thus did the hen reward Beecher.
 b. Thus the hen rewarded Beecher.

- (20) a. *Sometimes will they play volleyball.
b. Sometimes they will play volleyball.

Apparently, what is judged to be 'marked' or *functionally neutral* varies with the illocutionary intent attributed to a hypothetical utterance of a sentence. If FUNCTIONAL NEUTRAL has to be defined relative to the intentions of potential speakers, then it is not a strictly formal property of expressions in a language. If inverted clauses cannot be identified as exceptionally and unequivocally MARKED, then it cannot be so identified.

However, HPSG (Pollard and Sag, 1987, 1994), provides a structured, declarative, unification–based framework for the representation of syntactic and semantic information. But the logic of property inheritance which HPSG is based on neither requires nor defines a notion of DEFAULT SPECIFICATION. So the question HOW SHOULD THE VALUE OF A FEATURE BE SET IN THE ABSENCE OF SPECIAL INFORMATION TO THE CONTRARY does not result.

In optional cases syntactic clause types which occur both with and without inversions will be licensed by specifications which will simply make no reference to a feature like [INV]. Specifications for those few phrase types that disallow inverted clauses must specifically refer to S constituents which are [–INV]. This includes relative clauses as in (21), complements of those verbs which do not subcategorize for interrogative clause complements (*think, believe...*) as in (22), and adverbial clauses with presupposed content (for example, those beginning with *before* or *when* but not *because, since* or *so*), as in (23).

- (21) *A man who *did we* like telephoned.

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(22) *I dont think *is he* sick.

(23) *I left after *did he* have everyone rolling in the aisles.

But verbs which can be used to reference or implicate questions allow the question clause to occur inverted or uninverted as in (24).

(24) Someone must know *is he* sick.

Licensing principles for those phrase types that require a [+INV] clause must specify this. Since this requirement is a property of particular phrase types, rather than a lexical property of some particular lexical item, subsorts of constructions (for example, gap-containing clauses in filler-gap constructions) must be identified as having this property. Negative-topic filler-head clauses and comparative-topic filler-head clauses would have all the attributes of filler-head clauses in general, but would require that the clausal head daughter be inverted.

The following section shows a multiple inheritance hierarchy adapted from Green and Morgan(1995)'s figure, enriching their version by providing more detailed hierarchies and adding some cross-classifications.

3. A Revision of Multiple Inheritance Hierarchy presented by Green and Morgan (1995)

To express generalizations about the shared properties of diverse constructions types, we (following Sag 1997 and Ginzburg & Sag 2000) can classify phrases not only in terms of their X type (e.g. whether they are headed or not: if they are headed, what kind of daughters are involved, etc.), but also

relative to an independent dimension of clausality. On this theory, each type of phrase is cross-classified: each maximal phrasal type inherits both from a CLAUSALITY type and from a HEADEDNESS type as shown in Figure 1.

If clauses–type sorts, as well as constituent–structure sorts are declared, as Sag(1994) has suggested, together these define a large number of phrase types where any inversion specifications are inherited from a variety of sources through the multiple inheritance network that the sort classifications defines. Thus in addition to the sorts of constituent structure defined by the six phrase–structure schemata described in Pollard & Sag (1994), sort declarations for declarative, interrogative, and relative clauses constrain the syntactic and semantic composition of clauses. For example, partitions of the sorts constituent–structure (head–complement, head–marker, head–filler, ...) and clause–type (declarative, interrogative, relative, ...) and their respective subsorts cross-classify clausal structures so that, a subject–relative clause like *who saw her* is both a head–subject structure and a type of relative clause, and an unprefixed relative clause like *she saw* is also a

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head-subject structure, and a different type of relative, while *who she saw* is also a relative clause, but a head-filler structure, rather a head-subject structure (see figure 2 below). The dotted lines in the following partial-inheritance sort-hierarchy represent the cross-classifications which were not originally present in Green & Morgan's description of the hierarchy but which I added to Green & Morgan's multiple inheritance hierarchy or revised on my own.

4. Will not they· vs. Will they not...?

In HPSG generalizations about the left–right order of sisters in inverted clauses with auxiliaries are made by Linear Precedence Constraints. Linear Precedence Constraint 1 says simply lexical heads in English are phrase–initial (Pollard and Sag, 1987). Linear Precedence Constraint says that complements must precede more oblique *phrasal* complements (Pollard and Sag 1987). For inverted structures this establishes the ordering subject < other phrasal complement (where the other phrasal complement may be a VP, or XP[+PRD], or NP). Since *not* is subcategorized for, and occurs in the second position in ARG–ST, it too is part of the obliqueness hierarchy. But if it is of type *word*, the subject (although less oblique) need not precede it in inverted structures: the order *subject+ not* and the order *not +subject* both comply with Linear Precedence Constraint. Hence the principles set up for English in Pollard and Sag (1987), together with the interpretation of *not* as a complement of type *word* in the second position of the ARG–ST list, account immediately for the variations in the position of *not* found with NP subjects in inverted structures, and provide some further evidence for its analysis as a complement. The following examples from (25) to (27) support the principles.

(25) a. Will not this hypothesis be upheld?

HEAD [*word*] – *not* – subject – VP

b. Will this hypothesis not be upheld?

HEAD [*word*] – subject – *not* – VP

(26) If everyone stands firm, they ask, will not the next step be a clash leading inexorably to mutual annihilation?

(LOB–b TXT 3164)

(27) The most glorious and praiseworthy hero that ever desolated nations might have moldered into oblivion among the rubbish of his own monument, did not some historian take in into favor and benevolently transmit his name to posterity. (*Washington Irving* in his *History of New York*)

But Bresnan(2000) cited by Sag(2001 unpublished) discusses the fact that in most varieties of American English, unfronted finite negation combined with the inversion of the auxiliary is ill-formed as in (28)

- (28) a. % Will they not stop singing?
b. % Have they not been to Prague?

If Bresnan's discussion is well-founded and only fronted negation combined with the inversion of the auxiliary is well-formed, our task is to come up with a way to block inversions whenever a finite negation is also applied simultaneously with a subject-auxiliary inversion and to always force *not* to happen right after auxiliary verbs.

One way would be to incorporate *not* into *will* morphologically and to treat them as a morphological unit. This will correctly predict that only either "*Will not they not stop singing?*" or "*Won't they stop singing?*" is well-formed.

Another way would be to change the valence membership of its head, making use of Warner(2000)'s inverted ARG-ST, as proposed (26), such that parenthesized *not* should come as the first member of the ARG-ST and COMPS list. This constraint will allow *not* to appear right after auxiliaries when negated

expressions are to be inverted.

(30)

Will (in inverted sentences with fronted negation as in *Will not they stop singing?*)

If the adverbial negative *not* appears as the first member of ARG–ST list, it will be placed right after auxiliary heads according to the constraint imposed on the inverted/negated clause. In addition, the second member of the ARG–ST and the second member of the COMPS list are identified, which indicates that the sentence with such an ARG–ST is inverted. If *not* comes after the subject, it will be automatically be placed after the subject, thus licensing such an inverted/negated sentence. Are they not rich?

5. Conclusion

We have shown three analyses of subject–auxiliary inversions, the one with lexical rules, the one without lexical rules, and the one in the light of a multiple inheritance hierarchy. Which analysis is more persuasive and more economical remains to be seen. I will take it to be something to work on a little harder. My analysis of *Will not they..?* vs. *Will they not.?* may be open to some criticism unless more refined tools are to be found.

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