The English Auxiliary System Revisited*

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Abstract

This paper examines the question of the functional status of auxiliaries in English. Two approaches are contrasted: one which treats auxiliaries as mere feature-carriers, and one which treats them as argument-taking predicates. It is argued that no analysis is correct for all auxiliaries: supportive *do*, perfective *be*, and the modals *will* (*shall*) and *would* are argued to be feature-carriers, while progressive *be* and the rest of the modals are argument-taking predicates. It is also argued that the selection of the past participle by perfective *have* is a case of c-structure selection, not f-structure selection or realizational morphology. An account is offered for the relative ordering of *have* and *be*.

1. The Problem

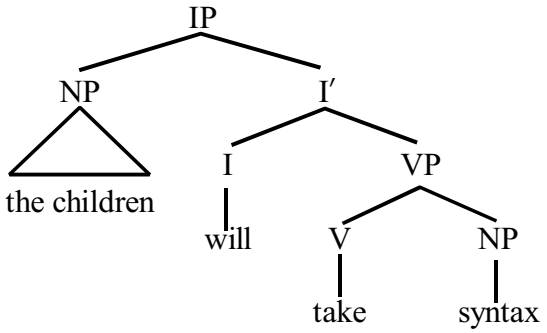
One of the most enduring issues in the analysis of English syntax is the nature of the auxiliary system. The issue that this paper will focus on is the question of the syntactic relations between the "verbal" elements of sentences with auxiliaries. If we consider a fairly simple sentence, such as (1a), are the relations as in (1b) or (1c)?

(1) a. The children will take syntax.
b. *will* is the head of the sentence, and *[take syntax]* is a complement of *will*
c. *take* is the head of the sentence, and *will* is a "modifier" or morphological marker expressing/realizing future tense

We will refer to these two analyses as the **aux-predicate** (1b) and **aux-feature** (1c) analyses. In early work in generative syntax, this question was related to the question of categorization: those who considered *will* to be a verb (such as Ross 1969 and Pullum and Wilson 1977) adopted the aux-predicate analysis, while those who considered it to belong to a distinct category (such as Chomsky 1965 or Jackendoff 1977) adopted the aux-feature analysis. However, more recent work has tended to dissociate these two issues.

In this study, we will assume that *will* belongs to the category Infl, which is the categorial head of the clause.[1]

(2)



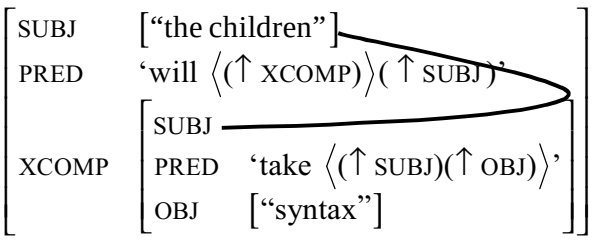
However, such an analysis does not entail that *will* is functionally the head of the clause. This can be seen in extant non-LFG analyses; that is to say, analyses combining the IP approach to clauses with a version of the aux-feature approach, have also been proposed in other theoretical

[1] In the case of the aspectual auxiliaries *have* and *be*, we follow the standard "V-to-I" analysis, under which they are verbs when nonfinite and infls when finite. V-to-I is achieved by movement in derivational frameworks and by lexical specification in lexicalist frameworks.

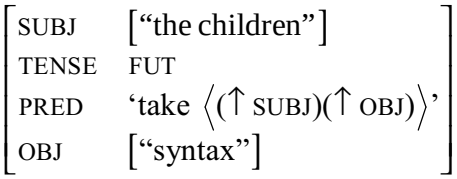
frameworks. For example, Pollock (1989) argues in a GB analysis that auxiliaries do not assign θ roles, i.e. do not take arguments. Chomsky (1995: 198) takes the position that auxiliaries have no semantic features (such as predicate-argument structure). Radford (1997), a textbook on the Minimalist Program, states "Whereas a typical verb like *want* may take a range of different types of complement…, by contrast auxiliaries typically take a verb expression as their complement, and have the semantic function of marking grammatical properties associated with the relevant verb, such as *tense*, *aspect*, *voice*, *mood*, or *modality*." These analyses in the transformational tradition thus take the position that *will* is the structural head of this sentence but *take* is the functional head: the equivalent of what we are calling the aux-feature analysis. LFG has the advantage of making more explicit than other frameworks do the dissociation between constituent and category information on the one hand and functional relations on the other.

The f-structure representations of the two analyses are as follows.

(3) a.



b.

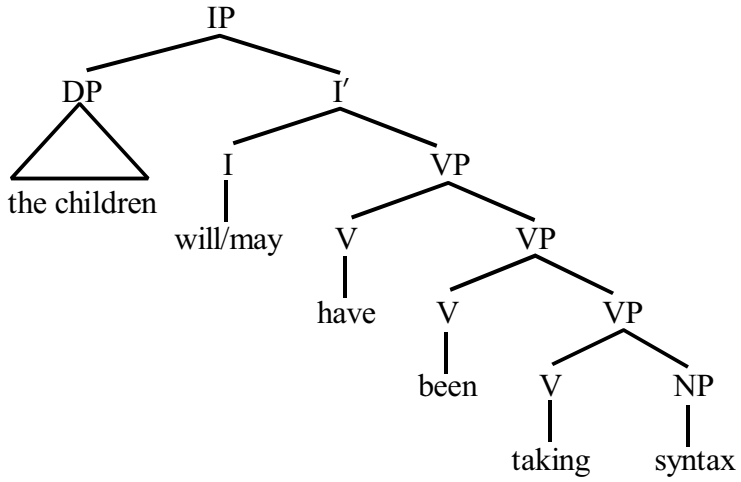


Under the aux-predicate analysis, *will* is a raising predicate, sharing its (nonthematic) subject with its complement. This is a functionally bi-clausal analysis. The aux-feature analysis is monoclausal; *take* is the only argument-taking predicate, and *will* provides the future tense feature.

It is not easy to distinguish these two analyses. Under the aux-predicate analysis, *will* takes a single thematic argument, the XCOMP. Since the SUBJ is not a thematic argument , *will* imposes no selectional restrictions. The internal structure of the XCOMP is almost indistinguishable from the sole functional level in the aux-feature analysis, the only difference being the lack of the future tense feature. There is thus not much on which to base an analysis. The present study takes as its starting point the analysis of Falk (1984), under which supportive *do* is given an aux-feature analysis while all other auxiliaries receive an aux-predicate analysis. More recent LFG analyses broaden the class of auxiliaries which receive an aux-feature analysis; we will conclude that in addition to supportive *do*, perfective *have* and the modals *will* (and *shall*) and *would* are simply carriers of features, while progressive *be* and the other modals are predicates defining their own clause nucleus. The various analyses are exemplified with the following sentence with a variety of auxiliaries.

(4) a. The children will/may have been taking syntax.

b. c-structure



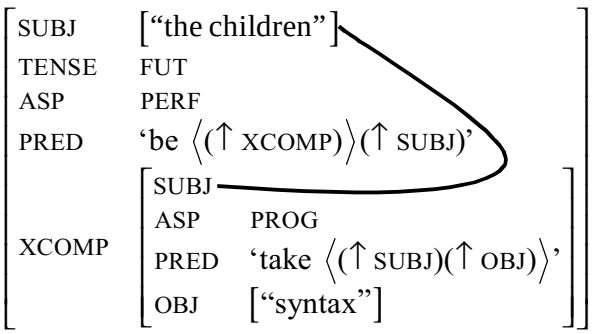
c. f-structure under uniform aux-predicate analysis of all auxiliaries (e.g. Falk 1984)

$$\begin{bmatrix}
\text{SUBJ} & [\text{“the children”}] \\
\text{TENSE} & \text{PRES?} \\
\text{PRED} & \text{‘will/may } \langle(\uparrow \text{XCOMP})\rangle(\uparrow \text{SUBJ})\text{’} \\
\text{XCOMP} & \begin{bmatrix}
\text{SUBJ} & \\
\text{PRED} & \text{‘perf } \langle(\uparrow \text{XCOMP})\rangle(\uparrow \text{SUBJ})\text{’} \\
\text{XCOMP} & \begin{bmatrix}
\text{SUBJ} & \\
\text{PART} & \text{PERF} \\
\text{PRED} & \text{‘be } \langle(\uparrow \text{XCOMP})\rangle(\uparrow \text{SUBJ})\text{’} \\
\text{XCOMP} & \begin{bmatrix}
\text{SUBJ} & \\
\text{PART} & \text{PRES} \\
\text{PRED} & \text{‘take } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{’} \\
\text{OBJ} & [\text{“syntax”}]
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}
\end{bmatrix}$$

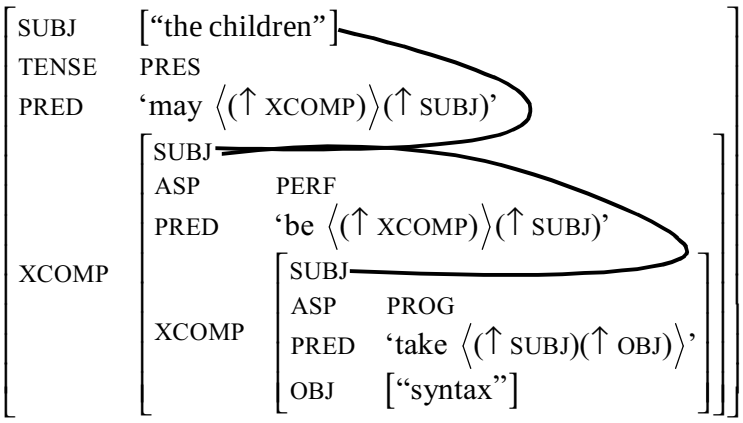
d. f-structure under uniform aux-feature analysis of all auxiliaries (e.g. Bresnan 2001)

$$\begin{bmatrix}
\text{SUBJ} & [\text{“the children”}] \\
\text{TENSE} & \text{FUT/POSSIBILITY} \\
\text{PERF} & + \\
\text{PROG} & + \\
\text{PRED} & \text{‘take } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{’} \\
\text{OBJ} & [\text{“syntax”}]
\end{bmatrix}$$

e. f-structure of *will* sentence under analysis proposed here



f. f-structure of *may* sentence under analysis proposed here

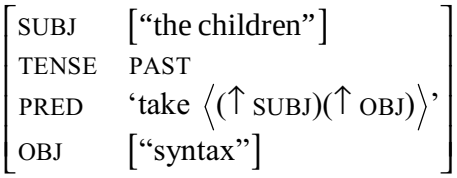


We will begin by reviewing Falk's (1984) arguments for treating *do* as a mere feature carrier; we will then progress to perfective *have*, progressive *be*, then to *will* and *would*, and finally the other modals.

2. Supportive *Do*

We begin with supportive *do* (henceforth *do*). The idea that *do* is merely a carrier of the tense feature (or a spell-out of the tense feature in derivational frameworks) has a long tradition in generative syntax. Classical transformational grammar included a rule of *Do* Support which inserted *do* when the tense feature could not be attached to a verbal element. Translating such an analysis to LFG, (5a,b) would both have the f-structure (5c).

(5) a. The children took syntax.
b. The children did take syntax.
c.



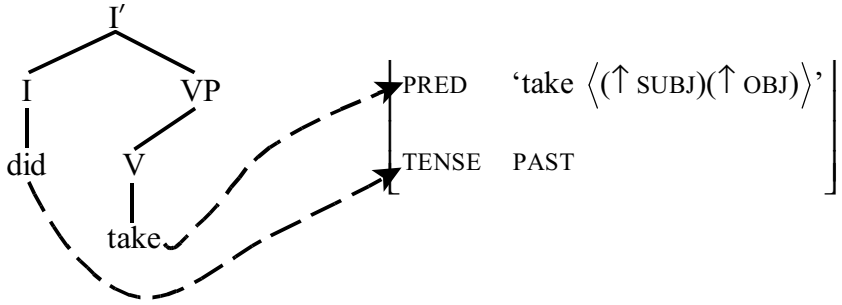
The lexical entries of the relevant verbal forms would be:

(6) a. *did*: (↑ TENSE) = PAST
b. *take*: (↑ PRED) = ‘take ⟨(↑ SUBJ)(↑ OBJ)⟩’

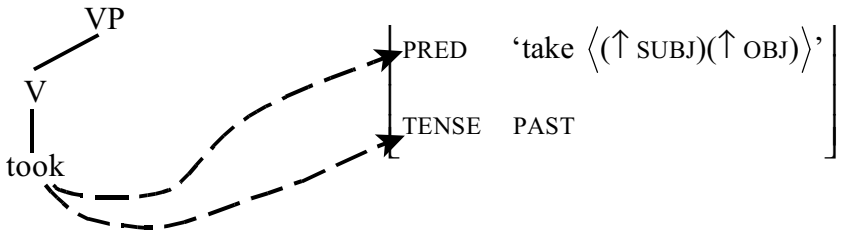
c. *took:* (↑ PRED) = 'take ⟨(↑ SUBJ)(↑ OBJ)⟩'
(↑ TENSE) = PAST

The f-structure features of *did* and *take* unify to create the same f-structure fragment as the synthetic form *took*.

(7) a.



b.



The functional equivalence of the two sentences is thus accounted for.

It has occasionally been observed that these two sentences are not entirely equivalent. Sentence (5b) is ungrammatical if the auxiliary is unstressed, a deviance which disappears in inverted and polarized sentences. Sag (2000) refers to this as a "theoretically central issue" which constraint-based accounts have failed to explain. However, as assumed by Falk (1984), this can be explained on the grounds of what would be referred to in contemporary LFG as the Economy of Expression principle, which, inter alia, prefers morphological expression to syntactic expression.

Falk (1984) argues for the aux-feature analysis of *do* on the basis of co-occurrence restrictions. The habitual expression *used to* is restricted to appear in past tense clauses. This can be expressed by associating *used to* with the following lexical constraint:

(8) (↑ TENSE) $=_c$ PAST

There are two ways in which this requirement can be met: the verb *use* can be affixed with the past tense suffix (9a), or it can cooccur with supportive *did* (9b).

(9) a. The children used to take syntax.
b. The children did not/so use to take syntax.
c. Did the children use to take syntax?

An analysis of *do* under which it is an argument-taking predicate (as in the analysis of Sag 2000, shown in (10)) is unable to maintain a uniform analysis of the restriction on *used to*.

(10)
$$\begin{bmatrix} \text{HEAD} & \begin{bmatrix} v \\ \text{VFORM} & \textit{fin} \\ \text{AUX} & + \end{bmatrix} \\ \text{COMPS} & \left\langle \begin{bmatrix} \text{VP} \\ \text{VFORM} & \textit{base} \\ \text{SUBJ} & \boxed{1} \end{bmatrix} \right\rangle \\ \text{SUBJ} & \boxed{1} \end{bmatrix}$$

As in 1984, we maintain that this is a strong argument for the aux-feature analysis of *do*.

An alternative implementation of this analysis has been suggested in the context of recent work on realizational morphology (e.g., by Ackerman and Stump 2003). From the perspective of the argument being made here, the choice between implementing the aux-feature analysis of supportive *do* as unification or as periphrastic morphological realization makes little difference. What is important is the adoption of the aux-feature analysis, however it will be implemented. However, it is unclear that the *do* supported forms could be profitably analyzed as members of paradigms when the verbs also have synthetic present and past tense forms. The competition between, e.g., *took* and *did take* is not at the level of morphology but rather syntax; if it were morphology then only one would exist. As it is, both exist but are used in different syntactic constructions.

3. Perfective *Have*

3.1.The Analysis

The next auxiliary we discuss is perfective *have* (henceforth *have*). *Have* has certain properties that make it a good candidate for an aux-feature analysis. The perfective verb forms in English and morphologically similar languages consist of two parts: the auxiliary *have* (or 'have' and 'be' in some languages) and a participial form. In some languages (such as French), when the auxiliary is in the present tense the perfect form is used for simple reference to past time, making an aux-predicate analysis for such languages implausible. As observed by Frank and Zaenen (2002), the following French sentences are functionally identical.

(11) a. Il parla.
he speak.PST
b. Il a parlé.
he has spoken
'He spoke.'

This is similar to the English situation, where *He spoke* and *He did speak* are alternate versions of the past tense, as discussed in the previous section. The use of these two forms in French differs from that in English; in French these forms are distinguished stylistically, with the analytic form being the one used in ordinary conversation. However, the logic of providing the same f-structure for *he spoke* and *he did speak* applies here as well. An analysis parallel to the English case thus appears to be called for.

(12) a. *a*: $(\uparrow \text{TENSE}) = \text{PAST}$
b. *parlé*: $(\uparrow \text{PRED}) = \text{'speak} \langle(\uparrow \text{SUBJ})\rangle\text{'}$
c. *parla*: $(\uparrow \text{PRED}) = \text{'speak} \langle(\uparrow \text{SUBJ})\rangle\text{'}$
$(\uparrow \text{TENSE}) = \text{PAST}$

d.
$$\begin{bmatrix} \text{SUBJ} & [\text{“he”}] \\ \text{TENSE} & \text{PAST} \\ \text{PRED} & \text{‘speak } \langle(\uparrow \text{SUBJ})\rangle\text{’} \end{bmatrix}$$

It has been argued on other grounds in LFG that perfective constructions in the Romance languages are monoclausal (Schwarze 1996; for similar arguments from an HPSG perspective Abeillé and Godard 1995). For example, while XCOMPs can be pronominalized, the VP following the perfect auxiliary cannot, as in the following Spanish examples.

(13) a. Ver el castillo, lo quiere.
to.see the castle it.ACC he.wants
‘To see the castle, he wants (it).’
b. *Visto el castillo, lo ha.
seen the castle it.ACC he.has
‘Seen the castle, he has`(it).’

Other arguments that have been proposed are less convincing. For example, Butt, King, Niño, and Segond (1999: 61) point out that what is done with an auxiliary construction in one language is done with inflectional morphology in another. They argue that treating auxiliaries as not being argument-taking predicates “allows for the invariant contribution of auxiliaries to (complex) tenses to be modelled crosslinguistically in the f-structure, while language particular idiosyncratic syntactic properties … are handled in the c-structure.” In a related vein, Frank and Zaenen (2002) observe that auxiliaries proved temporal and aspectual information, unlike verbal predicates. Arguments of this type are based on a concept that f-structure ought to be relatively transparent semantically, and therefore synonymous sentences in different languages should have essentially identical f-structures. However, as Dyvik (1999) points out, this represents an a priori view which is fundamentally in conflict with the role of f-structure in LFG as a level of **syntactic** representation.

The aux-feature analysis of perfective auxiliaries in Romance languages seems reasonable to us. This, of course, does not necessarily mean that the analysis is correct for English.[2] However, the properties of the English perfective construction do suggest that an aux-feature analysis is desirable.[3] Specifically, we propose that forms of *have* have lexical entries such as the following:

(14) *have* $(\uparrow \text{TENSE}) = \text{PRES}$
$(\uparrow \text{ASP}) = \text{PERF}$

and that a typical f-structure is the following:

(15) a. The children have taken syntax.

[2]Dyvik (1999) provides an aux-predicate analysis for the perfect auxiliary in Norwegian, but, unlike his analysis of modals, to which we will return later, he does not provide any arguments for this analysis.

[3]Falk (1984) considers and rejects an aux-feature analysis for reasons that I now consider flawed. It is noted there in a rather cryptically worded footnote (fn 18) that *had used to* is ungrammatical. The argument is that this ought to be grammatical under an aux-feature analysis because the past tense feature of *had* is in the same f-structure as *used to*, so the past tense constraint is met. Therefore, so the argument goes, *had* and *used to* must define separate local f-structures. However, it is plausible that *had used to* is ungrammatical for aspectual reasons: the perfective aspect of *had* and the habitual aspect of *used to* clash.

b.
$$\begin{bmatrix} \text{SUBJ} & [\text{“the children”}] \\ \text{TENSE} & \text{PRES} \\ \text{ASP} & \text{PERF} \\ \text{PRED} & \text{‘take } \langle (\uparrow \text{SUBJ})(\uparrow \text{OBJ}) \rangle \text{’} \\ \text{OBJ} & [\text{“syntax”}] \end{bmatrix}$$

That is to say, we propose that *have* provides two features: a tense feature and an aspectual feature. The past participle form, on the other hand, provides the verb's predicate, but no tense or aspectual information. There are facts which suggest that the aspectual information is provided by *have* rather than the participle. In the first place, as noted by Bresnan (1982), the participle is not sufficient for the perfective aspect.

(16) a. Anyone taking syntax [=anyone who is taking syntax] should have his head examined. **[present participle]**
b. Any subject taken by the children [=any subject which is taken by the children] is boring. **[passive participle]**
c. *Anyone taken syntax [=anyone who has taken syntax] should have his head examined. **[past participle]**

Moreover, past participles are not even necessary for perfective aspect. As noted by Andrews (1994) and Bresnan (2001), a fronted VP in a perfective sentence in English need not be a past participle.[4]

(17) a. Take linguistics they have!
b. ?*Taken linguistics they have!

We will return to the analysis of this pattern in the next section. But the point here is that the past participle is not necessary for a perfect construction. Another indication of this is the following dialog; note that in B's answer there is no need for a past participle for the perfect interpretation:

(18) A: (Taking orders for lunch.) Who eats falafel?
B: Well, I have in the past, but I really don't want any now.

As in the case of *do*, there appear to be co-occurrence restrictions that can only be accounted for under the aux-feature analysis of *have*. One of these concerns *have got*. As discussed by Fodor and Smith (1978), *got*, at least in American English, must be analyzed as a distinct verb, which is irregular in that it is supported by *have* rather than by *do*. Part of their evidence is a drift in progress from *have got* to *do got*, which they analyze as a regularization of the verb.[5] The lexical entry of *got* in the *have got* dialect is:[6]

[4]There appears to be some variation between speakers over whether the participle is even possible in fronted position. What is critical here is the grammaticality of the version with the bare verb.

[5]My analysis of *have got* differs somewhat from that of Fodor and Smith, in that they argue that the *have* in *have got* is not the perfective *have*, as it does not have perfective meaning. I assume that since *have got* is idiom-like (a point on which Fodor and Smith concur), the [ASP PERF] feature does not receive the usual semantic interpretation.

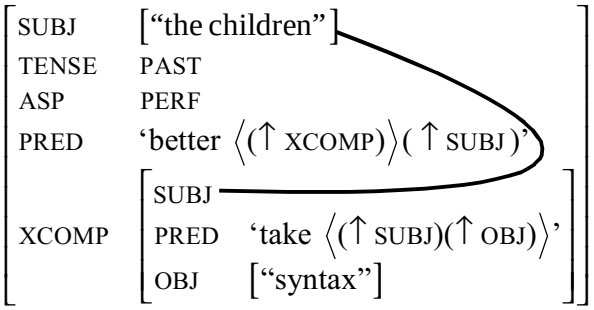
[6]In all dialects with which I am familiar, *have got* is limited to present tense, and I have included that constraint in the lexical entry. Those for which such a constraint does not exist would not have the constraint equation for TENSE.

(19) *got*: (↑ PRED) = 'got ⟨(↑ SUBJ)(↑ OBJ)⟩'
(↑ ASP) =$_c$ PERF
(↑ TENSE)=$_c$ PRES

In the *do got* dialect, the idiosyncratic aspectual constraint has been lost. Another case of a co-occurrence restriction of this kind is *had better*.

(20) a. *better* (↑ PRED) = 'better ⟨(↑SUBJ)(↑XCOMP)⟩'
(↑ TENSE) =$_c$ PAST
(↑ ASP) =$_c$ PERF

b. The children had better take syntax.



3.2. Selection of the Past Participle

The behavior of the past participle heading the VP complement to *have* raises interesting issues concerning the selection of inflectional features.

In Falk (1984), where an aux-predicate analysis was adopted for *have*, the selection was part of complement selection; in addition to selecting an XCOMP, *have* was analyzed as specifying that the XCOMP must include the inflectional feature [PART PAST].

(21) (↑ XCOMP PART) =$_c$ PAST

This is, of course, inconsistent with the aux-feature analysis. Furthermore, it is based on the assumption that the selection of the past participle by *have* is an f-structure property. In fact, as shown by (17) above, it is a c-structure property: the VP takes on the past participle form only when it is in c-structure complement position. An f-structure complement-selection approach is therefore inappropriate.

Realizational morphology provides another possible approach. Under realizational morphology, *have* does not select the past participle. Instead, *have* and the past participial morphology jointly constitute the realization of the paradigmatic positions associated with the perfect forms. Spencer (2001) states the rule informally as follows:

(22) Realize the feature ASPECT PERFECT on a verb V by means of the construction:
have + V[Vform:-*en*]

In Spencer (2003) he states rhetorically: "If we are to treat this as a piece of compositional syntax then we will have to decide which formative it is that bears the feature ASPECT PERFECT, the auxiliary or the past participle suffix. It's not clear how such a question could be answered." As an implementation of the aux-feature analysis, the realizational morphology approach does not suffer from reliance on f-structure. However, it implies that *have* and the past

participle are equally necessary to create a perfect form. As we have seen, we reject the implication in Spencer's comment that there is no way to decide which element is bears the aspectual feature: the two are not equally necessary for the construction. In other languages, it may well be the case that a realizational approach is superior, but it is not for English.

The correct generalization appears to be the following:

(23) The "main verb" in the perfective must be a past participle if the VP it heads is in a complement position in *have*'s extended projection. (The VP need not be a sister of *have*; in subject-auxiliary inversion, where *have* is in C position, the VP is still a past participle.)

When fronted to a non-complement position, it no longer needs to be a past participle, and (for many speakers, at least) takes on the default infinitive form.

An approach which has been used frequently in the recent LFG literature is to hypothesize an additional level of representation, m(orphosyntactic)-structure, as a projection of c-structure (Butt, King, Niño, and Segond 1999). Under this proposal, m-structure reflects the embedding of c-structure independently of f-structure, and the relevant morphological selection can be expressed in those terms. Using μ to represent the c-structure–m-structure mapping, this involves the following phrase structure rule, lexical specification for *have*, and structures.

(24) a. $I' \rightarrow \underset{\uparrow=\downarrow}{I} \quad \underset{\uparrow=\downarrow}{VP}$

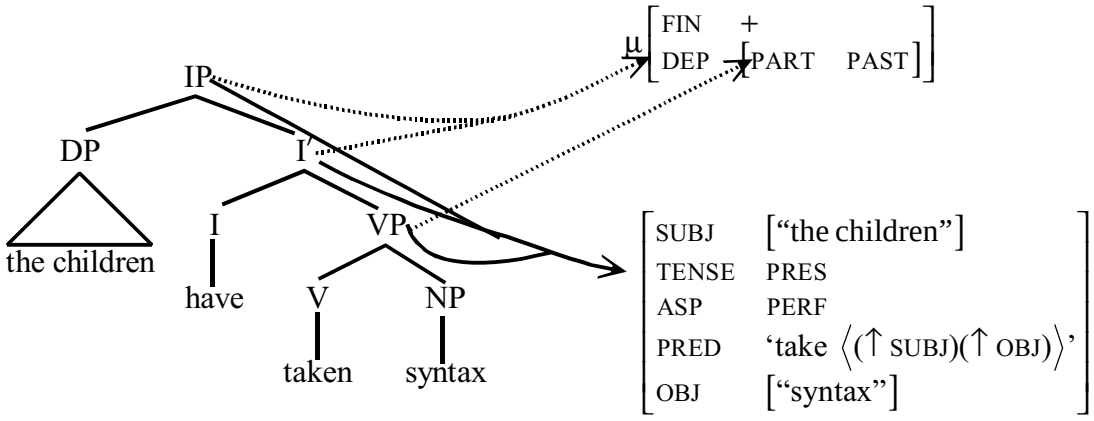
$\hat{*}_\mu = *_\mu \quad (\hat{*}_\mu \text{ DEP}) = *_\mu$

b. *have*: $(\uparrow \text{TENSE}) = \text{PRES}$

$(\uparrow \text{ASP}) = \text{PERF}$

$(\hat{*}_\mu \text{ DEP PART}) =_c \text{PAST}$

c.



Since m-structure is a projection from c-structure, an m-structure–based analysis reflects the c-structural nature of the selection. However, the m-structure-based analysis suffers from several formal and conceptual problems. The formal problems are discussed by Frank and Zaenen (2002), and involve the relationship between m-structure and f-structure. The conceptual problem is that it is not clear why morphosyntactic structure should be a distinct level. Many inflectional properties are clearly related to f-structure properties, and it is only an a priori concept of the universality/semantic relevance of f-structure, correctly disputed by Dyvik (1999), that would lead one to not include such features in f-structure. Those properties which are

c-structural (such as, apparently, the past participle feature in English) should be represented directly at c-structure. Recent work on morphology in LFG further undermines the idea of a morpho*syntactic* structure of the kind that m-structure is supposed to be.

We propose analyzing the selection of the past participle explicitly as c-structure selection. We follow the suggestion by Frank and Zaenen (2002) that c-structure contain categories that are more fine-grained than is traditional, what they refer to as complex categories. These complex categories include inflectional features. Past participles belong to the complex category V[part], and the verb *have* selects a c-structure complement that belongs to this category. Complex categories of this kind are used in HPSG, and often implicitly in other frameworks. While Frank and Zaenen discuss this within the context of a theoretical architecture that includes a level of m-structure, they note that

> one might wonder whether the formal device of complex c-structure categories…could be extended to an approach where all morphological constraints are encoded in terms of complex c-structure categories. A separate level of representation for morphological constraints [m-structure] would then be unnecessary. At first glance it seems, though, that not all morphological distinctions can be naturally encoded in terms of c-structure categories. In the case of the French auxiliary system, for example, one has to express certain restrictions on tense formation which preclude ungrammatical constructions like **est eu travaillé* ['is had worked'] as opposed to the well-formed *a eu travaillé* ['has had worked'], and similarly for **est été arrivé* ['is been arrived'] as opposed to *a été arrivé* ['has been arrived']. To capture these restrictions, an analysis that relies on purely c-structure categorial distinctions will have to encode the lexical form of the auxiliary, *être* vs. *avoir*, as a c-structure parameter of auxiliary categories. Here we would have to decide whether this kind of lexicalization is still within the range of a natural complex c-structure category.

For present purposes, we will assume that those morphological constraints which are not best expressed at f-structure or in terms of realizational morphology will be expressible in terms of complex c-structure categories, without m-structure. Using the informal "compl" to refer to an element in c-structure complement position, and λ for the category label function, we can express the requirement of *have* semiformally as:

(25) $(\hat{*}\ \text{compl}) \Rightarrow \lambda\,(\hat{*}\ \text{compl}) =_c \text{VP[part]}$

4. Progressive *Be*

The progressive auxiliary *be* is often grouped together with *have*, the two of them forming the class of aspectual auxiliaries. However, there is reason to believe that the analysis of progressive *be* differs from that of *have*; in particular, that it is best treated under the aux-predicate analysis. In this, we are following in essentials an analysis suggested by Jackendoff (1977), where progressive *be* is treated as a "main verb".

In the first place, progressive *be* appears to be predicative. As noted by Jackendoff (1976), progressive *be* is in paradigmatic contrast with other verbs that take progressive complements.

(26) a. The children were taking syntax.
b. The children started taking syntax.
c. The children kept taking syntax.
d. The children stopped taking syntax.

These sentences can be paraphrased as follows:

(27) a. The children were in the state of taking syntax.
b. The children entered the state of taking syntax.
c. The children continued in the state of taking syntax.
d. The children left the state of taking syntax.

It is the participial complement which is progressive in these examples, the governing verbs specify the relationship between the subject and the state. In a similar vein, Jackendoff (1977) notes that some of these verbs take PP predicative complements (XCOMPs) as an alternative to the participle (28a,b); although he doesn't mention it explicitly, this is even true of progressive *be* (28c).

(28) a. John kept Bill $\left\{\begin{matrix}\text{running}\\ \text{at a run}\end{matrix}\right\}$.

b. Moe went on $\left\{\begin{matrix}\text{working}\\ \text{with his work}\end{matrix}\right\}$.

c. Rodgers is $\left\{\begin{matrix}\text{working}\\ \text{at work}\end{matrix}\right\}$ on a new play.

There is no reason to analyze progressive *be* differently at the functional level than any of these other verbs.[7]

(29) a.
$$\begin{bmatrix} \text{SUBJ} & [\text{“the children”}] \\ \text{TENSE} & \text{PAST} \\ \text{PRED} & \text{‘be } \langle(\uparrow \text{XCOMP})\rangle(\uparrow \text{SUBJ})\text{’} \\ \text{XCOMP} & \begin{bmatrix} \text{SUBJ} & \\ \text{ASP} & \text{PROG} \\ \text{PRED} & \text{‘take } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{’} \\ \text{OBJ} & [\text{“syntax”}] \end{bmatrix} \end{bmatrix}$$

b.
$$\begin{bmatrix} \text{SUBJ} & [\text{“the children”}] \\ \text{TENSE} & \text{PAST} \\ \text{PRED} & \text{‘start } \langle(\uparrow \text{XCOMP})\rangle(\uparrow \text{SUBJ})\text{’} \\ \text{XCOMP} & \begin{bmatrix} \text{SUBJ} & \\ \text{ASP} & \text{PROG} \\ \text{PRED} & \text{‘take } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{’} \\ \text{OBJ} & [\text{“syntax”}] \end{bmatrix} \end{bmatrix}$$

Progressive *be* is no different from main verb *be*, which also expresses the existence of a state. Like progressive *be*, main verb *be* also undergoes V-to-I, so there is no c-structure difference between them either. Progressive participle phrase can even be coordinated with other

[7]Andy Spencer has suggested to me that the present participle form, which is morphologically identical to the nominal gerund form, may have some residual nominality itself. He notes the following:

(i) a. Horse-riding is fun.
b. The children are horse-riding.
c. *The children have horse-ridden.
d. *The children horse-rode.

XCOMP arguments of *be*. We propose that the lexical entry for *be* includes the following:

(30) (↑ PRED) = 'be ⟨(↑ XCOMP)⟩ (↑ SUBJ)'
VP ∈ CAT (↑ XCOMP) ⇒ (↑ XCOMP ASP) =$_c$ PROG

The present participle form will include the aspectual feature.

(31) (↑ ASP) = PROG

We leave as an open question the analysis of passive *be*.

One interesting consequence of the aux-predicate analysis of *be* is that, as a biclausal structure, a sentence with progressive *be* should be able to have distinct modifiers for *be* and its complement. It is difficult to set up a convincing test case, but it is possible, and the resulting sentence is grammatical.

(32) Today, the repairman is coming tomorrow (but tomorrow that may change).

This sentence means that today the repairman is in the state of coming tomorrow. Such a sentence works when combined with appropriate real-world knowledge, such as the unreliability of repairmen. But syntactically, it requires the *is* (modified by *today*) and the *coming* (modified by *tomorrow*) to be in distinct functional clauses.

Finally, we note that our analysis of progressive *be* accounts for one of the most recalcitrant facts about the English auxiliary: the relative ordering of *have* and *be*.

(33) a. The children have been taking syntax.
b. *The children are having taken syntax.

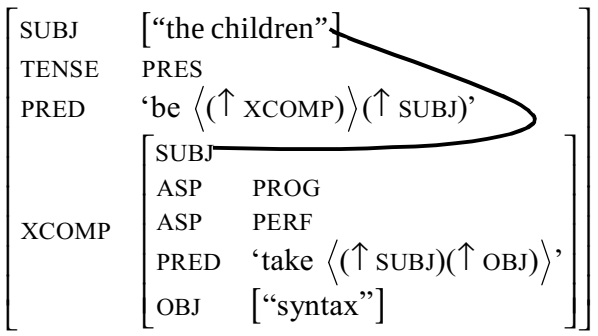
Under our analysis, the f-structure of (33a) is the unremarkable (34).

(34)
$$\begin{bmatrix} \text{SUBJ} & [\text{“the children”}] \\ \text{TENSE} & \text{PRES} \\ \text{ASP} & \text{PERF} \\ \text{PRED} & \text{‘be } \langle(\uparrow \text{XCOMP})\rangle(\uparrow \text{SUBJ})\text{’} \\ \text{XCOMP} & \begin{bmatrix} \text{SUBJ} & \\ \text{ASP} & \text{PROG} \\ \text{PRED} & \text{‘take } \langle(\uparrow \text{SUBJ})(\uparrow \text{OBJ})\rangle\text{’} \\ \text{OBJ} & [\text{“syntax”}] \end{bmatrix} \end{bmatrix}$$

On the other hand, there is no well-formed f-structure for the ungrammatical (33b). The putative present participle *having* would specify two conflicting values for the feature ASP: PERF by virtue of being a form of *have* and PROG because of the present participle form:

(35) (↑ ASP) = PERF
(↑ ASP) = PROG

The f-structure of any sentence with *having* would therefore be inconsistent, and therefore ill-formed.

(36)


An analysis in which both *have* and progressive *be* receive the aux-feature treatment would be unable to express this contrast without additional stipulations.[8]

5. Modals

5.1. Overview

We turn now to the modals: *will*(/*shall*)[9], *would*, *can*, *could*, *may*, *might*, *should*, *must*, *ought*, modal *dare*, and modal *need*. These differ from *have* and *be*, and even *do*, in having no verb-like properties. They are thus generally analyzed as lexical items that belong to the category I, rather than verbs which undergo V-to-I. We accept this categorial analysis here without argument.

As infls, modals belong unambiguously to what is generally referred to as a functional category, rather than a lexical category. The nature of functional categories is that they are generally taken to not be predicative categories, but rather feature carriers. This is the meaning of the name "functional category", which has its origins in transformationalist studies of $\bar{X}$ theory. In recent work in LFG, it has been hypothesized that, among the universal constraints on c-structure–f-structure mapping is the following principle (Bresnan 2001):

(37) C-structure complements to functional categories are f-structure coheads.

Bresnan (2001: 105f) states that this

> captures the intuition that the relation of the functional F^0 categories to their complements is not that of predicator to argument; either the F^0 element is a function word lacking descriptive content altogether, or it is an inflectionally defined lexical element such as a finite verb which is related to arguments within its phrasal cohead at the level of f-structure.

However, it is telling that the only f-structures Bresnan presents for sentences with infls have the auxiliaries *do* and *will*: we have already provided an aux-feature analysis for *do*, and of the modals *will* is the most plausible case for an aux-feature analysis. It is therefore unclear whether Bresnan would extend such an analysis to a modal like *can*. More interesting is a comment by Dalrymple (2001: 178), who accepts (37). Her examples of sentences with auxiliaries involve the non-modals *have* and *be*, of which we have accepted the aux-feature analysis for the former but not the latter. She states that

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[8] One of the difficulties here is that the suffix *-ing* has other uses. The form *having* is possible with any use of *-ing* which is not progressive, because then there is no inconsistency in the feature ASP. It is grammatical, for example, in the following:

(i) Having taken linguistics, David knew he would never be sane again.

[9] In the variety of English covered here, *shall* exists only as a stylistically marked variant of *will*. We will not have anything to say about *shall* in what follows.

> although a multiclausal structure may be appropriate for English modals, there is no compelling evidence in English for a multiclausal structure for non-modal auxiliaries, and indeed it has often been argued that auxiliary verbs and their complements in other languages correspond to a single f-structure…

By acknowledging the possibility of an aux-predicate analysis for the modals, elements which are purely infls (not inflected forms of verbs), Dalrymple undermines (37) as an inviolable principle.

Our approach will be to propose an aux-feature analysis for *will* and *would*, and an aux-predicate analysis for the other modals. This appears to be the analysis most consistent with the behavior of these elements. It is also consistent with the implicit analysis in Butt, King, Niño, and Segond (1999), where it is explicitly stated that modals are predicative, but an f-structure is provided for a sentence with *will* in which it is simply a carrier of the future tense feature.

5.2. *Will* and *Would*

The modals *will* and *would* are the most tense-like of the modals. In fact, it is tempting to see the following as a pattern of syntactic expression of tense.[10]

(38) a. The children did take syntax. (past tense)
b. The children do take syntax. (present tense)
c. The children will take syntax. (future tense)
d. The children would take syntax. (conditional tense)

Under such a view, which we accept, the only difference between the past and present on the one hand and the future and conditional on the other is that for the former English also has competing synthetic forms which, because morphological means are generally preferred over syntactic means, are usually used instead.

The use of an analytic form for future tense is not uncommon, at least among the Indo-European languages. An interesting case, discussed by King (1995), is Russian. In Russian, the imperfective future is analytic, while all other tense/aspect combinations are synthetic.

(39) a. Ja budu čitat' knigu.
I will read.IMPF book
'I will be reading a book.'
b. Ja pročitaju knigu.
I PRF.read.FUT book
'I will read the book.'
c. Ja čitala knigu.
I read.PST.IMPF book
'I was reading the book.'
d. Ja pročitala knigu.
I PRF.read.PST book
'I read the book.'

Since the only difference between (39a) and (39b) is aspect, and the only difference between (39a) and (39c) is tense, King argues, the best analysis would not make (39a) biclausal at

[10]Of course, the semantics of *will* and *would* are more complicated than "future" and "conditional", but there do not appear to be any syntactic differences between, for example, the strictly future use of *will* and the probability use as in *That will be Joan*. It is also possible to hypothesize that this is a different *will*, but I know of no syntactic evidence for this.

f-structure.

On the other hand, Dyvik (1999) argues that the construction cognate to the English future is biclausal in Norwegian. That is to say, he proposes an aux-predicate analysis for Norwegian *ville*. However, there is a crucial difference between the English and Norwegian cases: in Norwegian, *ville* also has the clearly predicative meaning of 'want', a meaning which is lacking in present-day English *will*.

(40) a. Han vil dreie håndtaket.
he will turn the.lever
'He will [i.e. future] turn the lever.'/'He wants to turn the lever.'

b. He will turn the lever. (≠ He wants to turn the lever.)

Norwegian *ville* thus exhibits both root and epistemic uses, behavior which is typical of some other modals in English but crucially not *will*. Thus, while the aux-predicate analysis of Norwegian *ville* appears correct, present-day English *will* is better assigned an aux-feature analysis.

In the case of *would*, there is also the evidence of co-occurrence restrictions, as there was with *do* and *have*. The predicate *rather* requires the auxiliary *would* to appear in its clause.

(41) a. The children would rather take syntax.

b. *rather* $(\uparrow \text{PRED}) = \text{'rather } \langle(\uparrow\text{SUBJ})(\uparrow\text{XCOMP})\rangle\text{'}$
$(\uparrow \text{TENSE}) =_c \text{CONDIT}$

This provides further support for an aux-feature analysis of *would*.

5.3. Other Modals

For modals other than *will* and *would*, the aux-feature analysis seems significantly less attractive. At the center of the argument in favor of the aux-predicate analysis is what is often referred to as the distinction between root and epistemic uses of modals.

(42) The children may take syntax.
a. ≈It is possible that the children will take syntax. (epistemic)
b. ≈The children are permitted to take syntax. (root)

In both uses, the modal appears to be predicative; at the very least, it can be paraphrased with predicates like *possible* and *permitted*. That is to say, under both uses the aux-predicate analysis is plausible. However, the argument is stronger under the root use, because the modal imposes selectional restrictions on the subject, which is a thematic argument of the modal. Thus, the following sentence, with a pleonastic subject, is unambiguously the epistemic use.

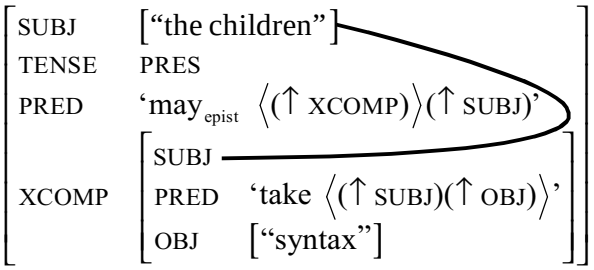
(43) There may be children taking syntax. (≈It is possible that there are children taking syntax.)

This is even clearer with a modal that has only a root use, such as modal *dare*. In such a case, a sentence with a pleonastic subject is ungrammatical.

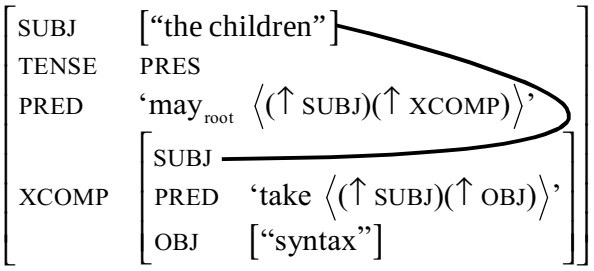
(44) a. The children dare not take syntax.
b. *There dare not be any children taking syntax.

Ross (1969) was the first to suggest analyzing root modals as equi (control) predicates and epistemic modals as raising predicates. This analysis is adopted in the LFG analysis of Falk (1984) for all modals. While we have now rejected such an analysis for *will* and *would*, it appears to be correct for the other modals. The f-structures for the two readings of (42) are:

(45) a.



b.



For the epistemic modals, the argument for an aux-predicate analysis is weaker, since there is no relation of selection between the modal and the subject. Dyvik (1999) argues for such an analysis for Norwegian modals, but their properties differ in certain respects from those of English modals. Specifically, Norwegian modals can take nominal objects, and even epistemic modals can have pronominalized complements.

(46) a. Jeg vil/kan/må/skal dette.
I will/can/may/shall this
'I want/am able to do/am obliged to do/have a duty to do this'

b. (Vil det regne?) Det vil det.
(will it rain?) it will that
'(Will it rain?) It will (that).'

In English, nominal or pronominal complements of modals are ungrammatical, presumably because modals are infls and not verbs in English. For some, separate modification of the two clauses appears to be possible, although it is less clearly well-formed than in the case of progressive *be*.

(47) ??Today, the repairman may come tomorrow (but tomorrow that may change).

In a similar vein, it is sometimes possible to distinguish between a single adverbial modifying the modal and one modifying the verb, either because one is ungrammatical or because they have different meanings.

(48) a. *Tabs never may be kept on syntax students.
b. Tabs may never be kept on syntax students.

(49) a. Tabs never should be kept on syntax students. (≈ There is never an obligation.)
b. Tabs should never be kept on syntax students. (≈ There is an obligation to never keep tabs on them.)

This suggests that the aux-predicate analysis is correct even for epistemic modals. We are aware of no specific evidence in favor of the alternative aux-feature analysis for epistemic modals, such as co-occurrence restrictions.

It is important to reiterate that the aux-predicate analysis is the only possible analysis of root modals. There is no other way to express the fact that the subject is thematically selected by the modal. Thus, even if this analysis were to be rejected for the epistemic modals, it would still not be possible to maintain that infls can never be argument-taking predicates.

6. Where does this leave us?

Although our specific analyses differ somewhat from those of Falk (1984), the essential conclusion is the same. There is no single analysis that covers all auxiliaries. Each one needs to be examined on its own terms. This differs from what is assumed, sometimes explicitly and sometimes implicitly, in most other analyses, regardless of theoretical framework. There is no escape from the conclusion that some auxiliaries require the aux-feature analysis, and others the aux-predicate analysis.

Furthermore, as argued by Falk (1984), the LFG framework is particularly well suited to account for facts of this kind. The parallel architecture, in which constituent structure and functional relations are dissociated, allows us to express naturally the fact that the constituency of auxiliaries is fairly uniform, while functionally there is greater diversity.

Appendix: Lexical Entries

tensed forms are given in the past tense so as not to create confusion with the bare infinitive

did category: I
($\uparrow$ TENSE) = PAST

had category: I
($\uparrow$ TENSE) = PAST
($\uparrow$ ASP) = PERF
($\hat{*}$ compl) $\Rightarrow$ λ ($\hat{*}$ compl) $=_c$ VP[part]

was category: I
($\uparrow$ PRED) = 'be $\langle$($\uparrow$ XCOMP) ($\uparrow$ SUBJ)$\rangle$'
($\uparrow$ TENSE) = PAST
VP $\in$ CAT ($\uparrow$ XCOMP) $\Rightarrow$
($\uparrow$ XCOMP ASP) $=_c$ PROG

will category: I
($\uparrow$ TENSE) = FUT

may category: I
($\uparrow$ TENSE) = PRES
($\uparrow$ PRED) = 'may$_{epist}$ $\langle$($\uparrow$ XCOMP)$\rangle$ ($\uparrow$SUBJ)'

may category: I
($\uparrow$ TENSE) = PRES
($\uparrow$ PRED) = 'may$_{root}$ $\langle$($\uparrow$SUBJ)($\uparrow$ XCOMP)$\rangle$'

would category: I
($\uparrow$ TENSE) = CONDIT

take category: V[base]
($\uparrow$ PRED) = 'take $\langle$($\uparrow$ SUBJ)($\uparrow$ OBJ)$\rangle$'

took category: V[fin]
($\uparrow$ PRED) = 'take $\langle$($\uparrow$ SUBJ)($\uparrow$ OBJ)$\rangle$'
($\uparrow$ TENSE) = PAST

taken category: V[part]
($\uparrow$ PRED) = 'take $\langle$($\uparrow$ SUBJ)($\uparrow$ OBJ)$\rangle$'

taking category: V[prog]
($\uparrow$ PRED) = 'take $\langle$($\uparrow$ SUBJ)($\uparrow$ OBJ)$\rangle$'
($\uparrow$ ASP) = PROG

used (to) category: V[fin]
($\uparrow$ PRED) = used-to $\langle$($\uparrow$ XCOMP)$\rangle$ ($\uparrow$ SUBJ)'
($\uparrow$ TENSE) $=_c$ PAST
($\uparrow$ ASP) = HABITUAL
($\uparrow$ TENSE) = PAST

use (to) category: V[base]
($\uparrow$ PRED) = used-to ⟨($\uparrow$ XCOMP)⟩ ($\uparrow$ SUBJ)'
($\uparrow$ TENSE) $=_c$ PAST
($\uparrow$ ASP) = HABITUAL

got category: V[part]
($\uparrow$ PRED) = 'got ⟨($\uparrow$ SUBJ)($\uparrow$ OBJ)⟩'
($\uparrow$ ASP) $=_c$ PERF

better category: V[part]?
($\uparrow$ PRED) = 'got ⟨($\uparrow$ SUBJ)($\uparrow$ OBJ)⟩'
($\uparrow$ TENSE) $=_c$ PAST
($\uparrow$ ASP) $=_c$ PERF

rather category: V[base]?
($\uparrow$ PRED) = 'rather ⟨($\uparrow$SUBJ)($\uparrow$XCOMP)⟩'
($\uparrow$ TENSE) $=_c$ CONDIT

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