STRUCTURAL PROBLEMS OF MULTIPLE MODAL CONSTRUCTIONS:
VIEWS FROM MANDARIN, RURAL CHESAPEAKE ENGLISH AND JAMAICAN CREOLE[*]

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1.   Introduction

Multiple modal constructions (also called stacked-modals) have intrigued researchers for several decades. Cross-linguistically, among the languages that permit multiple modality, the number of modals allowable varies from double-modal constructions in Southern English (Labov 1972; di Paolo 1989; Hasty 2012; Ellison 2007 *inter alia*), to as many as four in Mandarin Chinese (Lin 2012; Huang 2009 *inter alia*).[1]

In the present study, we begin with a general exposition of the characteristics of verbal modality, some theoretical background, and briefly discuss some previous approaches to the topic. We then examine multiple modality in Mandarin, attempting to establish an adequate description of its derivation. Following this, we discuss Southern English and Jamaican Creole, before finally formulating some conclusions and theoretical ramifications with the aim of establishing a cross-linguistic typology.

We posit that a Distributed Morphology (Harley and Noyer 2003) based analysis coupled with as a feature-geometric approach to morpho-syntactic features (Harley 1994; Cowper and Hall 2007, 2013; Hall 2001; Cowper 2003; etc.) will permit us to understand the behaviour of multiple modals in Jamaican Creole and Southern English, as well as the differences between them and languages like Mandarin Chinese.

2.   The modal bestiary

2.1   On modality

Modality, generally considered a linguistic function employed to express non-real or conditional semantics, may be produced through a closed class of modal auxiliaries in a set of languages, including English, Jamaican Creole and Mandarin. Most theories of modal

semantics are based on a form of modal logic positing that modality restricts the set of possible worlds in which a given proposition is true. Regardless of which semantic framework of modality that is adopted, the trend in the literature is to delineate between *epistemic* and *root* modalities. The former indicates the speaker's knowledge, belief, or disposition towards a given proposition while the latter addresses a wide variety of meanings.

The types of modality investigated in the present study are largely based on Palmer's (1990) typology, with modifications from the recent literature on modality in Chinese. Palmer distinguishes between epistemic and deontic modality, but he also adds *dynamic* modality to discuss *capability*. Additionally, a class of *volitional* modality is argued to be a sub-form of deontic modality, while at other times being a class of its own. In Mandarin there is a set of modals like *yuan yi, ken, gan* etc. that express willingness, or daring (*gan*) of a subject to perform an action. Thus, the four types of modality discussed here are *epistemic, deontic, dynamic* and *volitional* modality.

2.2   Southern English

The category of English modal auxiliaries is generally thought to include the words *might, may, must, could, can, should, will,* and *would*. In Southern English, even when they appear in two modal pairs, each individual modal's semantics is largely comparable to its Standard English counterpart. When multiple modals appear, the first of which must be epistemic. That is, the first modal must always be *may, must* or *might*, and the following modal may be either *could, can, will, should* or *would*. Compare examples (1-a) through (1-d):

(1)   a.   He **might can** bring the car over.
      b.   *He **can might** bring the car over.
      c.   *John **might must** go to work.
      d.   *John **should could** go to work.

2.3   Jamaican Creole

Jamaican Creole modals include: *wuda, shuda, maita, musa, kuda, mos, kan, hafi* (Durrleman-Tame 2008). The modals *wuda, shuda, maita, musa, kuda* are all epistemic, while *mos, kan, hafi* are not. Much like English, the first modal in multiple modal sentences in Jamaican Creole is always epistemic, followed by a root modal of some flavour. Compare examples (2-a) and (2-b):

(2)   a.   Im **wuda hafi**   nyam di food
           He would have.to eat   the food
           'He would need to eat the food'
      b.   *Im **hafi**   **wuda** nyam di food
           He have.to would eat   the food

As seen in Southern English, there is also a ban on two modals of the same class appearing in the same clause:

(3)   a.   *Im **wuda kuda** nyam di food
       b.   *Im **kan hafi** nyam di food

Additionally, the literature on Jamaican Creole suggests that the language can have up to three modals (though see section 6.2 for an alternate view). In the case of the triple modal construction, the second modal is always *mos*:

(4)   Im **shuda mos kan** nyam di food

2.4   Mandarin

Mandarin modals are thought to include the following, organised in table (1) modified from Lin (2012) based on the semantic classifications and observations of Mandarin modals presented by Huang (2009).

Table 1: Modals in Mandarin Chinese

Epistemic:	*keneng* 'likely', *yinggai* 'should', *hui* 'will'
Deontic:	*bixu* 'must', *yinggai* 'should', *dei/de* 'obliged to', *keyi* 'permitted to', *hui* 'will'
Volitional:	*ken* 'be willing to', *yuanyi* 'be willing to', *gan* 'dare'
Dynamic:	*neng/nenggou* 'be able to', *hui* 'be capable of'

Mandarin sentences may contain as many as three or four modals, according to Lin (2012):

(5)   Zhangsan **keneng hui nenggou** lai.
       Zhangsan likely   will can   come
       'It is likely that Zhangsan will be able to come'   (Lin 2012)

(6)   Zhangsan **yinggai keneng hui nenggou** lai.
       Zhangsan should   likely   will can   come
       'It should be the case that it is likely that Zhangsan will be able to come.'   (Lin 2012)

However, epistemic modals must always appear first, followed by deontic, then volitional and dynamic as the lowest of the modals. Compare examples (7-a) and (7-b):

(7)   a.   Ta **bixu neng** chuxi
             He must can   present
             'He is required to be present.'
       b.   *Ta **neng bixu** chuxi
             He can   must present

(Huang 2000)

In example (7-a), a deontic modal precedes a lower dynamic modal, and the sentence is felicitous. However, in (7-b), the order is reversed and the sentence is not felicitous. A further restriction on Mandarin modals is a ban on repetition of two modals of the same class. In examples (8-a) and (8-b) there are two epistemic, and two dynamic modals, respectively:

(8)   a. *Zhangsan **kending yiding** yao lai.
            Zhangsan surely   surely will come
        b. *Zhangsan **nenggou hui** xie   shi.
            Zhangsan can   can write poem

2.5   Cross-linguistic commonalities

Cross-linguistically, two important observations hold when multiple modality is employed. Firstly, when multiple modals are present in a sentence, their ordering adheres to a hierarchy as follows:[2]

(9)   [Mod $_{\text{Epistemic}}$] > [Mod $_{\text{Deontic}}$] > [Mod $_{\text{Volitional}}$] / [Mod $_{\text{Dynamic}}$]

A second important observation is that only one modal of each type (e.g. epistemic, deontic, volitional, dynamic) may appear per clause. Following from this fact, we posit a *uniqueness constraint* which we argue to fall out from a requirement that each modal feature must be unique in the syntax. The syntactic source of this constraint will become apparent when we describe the proposed formal feature-geometry of modality in section 4.1. Essentially, any feature merged into syntax under a feature hierarchy in INFL (and, as we will posit from an additional root modal hierarchy) is required to be unique.

3.   Previous approaches

Perhaps the earliest formal mention of double modal constructions in North-American English was in Labov et al.'s (1968) description of *non-standard* English in the U.S., followed by a more detailed analysis in Labov's (1972) account of urban African American vernacular. Labov analysed the first modal as adjectival in nature, relating to a supposed lack of syntactic tense.

Another influential analysis was conducted by di Paolo (1989), and viewed double modal constructions as single lexical items. Di Paolo calls these "Modal-Modal" compounds, and equates them to idiomatic multi-word lexical items along the lines of similar V-V compounds like "drop-kick".

Boertien (1986), on the other hand, treats both modals as verbal (contra Labov), and as individual constituents (contra di Paolo), positing two possible structures: one in which both modals project under a single T head, and a second in which the lower modal is a verb, taking the lexical verb as a complement, the higher a T head.

Battistella (1995) was the first to propose that in English the first modal may reside somewhere above T/INFL, based on observations that the first modal seems "tenseless". This theory posited that the higher modal was a modifier of the lower one at an X' level in the syntax. A related study by Hasty (2012) posits that the first modal resides in a ModP which immediately dominates T/INFL, putting it outside the domain of Tense features, with

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[2]Our proposed hierarchy is more or less consistent with the on proposed by Cinque (1999).

the second modal base-generated in T. Battistella (1995) on the other hand puts the first modal as an adjoined modifier to T, the second base-generated in T. These two approaches are somewhat related, and both capture the requirement that the second modal must be in T in order for Subject-Aux inversion to select it in the following example:

(10)   a.   **Could** he **might** wash the car?
        b.   ***Might** he **could** wash the car?

For Chinese Modals, authors such as Lin (2012), R. Li (2003), Li and Thompson (1981) and Yip and Rimmington (1997) (among others) break with traditional Chinese grammarians and treat modals either as verbal auxiliaries or modal verbs, differentiating them from lexical verbs by their selection properties, semantics, interaction with negation and aspect, and other characteristics. Recent treatments such as X.-Y. Huang (2000) however, equate Chinese modals with Cinque's (1999) Functional Projections, noting the ordering constraints in their distribution.

The earliest studies, such as that of Labov's (1968) account, did not propose structural derivations. The study essentially stipulated that the upper modal was a modifying adverbial. This stance however, is challenged by examples such as in (11), where it is clear that the upper modal is not in complementary distribution with a related epistemic adverb.

(11)   (Probably,) Christina **might** (probably) **will** (probably) finish her dissertation.

Di Paolo's (1989) analysis has also been roundly rejected in the subsequent literature, as evidence for the compositional nature of multiple modal constructions abounds. Furthermore troubling for di Paolo's analysis are the presence of intervening adverbials and negation between double modals in Southern English, the fact that only the second modal may undergo subject-aux inversion, and the fact that only one of the modals may be used to form tag questions. Likewise, Boertien (1986) who posits that the higher modal resides in T, cannot explain why only the lower modal inverts with the subject. Examples (12-a) and (12-b) demonstrate that it is crucially (only) the lower modal which undergoes T-to-C movement.

(12)   a.   **Should** I **might** not go to Jack's tonight?
        b.   ***Might** I **should** not go to Jack's tonight?

Battistella's (1995) analysis, which puts the lower modal in the T/INFL head (rather than the higher one à la Boertien), has the most success with the subject-auxiliary inversion facts. However, while this is progenitor of the present analysis, the X-Bar theory that Battistella's study was couched in is outdated; since that time it has come to be accepted that the specifier positions in T are case-assigning positions and reserved for arguments (Chomsky 1995).

4. Proposal

4.1 Syntactic frameworks

Our analysis is situated in the Distributed Morphology (DM) (Harley and Noyer 2003) framework. DM assumes that only bundles of features are merged in the narrow syntax and vocabulary items are inserted cyclically at spell-out, a position termed the Late Insertion Hypothesis. Moreover, DM posits a level called "Morphological Structure" (MS) between syntax and PF where productive morphological work takes place.

4.2 Theoretical assumptions

Cowper and Hall (2007: 2013) employ a feature-geometric approach to formally organise the features of the inflectional domain. These feature geometries are dependency-structures: a more embedded node entails the de-linking of dominating nodes upon insertion. Furthermore, they are considered to be monovalent – that is, the absence of one feature entails the interpretation of a feature in the immediately dominating node. The following feature geometry in figure (1) for [INFL] features in the syntax is assumed, from Cowper and Hall (2007).

Figure 1: INFL feature geometry
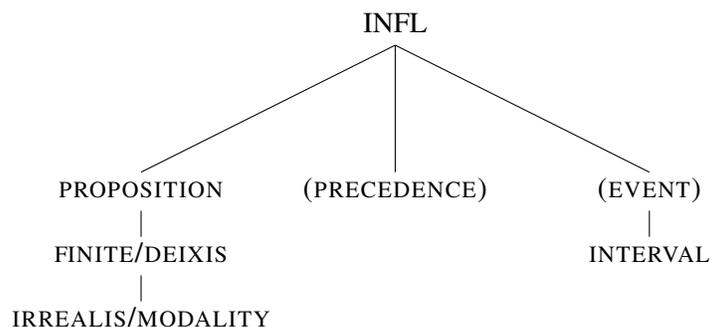
This approach proves valuable as the properties of the system itself (e.g. uniqueness when associated with functional projections) will account neatly for the various types of multiple modality observed cross-linguistically.

4.3 Two types of modal feature hierarchies

We propose that there are two types of feature hierarchies in natural language which conspire to produce the morphology of modality. The first is the product of the INFL feature geometry as proposed by Cowper (2005), the second being a hierarchy of features associated with flavours of root modality. The feature geometry in INFL may only produce epistemic modality, a highly grammaticalised form of bare or default modality. The root modal feature hierarchy in (13) is proposed in order to account for the various additional

semantics exhibited by root modality. The independence of this hierarchy from the formal organisation of INFL features is related to Butler's (2003) suggestion that while epistemic modality is manifested at or above the T or I, root modality is below this projection.

(13)   [Dynamic] > [Volitional] > [Deontic] > ([Epistemic])

Note that the order here is the reverse of the hierarchy in (9): this ordering is determined by dependency relations and the notion that sequential modals are merged in independent projections from the bottom up.

    With these two modal hierarchies established, along with our uniqueness constraint, we can account for several of the cross-linguistic observations made above. First, as we cyclically merge from bottom to top, if a traditional "higher" modal is selected, it de-links all dominating nodes, and further modals may not project features from 'lower' in the hierarchy. However, if a 'lower' modal appears first, so long as the language has a place to merge them, less-embedded modals may appear above it until the hierarchy is exhausted.

4.4   Two types of multiple modal languages

We propose that the two types of languages which permit multiple modality are typified by English and Mandarin, and that this ontology is a product of the interaction of the two modal feature hierarchies. English, as discussed by Cowper (2003, 2005, 2012) derives its modality from the manifestation of modal / irrealis features in the INFL domain. Therefore, modals in English are a product of the mandatory projection of features from the INFL feature geometry, and optional additional inclusion of features from the root modal hierarchy. Mandarin modality however, is produced solely via the root hierarchy. We will see below that this approach is in line with Butler's observation that root modality involves structures below T, while epistemic modality is constrained to the INFL domain.

    Multiple modality in these two types of languages may, then, have the following distinguishing characteristics: Mandarin-style multiple modals will result from the recursion of a verbal or modal phrase below T. This phrase projects only root modal features, and is not dependant on an INFL feature geometry as in English. Southern English-style double modals necessitate the post-syntactic split of the INFL domain. The lower modal, produced in syntax, appears just as in Standard English, while the higher modal is a product of Fission, and is obligatorily epistemic as it involves only those features from the INFL feature hierarchy.

5.   Deriving the Mandarin multiple modal structure

As previously noted, Mandarin may have three or even four modals in a single clause, and these modals appear in a strict hierarchical order. Lin (2012) remarks that sentences with two modals occur very frequently in Mandarin speech, unlike their counterparts in Southern English. Mandarin multiple modals are subject to the ordering constraints discussed in section 2.5.

An important characteristic of Mandarin modality which informs the present analysis is the fact that Mandarin modality is independent of the formal [FINITE] features, and is lexical in nature. While there has always been an ongoing debate on whether Chinese languages have a finite-nonfinite distinction, the present analysis is agnostic as to whether there is in fact a finite distinction in Mandarin. However the important distributional fact is that Mandarin modals may occur in any clause, finite or not. This is discussed extensively by Lin (2012) who notes that some modals appear only in supposed finite contexts, and others in non-finite contexts. Keeping the featural hierarchy in figure 1 in mind, this would suggest that Mandarin modals employ solely root modal features and do not necessarily interact with features from INFL.

Under the current theory, multiple modals in Mandarin are derived by recursive merge of ModalP which projects a subset of the root modal hierarchy. The INFL domain and the VP/ModP complements are shown in figure 2 to demonstrate the proposed derivation for Mandarin multiple modal constructions.

Figure 2: Mandarin modal derivation
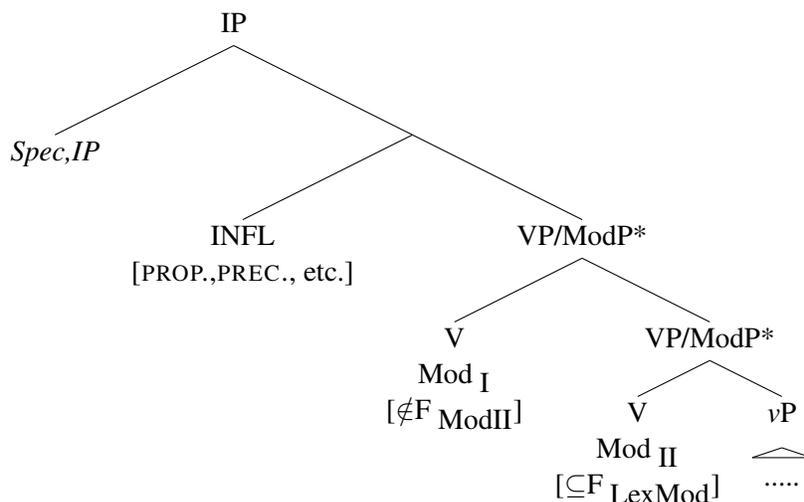
In figure 2, Mod $_{II}$ merges first projecting a feature from the root modal hierarchy, and all dominating nodes from this geometry. Mod $_I$ or higher modals, merge above this lower projection, with an additional subset of the root modal hierarchy. So long as the features merged here do not conflict via the uniqueness constraint with the set of features merged with the previous modal, the derivation will converge. In this fashion Mandarin may theoretically merge as many modals as there are unique features for.

6.   Southern English and Jamaican Creole double modals

Considering the fact that English modals are restricted to finite clauses, and that when they appear in multiples they are restricted to pairs, a recursive analysis à la Mandarin is clearly

not feasible. Further facts about the syntax of double modals in Southern English and Jamaican Creole will inform our analysis of their derivation.

6.1   The nature of English and Jamaican Creole multiple modality

Several facts converge to indicate the structure of the INFL domain in English double modal clauses. Crucially, it is the lower modal which resides in T, while the upper modal resides in a dominating modal phrase above the lower projection. The facts concerning subject-auxiliary inversion, and sequence of tense (SoT) effects demonstrate that the lower modal is a T head, while the distribution of negation demonstrates that the two modals are separate projections.

Firstly, as noted briefly above, it is only the second modal which inverts with the subject to form Yes/No questions. The examples in (14-a) and (14-b) demonstrate that where T-to-C movement occurs, it is importantly the lower modal that inverts with the subject. Thus, when T-to-C movement occurs, it is important that the C probe target only the lower modal, in T.

(14)   a.   He **might could** wash the car.
        b.   **Could** he **might** wash the car?
        c.   *__Might__ he **could** wash the car?

Secondly, as is well known in English, sentences like that in (15) may have two interpretations, either in which the event in the subordinate clause is complete at the time of speech as in (16-a), or in which it is not as in (16-b).

(15)   John said he **might** cook dinner

(16)   a.   John said he **might** cook dinner, and he did.
        b.   John said he **might** cook dinner, but he didn't yet.

This is likewise the case in Jamaican Creole, where sentences such as in (17) may be interpreted with the tense shift or without.

(17)   Jan se im **maita** cook di food.
        "John said he might cook the food... (and he did / but he didn't)"

However, both interpretations are not available for every modal in English and Jamaican Creole, suggesting that some modals are inherently tensed. In (18), (18-b) and (19), (19-b), only a reading in which the event is complete prior to the moment of speech is felicitous.

(18)   John said he **can** cook dinner,
        a.   and he did.
        b.   # but he didn't yet.

(19)   Jan se im **musa** cook di food,

a. an di food cook
   "and the food was cooked."
b. # an di food neva cook yet
   "and the food was not cooked yet."

Thus, when we employ one of the inherently tensed modals with a modal that does not show these SoT effects, we should be able to determine which is involved with performing tense-related function. If only one interpretation is available, we will have evidence that one modal is solely involved with temporal deixis. Consider the examples in (20) and (21), where we see the same results as above with (18), (18-b).

(20)   John said he **might can** cook dinner,
       a.   and he did.
       b.   #but he didn't yet.

(21)   Jan se im **musa kan** cook di food,
       a.   an di food cook.
       b.   #an di food neva cook yet.

This suggests, as Battistella (1995), Hasty (2012), Labov (1972) and others note, that the upper modal is not involved directly with tense. This is further evidence that the lower modal must reside in a position in INFL that is associated with tense.

Finally, facts from the distribution of negation support an INFL domain divided between two separate functional projections. In Southern English, negation may occur in one of two positions, with three possible scopes:

(22)   a.   He **might could** not wash his car.
       b.   He **might** not **could** wash his car.
       c.   *He not **might could** wash his car.

In (22-a) the negation may either take clausal scope, or constituent scope over the verb. In (22-b), however, only constituent negation of "could" is permitted. This is evidenced by the fact that NPIs are not licensed in this configuration, seen in (23-a); clausal negation in (22-a) however, easily licenses NPIs as in (23-b).

(23)   a.   *He might not could **ever** wash his car.
       b.   He might could not **ever** wash his car.

6.2   Jamaican-Creole's double modals

As already noted, when Jamaican Creole forms sentences with putative triple modals, the second 'modal' is *always* **mos**. Durrleman-Tame (2008: 82) notes that in Jamaican Creole there is a constraint responsible for ruling out modals in focalised constructions like in (24-a). However, sentences as in (24-b) are acceptable.

(24)   a. *A **mosa** im **mosa** tiif.
             FOC must 3SG must steal

        b. A   **mos** im **mos** tiif.
             FOC ADV. 3SG ADV. steal

If **mos** were truly modal then we would expect (24-b) to be ungrammatical, which is contrary to fact. What's more, the space usually occupied by the 'second' modal may also be filled with the adverbial *no mos* 'certainly' as well as by negation.[3] This suggests that the 'second modal' is an *adverbial*, similar to what is seen in Southern English:

(25)   a. Im **shuda** mos **kan** nyam dat.
        b. He **might** probably **can** eat that.

6.3 Deriving the Southern English-style double modal structure

There are several contradictions produced by the above observations which are problematic for any explanation which posits that multiple modality is produced in the narrow syntax, into an INFL domain resembling Standard English. While both modals interact with features in the INFL domain, we have shown the lower modal must be a T head, and the higher modal must be a distinct projection. However, we have also shown that only the lower modal may undergo T-to-C movement. These issues are also problematic for any cartographic structure as per Cinque (1999). We must therefore posit that some post-syntactic mechanism produces the structures we see in Southern English double modality.

A preliminary approach considered the possibility that Mod$_I$ was merged in the syntax in a split INFL domain as is seen in other Germanic languages (Wurmbrand 1998). This explanation is rejected however because of the ungrammaticality of tag questions employing the first modal:

(26)   a. You **might should** read *Syntactic Structures*, **shouldn't** you?
        b. *You **might will** take a philosophy class, **mightn't** you?
        c. *You **may will** want to refrigerate the leftovers, **may won't** you?

If the first modal were present in the narrow syntax, we would expect that in T-to-C movement, the C-probe would obligatorily target the upper modal. However, this is clearly not the case. Previous analyses such as Battistella (1995) had observed this fact, calling the first modal "spurious". The spurious nature of the first modal may in fact be indicative of its post-syntactic origins.

Knowing that the first modal is likely a product of post-syntactic operations, the exact mechanism of its origin then remains an open question. It may either be that the item is inserted as a unit post-syntactically, or that it is produced via an operation on a previously existing item in the syntax. The latter approach is favoured, as the addition of structure

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[3]We assume that *no mos* is actually just the confluence of *mos* and negation glossed as 'certainly' but in fact means some like 'isn't it so'.

post-syntactically would violate the the Inclusiveness Condition which stipulates that "no new objects are added in the course of computation apart from rearrangements of lexical properties" (Chomsky 1995: 228).

In DM, a function called *Fission* exists, posited by Noyer (1992) and discussed in detail by Halle (1996). Fission involves the insertion of more than one vocabulary item for a single exponent, by splitting a terminal node. If we assume that the INFL domain may be split post-syntactically between a lower T head, and an upper Modal head, Southern English INFL domains may now resemble those of German, as Wurmbrand (1998) posited for multiple modal structures there.

We present a possible structure in figure (3), including our expanded INFL domain with the split T and Mod, and a possible position for an adverbial adjunct, as well as a lower location for negation.

Figure 3: Southern English and Jamaican Creole double modal derivation
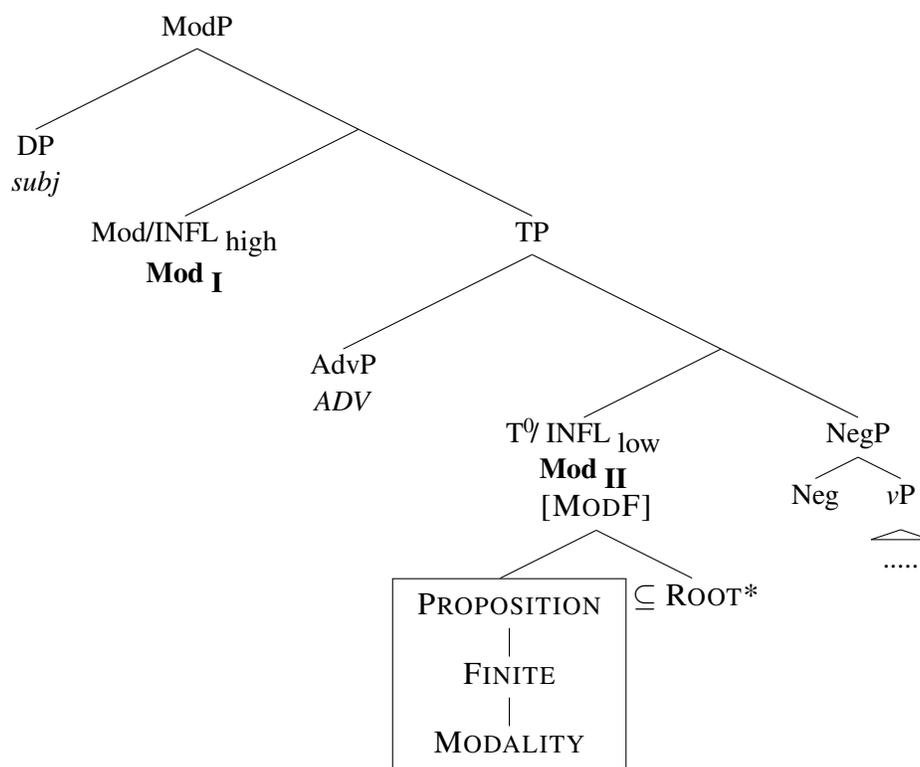
Our approach solves several of the structural problems presented above. Mod_I will not intervene with T-to-C movement required for subject-aux inversion because it is not of the type attracted by C due to lack of T features (cf. Roberts 2001), and is crucially not present until MS. Furthermore, we are not required to merge Mod_I as an adjunct to T/INFL as per Battistella, while still maintaining the fact that the first modal is structurally above T. We can also account for the fact that with one single INFL feature hierarchy, we now have two individual heads which inherit its features at different times in the derivation.

We posit that Fission will always leave the upper modal with only the grammatical INFL features, obligating it to be epistemic. This is perhaps one of the largest points gained by the present hypothesis, as it neatly accounts for the limited inventory of double modals in Southern English. Furthermore, tense features are not transferred to Mod $_I$, capturing the observation that it might be "tenseless". These features will remain on the proper T head. Finally, we will not over-generate Mod $_I$ as was a concern for Battistella's adjunction hypothesis, as Fission operates only on the limited set of features from syntax.

7.   Conclusions

Accounting for the occurrence of multiple modality cross-linguistically, we have proposed that there are two modal feature hierarchies in natural language, one grammatical, dependant on the features of INFL, complemented by a second set of root modality features. We have furthermore proposed that there there are two types of languages which permit multiple modals, typified by Mandarin-style languages with a recursive modal phrase external to the INFL domain, and Southern English-style languages which involve Fission of an otherwise syncretic I.

Evidence from Mandarin suggesting that modality in these languages is independant of the INFL system has provided motivation for our root modal hierarchy. English modality, being the product of both the INFL [MODALITY] feature and additional semantics would have otherwise proved difficult to explain were it not for this postulation of our root modal hierarchy, and the additional hypothesis that the INFL domain may be split between a tense head, and additional functional projections. However, the fact that T-to-C movement targets only the lower modal in double modal pairs was crucial in indicating that this operation be post-syntactic in nature.

Additional questions remain however, including the necessity for further investigation into the extensibility of this thesis to other languages that permit multiple modality, such as German, Dutch, and some Slavic languages. What's more, the conclusions that have been drawn concerning modal systems in these two types of languages deserves further inquiry concerning the theoretical ramifications of this hypothesis for the various languages in question.

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