

# *Do*-support and the syntax of finiteness\*

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Abstract: In Standard English, only a subset of verbs can appear to the left side of *v*P-adverbs like *always* and negative markers *not* and *n't*, namely finite forms of *have* and *be* and inherently finite modals. To account for this paradigm, standard analyses use two assumptions that can be shown to be questionable, namely (i) that negative marker *not* is a head and (ii) that (modal) auxiliaries are base-generated outside of the verb phrase. In this article, we work towards an analysis that is not based on these assumptions and pinpoint the property that enables only a subset of the verbs in English to appear higher in the clausal structure. We argue that verbs that do not assign an internal theta-role and have no regular inflection (neither *-s* and *-ed* is regularly attached to the stem) are base-generated in *v* rather than V. This in combination with the acquisition process will determine the distribution of [iFin] and [uFin] features in the syntactic structure. The syntax of finiteness will in turn generate the pattern that we see.

Keywords: *do*-support, finite verbs, auxiliaries, negation, verbal raising

## 1. Introduction

### 1.1 Three observations

Even though English is standardly used as an example language in syntactic theory, it has a number of properties that are not standard. At the same time, these properties should follow from

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\* Many thanks to the editors and Klaus Abels for excellent comments, questions and rightful demands for more clarity. Whatever we failed to tackle reflects our shortcomings.

general principles underlying the syntax of natural languages. This paper shows how this can be done for the rather intricate distribution of finite verbs in English.

We start with three observations. First, English finite lexical verbs, in contrast to finite non-lexical verbs (auxiliaries, modals), readily appear to the right of *vP*-boundary adverbs, such as *always*, *often* and *never*.<sup>1</sup>

- (1) a. Mary {always dates/\*dates always} Ad
- b. Ad {often dates/\*dates often} Bill
- c. Bill {never dates/\*dates never} Mary
  
- (2) a. Mary has always dated Ad
- b. Ad may often date Bill
- c. Bill is never dating Mary

A second observation is that finite lexical verbs, in contrast to finite non-lexical verbs, cannot appear at all in clauses with a negative marker (neither with *not* nor *n't*), as shown in (3)a. In those cases, a finite dummy *do* is inserted in the absence of an auxiliary and the lexical verb appears as an infinitive, a phenomenon known as *do*-support (cf. (3)b).

- (3) a. \*Ad {dates not/ not dates} Mary
- b. Ad {does/may/will} not date Mary

Third, *do*-support is not restricted to such negative clauses. Finite lexical verbs also have to be replaced by finite *do* in cases where a finite verb would have to precede the subject.

- (4) a. Does Mary date Ad? / \*Dates Mary Ad
- b. Not often did Ad date Bill / \*Not often dates Ad Bill
- c. Whom did Mary see? / \*Whom saw Mary?

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<sup>1</sup> We will ignore the fact that these adverbs can also precede finite auxiliaries (*Mary always/often has dated Ad*). First of all, under the assumption that *vP*-adverbs can optionally be generated in a higher position (to INFL' or some projection between IP and *vP*), this position will not diagnose the differences between lexical verbs and auxiliaries that we are interested in. Second, these word order are not neutral ones but have a contrastive flavor.

Naturally, the question arises how these English facts follow. In this article, we will propose a novel analysis of these facts. Before doing so, let us first look into existing analyses in order to pinpoint their problems.

## 1.2 *Previous analyses*

A prominent line of reasoning argues that Tense and Agreement affixes are not base-generated on the verbs themselves but rather on I<sup>0</sup> (or INFL) and then lower onto the verb. Under such affix-hopping approaches, *do*-support is the result of the fact that the affix that realizes I<sup>0</sup>'s features can appear on the verb only if its projection is immediately selected by I<sup>0</sup>; if, however, some other functional projection, such as NegP, intervenes, affix hopping is no longer an option, and a *do*-auxiliary needs to be inserted. Such analyses go back to Chomsky (1957). See Bobaljik (1995), and Embick & Noyer (1999) for more recent implementations of it in terms of post-syntactic morphological merger. Other approaches (see, for instance, Lasnik 1995, 2000) argue that *do*-support is last resort insertion of a dummy auxiliary when the verb cannot raise to I<sup>0</sup> across another head itself.

To account for the fact that finite non-lexical verbs can appear to the left of negation and adverbs, such approaches have to assume that auxiliaries are generated in a *vP*-external head position. Hence, they can appear to the left of *vP*-adverbs and negation. But base-generating auxiliaries in a *vP*-external head position faces several challenges.

First, finite auxiliaries must precede negation and *vP*-adjoined adverbs (as in (5)) but non-finite auxiliaries *actually* follow such elements. This does not follow if all auxiliaries are generated above negation and *vP*-adjoined

- (5) a. Mary has often been ill  
b. Mary will often have visited him

This would rather suggest that such non-lexical verbs start out inside *vP* and when finite raise to I<sup>0</sup>, in contrast to lexical verbs. But this in turn begs the question why lexical verbs cannot raise to I as well.

A second issue concerns the locality of affix hopping. If raising across negation is allowed, why would affix lowering (nowadays taken to be m(orphological)-merger) over negation be forbidden? Of course, one could argue that affix lowering is a PF phenomenon and that PF phenomena are highly local, but verb movement is nowadays also often considered to

take place in the PF branch of grammar (Chomsky 2001, Boeckx & Stjepanović 2001, Schoorlemmer & Temmerman 2012, Harizanov & Gribanova 2019) but is not local (or at least does not apply in a cyclic fashion). In fact, it is not even clear why m-merger should involve lowering instead of raising other than by stipulation. In short, this asymmetry between affix hopping and verb raising is not obvious at all.

And third, why would affix lowering over negative markers be forbidden, but fine over other, possibly negative, adverbials such as *often* or *never*, which we uncontroversially take to be at least as high in the structure as the *vP* (see Koenenman & Zeijlstra 2014 for discussion)?

As for the first two problems, one could hypothesize that, unlike modals, auxiliaries *have* and *be* form a hybrid class of verbal elements in that they can be both base-generated in *VP* and in  $I^0$  depending on their finiteness. Finite auxiliaries preceding *vP*-boundaries would then be base-generated in  $I^0$ , but those non-finite auxiliaries that follow such adverbs in *V*. One can then generalize that no verb base-generated in *V* ever raises to  $I^0$ .

However, such an approach is rather problematic. Apart from stipulating that there are different bases for auxiliaries like *have* and *be*, it can be shown that modals generally reconstruct under negation despite the fact that they obligatorily appear above negation ((6)a-b). Since negation is not a raiser itself, such modals must have raised to  $I^0$  as well (cf. Iatridou & Zeijlstra 2013, Zeijlstra 2022 for argumentation). Therefore, finite modals would still have to start out below negation.

- |     |    |                       |         |
|-----|----|-----------------------|---------|
| (6) | a. | Ad cannot/can't leave | NEG>MOD |
|     | b. | Ad needn't leave      | NEG>MOD |
|     | c. | Ad mustn't leave      | MOD>NEG |

The only exception to this are modals that are Positive Polarity Items (PPIs), such as *must* (6c). But as (7) shows, even such modals can reconstruct below negation if this negation itself appears in a downward entailing context (as introduced by *few*).

- |     |                          |         |
|-----|--------------------------|---------|
| (7) | Few people mustn't leave | NEG>MOD |
|-----|--------------------------|---------|

This rather suggests that verbal heads are generally base-generated below  $I^0$  and raise to their surface position. But this again begs the question why lexical verbs cannot raise into  $I^0$ , whereas non-lexical verbs can.

An alternative take on the question why only auxiliaries can raise to  $I^0$  is to say that verbs that raise into an AgrP position in a poor/zero agreement language cannot assign their theta roles: [V-Agr] blocks theta-role assignment. Consequently, only verbs that do not assign theta-roles can raise out of  $vP$ , as suggested by Pollock (1989). Again, such a solution would also give rise to various additional problems. For one, certain lexical verbs do not assign theta roles (like *weather*-verbs), but such verbs can still not raise into  $I^0$ . Moreover, the conjecture that poor but not rich agreement morphology blocks theta-role assignment is, again, purely stipulated and does not follow from any well-known grammatical constraint. And finally, the question arises why only English would exhibit *do*-support but not any of the other (Germanic) poor/zero agreement languages (like Danish or Dutch).

As for the third issue (the ban on lowering across negation), it could be argued that negative markers *not/n't* are realizations of syntactic heads, but that adverbs like *never* are  $vP$ -adjuncts. In that event, only intervening heads can be taken to block morphological merger of an affix in  $I^0$  and the verbal stem (Bobaljik 1995). However, while *n't* shows the characteristics of an element in a head position in the clausal spine, *not* does not. To see this, first note that raising verbs can cross the position taken by *not* and target a position that is decidedly higher. The raised verb and *not* can be separated by an adverb for instance:

- (8) a. I am (definitely) not ill  
 b. I have (definitely) not been ill

In contrast, *n't* is a clitic. Although raising verbs can also appear to the left of *n't*, it is not obvious that the verb ever ends up in head position that is decidedly higher than the one taken by *n't*. In cases that involve movement to C, for instance, *n't* travels along with the verb to C, in contrast to *not*.

- (9) a. Have you not been ill?  
 b. Haven't you been ill?
- (10) a. Could he not have stayed home?  
 b. Couldn't he have stayed home?

This suggests that raising verbs move to the position taken by *n't* (thereby not violating the Head Movement Constraint (Travis 1984)), whereas they move across *not* to a higher head position. But this means that *not* is not a head.

A second argument supporting the hypothesis that *not* is a phrase is based on Merchant (2006). Phrases can only adjoin to other phrases, not to heads. As Merchant shows, every language in which the negative marker is phrasal allows its adjunction to *why*; every language in which it is not, does not allow this.

- |      |                         |         |
|------|-------------------------|---------|
| (11) | Why not?                | English |
| (12) | a. *Perche <i>non</i> ? | Italian |
|      | b. *Giati <i>dhen</i> ? | Greek   |
| (13) | a. Warum <i>nicht</i> ? | German  |
|      | b. Varför <i>inte</i> ? | Swedish |

Therefore, (11) suggests that *not* is phrasal (cf. Merchant 2006). This means that in the case of *not*-intervention there is in fact no overt head intervening between  $I^0$  and the verbal stem, so that the classic motivation behind *do*-support disappears.

### 1.3 Summary and open questions

So where do we stand? So far, we have reached the following conclusions: (i) all verbs start out in below  $I^0$  and negation; with negation being the closest head outside  $vP$ , all verbs start out  $vP$  *in situ*; (ii) some verbs may raise out of  $vP$  while other verbs may not; (iii) verbs that do not raise are blocked from appearing under *not/n't* in finite contexts and trigger *do*-support; (iv) *not* is a phrasal element whereas *n't* isn't.

These observations jointly give rise to (at least) the following set of questions:

- Q1. Which property X (where X can be complex) properly distinguishes finite raising verbs from finite non-raising verbs?
- Q2. Why is it that finite verbs with property X raise out of  $vP$  and elements without this property cannot?

- Q3. Why do non-raising finite verbs yield ungrammaticality in sentences that contain a negative marker *n't/not*. And why doesn't the same happen with adverbs (including negative adverbs, such as *never*, even in their unmarked position (see fn. 1))?
- Q4. Why can only finite verbs with property X be triggered to raise into positions above I (e.g. C in interrogatives)?
- Q5. Why is it that English exhibits *do*-support and other languages not?

In the remainder of this paper, we address questions Q1-5 in turn.

## 2. Raisers versus non-raisers

Let's start with Q1, which for convenience, we repeat below:

- Q1. Which property X (where X can be complex) properly distinguishes raising finite verbs from non-raising finite verbs?

In order to address this question, let us first make a list of verbs that are raisers and verbs that are non-raisers when they are finite. In Table 1, we identify the following raisers: *be*, auxiliary *have* and, for some speakers also possessive *have*, finite modals that lack a non-finite counterpart (like *can*, *must* and *may*), and auxiliary *do*. Other verbs, including modal/adversative/causative *have*, *used to*, are non-raisers.

Raisers (if finite)	Non-raisers
<i>Be</i>	Modal/adversative/causative <i>have</i> Possessive <i>have</i> (some varieties)
Auxiliary <i>have</i> Possessive <i>have</i> (some varieties)	Regular modals (e.g. <i>allow</i> , <i>require</i> , <i>want</i> )
Finite modals ( <i>can</i> , <i>must</i> , <i>may</i> )	Lexical <i>do</i>
Auxiliary <i>do</i>	<i>Used to</i> (past tense only)
	Weather verbs
	All other verbs

Table 1: English verbs classified as either raiser or non-raiser

In order to distinguish between these types of verbs, we assume that phonologically identical verbs that display different syntactic behaviour are homophonous. That is, auxiliary *do* (as in *he does not leave*) is homophonous with lexical *do* (as in *Ad does the dishes*). Phonologically identical verbs that also display identical syntactic behaviour, e.g. modal (*he doesn't have to leave*) vs. causative *have* (*I didn't have him clean the house*)), we take to be polysemous (cf. Harley 1998), although nothing crucial depends on this second assumption.

With this in mind, let us see what grammatical properties may distinguish the raisers from the non-raisers. We argue that two questions are crucial: (i) Does the verb assign an internal theta role? And (ii) Can the finite form of the verb contain an affix, either tense or agreement, that is regularly attached to the stem (where the stem is identical to the infinitival form)?

Property (i) is straightforward for the most part. Classical semantic tests for internal theta-role assignment apply. The only hairy case is *have*. First of all, *have* appears in both columns in its possessive reading, depending on the variety, suggesting that an internal theta role is not a sufficient factor in distinguishing raisers from non-raisers. Second, in one of its readings as a non-raising verb (obligatory *have (to)*) the interpretation of *have* is quite close to that of *must*, which is a raising verb, again suggesting that thematic properties are irrelevant for making the right cut between raisers and non-raisers.

Following Harley (1998) in assuming that there is only one polysemous non-raising *have* and that its interpretation depends at least on the complement that it selects, we assume that possessive *have* selects a DP ('I have a car'), causative *have* selects a *v*P ('I had him leave'), modal/obligatory *have* selects a TP ('I have to leave'). In the case of possessive and causative *have*, these selected constituents are assigned an internal theta role. Since modal and causative *have* are not homophonous, modal *have* sits in the right column.<sup>2</sup> The fact that possessive *have* is a raiser in some British varieties is, we assume, because the theta-assigning verb in that construction is a silent *got* ('I have (got) a car'), idiomatically paired with auxiliary *have* to create a possessive, non-perfect meaning. The construction has been losing ground to the one with overt *got* (cf. Fodor & Smith 1978), which may be further evidence for the relatedness of the constructions with and without overt *got*, apart from their similar syntactic behaviour (neither construction displays *do*-support).

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<sup>2</sup> The fact that lexical verbs selecting a verbal complement can be similar in meaning to what we may call modal operators is a wider fact and one that crucially accommodated the transition of lexical verbs into functional modals over time (cf. the similarity between auxiliary *need* and lexical *need (to)* as a case in point). Lexical and functional categories co-exist as means for semantic expression and they partially overlap. The fact that *must* and *have to* are close in meaning therefore does not indicate that they must have similar theta structures, or lack thereof.



For (ii), more needs to be said. Here, we look at the morpho-phonological make up of a finite verb. If in some paradigm the finite verb has an inflectional ending regularly attached to the stem, we answer (ii) with yes. What counts as regular inflection is the *-s* in 3<sup>rd</sup> person singular contexts (in one of its allophonic spell outs /s/, /z/ or /Iz/) and past tense marking with *-ed* (in one of its allophonic spell outs /d/, /t/ or /Id/). *Dates*, *kisses*, but also *used (to)* have a separate finite affix. Uninflected verbs (*can*, *must*) and verbs with suppletive finite forms only (*have*, *be*) do not count as verbs that consist of an affix regularly attached to the stem; i.e., *cans/canned*, *haves/haved* and *be(e)s/beed* do not exist.

Let us now reallocate the verbs in Table 1 with respect to properties (i) and (ii).

	<i>Does not assign an internal theta-role</i>	<i>Does assign an internal theta-role</i>
<i>No affix regularly attached to the stem</i>	<i>Be</i> , auxiliary <i>have</i> , uninflected modals, auxiliary <i>do</i> , possessive <i>have</i> (some varieties)	Possessive <i>have</i> (some varieties), modal/causative <i>have</i> , <i>say</i>
<i>Affix regularly attached to the stem</i>	Weather verbs, <i>used to</i>	All other verbs

Table 2: English verbs classified w.r.t. their thematic properties and morphological regularity

It turns out that all raising verbs appear in one and the same cell (colour-coded in black), which allows us to make the following novel generalization:<sup>3</sup>

- (14) *Generalization*: a verb is a raiser iff (i) it does not assign an internal theta role; and (ii) it does not have an affix regularly attached to the stem.

What we referred to as property X in Q1 thus appears to be related to two factors (internal theta-role assignment and morphological regularity). However, rather than just aiming at reducing verb raising to two properties instead of one, the next step in the reasoning should be whether these two grammatical properties may stem from one and the same source.

<sup>3</sup> Klaus Abels rightfully notes that this generalization predicts the possible existence of an unergative, irregularly inflected weather verb that allows raising (assume e.g. *to ray* which inflects like *to say*: 3SG ‘it /rez/’, past tense ‘it /red/’). In practice, it may be hard for such a raiser to develop. For one, English weather verbs are predominantly derived from nominals by zero conversion, a process that tends to create regular verbs (cf. Don 1993).

In the remainder of this section, we conjecture that these properties indeed have one source. We base that conjecture on the fact that these two properties have one common denominator, namely the fact that finite non-raising verbs contain a stem *V* that attaches to a *v* (which can be phonologically unrealized), whereas raising verbs do not. In short, non-raisers have a reason to be in the *V*-position, whereas raisers do not. This conjecture is grounded on two assumptions.

First, and rather uncontroversially, we assume that internal theta roles are assigned from the *V* position. Consequently, every verb that assigns an internal theta-role starts out in *V*.

Second, finite verbs that are regularly inflected by either a regular agreement or tense affix provide evidence for the existence of spell-out rules that only target the functional information of the finite verb:

- (15) a.    [ $\phi$ :3SG]        $\Leftrightarrow$     -s  
           b.    [T: past]        $\Leftrightarrow$     -ed

A separate spell-out rule must then target the stem of the finite verb (*walk* or *fall*) and this stem is of category *V* (in some theories complex, consisting of a root and a verbalizer). In other words, regular finite morphology provides robust evidence for a verbal head that is separate from its inflection and this head must start in the quintessential *V* position.

We assume that agreement morphology in English (and other poor agreement languages) is realized in *v* and spelled out on *V* after *V*-to-*v* movement (Koenenman & Zeijlstra 2014, Tvica 2017, and Koenenman, Tvica & Zeijlstra 2022). This assumption is less trivial but grounded in the observation that languages exhibiting poor agreement morphology lack any kind of verbal movement to a head that realizes agreement features. Instead, agreement morphology is hosted in *v* and not by some higher head in the clausal spine, such as AgrS (or Arg, as in the references above). This means that every verb that is regularly inflected must have a finite structure [*V*-*v*]. Even if some form of such a verb is irregular (e.g. an irregular past tense form of a verb that is regular in the present tense), the finite verb still spells out [*V*-*v*]. For instance, *leaves* is the spell-out of [<sub>v</sub> *v*<sub>[ $\phi$ :3SG]</sub> *V*<sub>i</sub> [*v* *t*<sub>i</sub> ]]

and hence *left* must spell out [<sub>v</sub> *v*<sub>[ $\phi$ :3SG]</sub> *V*<sub>i</sub> [*v* *t*<sub>i</sub> ]]

in combination with some tense feature [PAST].

The summation of these assumptions entails that every verb that assigns an internal theta-role and/or shows some morphological regularity must be base-generated in *V* and move into *v*.

Now, let us look at verbs that lack these properties. Since there is no syntactic, morphological or semantic evidence that such verbs start out in V and move to *v*, a more economic assumption is that these verbs are directly base-generated in a higher position. This leaves two possibilities. Either finite raising verbs are base-generated in the position in which we see them, an inflectional position outside of the verbal domain higher than negation (cf. Roberts & Roussou 2003), or they are base-generated in a position between V and this higher inflectional position, which is exactly where *v* is positioned. In the latter case, modals and finite forms of *have* and *be* raise to the position in which we see them.

There are two arguments for the latter view. First of all, we know that modal verbs should be able to scope under negation, an observation we already mentioned in the introduction and which constitutes an argument against the classical analysis of English verbal syntax. Second, we also know that modal verbs and finite forms of *have* and *be* are in complementary distribution with other finite inflectional markers *-s* and *-ed*. (cf. *\*He can leaves/\*He could walked*); no English raising verb has any regular agreement marker *-s* or *-ed*. This strongly suggests that all these elements are in competition for insertion into the same slot, a hypothesis that was in fact part and parcel of Chomsky's classical 1957 analysis. Now, if inflectional elements as *-s* and *-ed* are spell outs of features residing in *v*, then so must modals be, as well as finite forms of *have* and *be*. We therefore conclude that finite auxiliaries *be* and *have* and inherently finite modals like *can*, *may* and *must* do not project a VP but are instead base-generated in *v*.

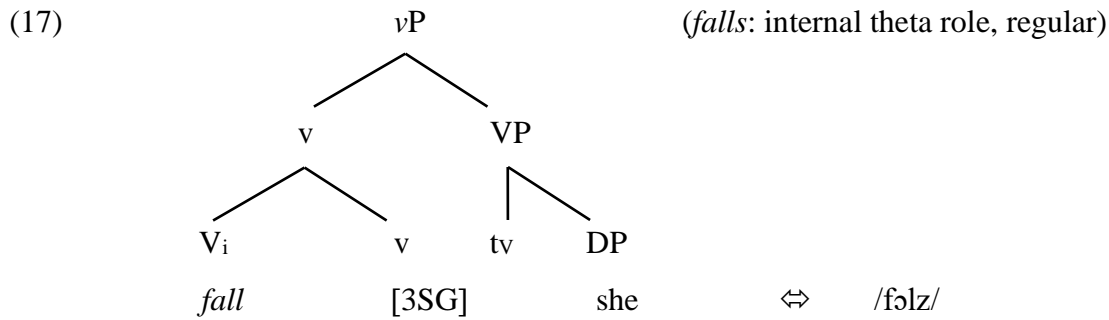
This way, we end up with the following generalization:

- (16) *Generalization*: Raising verbs are base-generated in *v*; non-raising verbs are base-generated in V.

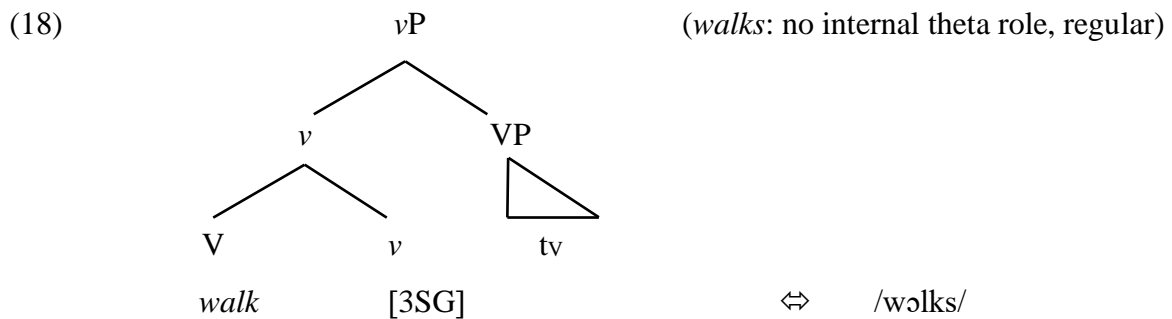
Below, we show how our generalization works for a number of verbs. As we take agreement morphology to be hosted in *v*, we assume with Legate (2003) that every VP is embedded in a *v*P, even if the verb itself is unaccusative. This is the case for *(she) falls* in (17) where the verb starts out in V and head-adjoins to *v*, which hosts the underlying [ $\phi$ : 3,SG] feature.<sup>4</sup>

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<sup>4</sup> Note that under this analysis that finite lexical verbs move to *v* but non-finite ones remain in V. This triggers the question as to whether one can distinguish these positions by means of adjunction to VP (where finite verbs would end up to the left of the adjunct and non-finite ones to the right of it). We are not aware of any such diagnostics, but leave this open for further research.



(*She*) *walks* in (18) receives a very similar analysis albeit that its argument is not base-generated within  $VP$  given that *walks* only assigns an external theta-role. But the verb still head-adjoins to  $v$ , because its inflection is regular in both the present and past tense.

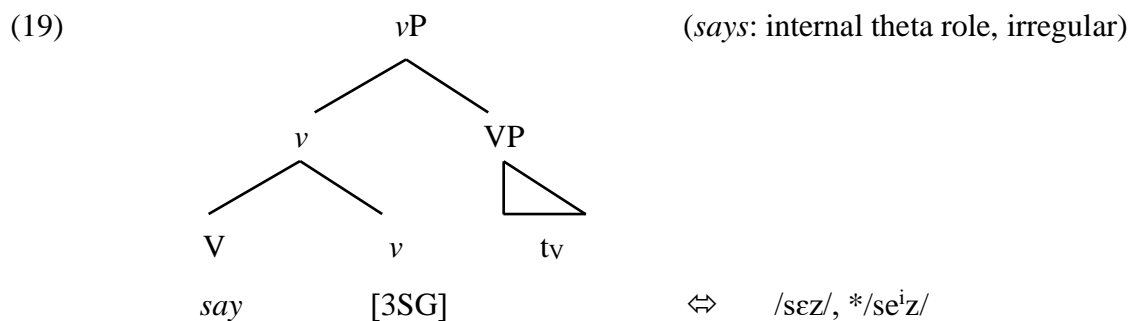


Unergative *to run* differs from unergative *to walk* in that the past tense is irregular. The present tense, however, is regular and (15)a therefore provides evidence for base-generation in  $V$ .<sup>5</sup>

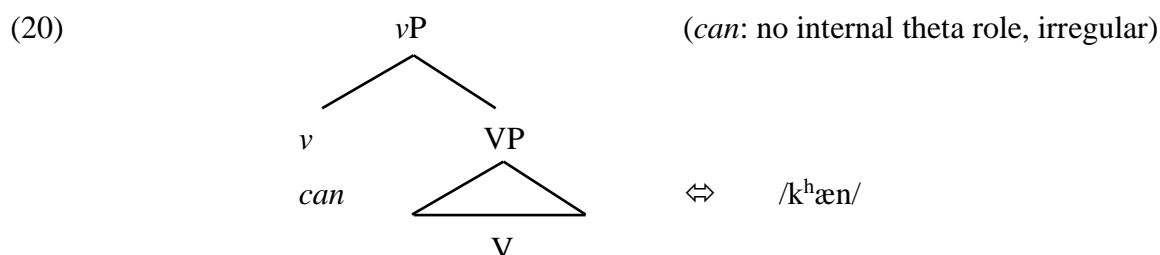
Note that every verb assigning an internal theta-role must project  $V$ , irrespective of whether its finite forms are regular or not. This can be illustrated for (*She*) *says*, which is irregular as the 3<sup>rd</sup> singular verb is pronounced as /sez/ and not as /se<sup>i</sup>z/, and the past tense *said* as /sed/ and not as /se<sup>i</sup>d/. Despite its irregularity, the underlying structure of *She says* is the same as that of *She falls* or *She walks*.

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<sup>5</sup> One may wonder why present tense forms of *to run* (which are regular) are not generated in  $V$  and past tense forms (which are irregular) generated in  $v$ . In other words, why is the locus of base-generation determined by the verb *run* (i.e. the morpheme with the root meaning) and not by the verb forms? We take this to be a consequence of the fact that a lexically listed verb needs a categorial feature, which involves a categorial choice between either  $V$  or  $v$ . If some morpho-phonological form or the theta-structure of a verb provides evidence for the existence of an independent  $V$ , then this will be the categorial feature of that verb. Since inherently finite modals do not provide such evidence, they are analyzed as  $v$ -heads. This has consequences for the way we treat stacking of auxiliaries in examples such as *He is being interrogated* and *He must have been interrogated*. If finite forms of *have* and *be* are base-generated in  $v$ , then they must also be of category  $v$  when they are non-finite. In other words, stacking of finite and/or non-finite auxiliaries involves stacking of  $v$ -categories rather than a mixture of  $v$  and  $V$  categories. This has non-trivial consequences for the theory of little  $v$ , as we are aware, but we must leave this as an issue for further research.



But let us now look at *can*, a modal that selects a VP. There is no need to assume that *can* projects a VP of its own. Neither its morpho-phonological structure, nor its theta structure necessitate that *can* heads a VP and head-adjoins to *v*. *Can*'s syntactic behaviour can be fully captured by assuming that it directly heads a projection dominating VP, a structure that is fairly commonly used for such modals in general (albeit with another name for the projection in which *can* is base-generated, cf. Roberts & Roussou 2003 a.o.).



To conclude, we have identified the property X that distinguishes raisers from non-raisers. Non-raisers are base-generated in V, raisers in *v*. Of course, this does not address the other questions yet. For that, we need to understand why verbs base-generated in *v* must raise but verbs base-generated in V cannot. It is this question that we will address in the next section.

### 3. *v*, V and raising

We are now in a position to formulate an answer to Q2:

- Q2. Why is it that finite verbs with property X raise out of *v*P and elements without this property cannot?

Given the above we can further narrow down Q2 into Q2':

Q2'. Why is it that finite verbs that are regular and/or assign an internal theta role cannot raise out of  $vP$  whereas finite verbs that are irregular and assign no internal theta role can?

For this, we first need to see what formal feature distinguishes finite from non-finite verbs. Since English finite verbs are distinguished from infinitival verbs by means of tense/agreement morphology only, the feature jointly realized by agreement and tense morphology is the overarching feature *finiteness*. After all, as argued for at length in Bobaljik & Thráinsson (1998) and subsequent work, including Koenenman & Zeijlstra (2023), English verbal inflectional morphology is monomorphemic in nature and only realizes a feature present on one single head. Let us call this superfeature above tense and agreement Finiteness, though it could be addressed as I(nflection) or even T(ense) as well.

So, let's take as a starting point that apart from some verbal feature every finite verb carries a feature [Fin]. Given that formal features come in two kinds, interpretable and uninterpretable features (Chomsky 1995, 2001, 2002), let us ask if this feature [Fin] on English finite verbs is an interpretable [iFin] or an uninterpretable [uFin].

Now, which verbal element is assigned a feature [iFin] and [uFin] is ultimately a question of language acquisition. A language learner should acquire which features it assigns to which elements. Hence, the question arises as to what makes the child decide when a finite verb carries [iFin] or [uFin]. The answer lies in the syntactic distribution of the finite verbs themselves.

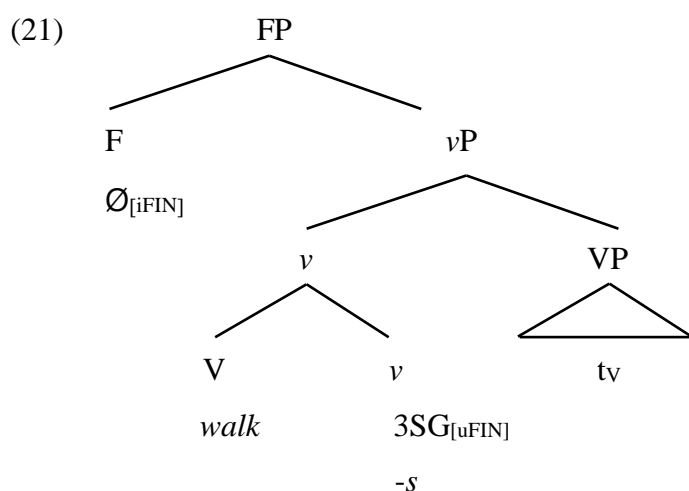
Let us first discuss the regular cases. Since semantically finiteness is a property that applies to fully saturated predicates and not to verbs, it must be interpreted in a position outside  $vP$ . Tense cannot take scope  $vP$ -*in situ*. At the same time, non-raising verbs never leave  $vP$ . This means that the [Fin] feature on regular verbs cannot be an interpretable feature. Hence, the child will analyze non-raising verbs as carrying an uninterpretable feature [uFin] that stands in an (upward) Agree relation with some higher feature [iFin] (after Zeijlstra 2012, Bjorkman & Zeijlstra 2019). What we see here is that the existence of some trait in the word order of the language is a sufficient trigger for the acquisition of some other formal property.

At the same time, raising verbs should be analyzed as carrying an interpretable feature [iFin], in contrast to the [uFin]-carrying non-raisers. That raising verbs carry [iFin] seems straightforward given their distribution. There is no reason for the child to assume that these

verbs carry a feature [uFin], given that their tense subfeatures can indeed take scope from their  $\nu$ P-external surface position. We assume that the default for a language learning child is that if some element can be taken to be the carrier of a semantic property, it should take that element to be the carrier of that semantic property. If tense takes scope from  $I^0$  (which is above negation, cf. Zeijlstra 2022), and finite auxiliaries and modals appear in that position, the child should take them to be carriers of semantic tense.

What we need to explain next is why the properties of carrying [uFin] or [iFin] align with the properties that separate raising from non-raising verbs, namely regularity and VP-internal thematicity.

Let us start with verbs carrying [uFin]. We already argued that the host of regular agreement and tense morphology in English is  $\nu$ . A verb that is regularly inflected in either the present or past tense therefore provides evidence for base-generation of that verb in V. A finite verb then becomes finite by syntactically adjoining to  $\nu$ . This captures the link between verbs carrying [uFin] and inflectional regularity: the regularity reflects the fact that the finite verb forms at hand are morpho-syntactically composed. A verb (V) enters the derivation without any finiteness features itself and only becomes finite when it adjoins to  $\nu$  carrying a feature [uFin], which is subsequently checked in situ against the higher [iFin]:



Second, a verb that needs to assign an internal theta role must project a VP and can only become finite by syntactically combining with  $\nu$ , and this is again the locus of [uFin]. This captures the link between carrying [uFin] and thematicity.

Let us now discuss why irregularity and non-thematicity align with being a carrier of [iFin]. Given the above, finite regular and thematic verbs must be analyzed as spell outs of a

complex [*v*-*V*] cluster. Hence, only finite verbs that are irregular and non-thematic can be the spell out of a simplex head base-generated in *v*. Because they are non-thematic, they do not have to start in *V* and become finite by adjoining to the [*uFin*]-carrying *v*. And because they are irregular, they offer no indication of a compositional [*V*-*v*] analysis. Note that this does not predict that all irregular verb automatically carry [*iFin*]. A case in point is *to say*. Its irregularity is revealed by its pronunciation (/sɛz/ instead of \*/se<sup>i</sup>z/ and /sɛd/ instead of \*/se<sup>i</sup>d/) but its thematic properties require base-generation in *V*. Put differently, although the phonological properties of inflected forms of *to say* verb provide no evidence for a compositional analysis, its thematic properties do. Therefore, /sɛz/ and /sɛd/ are irregular spell outs of a syntactically composed [*V*-*v*] complex and inflected forms of *to say* will end up carrying [*uFin*] and having the same syntactic distribution as other verbs that are regular and/or assign an internal theta role. Also note that irregular unergative verbs (like *leave*) should be taken to be [*V*-*v*] composites as they are regular in the present tense (*leaves*).

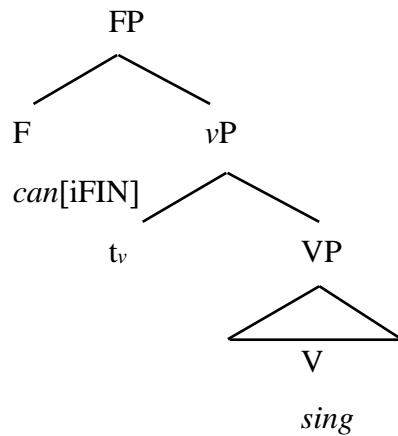
As a next step, note that irregular, finite verbs that do not assign an internal theta role cannot Agree with the head of FP, given that they carry [*iFin*], but instead raise to it. One way of thinking about this head movement would be reprojection along the lines of Ackema, Neeleman & Weerman (1993) and Koenenman (2000); the [*iFin*]-carrying head moves to bring this feature into the appropriate structural position. But there are other ways to implement this movement as well. The fact that only verbs with [*iFin*] but not with [*uFin*] raise is not surprising at all. Under any version of feature-driven movement (EPP-driven movement, Upward Agree, etc.), it is only elements carrying the relevant interpretable features that can move up.

In this way, the second part of our generalization now follows: only irregular, non-thematic finite verbs can raise out of *vP*.

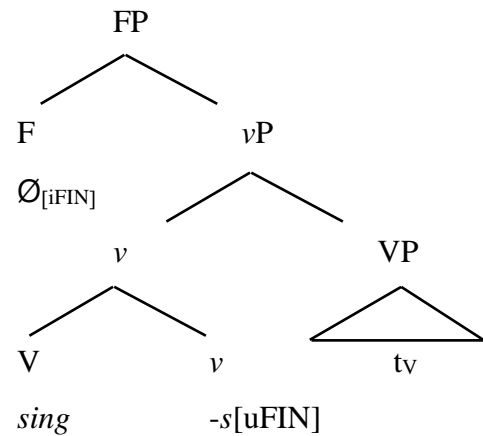
The two types of *vPs* are illustrated below for *(She) can sing* and *(She) sings*:



(22) a.



b.

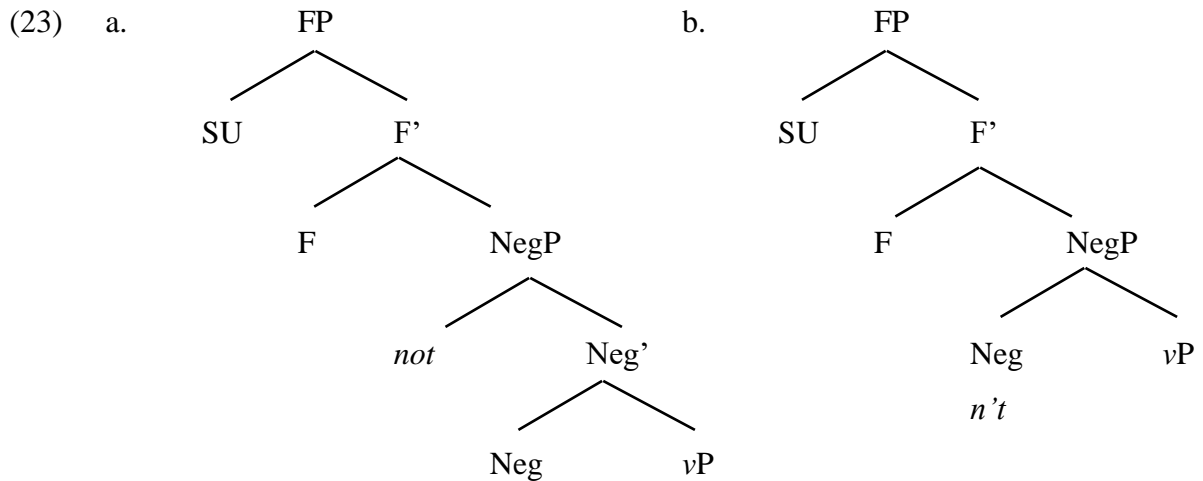


#### 4. *Do*-support in negative clauses

Now we have achieved an understanding of why only certain verbs in English raise to a vP-external position and others not, successfully addressing Q1-2. Let us, therefore, now focus on Q3:

- Q3. Why do non-raising finite verbs yield ungrammaticality in sentences that contain a negative marker *n't/not*. And why doesn't the same happen with adverbs (including negative adverbs, such as *never*, even in their unmarked position (see fn. 1))?

As for the latter question, we make the pretty standard assumption that *never* is an adverb prototypically adjoined to vP. It can appear in higher positions (in clause-initial position or between the subject and auxiliary, like other adverbs, as mentioned in footnote 1)). This is in contrast to *not* and *n't*, which are distributionally restricted because they are tied to a functional projection, NegP, between FP and vP. Although *not* is not a syntactic head, it has the same distribution as *n't* when used for sentential negation, modulo its impossibility to move along with the verb. We assume that it is base-generated in SpecNegP, as proposed in detail in Zeijlstra (2022). This yields two different possible structures of finite negative clauses:



Given these structures, what is it that triggers *do*-support? This is not immediately obvious in an Agree system, as [iFin] in F should be able to look beyond NegP, obviating the need for *do*-insertion. Moreover, since inflection does not originate in F in our analysis, there is no lowering operation that is blocked by negation either. From this perspective *do* would not be necessary either.

However, we argue that there is another factor that should be taken into consideration, namely the fact that the head of NegP carries a [uFin] feature. The motivation for this is fairly straightforward, both conceptually and empirically.

Conceptually, under the assumption that covert operators should be as close as possible to the highest overt signpost of it (ultimately a parsing requirement in the spirit of Ackema & Neeleman 2002), [iFin] should be as close as possible to [uFin]. Thus, FP with the finiteness operator should in principle be taken to immediately dominate *v*P. If NegP did not have [uFin], the predicted order is NegP>FP>*v*P, and this is not what we find. However, by postulating a feature [uFin] on Neg<sup>0</sup> it is ensured that FP dominates NegP in line with the observed facts.

Empirically, the fact that the head of NegP can be spelled out by *n't*, a negation marker that can only appear in finite clauses, provides independent confirmation for the direct link between *n't* and finiteness in Neg<sup>0</sup>. If Neg<sup>0</sup> lacked a feature [uFin] there would be no reason why it would be restricted to finite clauses.

Of course, the [uFin] feature in Neg<sup>0</sup> must be checked by [iFin] as well. There are two ways of doing so, depending on the position of [iFin] in the structure. Either [uFin] on Neg<sup>0</sup> is checked under Agree with the empty operator carrying [iFin] in F, or [uFin] on Neg is checked by raising a verb carrying [iFin] into Neg.

However, this proposal so far overgenerates, because under the first option [iFin] would check the [uFin] features on Neg and *v*, thereby generating the ungrammatical *\*Ad not leaves*.

This ungrammaticality, we argue, has to do with the fact that NegP is not necessarily part of the clausal spine. In order to ensure that NegP is present, its head must be licensed in one way or another. We hence allude to an independently needed licensing requirement, which we formulate as follows:

- (24) *Licensing requirement:* The head of an XP that is not always part of the clausal spine of a finite clause must be overtly lexicalized.

To motivate (24), let us look at the following cases. FP is always present in a finite clause. Hence its presence does not have to be overtly marked in F and can be lexicalized by a null morpheme. This is shown in (25):

- (25) Ad will date Mary / Ad  $\emptyset$  dates Mary.

By contrast, CP in finite main clauses is not always present and needs to be overtly lexicalized. This explains the following minimal pair:

- (26) Who will Ad date? / \*Who Ad dates?

CP in finite embedded clauses, however, is always present and can thus be lexicalized by a null morpheme. Therefore, C can be unmarked in (27).

- (27) I know that Ad dates Mary / I know  $\emptyset$  Ad dates Mary.

Now, similarly, since NegP is not present in non-negative sentence, its head must be licensed when present. This can be done by lexicalizing Neg as *n't* but since this spell out is a verbal clitic, a verb must still independently raise to Neg. Note that inserting *not* in Spec,NegP does not suffice for licensing: it is not a head but a phrase. Therefore, Neg still requires overt lexicalization when *not* is used for sentential negation.

The hypothesis that Neg carries [uFin] together with the licensing requirement in (24) now conspire to derive the *do*-support paradigm. To see this, let us go through the relevant cases.

Combining *n't* with a lexical verb, as in (28), is not possible. Here, Neg is lexicalized but *n't* is not properly supported. For that, a verb should independently raise across *n't*, but as we saw, lexical verbs are non-raisers. Therefore, (29) is ungrammatical as well.

(28) \*<sub>[FP Ad Ø <sub>[NegP n't <sub>[vP dates Peter]]]</sub>]</sub></sub>

(29) \*<sub>[FP Ad (Ø) <sub>[NegP datesn't <sub>[vP t<sub>dates</sub> Peter]]]</sub>]</sub></sub>

Replacing *n't* by *not* will not rescue the structure. As shown in (30), Neg itself is now not lexicalized anymore.

(30) \*<sub>[FP Ad Ø <sub>[NegP not <sub>[vP dates Peter]]]</sub>]</sub></sub>

At the same time, the lexical verb still cannot raise into Neg or even into F for lack of an independent trigger for such a movement:

- (31) a. \*<sub>[FP Ad <sub>[NegP not dates <sub>[vP t<sub>dates</sub> Peter]]]</sub>]</sub>  
b. \*<sub>[FP Ad dates <sub>[NegP not t<sub>dates</sub> <sub>[vP t<sub>dates</sub> Peter]]]</sub>]</sub></sub></sub>

However, inserting auxiliary *do* carrying [iFin] can yield grammaticality. Since the alternative derivations crash, only a derivation that contains auxiliary *do* will end up being grammatical. Crucially, *do*-support is not a last resort mechanism. Next to the sentence *Ad dates Mary*, the sentence *Ad does date Mary* is grammatical too. When negated, only the latter but not the former is grammatical. This gives rise to the classical of *do*-support paradigm. In (32), Neg is licensed in both examples. In ((32)a), it is licensed by *n't* itself, and *n't* in turn can take *does* as a host. In ((32)b), Neg is licensed by the lower copy of *does*, which ultimately lands in the head of FP.

- (32) a. <sub>[FP Ad doesn't <sub>[NegP t<sub>doesn't</sub> <sub>[vP date Mary]]]</sub>]</sub>  
b. <sub>[FP Ad does <sub>[NegP not t<sub>does</sub> <sub>[vP date Mary]]]</sub>]</sub></sub></sub>

To sum up, whenever a verb is base-generated in *v*, it will be the head that introduces [iFin] into the structure. This verb will therefore move to Neg (when present), thus licensing NegP, and move next to F to put [iFin] in the appropriate position. When a verb is base-generated in *V*, it will carry [uFin] and therefore not be able to move (via Neg) to F. NegP in that case cannot be licensed by this verb; a negative marker *n't*, unlike negative marker *not*, could license NegP but it will then lack a verbal host that it can attach to.

## 5. *Do*-support and raising to C

With this in mind, let us now proceed with the final two questions. We first take Q4, which we can rephrase in terms of Q4'.

Q4. Why can only finite verbs with property X be triggered to raise into positions above I (e.g. C in interrogatives)?

Q4' Why can only finite verbs in F be triggered to raise to C?

As mentioned before, CP is not obligatorily part of the clausal spine of a finite clause. It is only present in questions and negative fronting constructions; otherwise, the entire clause would be an FP(/TP/IP). If CP is present, the same licensing requirement that holds for NegP holds for CP, so the verb carrying [iFin] will move to C, which we take to carry a feature [uFin] as well to trigger this movement. As a result, (24) is satisfied. As verbs with [uFin] cannot raise out of vP, *do*-support is triggered in questions. The licensing of NegP and main clause CP works in an identical fashion: just filling the specifier is not enough.

Note in this respect that, as is well known, subject questions do not trigger *do*-support in English. Under the current analysis, this means that *wh*-subjects do not move to Spec,CP but stay in Spec,FP. This is in line with the proposal by Grimshaw (1997), who argues that *wh*-operators should occupy the highest specifier in the clause. Since *wh*-subjects already do that when they are in Spec,FP, no further movement is required. And since FP is always present in a finite clause, its head does not have to be licensed and the absence of *do*-support follows.

To conclude, we have derived a unified explanation for *do*-support in interrogative and negative clauses. Note that CP is obligatory in embedded clauses; hence CP does not need to be licensed here and *do*-support is correctly predicted to be absent in embedded interrogatives.

## 6. Comparison with other languages

Finally, let us approach Q5:

Q5. Why is it that English exhibits *do*-support and other languages not?

Q5 is not a trivial question. Since the general assumptions we have based our analysis on are not specific to English, one may (or should) wonder why *do*-support, at least within the Germanic language family, is restricted to English.

However, if we zoom in on the exact properties of English that trigger *do*-support, we find that these properties together form a somewhat explosive cocktail. These properties are: (i) the existence of different finite verbs ([iFin] versus [uFin] marked); (ii) the existence of a specific finite Neg-head in negative clauses; and (iii) the existence of agreement morphology that is hosted in  $v$ .

These properties are quite specific, and their combination is even much rarer. In most languages, the distribution of finite verbs is the same, suggesting that they all carry either [iFin] or [uFin]. There is no verb second language, for instance, in which only a subset of finite verbs can make it to C. Also, English is unique in the Germanic languages in the sense that negative elements can be marked for finiteness. Finally, languages that host agreement morphology in  $v$  are rare as well, if Koenenman & Zeijlstra (2014) are right that rich agreement morphology is always hosted in a  $v$ P-external position and zero agreement languages do not host any agreement-related features.

## 7. Conclusions

In this short article, we have provided an analysis for the classical *do*-support paradigm. We argue that what makes raisers raise is a complex of two properties, having to do with lack of internal theta role assignment and irregularity. These properties do not form a natural class at first view but both relate to the issue of whether a particular verb needs to be in V. If there is no thematic or inflectional evidence for base-generation in V, base-generation in  $v$  becomes possible, and likely preferred given standard economy considerations. This analysis is inspired by the fact that the classical dichotomy (base-generation in either a  $v$ P-internal or  $v$ P-external position) runs into some serious issues. With this alternative dichotomy in place (base-generation in either  $v$  or V), these problems can be circumvented. The fact that modals can scope under negation, for instance, is straightforwardly compatible with an analysis in which all verbs start from a  $v$ P-internal position. After justifying this new dichotomy, we argued that the syntax of finiteness does the rest. For the language acquiring child, the choice between base-generation in either V or  $v$  has immediate consequences for the distribution of [iFin] and [uFin] features and their properties (i.e., [iFin] needs to be  $v$ P-external, and [uFin] features must be checked)

ultimately give rise to the pattern of verbal syntax we see in English. This proposal requires a specific analysis for the trigger for *do*-support (as proposals from the literature cannot be straightforwardly adopted). We propose that *do*-support is the result of a conspiracy between the presence of a [uFin] feature in Neg and a licensing condition on functional projections that are not always part of the clausal spine of a finite clause (NegP and main clause CP). Given the ingredients necessary to derive the *do*-support paradigm, it is no longer a surprise that it is so unique.

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