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The rise of *do*-support in English: implications for clause structure[*]

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0. Introduction

This paper presents an account of the statistical patterns in the development of *do* forms in various sentence types in English. Unlike previous works on the rise of *do*-support, our analysis takes into account the evolution of *do*-support in imperatives. We show that the development of *do* forms in negative imperatives cannot be explained with a clause structure that has only one INFL projection and one NegP, as in Roberts (1985) and Kroch (1989b). We therefore propose a more articulated clause structure, which we argue is already necessary to explain the syntax of Middle English infinitivals. We argue that the syntax of negative infinitivals in Middle English can be accounted for if we posit two possible syntactic positions for negation and an intermediate functional projection, which we assume to be an Aspect Phrase (AspP), between the two negation projections. This articulated clause structure enables us to distinguish two types of verb movement: movement over the lower negation and movement over the higher negation. We show that the patterns in the development of *do*-support in imperatives as well as in questions and negative declaratives can be explained if the loss of verb movement occurs in two steps in the history of English with the loss of the higher movement preceding the loss of the lower movement. For data relating to the development of *do* forms, we use an online version of Ellegård's (1953) collection of clauses (Kroch and Taylor 1990). The source for the data relating to Middle English infinitivals is the Penn-Helsinki Parsed Corpus of Middle English (PPCME) (Kroch and Taylor 1994).

1. Previous accounts on the rise of *do*-support

In Present-day English, auxiliary *do* is required in *yes-no* questions, non-subject *wh*-questions, negative declaratives (i.e., those containing *not*) and in negative imperatives.

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(1) a. Did you finish? c. I did not finish.
b. What did you finish? d. Do not finish!

In early Modern English (ca.1500-ca.1700), the use of *do* in these contexts was variable but increased over time. Ellegård provides a quantitative study of the development of *do* forms in various sentence types using a collection of sentences extracted from texts ranging in time from late Middle English to the 18th century. Figure 1, from Ellegård (1953:162), plots the relative frequency of *do* forms in affirmative and negative declaratives, affirmative and negative questions, and negative imperatives, based on a sample of more than 10,000 tokens. After the middle of the 16th century, the frequency of *do* in (non-emphatic) affirmative declaratives declines steadily until, by 1700, the use of *do* in this environment is prohibited. The frequency of *do* in negative declaratives and in both affirmative and negative questions rises continuously until sometime after the 18th century, *do* becomes obligatory in these environments.

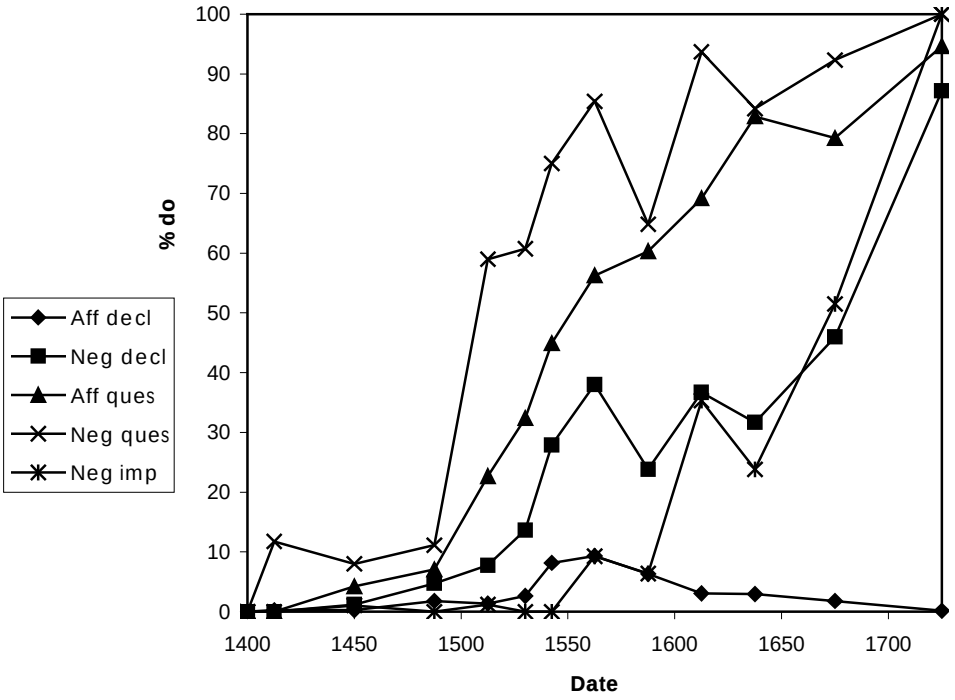


Figure 1: Percent of do forms in various sentence types (from Ellegård 1953:162)

According to a common analysis of Middle English (ca.1150-ca.1500), questions exhibit V-I-C movement and declaratives V-I movement. Supporting evidence for this analysis comes from word order facts: in questions the verb precedes the subject, as in (2a), and in declaratives the verb precedes *not*, as in (2b), and adverbs, as in (2c).

(2) a. **Bileuest thou** this thing? (*The New Testament,Wycliffe* XI,20.1033)
b. but he **spack not** one worde (*Caxton's History of Reynard the Fox* 52.278)
c. Here men **vndurstonden ofte** by this nyght the nyght of synne.
here men understood often by this night the night of sin
(*Wycliffite Sermons* I,477.605)

According to Roberts (1985) and Kroch (1989b), English completely lost V-I movement for lexical verbs in the middle of the 16th century. When V-I movement was lost, only *be*, auxiliary *have* and the modal verbs (*can*, *may*, *must*, etc.) could appear in I^0. Based on the behavior of indicative sentences, Roberts argues that the rise of *do* forms is a reflex of the loss of V-I movement. As V-I movement was lost, INFL lowering replaced it and so the verb came to remain *in situ*. In questions, the requirement that a verbal material move to C^0 persists; thus, auxiliary *do* is inserted in I^0 as a last resort device and then moves to C^0. Examples of questions with *do*-support are given in (3).

(3) a. and wherfore doth the earth sustaine me? (304 25-24)
b. Dyd ye wryte this with your owne hande? (308 96-25)

In negative declaratives, negation blocks INFL lowering, stranding the material in I^0. Again, auxiliary *do* is inserted in I^0 to support the stranded material as a last resort device. Examples of negative declaratives with *do*-support are given in (4).

(4) a. They dyde not set theyr mynde on golde or rychesse. (305 35-23)
b. Christ dyd not praye for Iames and Iohan & for the other. (305 319-11)

If, however, English completely lost V-I movement in the middle of the 16th century, as Roberts and Kroch claim, we would expect to see categorical *do*-support in questions and negative declaratives at this point. But this is contrary to fact, as can be seen from Figure 1, a circumstance which has been used by Lightfoot (1993, 1999) to argue that V-I movement was actually lost much later in the history of English. But Kroch (1989) gives statistical evidence that there was a grammatical reanalysis in the middle of the 16th century. He shows that the rate of the rise of *do* forms in questions, negative declaratives and affirmative declaratives, is the same up to the middle of the 16th century. But after this period, the rise of *do* forms in these contexts shows different rates and different paths. In particular, the percentage of *do* forms in affirmative declaratives begins to decline at this point and the behavior of negative imperatives changes abruptly. Our goal in this paper is to find an analysis that reconciles Kroch's findings with the fact that *do*-support is not categorical at the point of reanalysis.

3. Puzzle: the rise of *do*-support in imperatives

In Middle English, the imperative verb precedes the subject, as in (5).

(5) a. Naske ye of cunseil.
not-ask you of counsel
(*Ancrene Riwle* 58.569)

b. Helpe thou me.
help you me
(*The Earliest Prose Psalter* 150.2290)

As in van Kemenade (1987), Pintzuk (1991), and Kroch and Taylor (1997), we assume that weak pronouns in Middle English occur at the CP/IP boundary. Thus, the fact that the imperative verb precedes the pronominal subject implies that the verb is located in C^0.

In early Modern English, imperatives show the same word order as in Middle English. But imperatives with *do*-support are also attested. In imperatives with an overt

subject and with *do*-support, auxiliary *do* precedes the subject, as shown in (6). In imperatives with an overt subject but without *do*-support, the verb precedes the subject, as shown in (7). This word order fact suggests that *do* or the verb occupies C^0.[1]

(6) a. but I will be your good lord, do you not doubt. (361 O:4-2-39)
b. Do you and your fellows attend them in. (361 M:5-1-106)

(7) a. And feare ye nott them which kyll the body (310 mt10-28)
b. Forbid ye hym not (310 lk9-50)

In Present-day English, negative imperatives require *do*-support. In negative imperatives with an overt subject, auxiliary *do* with contracted negation must precede the subject, as in (8).

(8) a. Don't you worry.
b. Don't anybody move

An affirmative imperative does not allow *do*-support unless it is emphatic. In an affirmative imperative with an overt subject, the subject must precede the verb, as (9) and (10).

(9) a. You come here!
b. *Come you here!

(10) a. Nobody move!
b. *Move nobody!

In emphatic affirmative imperatives with auxiliary *do* and an overt subject, *do* precedes the subject, as shown in (11).

(11) a. Do somebody open the window!
b. Do at least some of you show up!

In Present-day English imperatives, therefore, the data suggest that while auxiliary *do* is located in C^0, the lexical verb is located lower in the clause.

Comparing the development of *do* forms in negative declaratives and negative imperatives poses an interesting puzzle. The development of *do* forms in the two contexts does not show the same pattern. As can be seen in Figure 1, up to the end of the 16^{th} century the frequency of *do* in negative imperatives was as low as in affirmative declaratives. Then after 1600, the frequency of *do* in negative imperatives jumped to the much higher rate found in negative declaratives and subsequently the two negative environments evolved identically. If *do*-support is triggered when negation intervenes between V^0 and I^0, it is puzzling why the development of *do* forms in negative imperatives patterns with negative declaratives only after 1600. Comparing the development of *do* forms in questions and imperatives raises another issue. In Middle English, both questions and imperatives had verb movement to C^0. If *do*-support is triggered in questions as a reflex of the loss of V-I movement, as proposed in Roberts

[1] Early Modern English examples in this paper are taken from the sources in Ellegard (1953). They are identified with Ellegard's numbering system: (source number:page number:line number).

(1985) and Kroch (1989b), then we expect to see imperatives pattern with questions with respect to the development of *do* forms. However, as can be seen in Figure 1, the rate of use of *do* forms in negative imperatives is much lower than in questions at all periods prior to the completion of the change. It is only after 1700 that the rate of use of *do* forms in negative imperatives catches up with the rate in questions. As for affirmative imperatives with *do* forms, their frequency is extremely low, never exceeding 1% according to Ellegård (1953). In Present-day English, although *do*-support is required in negative imperatives, it is not allowed in non-emphatic affirmative imperatives. If both questions and imperatives had verb movement to C^0, it is unclear why there should be this asymmetry in the development of *do* forms in questions and imperatives

4. Infinitivals in Middle English

Before addressing the issues raised in the preceding sections, we discuss a new set of data from Middle English negative infinitivals. We will show that this data provides evidence for a certain inventory and positioning of functional projections in English clause structure and that the questions raised in sections 2 and 3 can be answered if the proposed clause structure is adopted.

4.1. Infinitive verb and negation

In negative infinitivals, Middle English allowed both '*not*-*to*-verb' order (as in (12)) and '*to*-verb-*not*' order (as in (13)).

(12) *not*-*to*-verb

a. that sche wuld vwche-save **nowth to labowre** agens yw in this matere
that she would promise not to labour against you in this matter
tyl ye kom hom
until you come home (*Paston Letters* 221.310)

b. that they that ben sike of hir body ben worthy to ben hated but rather
that they that are sick of their body are worthy to be hated but rather
worthy of pite wel more worthy **nat to ben** hated
worthy of pity even more worthy not to be hated
(*Chaucer's Boethius* 449.C2.379)

(13) *to*-verb-*not*

a. **to sorow noght** for hys syn as he sulde do
to sorrow not for his sin as he should do (*Rolle's Form of Living* 99.260)

b. And herfore monye men vson wel **to come not** in bedde with
and therefore many men are-accustomed well to come not in bed with
schetis, but be hulude aboue the bed
sheets but be covered above the bed (*Wycliffite Sermons* I,479.641)

Table 1 provides the number of infinitivals with '*to*-verb-*not*' and '*not*-*to*-verb' order throughout Middle English. There are no tokens in early Middle English because the prevalent way of forming sentential negation in these periods was with *ne*, which procliticizes to the verb. In Old English, sentential negation was formed with *ne* alone.

Then in Middle English, both *ne* and *not* came to be used (often together), until *ne* is completely replaced by *not* in late Middle English.

	not-to-verb	*to*-verb-*not*
1150-1250	0	0
1250-1350	0	0
1350-1420	10	4
1420-1500	4	10

Table 1: '*not-to*-verb' and '*to*-verb-*not*' order in negative infinitivals

According to Frisch (1997), *not* in Middle English is either a VP-adjoined adverbial or a sentential negative. Let us assume that the infinitive marker *to* originates and stays in a fixed position, namely I^0, and that *not* originates and stays in a fixed position lower than I^0, as in (14).

(14) $[_{IP} [_{I}$ to] $[_{NegP}$ not $[_{VP}$ ...verb...]]]

(15) $[_{NegP}$ not $[_{IP} [_{I}$ to] $[_{VP}$ ...verb...]]]

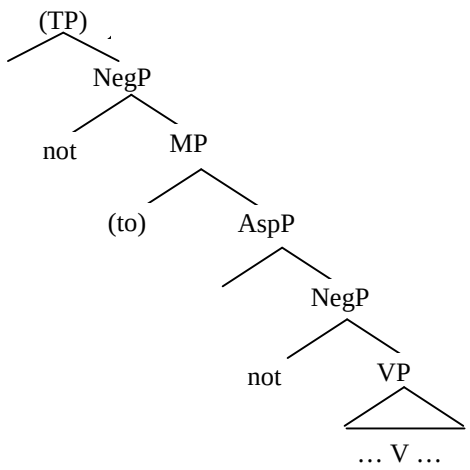
Given the phrase structure in (14), the word order '*to*-verb-*not*' can be derived only if the verb moves across *not* and right-adjoins to I^0. But this is an unattractive solution in that we are forced to admit right-adjunction in syntax. Moreover, the phrase structure in (14) cannot derive the word order '*not-to*-verb'. Alternatively, if *to* is in I^0 and *not* originates and stays in a fixed position higher than I^0, as in (15), then the word order '*not-to*–verb' can be derived; but there is no way to derive the word order '*to*-verb-*not*' with this phrase structure.

4.2. Two positions for negation

To accommodate both the '*to*-verb-*not*' and the '*not-to*-verb' orders in Middle English, we adopt the proposals in Zanuttini (1991, 1997) and Baltin (1993) that there are two possible positions for negation in the clause structure of English.[2] In particular, we propose to adopt a clause structure as in (16) for English. We assume that while in tensed clauses TP projects as the highest functional projection, infinitivals are not tensed and so do not project TP (as in Baltin 1993).

[2] See Zanuttini (1991, 1997), Baltin (1993), Han (in press) for motivations for two positions for negation in Present-day English.

(16)



We further assume that infinitive *to* is in a functional head that hosts mood features, M^0. This makes sense given that the subjunctive is replaced in several contexts by *to*-infinitives in the history of English. We also have syntactic evidence from Baltin for placing *to* in a head below T^0. He notes that negation can never precede finite auxiliaries, as shown in (17). If finite auxiliaries are in T^0 and Neg^0 is below T^0, then it follows that negation cannot precede the auxiliary.

(17) a. *John not will leave.
b. John will not leave

(18) a. Not to leave ...
b. To not leave ...

But in infinitivals, *to* can either follow or precede negation, as in (18). Baltin argues that if *to* is in a head below T^0 and below the higher Neg^0 (which is equivalent to our M^0 in (16)), the word order in (18a) is derived. The word order in (18b) is derived with the lower negation, which is below our MP.

Along the same lines, we place the high negation immediately above MP. This derives the word order '*not*-*to*-verb' in Middle English infinitivals. We also posit that there is an intervening functional projection, which we assume to be an Aspect Phrase, that encodes (im)perfectivity, between MP and VP, and that the low negation is below AspP (see Cinque (1999) for arguments that AspP is quite low in the clause structure).

4.3. Infinitive verb movement

Given the phrase structure in (16), we can now account for the '*to*-verb-*not*' order in Middle English by the movement of the verb over the lower negation to Asp^0. With this analysis, then, we expect to find cases in which the infinitive verb precedes *not* and *not* in turn precedes a participle or a direct object. Such cases can be found in the PPCME, as illustrated in (19) and (20).

(19) *to*-verb-*not*-participle
a. and said mayster parson, I praye you **to be not displeasyd** ...
and said master parson I pray you to be not displeased ...
(*Caxton's Prologues and Epilogues* 88.176)

b. Ha! What it es mykell to be worthi lovyng and **be noght loved**!
ha what it is much to be worth loving and be not loved
(*Rolle's Form of Living* 88.52)

(20) *to*-verb-*not*-direct object
a. **to conforme noght his will** to Gods will, **to gyf noght entent** till hes prayers
to conform not his will to God's will, to give not heed to his prayers
(*Rolle's Form of Living* 99.263)
b. and **to spille not oure tyme**, be it short be it long at Goddis ordynaunce.
and to waste not our time, be it short be it long at God's ordinance
(*Purvey's Prologue to the Bible* I,56.73)

A widely accepted diagnostic for verb movement is adverb placement with respect to the verb. In Middle English finite clauses, adverbs such as *often* and *ever* usually follow the tensed verb, as was shown in (2c). If these adverbs are VP-adjoined, then the fact that the tensed verbs precede the adverbs suggests that the verb moves over the adverb. In Middle English infinitival clauses, adverbs can also follow the infinitive, as shown in (21). This suggests that Middle English infinitive verbs also undergo movement.

(21) a. Monye men han a maner **to ete ofte** for to drynke
many men have a manner to eat often in-order to drink
(*Wycliffite Sermons* I,478.631)
b. the othur was that God wold geue hur that grace, to hur that was the
the other was that God would give her that grace, to her that was the
modur of God **to do euer** plesaund seruyse to God.
mother of God to do always pleasing service to God
(*Sermons from the MS Royal* 256.260)

5. Sequential loss of verb movement

If we assume the articulated clause structure proposed here, we can imagine two different ways in which the loss of verb movement can proceed: (i) the loss of V-Asp movement, and M-T movement occur simultaneously; (ii) the loss of M-T movement historically precedes the loss of V-Asp movement. In the rest of section 5, we will show that possibility (ii) makes the correct predictions for the overall statistical patterns shown in Figure 1: the loss of M-T movement begins at the beginning of the 15th century, going to completion around 1575; and the loss of V-Asp movement begins at the end of the 16th century. We take Kroch's (1989b) findings that the Constant Rate Effects is attested in the rise of *do*-support up to 1575 as evidence for the complete loss of M-T movement at 1575, which results in grammatical reanalysis.

What about Asp-M movement? We assume that in tensed clauses M^0 has weak feature content and so does not induce overt movement. But in tensed clauses in Middle English, when T^0 attracts the verb, the verb moves through M^0 on its way to T^0 even though M^0 itself is not an attractor. When M-T movement is lost, Asp-M movement disappears as well. On the other hand, the feature content of M^0 in Middle English

imperatives seems to be strong (see section 5.3.3). The discussion below presents our evidence for the hypothesis that the loss of M-T movement precedes the loss of V-Asp movement in the history of English, after a sketch of a mechanism for *do*-support.

5.1. *Do*-support in Present-day English

The facts of *do*-support are: (i) it is required in questions (except for subject *wh*-questions) and negative declaratives for lexical verbs, but prohibited for *be* and auxiliary verbs; (ii) it is prohibited in (non-emphatic) affirmative declaratives. The explanations for these facts in the literature are largely based on the assumption that auxiliary verbs and *be* undergo overt movement to INFL (which is equivalent to T^0 in the clause structure in (16)), but lexical verbs do not. We see this asymmetry as meaning that *be* and auxiliary verbs undergo category movement to T^0, but for lexical verbs, only their formal features move. In questions, a verbal element must move to C^0. Auxiliary verbs in questions undergo category movement to T^0 and then they further move to C^0. On the other hand, lexical verbs are stuck *in situ*. As a last resort, *do* is inserted in Asp^0 and moves through M^0 and T^0 to C^0 to check the appropriate features. In negative declaratives, we stipulate that negation blocks pure feature movement, and so for lexical verbs *do* is inserted in Asp^0 as a last resort and it moves through M^0 to T^0. Negation does not block category movement, however, and so auxiliary verbs do not require *do*-support (hence prohibiting it for reasons of economy). Affirmative declaratives do not require *do*-support for either auxiliary or lexical verbs since there is nothing that blocks feature movement or category movement.[3] One question that arises under this account is why negation blocks pure feature movement but not category movement. Here, we refer the readers to Chomsky (1989), Roberts (1993) and Bobaljik (1993) for possible answers. For the purposes of this paper it does not matter which particular line is adopted.

5.2. Development of *do*-support in negative declarative

As shown in Figure 1, by 1575, the frequency of *do* forms in negative declaratives is about 40%, not 100%. Given the articulated clause structure proposed here, the verb in declaratives in Middle English moves all the way up to T^0. When M-T movement is lost, the verb undergoes category movement only up to Asp^0, and then its features move to T^0. But in negative declaratives formed with higher negation, the feature movement is blocked by negation. Hence, *do*-support is required. Moreover, all negative declaratives, whether formed with higher or lower negation, require *do*-support when V-Asp movement is lost because as V-Asp movement is lost, only features of the verb move through Asp^0 and M^0 to T^0. Note that low negation will block feature movement to Asp^0 and high negation will block feature movement to T^0. If the loss of M-T movement begins at the beginning of the 15th century, we expect to find *do*-support in negative declaratives well before 1575. And if the loss of V-Asp movement does not begin until the end of the 16th century, we do not expect to find 100% *do*-support in negative declaratives in that century. We expect to find categorical *do*-support in negative declaratives only after the loss of V-Asp movement goes to completion, which happens later.

[3] For a more detailed account of the mechanism involved in *do*-support, see Kroch and Han (in prep.).

5.3. Development of *do*-support in imperatives

5.3.1. Verb movement in imperatives

Imperative verbs lack tense in their morphological makeup, just as infinitives do. We take this to mean that TP does not project at all in imperatives, as represented in (22).

(22) $[_{CP}\ [_{C}\ ]\ [_{MP}\ [_{M}\ ]\ [_{AspP}\ [_{Asp}\ ]\ [_{VP}\ ...\ [_{V}\ ]\ ...\ ]]]]$

Supporting evidence for this representation comes from the fact that modal verbs (*must, can, might, should* , etc.) cannot occur in imperatives. If modals are merged in T^0 and if imperatives do not project Tense Phrase, then we expect modal verbs to be barred from imperatives. Since the imperative verb surfaces in C^0 in Middle English, adopting the phrase structure in (22) implies that the imperative verb moves to Asp^0 and M^0 and then to C^0. We assume that C^0 in Middle English imperatives contains an imperative force operator which requires category movement of the verb. We further assume that M^0 in Middle English imperatives has an imperative mood feature which also requires category movement of the verb, unlike the mood features in tensed clauses.[4] Under this analysis, imperatives are similar to infinitivals in that the verb moves to Asp^0, but they differ in that the verb moves on further to M^0 and then to C^0.

5.3.2. *Do*-support in negative imperatives

Recall from Figure 1 that *do* forms are almost non-existent in negative imperatives before the end of the 16th century, but gain ground rapidly after 1600, which is much later than when the rise of *do* forms in negative declaratives begins. We propose that the rise of *do* forms in negative imperatives is a reflex of the loss of V-Asp movement, which begins at the end of the 16th century. The absence of T^0 in imperatives means that the loss of M-T movement has no consequences for the development of *do* forms in negative imperatives; and so, during the period in which M-T movement is being lost, the verb in imperatives will continue to move to C^0. But the loss of V-Asp movement does have direct consequences for the development of *do* forms in negative imperatives.[5] As V-Asp movement disappears, the imperative mood feature in M^0 and the imperative force operator in C^0 become weak, replacing category verb movement to M^0 and to C^0 with feature movements. But when Asp^0 and V^0 are separated by low negation, *do*-support is required as a last resort device, since this low negation blocks feature movement from V^0 to M^0. *Do* is inserted in Asp^0, and then it moves up to C^0, deriving *do*-(subject)-*not*-verb order, as represented in (23). At this point, given that low negation does not block feature movement from M^0 to C^0, one may expect just the features in M^0 to move to C^0, leaving behind the lexical material of *do* in M^0. We assume that *do* in imperatives is a spell-out of features in M^0 and so, when all the features in M^0 move to C^0, the lexical

[4] See Han (1998) for motivations for positing both a mood feature and a force operator for imperatives.

[5] Another difference between negative declaratives and negative imperatives has to do with the development of *do* forms with *be* and auxiliary *have*. While negative imperatives require *do*-support with these verbs, negative declaratives prohibit it. See Han (in press) for an explanation.

material of *do* is pied-piped along. Examples of negative imperatives with *do*-support are given in (24).

(23) $[_{CP}\ [_{C}\ do_i\ ]\ [_{MP}\ [_{M}\ t_i\ ]\ [_{AspP}\ [_{Asp}\ t_i\ ]\ [_{NegP}\ [_{Neg}\ not\ ]\ [_{VP}\ ...verb...]]]]]$

(24) a. Do not send me any letters (363 W:212a-33)
b. but I will be your good lord, do you not doubt. (361 O:4-2-39)

The loss of V-Asp movement requires *do*-support in negative imperatives with higher negation as well. When negation intervenes between M^0 and C^0, it blocks feature movement to C^0, and so *do*-support is again required. In the spirit of Baltin (1993), high negation is a clitic that must adjoin onto an adjacent verbal element. Thus, in negative imperatives with *do*-support and high negation, auxiliary *do* and negation move to C^0 as a unit, deriving the '*do*-*not*-(subject)-verb' order as illustrated in (25).

(25) a. Good brother, do not you envy my fortunate achievement. (361 W:3-1-86)
b. Don't read this, you little rogue, with your little eyes; (379 61-20)

5.3.3. *Do*-support in affirmative imperatives

When English lost verb movement for lexical verbs, questions, which require overt verb movement to C^0, resorted to *do*-support. Since imperatives also show overt verb movement to C^0, we expect the development of *do* forms in affirmative imperatives to pattern with questions. However, the relative frequency of *do* forms of affirmative imperatives has never exceeded 1%. In Present-day English, *do* forms are restricted to emphatic affirmative imperatives. We interpret this situation to mean that in imperatives, as V-Asp movement was lost, the imperative force operator in C^0 also lost the requirement that an overt verbal element surface in C^0. That is, as stated in section 5.3.2, the imperative operator in C^0 becomes weak and so only the features in M^0 move to C^0 in affirmative imperatives. This is possible since there is no negation to block feature movement.

5.4. The difference in the rise of *do*-support between questions and negative declaratives

Figure 1 shows that *do*-support was much more frequent in questions than in negative declaratives. This difference in frequency can also be explained by our hypothesis that the loss of M-T movement precedes the loss of V-Asp movement. In questions, the loss of M-T movement leads to *do*-support, and *do* moves to C^0. On the other hand, in negative declaratives, the loss of M-T movement does not entirely correlate with the development of *do*-support because negative declaratives have two possible analyses; that is, a negative declarative can be formed with negation either in the higher NegP (as in (26a)) or the lower NegP position (as in (26b)). During the period in which M-T movement is being lost and before the period in which the loss of V-Asp movement begins, if (26a) is chosen, then *do*-support is required, and if (26b) is chosen, then it is not. This explains why the frequency of *do* forms in negative declaratives is much lower than in questions before 1600. When V-Asp movement is lost after 1600, the analyses in

both (26a) and (26b) require *do*-support and so the frequency of *do* forms in negative declaratives rises rapidly.

(26) a. [$_{TP}$ [$_{T}$] [$_{\mathbf{NegP}}$ [$_{Neg}$] [$_{MP}$ [$_{M}$] [$_{AspP}$ [$_{Asp}$] [$_{VP}$ ...verb...]]]]]
b. [$_{TP}$ [$_{T}$] [$_{MP}$ [$_{M}$] [$_{AspP}$ [$_{Asp}$] [$_{\mathbf{NegP}}$ [$_{Neg}$] [$_{VP}$ ...verb...]]]]]

6. Further considerations

6.1. Development of '*never*–verb' order

In Middle English, weak adverbs such as *never* and *always* occur after the lexical verb, whereas in Present-day English they occur before the lexical verb. The change in the adverb placement is standardly taken to be a reflex of the loss of verb movement.

(27) a. Quene Ester looked never with swich an eye. (Chaucer's *Merchant's Tale*:1744)
b. Queen Esther never looked with such an eye

Ellegård noticed this change in the adverb placement and provides quantitative data on the position of the adverb *never* with respect to the lexical verb. According to his data, the frequency of '*never*-verb' order is close to 95% by 1575. Since at this point the lexical verb still moves up to Asp^0 (Asp-M movement is lost in conjunction with the loss of M-T movement), '*never*-verb' order can be derived by placing *never* in between TP and AspP, presumably adjoining it to MP or AspP. Given that '*never*-verb' order reaches almost 95% when the lexical verb can only move up to Asp^0, the position of *never* is predominantly between TP and AspP. Also, the fact that there is 5% of 'verb-*never*' order at 1575 implies that in 5% of cases, *never* occurs below AspP. After the loss of V-Asp movement goes to completion, 'verb-*never*' order disappears entirely.

6.2. Direct Asp-C movement in questions

We have been assuming that the loss of M-T movement goes to completion at 1575. But then it remains unexplained why questions do not reach 100% *do*-support at this point. Moreover, a related question arises as to why negative questions have more *do*-support than affirmative questions all through the period of change.

In a series of works on syntactic change, Kroch develops a model that accounts for the gradual replacement of one form by another form (Kroch 1989a, 1989b; see also Pintzuk 1991, Santorini 1992, Taylor 1994). According to Kroch, the gradual change in the relative frequencies of two forms is a reflex of the competition between two grammars, rather than a series of grammatical reanalyses. In particular, Kroch argues that the statistical pattern in the development of *do* forms reflects the competition between an old grammar that has V-I movement for lexical verbs and a new one that has lost it. In time, the grammar without V-I movement wins, at the expense of the grammar that has V-I movement. In this section, extending Kroch's grammar competition model, we present a possible scenario of change that explains the statistical patterns in development of *do*-support in questions.

At the beginning of the 15th century, the competition between the old grammar with M-T movement and the new grammar without M-T movement begins. In the new grammar without M-T movement, the verb moves up to Asp^0 since we assume that M-Asp movement is lost in conjunction with the loss of M-T movement. Moreover, the requirement that a verbal element move to C^0 in questions persists in the new grammar. Thus, the learner will come to have evidence that although T^0 cannot be a landing site for lexical verbs, C^0 must have a verbal element in questions. We postulate that two new grammatical options develop: (i) *do*-support, where *do* is inserted, presumably in M^0, moving through T^0 to C^0 and (ii) direct Asp-C category movement in conjunction with feature movement to C^0.

Although positing a verb movement that skips over intermediate heads may seem strange, it has been argued by Platzack and Holmberg (1990) that such verb movement must be a possible option in Universal Grammar. They give evidence that among the Germanic languages that have verb-object order, direct V-C movement is possible in exactly those that do not have V-I raising. They correlate the absence of V-I raising to the lack of agreement morphology and argue that when agreement is absent, INFL neither provides a landing site for the verb nor blocks movement to C^0. In particular, they conclude that direct V-C movement must be taking place in main clauses in modern mainland Scandinavian, given that embedded clauses show no verb movement but in main clauses the verb must move to C^0 (Verb-second). Under Platzack and Holmberg's analysis, in early Modern English (which has verb-object order), as M-T movement was lost, direct Asp-C movement in questions should have been a possible analysis due to the weakness of English agreement inflection.

In this scenario, competition between three grammars will take place in English questions throughout the change: (i) a grammar with M-T movement, (ii) a grammar without M-T movement and with *do*-support and (iii) a grammar without M-T movement and with direct Asp-C movement. Around 1575, the two grammars without M-T movement win at the expense of the grammar with M-T movement, and sometime after the 16th century, the grammar with *do*-support wins at the expense of the grammar with direct Asp-C movement in questions.

We are now in a position to give an account of the patterns in the development of *do*-support in questions. Even though the loss of M-T movement has gone to completion at 1575, affirmative questions do not reach 100% *do*-support, because the grammar with direct Asp-C movement is active at this period. That is, affirmative questions without *do*-support are not reflexes of M-T movement but of direct Asp-C movement. More specifically, the affirmative questions without *do*-support at this period have direct Asp-C verb movement satisfying the requirement that in questions C^0 contain a verbal element, in conjunction with feature movement to satisfy the requirement that inflectional features be checked by a verb (along the lines of Chomsky 1995).

Our scenario can also explain the fact that *do*-support in negative questions is always higher than in affirmative questions, but still does not reach 100% until after 1575. The direct Asp-C movement option is not available in negative questions formed with higher negation, since feature movement would be blocked by the higher negation.

Because only negative questions with lower negation can exhibit direct Asp-C movement, negative questions show a relatively high frequency of *do*-support, reaching 90% by 1575.

Clearly, Modern English questions do not allow direct movement of tensed lexical verbs to C^0, so the direct movement option has been lost. A possible explanation as to why the *do*-support option wins at the expense of the direct verb movement option is that all negative questions, once V-Asp movement is lost, will require *do*-support. Perhaps there was a tendency toward using a unified question formation mechanism which led to *do*-support winning out.

7. Conclusion

We have argued that the syntax of Middle English infinitivals can be explained if we allow two possible positions for negation and an intermediate functional projection, which we assume to be an aspect phrase (AspP), between the mood phrase (MP) and the verb phrase (VP). Furthermore, we have been able to account for the patterns of *do*-support in various sentence types based on this articulated clause structure. In particular, we have shown how the development of *do*-support in negative imperatives can be treated as a reflex of the loss of V-Asp movement. That is, as V-Asp movement is lost, only the features on the imperative verb move to C^0. In negative imperatives, *do*-support is required as a last resort device because negation blocks pure feature movement. We have also shown how the differences and similarities attested in the statistical patterns of the development of *do* forms among imperatives, questions, and declaratives can be explained if the loss of M-T movement precedes the loss of V-Asp movement in the history of English.

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