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Indirect Grammatical Pressure Driving Language Change

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1. Introduction

While many aspects of language change are relatively unexplainable—for example, why some words from a given era disappeared while others became more widely used—other instances of language change can provide insight about the abstract structure of language as well as the language acquisition device (see Lightfoot 1979, 1991). In addition, even though many instances of change can be seen to be the direct consequence of specific sociolinguistic influences (e.g. invasion and political domination by speakers of a non-indigenous language), there are other instances of change for which no such obvious external cause is determinable. It is the latter type of change which I focus on here.

The particular details I will address concern the loss of V-raising in English. The specific aim of the paper is to present new evidence from the Penn-Helsinki Parsed Corpus of Middle English which supports Arnold's (1995, 1997) proposal that the loss of V-raising is related to the (innovation and) spread of preposition stranding, exceptional case marking (ECM), and the possibility of deleting the sentential complementizer *that*.

The broader aim of the paper is to suggest, by way of illustration, that diachronic studies must begin to explore models of change which are far more subtle than those commonly invoked. In other words, the problem of explaining the loss of V-raising provides an excellent example of explanations which are too simplistic in the analysis of cause/effect relationships in language change.

The paper proceeds as follows. Section 2 opens with two preliminary examples of the direct type of cause/effect explanation and then turns to the overly simplistic analyses of the loss of V-raising. Section 3 provides a brief overview of Arnold's proposal, and the new evidence supporting the analysis is presented in section 4.

2. Direct causes for language change

2.1 Examples from A-movement

While any explanation for language change will—at some point in the view back through time—face the impossible task of explaining the background changes which led up to the change under study, there is nonetheless ample opportunity to gain enlightenment from changes which occurred once a given set of details was in place. That is to say, even though we might not know why certain details developed at time T, that does not detract from the insights we might uncover by investigating how the details changed from T to T+1.

In more concrete terms, the history of English provides an excellent opportunity to study the consequences of the collapse of rich morphological paradigms: Old English (OE) had full declensions for both nominal and verbal inflections, and these morphological paradigms began collapsing by early Middle English. Roughly speaking, the nominal system was essentially flattened by the 13th century, and the verbal paradigm was all but lost by the 16th. In terms of explaining these changes in the morphological systems, we have essentially nothing but speculation to offer for why the OE morphological system collapsed; nevertheless, given the collapse, we can take advantage of the history of English to study how other aspects of grammars change when the morphological system simplifies.

A clear ramification of the loss of morphology is that children will lose a direct trigger for various details of the grammar they are acquiring. In other words, whatever else morphology does for a grammatical system, it certainly provides children with overt triggering experiences for the acquisition process. To the extent that morphology provides an overt, phonetically realized presentation of the implementation of various abstract mechanisms of grammar, morphology provides children with a direct cue for those abstract mechanisms. However, if the morphological paradigm collapses, then the acquisition device has no direct trigger for those mechanisms and is left to some other means to determine the presence and/or influence of those mechanisms in the grammar being acquired.

A clear case of such a scenario can be found in the innovation of indirect object passives (see Lightfoot 1981): as long as English had a morphological distinction between Accusative and Dative case, moving the indirect object to subject position (in a passive construction) would violate the Case filter (Chomsky 1981). Given the fact that the morphological paradigm presented children with clear evidence for the Accusative/Dative distinction, the acquisition device would direct evidence to hypothesize an inherent abstract case for indirect objects, and indirect object passives would be impossible; however, once the morphological paradigm was lost, the acquisition device had no necessary reason to posit a distinction between the abstract cases for internal objects, and thus indirect objects could move to subject position without violating the Case filter.

The important point in the above example is the directness of the cause for the change: when the morphological paradigm collapsed, the acquisition device no longer had evidence to assume a distinction in the abstract case system, and thus the possibility for the innovation of indirect passives emerged (though the situation is a bit more complicated as noted in section 3). A similar example concerns P-stranding from A-movement (see van Kemenade 1987): as long as objects of prepositions were morphologically distinct from objects of verbs, the acquisition device had cause to posit an abstract distinction between verbal and prepositional objects, and thus moving the object of a preposition to subject position would violate the Case filter. However, once the morphological paradigm no longer provided a direct trigger for a distinction in the abstract case system, the acquisition device was free to analyze the case of prepositional objects on par with verbal objects, and thus P-stranding in passive constructions (so-called pseudo-passives) became possible.

In both of these cases, the syntactic change is taken to be the direct consequence of the loss of the morphological trigger for a particular detail of the abstract mechanisms of grammar. This type of direct analysis has also been used to explain the loss of V-raising in English, a point to which we now turn.

2.2 Direct cause(s) for the loss of V-raising

Given that English's verbal inflectional paradigm had a history similar to the nominal paradigm, Roberts (1993) and Rohrbacher (1994) provide essentially the same type of explanation for the loss of V-raising as Lightfoot and van Kemenade provided for the novel passive forms. Though the details of the morphology-based analyses differ, both face significant empirical and theoretical problems, discussed below. Likewise, Watanabe's (1993) proposal, though not stated in terms of the collapse of the morphological paradigm, is similar to the morphology approaches in that it assumes that the loss of V-raising is directly linked to the internal structure of the acquisition device. Like the morphology-based approaches, Watanabe's analysis faces serious empirical and theoretical problems.

As for the morphology-based approaches, the assumption in both studies is that a V head is raised to the Infl head in languages with rich verbal morphology; the corollary assumption is that such rich verbal paradigms will be a direct trigger for the acquisition device to hypothesize V-raising. The crucial assumption for these proposals is that the trigger for the acquisition of V-raising is the richness of the morphological paradigm—not syntactic word order effects such as subject/verb inversion.

Given the assumption about the central role of the verbal morphology for the acquisition of V-raising, both authors engaged in cross-linguistic studies of verbal inflectional paradigms in languages with and without V-raising. Of passing interest is the fact that these inductive studies led to different conclusions about what constitutes 'enough' morphology to trigger V-raising, but of much more importance is the way each author deals with a rather glaring historical fact: written evidence of V-raising continues to appear in texts for well over 100 years beyond the disappearance of the morphological trigger for V-raising (see Warner 1997).

In recognizing the chronology problem, Roberts proposes that children continued to hypothesize an abstract morphological marker which would have driven V-raising in the emerging grammar. Notice, however, that this view leaves us with a non-trivial question: if children in the Early Modern period hypothesized the abstract morphology necessary for V-raising, why couldn't subsequent generations of children continue to propose it? Presumably the trigger for the abstract morphology disappeared, but this is simply restating the problem.

Rohrbacher approaches the chronological disparity with the opposite impulse; he concludes that as soon as the morphological trigger for V-raising had disappeared, V-raising was no longer a productive mechanism for English speakers. Any evidence for the continued use of V-raising was purely archaic in nature, i.e. V-raising was used by writers out of familiarity with the older forms of the language, but given that the morphological trigger for V-raising was gone, so too was V-raising.

With this analysis, Rohrbacher proposes to account for the increased use of periphrastic *do*: given the loss of V-raising, speakers' grammars were forced to adopt the periphrastic form to encode Tense. However, it turns out that patterns during the early use of *do* actually point to a problem in the analysis; during the relevant period, *do* was used more frequently in formal texts, and V-raising was used more frequently in informal texts (see Ellegard 1953). This pattern contradicts what we would expect to find given Rohrbacher's scenario, i.e. if V-raising were no longer a productive mechanism in a writer's grammar, then we would expect *do* to be used more frequently in personal texts and V-raising to be used more in formal texts.

The empirical problems (for both morphology-based accounts) are underscored by a theoretical issue, namely motivating the assumption that the acquisition of syntactic mechanisms is triggered directly—and solely—by the richness of morphological paradigms. While it is true that there is some cross-linguistic evidence to suggest a correlation between richness of morphology and word order facts, i.e. languages with rich nominal inflections apparently allow 'freer' word order, there are also counter-examples, e.g. rampant scrambling in (essentially) morphology-less Chinese. Without a principled account of why/how syntactic mechanisms are triggered by rich morphological paradigms, the morphology-based approaches simply restate the problem.

A different sort of analysis, proposed by Watanabe, faces no less significant empirical or theoretical problems. Watanabe, adopting Chomsky's (1995)

Minimalist Program, assumes that the presence of periphrastic *do* in the linguistic input caused the loss of V-raising because *do* allowed V-raising to Procrastinate and thus provided more economical derivations. There are two empirical problems for this view. The first comes from observations made by van Kampen (1997) regarding the acquisition of Dutch: children acquiring Dutch over-generalize their early use of *doen* only to abandon it and converge on the adult forms with V-raising. While Watanabe's proposal might account for the early over-generalization of *doen*, the following question arises: if Dutch children can acquire V-raising, thereby (apparently) overriding the economy afforded by *doen*, why couldn't children acquiring English during the early Modern period do the same thing?

The other empirical problem is much broader and comes from the cross-linguistic observation that synthetic forms, when available in a language, generally block the use of a periphrastic form (see Poser 1992). This generalization is exactly the opposite of what we would expect if Watanabe's approach to language change were correct; given Watanabe's proposal concerning *do*, we would expect the general pattern to be that the economy provided by periphrasis (*vis a vis* overt movement) would typically block the use of the synthetic form because the synthetic form—being an instance of overt head movement—would be less economical than the periphrastic form. Thus, Watanabe's analysis of *do* flies in the face of the cross-linguistic pattern concerning periphrasis versus synthesis.

The theoretical problem is that Watanabe must allow the economy of derivations with *do* to be compared to derivations with V-raising, a comparison not allowed in the strict lexicalist system proposed by Chomsky. While it is true that the strict lexicalist hypothesis could be modified (as Arnold 1996 proposes), Watanabe doesn't address the issue, and thus the analysis encounters the following question: if the nature of the system is such that the relative economy of *do* cannot be compared to the relative economy of V-raising, and if children are receiving more input with V-raising than input with *do*, then why/how would children ever stop acquiring V-raising? Answering that question by saying that the linguistic input changed such that *do* was used more frequently than V-raising simply restates the problem.

With all that said, the important point is that the nature of the (attempted) explanation is very direct: 1.) the acquisition device is built to prefer economical derivations, 2.) *do* provided more economical derivations, 3.) V-raising was lost. This particular type of direct explanation, like the morphology-based approaches, encounters its own set of empirical and theoretical problems, but there is another set of problems—a sort of empirically based theoretical problem—which all three analyses face, namely that there is a wide range of historical facts related to the spread of *do* and the loss of V-raising which the above proposals are categorically unable to address. From a consideration of the full range of facts, discussed below, the need to entertain the possibility of a more indirect cause for the loss of V-raising becomes clear.

3. Towards a less direct cause of change

As a matter of illustrating the interconnectedness of the historical facts which motivate a unified analysis of various changes which took place during Middle English, the following list presents the chronological details addressed in Arnold's account of the loss of V-raising:

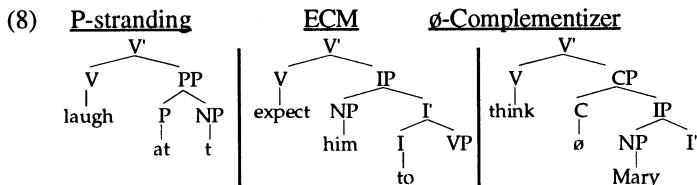
- (1) transitive verbs which had selected Dative complements in Old English (e.g. *help*) start showing novel passive forms (e.g. *The men were helped*)

in the 13th century; however, indirect objects (also marked Dative in Old English) did not appear as the subject of passive for 100-150 years after the appearance of the novel direct object passives (see Denison 1993);

- (2) the eventual innovation of indirect object passives (IOPs) ((1) above) aligned with the statistically significant use of periphrastic *do* : both first appeared with clear regularity at the end of the 14th century, and both remained relatively rare until the end of the 15th century (see Ellegard 1953 on *do*, and Denison 1993 on IOPs);
- (3) the disappearance of quasi-double object constructions (e.g. *Mary gave to John a book*) occurs in the same century in which verb movement had clearly given way to the widespread use of *do*, namely the latter half of the 16th century (see Visser 1963-1973 on double object constructions and Ellegard 1953 on *do*);
- (4) the innovation of complex prepositional passives (e.g. *John was taken advantage of*) paralleled the delayed innovation of IOPs (see Denison 1993);
- (5) deletion of *that* in that-trace contexts hits 100% in the 16th century (see Bergh and Seppanen 1992);
- (6) deletion of *that* in ECM and control structures (e.g. *Mary convinced him that to go*, *Mary expected that him to go*) approaches the modern standard in the 16th century (see Visser 1963-1973);
- (7) from 1400-1700, the relative frequency of periphrastic *do* was higher with transitive verbs than with intransitives; with respect to different sentence types, the relative frequency of *do* was highest with negative questions, then affirmative questions, then negative declaratives and was lowest in affirmative declaratives (see Ellegard 1953).

Arnold proposes an incorporation analysis of P-stranding, ECM, and *that*-deletion which allows the various diachronic developments outlined in (1-7) to be seen as the various consequences of a single underlying development rather than accidental similarities. Moreover, and crucially, neither the morphology-based approaches nor the economy approach to the loss of verb movement are capable of providing any insight about the chronological similarities outlined in (1-7).

The basic idea is that the spread of the novel incorporation constructions led to an increased use of *do*: *do* allowed the V head to remain in VP, thus allowing for a shorter movement when incorporating the relevant head into the verb.



For the various constructions in (8), movement of the verb out of VP would require LF incorporation of either P, infinitival-*to*, or the null complementizer to cross the VP projection. However, as illustrated in (9)—using a hypothetical P-stranding structure—use of *do* in (9b) allows incorporation to occur within the VP:

(9) a. neg. O with V-to-I-to-C:

-P must cross three X^{\max} for incorporation into V

[CP [V_i+I]_j [IP t_j [NegP [VP t_i [PP P [NP (e)]]]]]]]

b. neg. O with *do*:

-P crosses no X^{\max} for incorporation into V

[CP do_j [IP t_j [NegP [VP V [PP P [NP (e)]]]]]]]

Given that the derivation with *do* requires shorter movement in order to converge, it blocks the derivation with verb movement. Under this analysis, we can understand why *do* spread through the language—and we have an explanation for the patterns found by Ellegard, in the following way. First, since a transitive verb is more likely than an intransitive to have a complement containing an element which will incorporate into it, *do* was used more frequently with transitives than with intransitives. Second, the distinctions in the relative frequency of *do* in different sentence types follow from the overall degree of complexity in the different structures; (10a-d) represent structures with overt verb movement and a stranded P which must incorporate into the raised V head:

(10) a. Neg. Q:

-two instances of form chain, incorporation crosses three X^{\max}

[CP [V_i+I]_j [IP t_j [NegP [VP t_i [PP P [NP]]]]]]]

b. Aff. Q:

-two instances of form chain, incorporation crosses two X^{\max}

[CP [V_i+I]_j [IP t_j [VP t_i [PP P [NP]]]]]

c. Neg. Decl.:

-one instance of form chain, incorporation crosses two X^{\max}

[IP V_i [NegP [VP t_i [PP P [NP]]]]]

d. Aff. Decl.:

-one instance of form chain, incorporation crosses three X^{\max}

[IP V_i [VP t_i [PP P [NP]]]]

In sum, the incorporation analysis provides an explanation for the spread of *do* during late Middle English and thereby provides an explanation for the decrease in the frequency of syntactic triggers for V-raising, i.e. the increased use of *do* meant fewer instances of subject/verb inversion or instances of a tensed verb preceding negation. Thus, the syntactic trigger for V-raising disappeared as a consequence of the spread of unrelated constructions, e.g. P-stranding, ECM, and *that*-deletion. Under this view, the 'direct' cause for the loss of V-raising was simply the loss of the syntactic trigger, but rather than simply restating the problem, the incorporation analysis allows us to understand that the loss of the syntactic trigger was itself a consequence of the spread of the novel incorporation mechanism. Thus, the

'indirect' cause for the loss of V-raising was the spread of P-stranding, ECM, and *that*-deletion.

4. Extending the analysis and finding new evidence

The proposal outlined above was originally developed to address the spread of *do*; however, as the majority of the texts in the Penn-Helsinki Corpus predates the widespread use of *do*, the specific details of the proposal must be slightly modified in order to test the theory.

To that end, recall that the operative force in the analysis is the economy provided by *do* in constructions with P-stranding, ECM, or *that*-deletion: *do* allowed the verb to remain in VP and thus allowed for shorter LF incorporation of the relevant functional head. If the proposal is right, we expect the following situation to emerge: in those cases where a writer could select between two grammatical forms, e.g. P-stranding versus pied-piping, the presence of a V head in VP would have increased the likelihood of the use of P-stranding; likewise, in clauses with clear evidence that the verb had raised out of VP, P-stranding would have been disfavored.

Of course, the problem is that in many clauses with a simple tensed verb, there is no definitive way to establish whether the particular sentence corresponded to an instance of V-raising or affix-hopping. In other words, *Mary likes John* could correspond to either its (parsed/analyzed) Middle English form, as in (11a), or its modern form, as in (11b):

- (11) a. [Mary [likes_i [t_i [John]]]]
b. [Mary [(pres) [likes [John]]]]

The necessary approach, therefore, is to focus the research on clauses which provide clear evidence of the location of the V head. For the purposes of automatic searches in the corpus, there are two syntactic details which I take to provide clear evidence of either V-raising or V *in situ*: 1.) following Pollock (1989), the location of the Neg head relative to a finite V, or 2.) the presence of a non-finite V. (The second possibility, i.e. non-finite V, occurs either when tense is carried on a modal/auxiliary or the clause is infinitival.)

4.1 Some details about the Corpus

The Penn-Helsinki Parsed Corpus of Middle English is a collection of ASCII files which contain annotated sentences from a variety of Middle English texts. Each sentence from a given manuscript constitutes a separate token, and the annotation scheme provides low-level syntactic parsing as well as part of speech tags and locations of traces/elisions, e.g. s = subject, vt = tensed verb, a = auxiliary, p = preposition, %- = trace/empty. (12) provides a sample token:

- (12) ([f Al men 1[L [c-1 +tat] %s-1 r % [at wyll] [v her] [p of +te sege of Jerusalem], L]1] [I her] %[s +ge]% [at may] [v her] [p of gret meraculs 2[L [c-2 +tat] %d-2 r % [s almytty God] [vt wro+gt] 2.1[UP [a to] [v schow] [d his goodnys UP]2.1 L]2 and of gret vengans 3[L [c-3 +tat] %d-3 r % [s he] [vt toke] [p for syn] . L]3])(SIEGE,70.1)

Also, Anthony Kroch and Ann Taylor, the authors of the parsed corpus, provide a program which divides all of the sentences in a file into all of the separate

clauses which make up the sentences. (13) illustrates the result when the token in (12) is divided into separate clauses; the research reported here was conducted on files in which each clause is a separate token, as in (13).

(13) ([f Al men %L%] [l her] %s +ge]% [at may] [v her] [p of gret meraculs %L% and of gret vengans %L%])(SIEGE,70.1)

(1[L [c-1 +tat] %s-1 r % [at wyll] [v her] [p of +te sege of Jerusalem] , L]1)(SIEGE,70.1)

(2[L [c-2 +tat] %d-2 r % [s almytty God] [vt wro+gt] %UP% L]2)(SIEGE,70.1)

(3[L [c-3 +tat] %d-3 r % [s he] [vt toke] [p for syn] . L]3)(SIEGE,70.1)

(2.1[UP [a to] [v schow] [d his goodnys] UP]2.1)(SIEGE,70.1)

Additionally, the files in the corpus are divided chronologically into four periods: M1 (being the earliest) through M4. This distinction is particularly helpful for testing the predictions of the incorporation analysis for the following reason. Given the proposal that the novel incorporation constructions (P-stranding, ECM, and *that*-deletion) spread during Middle English, it is insightful to compare the patterns found in the earliest texts to those in the latest. Throughout the discussion, I will make clear which subsets of files were searched for given patterns.

A final note concerns the particular searches which were conducted. First, in order to research the correlation of *that*-deletion with verb movement, the most certain diagnostic was the position of the tensed verb relative to Neg; as noted above, when the tensed verb precedes Neg, I assume that the sentence exhibits V-raising. Second, for P-stranding, the diagnostic used was the presence of a non-finite V; I assume that a non-finite V occurs in the VP and therefore provides a very local incorporation site for the stranded P. Finally, due to the coding conventions in the corpus, there is no automatic way to distinguish ECM from control structures; thus, testing the predictions *vis a vis* ECM is left for future work.

4.2 *That*-deletion

Before turning to the specific correlation between *that*-deletion and verb movement (as indicated by Neg), it is worth considering the basic pattern of *that*-deletion in the earliest texts compared to the latest. Of the eleven files in the earliest period, only six have an example of deleted *that*, and the overall relative frequency of *that*-deletion is 12% (17/138). By contrast, all 14 files with M4 designation contain at least one example of deleted *that*, and the overall frequency is 39% (247/641). These general numbers provide clear evidence that the option of deleting the sentential complementizer *that* spread during Middle English.

Turning now to the more specific prediction, the search required 'rebuilding' of clauses such that the status of the complementizer (overt versus null) could be correlated with the position of the governing verb. In other words, given that the relevant detail for *that*-deletion is the position of the verb which governs the complementizer, and given that the sentences in each file had been divided into separate clauses, it was necessary to concatenate a *that*-clause with the clause it was originally embedded in. Once the clauses were appropriately rebuilt, the search

could then determine the correlation between certain verb movement—as indicated by a tensed verb preceding Neg—and deleted *that*.

The findings are quite striking: of the 27 tokens in which Neg intervenes between the tensed verb and the complementizer position, there are only three cases of *that*-deletion—and all three are examples of the same construction using a form of *would* such as *I would not her falseness be known*. Even if we make nothing of the fact that all three tokens are examples of the same construction, the rate of *that*-deletion when Neg intervenes between the verb and the complementizer is only 10% (3/27), well below the average of 30% (366/1228) for the periods (M3 and M4) in which the tokens are found.

However, further investigation of the *would* construction suggests that such examples of *that*-deletion are themselves special cases requiring further study, for the following reason. A search for all relevant *would* constructions reveals that *that*-deletion in such constructions is 58% (18/31), far above the 30% average for the M3 and M4 periods. Based on the higher than average rate of *that*-deletion in *would* constructions, I set them aside for further study. Having set aside the tokens with *would*, the final result offers strong support for the theory being tested: there are no instances of *that*-deletion when Neg intervenes between the governing verb and the complementizer position. This fact follows directly from an analysis in which the possibility of deleting *that* is restricted in those cases when the verb has raised out of VP.

4.3 P-stranding

For P-stranding, the automatic searches become a bit more complex for two related reasons. First, P-stranding was quite productive in relative clauses in Old English; thus the early texts—when searched without regard to clause type—actually have a higher rate of P-stranding than of pied-piping, contrary to what we might expect given the standard view that the productivity of P-stranding was a Middle English innovation. Second, given the high rate of P-stranding in the earliest texts, a superficial glance at the corpus suggests that P-stranding was actually disappearing during Middle English, contrary to the standard view.

However, by separating relative clauses from non-relatives, it becomes clear that P-stranding in non-relative clauses increases during Middle English, in line with the standard view. The conclusion to be drawn from the preliminary work is that the searches should be targeted to non-relative clauses, for it is in the non-relatives that we can see the patterns heading towards the modern norms. With that in mind, we turn to the results of searching for P-stranding in non-relative clauses.

Recall the prediction: the presence of a V head in VP will increase the likelihood that P-stranding will occur. In other words, if the proposal for the incorporation analysis of P-stranding is right, then there should be a higher than average rate of non-finite verbs in those clauses which contain stranded-Ps. As Table 1 shows, the prediction obtains: the frequency of non-finite verbs in non-relative clauses is nearly three times higher than normal when the (non-relative) clause also contains a stranded-P.

	<u>all non-relative clauses non-relatives with stranded-P</u>	
M1	24.59	65.00
M4	29.44	83.33

Table 1: Percentage non-finite V in non-relatives, with and without stranded-P

This same pattern obtains when the entire corpus is searched:

Corpus	<u>all non-relative clauses</u>	<u>non-relatives with stranded-P</u>
	27.56	71.01

Table 2: Percentage non-finite V in non-relatives, with and without stranded-P

Tables 1 and 2 illustrate the accuracy of the prediction when clause type is controlled for, i.e. setting aside relative clauses allows the pattern to stand out. Another similar research control arises if we consider that P-stranding due to A-movement was not at all possible in Old English, and thus another way to test the incorporation analysis would be to target so-called pseudo-passives, i.e. passive constructions in which A-movement creates a stranded-P.

Again, we expect that non-finite verbs should occur with a higher than normal rate in clauses with pseudo-passives. As before, the results are very compelling: the relevant verb is non-finite in all 35 tokens in which an overt subject is co-indexed with the trace of a stranded-P. Additionally, when the search is broadened to allow for empty subjects, i.e. A'-movement of the subject of a passive, only three of the additional nine tokens contain finite verbs. Thus, even without attempting to explain away the apparent counter-examples, the frequency of non-finites in pseudo-passives is 93%, well above the normal frequency for non-finites of 27.56%.

5. Conclusion

To close, there are two issues which are important to keep in mind. First, the findings are very robust: with respect to *that*-deletion, recall that there were no instances of deleted *that* when Neg intervened between the finite verb and the complementizer position; with respect to P-stranding, the frequency of non-finite verbs was three times the normal rate when the clause contained a stranded-P, and for the most clear-cut examples of pseudo-passive, every example of P-stranding co-occurred with a non-finite verb. The robustness of the findings strongly supports the incorporation analysis.

Second, these robust findings were found precisely because the incorporation analysis predicts a correlation between these novel Middle English constructions and the potential for verb movement. By contrast, in addition to the fact that the morphology-based accounts of the loss of verb movement are unable to address the original diachronic details outlined in (1-7) above, these new findings concerning the correlation of verb movement with other constructions are completely mysterious under the morphological analyses. Likewise, building an economy bias into the acquisition device in order to explain the spread of *do* allows for no explanation of the patterns presented here.

On a broader level, the findings provide evidence for a type of indirect cause/effect relationship we should be aware of when investigating the process of language change, for while it is true that there is a certain attractive certainty to the type of explanations which emerge from positing direct links between e.g. the acquisition of morphology and the acquisition of syntax, there is little reason to imagine that either the human language faculty or the acquisition device should be limited to such directly correlated systems. In other words, though the direct answers might appeal to our theoretical aesthetic, the data suggest a far more subtle analysis.

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