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When is not not not?

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Abstract Negated complements of negative implicatives in Vietnamese have a reading in which they are logically equivalent to their non-negated counterpart. We propose an analysis which predicts the distribution of such "pleonastic" occurrences of negation and show that it can account for the distribution of another case of pleonasm in Vietnamese: pleonastic modals. The analysis assumes the possibility of multidominance and contains a proposal on the linearization of syntactic structure.

Keywords Pleonastic negation · Multidominance · Linearization · Vietnamese

1 Introduction

1.1 Pleonastic negation under n-implicatives

Let us start with the term "negative implicatives," which we will shorten to "n-implicatives." Following Karttunen (1971), we use this term descriptively to refer to verbs which take a tenseless sentence as complement and license the inference that the negation of their complement is true. An example is **forget**:[1] (1a) implies that John did not read books and (1b), that he did.[2]

[1] We put words of the object language in **boldface**, adopting the practice in Heim and Kratzer (1998).

[2] Other n-implicatives mentioned in Karttunen (1971) include **decline**, **avoid**, **fail** and **neglect**.

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(1) a. **John forgot to read books**
b. **John forgot not to read books**

In Vietnamese, the negated complement of an n-implicative is ambiguous between a "compositional" reading in which it means what we expect it to mean, and a "pleonastic" reading in which the negation is semantically transparent, i.e. pleonastic.[3] Thus, (2) can mean John forgot not to read books, the compositional reading, or John forgot to read books, the pleonastic reading.[4] In other words, (2) has a reading in which it is semantically equivalent to (3).

(2) **John quên không đọc sách**
John forgot not read books
'John forgot (not) to read books'

(3) **John quên đọc sách**
John forgot read books
'John forgot to read books'

The main goal of this paper is to account for this fact. There are, naturally, questions about n-implicatives which we will not address. Among them are (i) how the lexical meaning of these verbs derives the inference that the negation of their complement is true, and (ii) why their complement is tenseless. We refer the reader to Karttunen (1971) and Abrusán (2011) for interesting answers to the first and the second question, respectively. Another observation about such sentences as (2) is that the pleonastic reading seems to be preferred over the compositional one. We know of no work which relates to this observation, and will leave it to future research.

1.2 Structure of the paper

Section 2 discusses three accounts of pleonastic negation and argues against each of them. Section 3 discusses how syntactic structures are generated, represented and linearized, setting up the theoretical background for the analysis of pleonastic negation which is presented in Sect. 4. Section 5 extends the analysis to constructions containing

[3] In what follows we will use the terms "compositional" and "pleonastic" with systematic ambiguity to describe either the readings of the negated sentence, or the readings of its main operator, the negation itself.

[4] Vietnamese has no inflectional morphology and neither the past nor the present tense is overtly realized as a word. We will assume a null T head in past or present tense sentences. Other verbs which instantiate the same pattern as **quên** 'forget' are **từ chối** 'refuse' and **tránh** 'avoid.' Thus, both (i) and (ii) show the same ambiguity as (2).

(i) **John từ chối không đọc sách**
John refused not read books
'John refused (not) to read books'

(ii) **John tránh không đọc sách**
John avoid not read books
'John avoided (not) reading books'

There seems to be no real lexical equivalent of **fail** or **neglect** in Vietnamese.

semantically transparent modals, arguing that these can be analyzed in the same manner as those containing pleonastic negation. The final section addresses some residual issues.

2 Arguments against three accounts of pleonastic negation

2.1 The "lexical analysis"

We will call the first analysis to be argued against the *lexical analysis*. This analysis is apparently the simplest way to make sense of pleonastic negation.[5] It says that the lexicon of Vietnamese contains well a pleonastic negation, just as the lexicon of English contains a pleonastic pronoun. And just as there is a referential pronoun in English which is homophonous to the pleonastic one, there is a "compositional" negation in Vietnamese which is homophonous to the pleonastic one. The ambiguity of (3) would then be of the same nature as that of the English sentence **it is hot**.[6] The problem, however, is that the *lexical analysis* massively overgenerates. Thus, we predict (4) to be ambiguous in the same way as (2), and it is not.

(4) **John không đọc sách**
John not read books
'John does *(not) read books'

We are confronted, then, with the question as to why removing **forget** from **John forget not read books** should make it impossible for **not** to be read as pleonastic.[7] Also, switching positions of **forget** and **not** or replacing **forget** with **định** 'intend' will yield the same result: **John not forget read books** can only mean John did not forget to read books, and **John intend not read books** can only mean John intended not to read books. In short, pleonastic negation is possible only in complements of n-implicatives. We believe the *lexical analysis* makes this distributional restriction too hard to explain, and suggest that it be abandoned.

2.2 The "featural analysis"

We now turn to another analysis, which we will call the *featural analysis*. This analysis says that the negation, **not**, may enter the derivation either with the interpretable feature [iNEG] and be visible to the rules of the semantic component, or with the uninterpretable

[5] Schwarz and Bhatt (2006) provide an analysis of expletive instances of German **nicht** which is in the same spirit. See Krifka (2010) for an alternative analysis of this phenomenon.

[6] The referential reading of **it is hot** can be questioned with **what is hot?**, while the pleonastic reading cannot. The fact that most occurrences of **it** are non-ambiguous is irrelevant, as it follows from the Θ-Criterion (cf. Chomsky 1981) which does not apply to the sentential negation.

[7] To facilitate comprehension, we use English words to represent their Vietnamese counterparts in the text, except when a Vietnamese word is introduced for the first time, as is the case with **định** 'intend' in the next sentence.

feature [uNEG] and be invisible to these.[8] The task of restricting pleonastic negation to complements of n-implicatives now translates to the task of restricting [uNEG] to this environment, and it looks quite feasible: we say that (A) unless [uNEG] is "checked" by a locally c-commanding [iNEG],[9] it will cause the derivation to crash,[10] and that (B) n-implicatives enter the derivation with [iNEG]. The conjunction of (A) and (B) entails that [uNEG] can only occur under n-implicatives, just as observed.

The structures underlying the compositional and the pleonastic reading of **John forget not read books** are presented in (5a) and (5b), respectively.[11]

(5) a. **John forget**$_{[iNEG]}$ **not**$_{[iNEG]}$ **read books**
b. **John forget**$_{[iNEG]}$ **not**$_{[uNEG]}$ **read books**

The results of removing **forget**, or switching positions of **forget** and **not**, or replacing **forget** with **intend**, would induce the non-attested pleonastic reading only if they are analyzed as (6a), (6b) and (6c), respectively. These structures all contain an instance of [uNEG] which is not c-commanded by any instance of [iNEG] and are thus ruled out. A good result.

(6) a. ***John not**$_{[uNEG]}$ **read books**
b. ***John not**$_{[uNEG]}$ **forget**$_{[iNEG]}$ **read books**
c. ***John intend not**$_{[uNEG]}$ **read books**

We can see that by relocating the ambiguity of **not** from the lexical to the featural level, the *featural analysis* is able to make use of the mechanism of feature checking which

[8] Similar ideas have informed analyses of "negative concord" (cf. Zeijlstra, 2008; Biberauer and Zeijlstra, 2012, and references therein).

[9] The word "locally" serves as recognition of the fact, not discussed in the text, that there are restrictions on the distance between an n-implicative and its associated pleonastic negation. For example, the negation in (i) does not have the pleonastic reading.

(i) **John quên muốn không đọc sách**
John forget want not read books
'John forgot to want *(not) to read books'

Since these restrictions turn out to follow from the analysis we are going to propose below and the *featural analysis* is to be abandoned anyway, we will not try to work out the precise meaning of "locally" here.

[10] We remain uncommitted as to whether the crash will happen at PF or LF, since nothing in our discussion hinges on this. Also immaterial is the fact that we talk in terms of "checking" and not "agreement". As far as we can see, there is enough flexibility in the understanding of both notions to make the difference purely terminological, at least for the issue at hand.

[11] The paradigm in (5) reminds one of the analysis of "fake pronouns" proposed in Kratzer (2009). Kratzer accounts for the ambiguity of sentences such as **only I did my homework** by assuming the two parses in (ia) and (ib).

(i) a. only I$_{[i\varphi]}$ did my$_{[i\varphi]}$ homework
b. only I$_{[i\varphi]}$ did my$_{[u\varphi]}$ homework

The idea is that an item may bear [uF] or [iF] in the local environment of an [iF], with the choice between [uF] and [iF] having consequences for semantic interpretation. (ia), with interpretable φ-features on **my**, means no one but me did my homework, while (ib), with uninterpretable φ-features on **my**, means no one but me did his or her homework (cf. also Heim 1994; Kratzer 1998; Stechow 2003)

enables it to constrain the distribution of pleonastic negation in a way not available to the *lexical analysis*. It remains to be seen how much of the improvement is real and how much of it is a trick. Before we answer this question, let us consider a fact which shows that the *featural analysis*, although it does not overgenerate as much as the *lexical analysis*, still does overgenerate.

(7) **John không không đọc sách**
John not not read books
'John does (*not) read books'

It is impossible to read (7) as containing one compositional and one pleonastic negation: the sentence cannot mean John does not read books. However, this reading is expected to exist under the *featural analysis*, as nothing in this analysis prevents [**John not**$_{[iNEG]}$ **not**$_{[uNEG]}$ **read books**] from being a parse of (7).[12] Another fact we consider in this connection concerns NPI licensing. Question words in Vietnamese such as **ai** 'who' and **gì** 'what' can also be construed as 'anyone' and 'anything,' respectively.[13]

(8) **John không đọc gí**
John not read what
'What does John not read?' / 'John does not read anything'

Example (8) shows that negation can license NPIs. Curiously, negation retains this ability even under the pleonastic reading, as evidenced by (9).[14]

(9) **John quên không đọc gí**
John forget not read what
'What did John forget to read?' / 'John forgot to read something'

However, n-implicatives turn out not to have this property: the word **gí** in (10) can only be construed as 'what.'

(10) **John quên đọc gí**
John forget read what
'What did John forget to read?' / *'John forgot to read something'

Taking together all the facts we have discussed, then, we come to the following four-part conclusion about [iNEG] and [uNEG] : (i) both negation and n-implicatives can bear [iNEG] but only negation can bear [uNEG] ; (ii) [uNEG] is licensed by [iNEG] when [iNEG] is on n-implicatives but not when it is on negation; (iii) NPIs are licensed by [iNEG] when it is on negation but not when it is on n-implicatives; and (iv) NPIs are also licensed by [uNEG]. Of course, a better conclusion is that only n-implicatives license pleonastic negation and only negation licenses NPIs, and neither [iNEG] nor [uNEG] has anything to do with anything. In other words, the *featural analysis* is just a restatement

[12] We take negation in Vietnamese to be a verb which takes a VP complement, just like a modal. For arguments supporting this view, see Trinh (2005).

[13] In the following, we will use **gì** as a representative example, noting that the discussion applies to **ai** also.

[14] The existential quantifier in the English translation of (9) and (10) is to be read as taking scope under the n-implicative.

of the *lexical analysis*, with [iNEG] encoding different properties on different heads ("can license pleonastic negation" on n-implicatives and "is semantically interpreted" on negation) and [uNEG] encoding "pleonastic." It is a trick.

2.3 The "ATB analysis"

The last analysis of pleonastic negation we want to argue against will be called the *ATB analysis*. It says that **John forget not read books**, in the pleonastic reading, is derived from (11) by (i) rightward ATB movement of the most deeply embedded VP and (ii) phonological deletion of the conjunctive particle, resulting in (12).

(11) **John quên đọc sách và không đọc sách**
John forget read books and not read books
'John forgot to read books and did not read books'

(12) **John**$_j$ [$_{XP}$ [$_{YP}$ t$_j$ **forget** t$_i$] ~~**and**~~ [$_{ZP}$ t$_j$ **not** t$_i$]] **...** [$_{VP}$ **read books**]$_i$

This analysis has two merits. First, it accounts quite naturally for the semantics of the construction: the meaning of **forget** guarantees that YP entails ZP, hence XP, the conjunction of YP and ZP, is equivalent to YP, which is **John forgot read books**. Thus, no pleonastic negation has to be assumed for negation to be pleonastic. Second, the analysis appeals to the possibility of rightward ATB-moved VP complements, and this possibility can be independently argued to exist in Vietnamese. The grammaticality of (13a) and (13b) is supporting evidence.

(13) a. **John quên và không đọc sách**
John forget and not read books
'John forgot to, and didn't, read books

b. **John nên và phải đọc sách**
John should and must read books
'John should, and must, read books'

But the *ATB analysis* also appeals to the possibility of phonologically deleting the conjunctive particle, and therein lies its problem. Consider (14a) and (14b): the first is ungrammatical, and the second can only mean John should be required to read books. This is unexpected under the *ATB analysis*, as the possibility of phonologically deleting **and** should allow (14a) to be derivable from (11) and be grammatical, and allow (14b) to be derivable from (13b) and mean John should and must read books.

(14) a. ***John quên đọc sách không đọc sách**
John forget read books not read books

b. **John nên phải đọc sách**
John should must read books

Another problem for the *ATB analysis*, which we already encountered in our discussion of the *lexical analysis*, is the fact that switching positions of the implicative and the negation leads to the disappearance of the pleonastic reading: **John not forget read**

books can only mean John did not forget to read books. Again, this is unexpected under the *ATB analysis*, as it does not rule out a parse for this sentence which is just like (12) except with **forget** and **not** switching places.

Of course, we can fix the *ATB analysis* by adding to it the stipulation that the conjunctive particle can only be deleted if (i) the first conjunct is headed by an n-implicative and the second conjunct is headed by the negation, (ii) the two heads have identical complement VPs, and (iii) these VPs are rightward ATB-moved. We take the need for this stipulation to be a sign not of minor defect but of fundamental inadequacy, and suggest that the *ATB analysis* be abandoned.

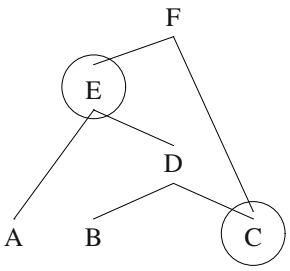
Let us now move on to the analysis we want to propose, starting with some theoretical groundwork.

3 On dominance and precedence

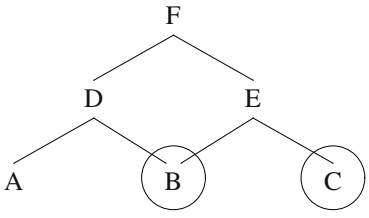
3.1 The operations "merge" and "label"

We presuppose the framework presented in Chomsky (1995) and many subsequent works, in which dominance is established by *merge*, a binary operation which combines two syntactic objects A and B into one containing A and B as immediate constituents. Crucially, *merge* can apply to non-roots, resulting in "multidominance." (15a) illustrates merger of a non-root with a node dominating it, and (15b) merger of a non-root with a node not dominating it.

(15) a.



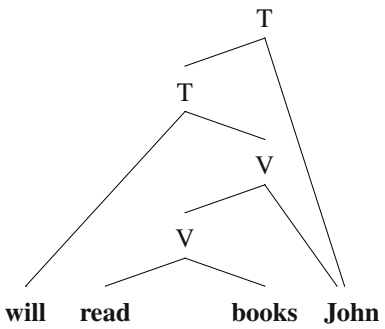
b.



The operation *label* applies to outputs of merge and assigns labels to them. We assume that this operation applies "only when necessary" (cf. Chomsky 2012). When it does apply, *label* obeys the principle of *endocentricity*, which states that the label of a constituent whose daughters are A and B is either that of A or that of B. It is generally agreed that the label of a lexical item includes at least, but not necessarily at most, its syntactic category. In what follows, we will use syntactic categories to label con-

stituents, adding subscripts when more distinction is called for. We will label complex constituents in the familiar way, taking for granted that the labelling can be motivated by way of subcategorization or other constraints. (16) illustrates how *merge* and *label* have applied to generate the structure of **John will read books**.

(16)

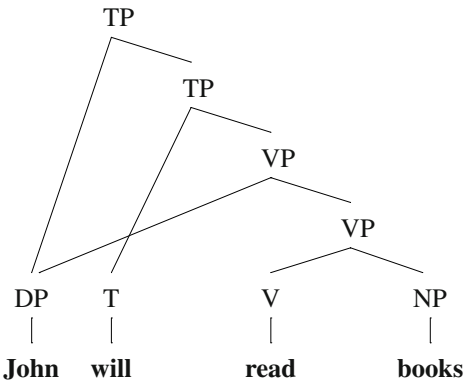


We say that a constituent "projects" if it has the same label as its mother. A "head" is a word that projects. A "specifier" is the sister of a projecting non-head.[15] We will notate non-head constituents of category X as "XP" and put lexical items in the order they are pronounced, letting tree branches cross when necessary. In addition, we will represent a lexical item a of category X as (17) and say that X "dominates" a. Our use of the term "dominate" will remain standard otherwise.

(17)

Heeding these conventions, we represent the syntactic structure of **John will read books** as in (18).

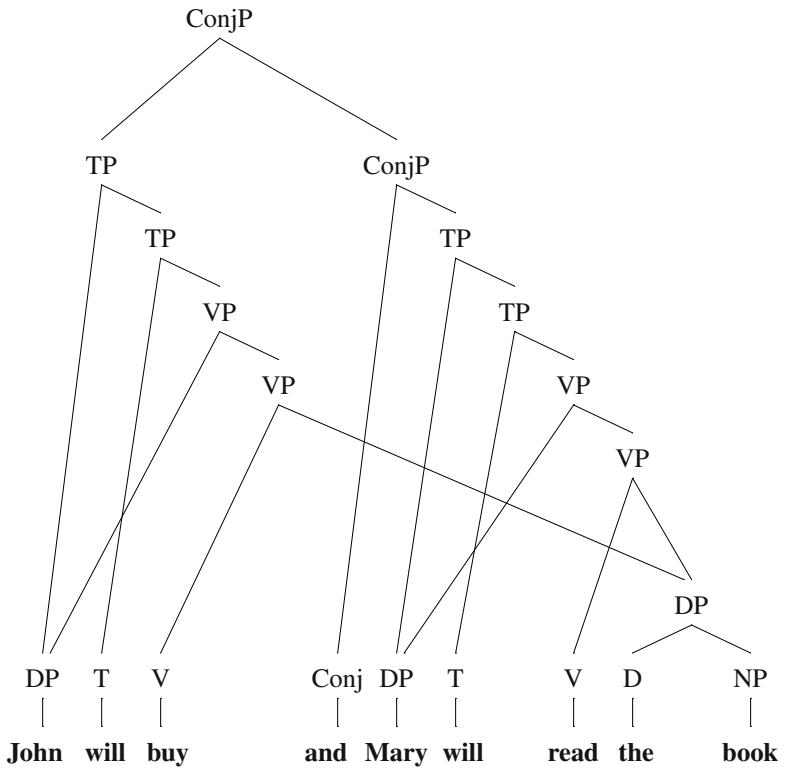
(18)



[15] This is the non-relational meaning of "head" and "specifier." These terms also have a relational meaning: X is "head of" Y if X is a head and Y has the same label as X, and X is "specifier of" Y if X is a specifier and Y has the same label as the mother of X.

Note that (18) does not involve merger of a non-root with a node not dominating it, i.e the scenario in (15b). This scenario is exemplified in (19), the structure of **John will buy and Mary will read the book**.

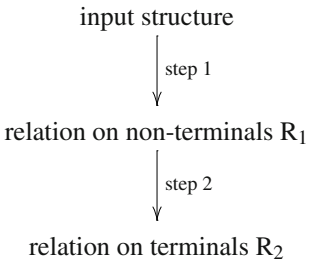
(19)



3.2 Linearization

Let us now address the question of how syntactic structures are linearized, i.e. mapped to sequences of words. Several proposals on linearization can be understood to share the scheme in (20). Specifically, they assume that a "precedence relation" on terminals, R_2, which tells us which word is pronounced before which word, is specified by way of a relation on non-terminals, R_1, which is itself specified by the input structure.

(20)



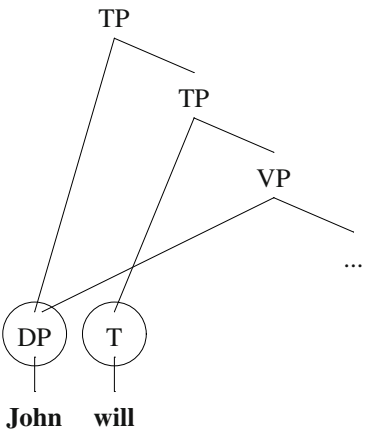
In addition, there is generally assumed to be a constraint on R_2, the *Linear Correspondence Axiom* (*LCA*), to the effect that R_2 must define a string (cf. among others Kayne 1994; Bachrach and Katzir 2009; Wilder 1995, 2008; Fox and Pesetsky 2007). Specifically, the *LCA* states that R_2 must be a linear ordering, i.e. a total, antisymmetric and transitive relation.[16]

The *LCA* was first proposed in Kayne (1994), which also contains the first elaboration of the scheme in (20). Kayne (1994) formulates the following definitions of R_1 and R_2.[17]

(21) $R_1 = \{X < Y \mid X \text{ asymmetrically c-commands } Y\}$
$R_2 = \{a < b \mid \text{there is an } X < Y \in R_1 \text{ such that X dominates a and Y dominates b}\}$

The *LCA* and the definitions in (21) are shown to derive several properties of $\overline{X}$-Theory. One of them, incidentally, is the "single mother condition," which says that one node cannot have more than one mother. In other words, Kayne's theory is designed to rule out multidominance. Consider (22), which is the relevant portion of the structure of **John will read books**.

(22)



The non-terminals DP and T c-command each other. Hence, neither one of these asymmetrically c-commands the other. Hence, neither DP < T nor T < DP is in R_1. Hence, neither **John < will** nor **will < John** is in R_2, which means R_2 is not total, hence not a linear ordering.

Since we assume *merge* can target non-roots, generating structures such as (22), we have to revise the Kaynean system to cope with multidominance. There are at least three ways to do this: (i) keep the definition of R_1 and R_2 and revise the *LCA*, (ii) keep

[16] A relation R on a set S is total if $\forall x, y \in S : Rxy \vee Ryx$, antisymmetric if $\forall x, y \in S : Rxy \wedge Ryx \rightarrow x = y$, and transitive if $\forall x, y, z \in S : Rxy \wedge Ryz \rightarrow Rxz$.

[17] We represent the ordered pair $<\alpha, \beta>$ as "$\alpha < \beta$." The notion "c-command" is understood in the usual way: X c-commands Y if a sister of X dominates Y.

the *LCA* and revise these definitions, or (iii) revise both. We opt for the second choice, and propose the following definition for R_1 and R_2.[18]

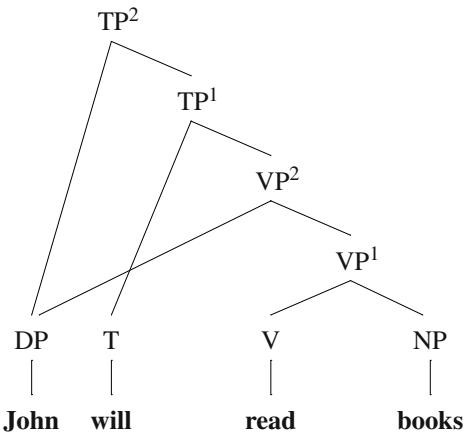
(23) $R_1 = \{X < Y \mid X$ is a specifier or head and Y is the sister of X$\}$
$R_2 = \{a < b \mid$ there is an $X < Y \in R_1$ such that X fully dominates a and Y fully dominates b$\}$

The notions "head" and "specifier" are understood as described on page 418. We define "full dominance" as follows.[19]

(24) X fully dominates Y if X dominates Y and every upward path from Y to the root node passes through X

To see how this system works, let us come back to the structure of **John will read books**, reproduced in (25).[20]

(25)



We list the elements of R_1 in the first column of the table in (26). The corresponding elements of R_2 are listed on the same row in the second column.

[18] Our proposal is inspired by Bachrach and Katzir (2009), Wilder (2008) and Fox and Pesetsky (2007) but differs from each in ways that cannot be discussed in this paper, lest the discussion stray too far from the main topic. One note we would like to make, however, is that we talk of linearization as a non-incremental procedure, applying all-at-once to a complete structure of a sentence. As far as we can see, it is possible to translate our proposal into a cyclic version in the spirit of Bachrach and Katzir (2009) or Fox and Pesetsky (2007). For arguments that linearization should be thought of as non-cyclic see de Vries (2009).

[19] This definition of full domination is taken from Fox and Pesetsky (2007), where it is called "total domination," and Wilder (2008), where it is given a more precise formulation.

[20] The numerical superscripts are just a notational device to facilitate naming of constituents which are different levels of projection of the same lexical item.

(26) Elements of R_1 and R_2 from (25)

R_1	R_2
V < NP	**read < books**
T < VP^2	**will < read**, **will < books**
DP < VP^1	**John < read**, **John < books**
DP < TP^1	**John < will**, **John < read**, **John < books**

Eliminating the redundancies in the second column of (26), we end up with R_2 = {**read < books**, **will < read**, **will < books**, **John < will**, **John < read**, **John < books**}, a linear ordering. Specifically, R_2 is total: every terminal is related to every other terminal. This is because every terminal is fully dominated by at least one non-terminal which is a head, a specifier, or a sister of a head or a specifier. Note, also, that defining R_2 in terms of full dominance prevents DP < TP^1 and T < VP^2 in R_1 from resulting in **John < will** and **will < John** in R_2, which would make R_2 non-antisymmetric. The reason is that VP^2 dominates **John** but does not fully dominate it: there is a path from **John** to the root node which does not pass through VP^2.

We will assume that a < b in R_2 is interpreted by the phonology as "a is pronounced before b."[21] Thus, we can take R_2 to "yield" the string **John⌢will⌢read⌢books**, which is the attested word order. A good result.

4 A multidominance analysis of pleonastic negation

4.1 Semantic interpretation

We propose that (27) is the structure underlying the pleonastic reading of **John forget not read books**.[22] For now, assume that XP has no label.[23]

[21] On why a < b in R_2 is not interpreted as "a is spoken after b," see Kayne (1994).

[22] The subscripts are just a notational device to faciliate naming constituents which are projections of different lexical items.

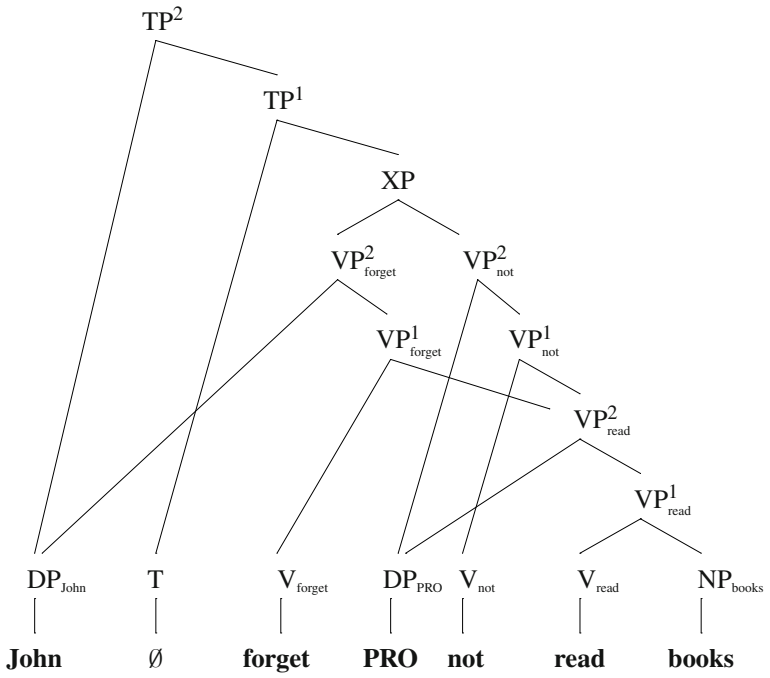
[23] Note that the Vietnamese negation **không** 'not' is analyzed as a (modal) verb. This analysis is supported by the distribution of **không**: it must combine with a VP, and cannot combine with, say, a PP or an NP like the English adverb **not**. Thus, the question 'what does John read' can be answered with (ia) but not (ib), and the question 'who did John come with' can be answered with (iia) but not (iib).

(i) a. Nó không đọc sách
He not read books
b. *Không sách
Not books

(ii) a. Nó không đến với Mary
He not came with Mary
b. *Không với Mary
Not with Mary

Note that this is not the case with adverbs such as **chỉ** 'only': both **chỉsách** 'only books' and **chỉ với Mary** 'only with Mary' are grammatical. For more arguments in favor of analyzing **không** 'not' as a verb, see Trinh (2005).

(27)



The question now is how to get the sentence to mean John forgot to read books, i.e. how to get XP to mean the same as its left daughter, VP^2_{forget}. For the moment, the answer looks quite simple: all we need is a version of Predicate Modification (cf. Heim and Kratzer 1998) which is generalized to expressions of type <s,t>. We will call this rule *Propositional Modification* and define it as in (28), noting that the definition will be revised later on.

(28) *Propositional Modification* (first version, to be revised)[24]
If A and B are daughters of C, both $[\![A]\!]$ and $[\![B]\!]$ are members of $\wp(\mathcal{W})$, then $[\![C]\!] = [\![A]\!] \cap [\![B]\!]$

As the n-implicative **forget** licenses the inference that its complement is false, we have $[\![VP^2_{forget}]\!] \subseteq [\![VP^2_{not}]\!]$. From this it follows that $[\![XP]\!] = [\![VP^2_{forget}]\!] \cap [\![VP^2_{not}]\!] = [\![VP^2_{forget}]\!]$, which is the result we want.

4.2 Linearization

4.2.1 The "non-totality problem"

We now move on to discuss the linearization of (27). Let us ask whether (27) satisfies the *LCA*. It turns out that the answer is no. For (27), R_2 is not a total relation and

[24] We take propositions to be sets of possible worlds. Thus, $\wp(\mathcal{W})$, the powerset of the set $\mathcal{W}$ of possible worlds, is the set of propositions.

consequently not a linear ordering. The reason is that **forget** is related to neither **PRO** nor **not** in R_2.[25] Let us show this, beginning with the case of **forget** and **PRO**.

In (27), the nodes which fully dominate **forget** are V_{forget}, VP^1_{forget}, VP^2_{forget}, XP, TP^1 and TP^2, and the nodes which fully dominate **PRO** are XP, TP^1 and TP^2. Thus, every node which fully dominates **forget** is a node which fully dominates **PRO**, which means no node which fully dominates **forget** is sister of a node which fully dominates **PRO**. But from (23) it follows that two terminals a and b are related in R_2 only if there are sister nodes X and Y such that X fully dominates a and Y fully dominates b. Hence, **forget** and **PRO** are not related in R_2.

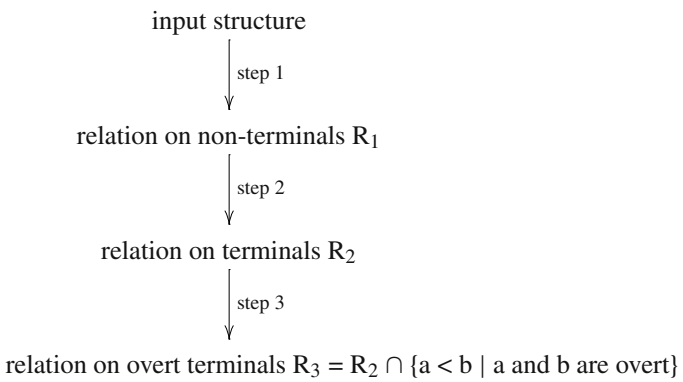
Now let us show that **forget** and **not** are not related in R_2. From (23) it follows that two terminals a and b are related in R_2 only if there are sister nodes X and Y such that X fully dominates a and Y fully dominates b and X and Y are related in R_1. In (27), VP^2_{forget}, which fully dominates **forget**, is sister to VP^2_{not}, which fully dominates **not**, but since neither VP^2_{forget} nor VP^2_{not} is a head or a specifier, as XP is by assumption without label, neither $VP^2_{forget} < VP^2_{not}$ nor $VP^2_{not} < VP^2_{forget}$ is in R_1. Hence, **forget** and **not** are not related in R_2.

Let us call this problem the *non-totality problem*. There are two solutions to it, which we will discuss in turn.

4.2.2 The "overt terminals solution"

The first solution, which we will call the *overt terminals solution*, capitalizes on the fact that **PRO** has no phonetic content and implements the suggestion, made in Chomsky (1995) and taken up elsewhere, that the *LCA* be viewed as pertaining to overt terminals only. Specifically, the *LCA* is reconceptualized as a condition not on R_2 but on another relation, R_3, which is constructed from R_2 by eliminating all pairs from R_2 which contain covert terminals.

(29)



Another component of the *overt terminals solution* concerns the labelling of XP in (27). Given *endocentricity*, XP must be either a projection of VP^2_{forget} or VP^2_{not}. Labelling XP

[25] We say "x and y are related in R" to mean either $x < y$ or $y < x$ is a member of R.

as VP^3_{not} would make VP^2_{forget} a specifier and VP^2_{not} its sister, resulting $VP^2_{forget} < VP^2_{not}$ in R_1 and **forget < not** in R_2. This scenario is presented in (30).

(30) Elements of R_1 and R_2 from (27) with XP = VP^3_{not}

R_1	R_2
$V_{read} < NP_{books}$	**read < books**
$V_{not} < VP^2_{read}$	**not < read**, **not < books**
$V_{forget} < VP^2_{read}$	**forget < read**, **forget < books**
T < XP	∅ < **forget**, ∅ < **PRO**, ∅ < **not**, ∅ < **read**, ∅ < **books**
$DP_{PRO} < VP^1_{read}$	**PRO < read**, **PRO < books**
$DP_{PRO} < VP^1_{not}$	**PRO < not**
$VP^2_{forget} < VP^2_{not}$	**forget < not**
$DP_{John} < TP^1$	**John** < ∅, **John < forget**, **John < PRO**, **John < not**, **John < read**, **John < books**

We would then have $R_3 = R_2 \cap \{a < b \mid a \text{ and } b \text{ are overt}\}$ = {**read < books**, **not < read**, **not < books**, **forget < not**, **forget < read**, **forget < books**, **John < forget**, **John < not**, **John < read**, **John < books**}, a linear ordering on overt terminals which yields the string in (31).

(31) **John⌢forget⌢not⌢read⌢books**

Labelling XP as VP^3_{forget} in (27) would make VP^2_{not} a specifier and VP^2_{forget} its sister. The reader can verify that this would reverse the order of **forget** and **not** in (31), yielding the string in (32).

(32) **John⌢not⌢forget⌢read⌢books**

The fact that (31), but not (32), allows the pleonastic reading would then mean that XP in (27) must be a projection of VP^2_{not} and cannot be a projection of VP^2_{forget}. The question, of course, is why this is the case. We have nothing to say regarding this question, except that the answer to it would likely appeal to asymmetries between the two daughters of XP. We can think of at least two: (i) VP^2_{forget} asymmetrically entails VP^2_{not}, and (ii) the specifier of VP^2_{forget}, DP_{John}, asymmetrically c-commands the specifier of VP^2_{not}, DP_{PRO}.[26] However, we see no sensible way to link one or both of these asymmetries to the labelling of XP as VP^3_{not} in (27). Therefore we will leave the *overt terminals solution* with a puzzle about the label of XP.

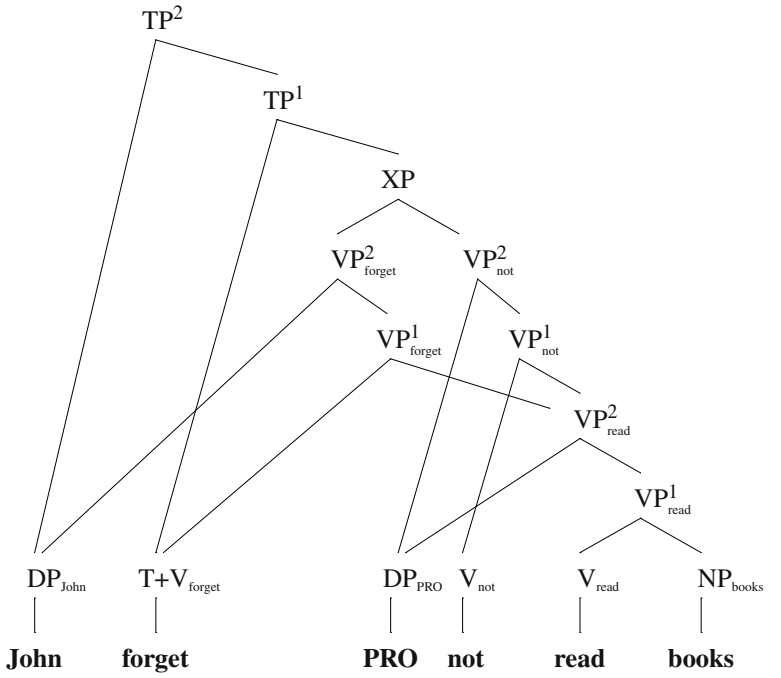
4.2.3 The "head-movement solution"

The second solution to the *non-totality problem*, which we will call the *head-movement solution*, is simpler in details. Nothing changes with respect to R_1, R_2 or the *LCA*. All that must be added is the possibility of V_{forget} "relocating" to the auxiliary position, i.e.

[26] Specifically, DP_{John} is sister to a node which dominates DP_{PRO}, but DP_{PRO} is not sister to a node which dominates DP_{John}.

T, as a "last resort operation" which rescues the structure from violating the *LCA*.[27] The input to linearization will be (33), where a complex word, $T+V_{forget}$, is the head of both VP^2_{forget} and TP.[28]

(33)



The elements of R_1 and R_2 will then be as in (34). Note that XP remains without label and there is thus no pair in R_1 which contains VP^2_{forget} or VP^2_{not}, as neither of these non-terminals is a head or a specifier. However, this does not result in R_2 being non-total, because there is no terminal fully dominated by any of these nodes which is not fully dominated by any other node.[29]

[27] Alternatively, we can say V relocates to a head position of a projection YP located between TP and XP. Supporting evidence for this view might be (i), where **sẽ**, a morpheme indicating future tense, appears between the subject and the rest of the sentence.

(i) **John sẽ quên không đọc sách**
John will forget not read books
'John will forget (not) to read books'

Of course, the V-to-T analysis can be made compatible with (i) by adding to it the claim that **sẽ quên** 'will forget' is the pronunciation of the complex head T+V, or that **sẽ** is a modal verb embedding a TP whose head is adjoined to **quên** 'forget.' We will not discuss these possibilities in this paper and will assume, for simplicity's sake, that the position to which the relevant V_{forget} relocates is T. The point is that the "symmetry" between VP^2_{forget} and VP^2_{not} is allowed to be broken by head movement of V_{forget} out of XP.

[28] See note 15.

[29] This is trivially true of VP^2_{forget} which fully dominates no terminal.

(34) Elements of R_1 and R_2 from (33)

R_1	R_2
$V_{read} < NP_{books}$	**read < books**
$V_{not} < VP^2_{read}$	**not < read**, **not < books**
$T{+}V_{forget} < VP^2_{read}$	**forget < read**, **forget < books**
$T{+}V_{forget} < XP$	**forget < PRO**, **forget < not**, **forget < read**, **forget < books**
$DP_{PRO} < VP^1_{read}$	**PRO < read**, **PRO < books**
$DP_{PRO} < VP^1_{not}$	**PRO < not**
$DP_{John} < TP^1$	**John < forget**, **John < PRO**, **John < not**, **John < read**, **John < books**

Eliminating redundancies from (34), we have $R_2 = \{$**read < books**, **not < read**, **not < books**, **PRO < not**, **PRO < read**, **PRO < books**, **forget < PRO**, **forget < not**, **forget < read**, **forget < books**, **John < forget**, **John < PRO**, **John < not**, **John < read**, **John < books**$\}$, a linear ordering on terminals which yields the string in (35).

(35) **John⌢forget⌢PRO⌢not⌢read⌢books**

Now suppose that it is V_{not} instead of V_{forget} which relocates to T. That would also rescue the structure from being a violation of the *LCA*. The reader can verify that the resulting string in this case will be (36).

(36) **John⌢not⌢PRO⌢forget⌢read⌢books**

The fact that it is (35), not (36), which can have the pleonastic reading means that V_{forget} does, and V_{not} cannot, relocate to T. Again, the question arises as to why this is the case, and this time there seems to be some hope of an answer. Recall that the specifier of VP^2_{forget}, which is DP_{John}, asymmetrically c-commands the specifier of VP^2_{not}, which is DP_{PRO}. This means, given *Relativized Minimality* (*RM*), that it is DP_{John}, not DP_{PRO}, which must *merge* with $T\,P^1$ to satisfy the *Extended Projection Principle* (*EPP*).[30] And this is in fact what we observe. Now suppose that there is a preference principle in grammar, call it *Preserve Spec-Head* (*PSH*), which adjudicates between operations not ranked by *RM* and favors those that re-establish previous spec-head relations. The *PSH* would force V_{forget} to, and prevent V_{not} from, being the head which relocates to T.

4.2.4 Taking stock

Which of the two solutions to the non-totality problem is better? Both rely on the ability of the grammar to "discriminate" between the two daughters of XP: the *overt terminals solution* requires that it is VP^2_{not}, not VP^2_{forget}, which gives XP its label, while the *head-movement solution* requires that it is the head of VP^2_{forget}, not VP^2_{not}, which

[30] Let us ignore the question whether **PRO** can in principle satisfy the *EPP*. We will see below that even if **PRO** is replaced by an overt DP, it is still the higher DP which raises to [Spec,T].

relocates to T. We have seen that the second requirement is easier to motivate. Thus, the scale is tipped towards the *head-movement solution* at this point. Now suppose we find a structure which is just like (27) except that the position of **PRO** is occupied by an overt DP. If such a structure turns out to be linearizable, then the *head movement solution* has to be correct, independently of whether the *overt terminals solution* is also correct. In the next section, we are going to consider a set of facts which instantiates precisely this scenario.

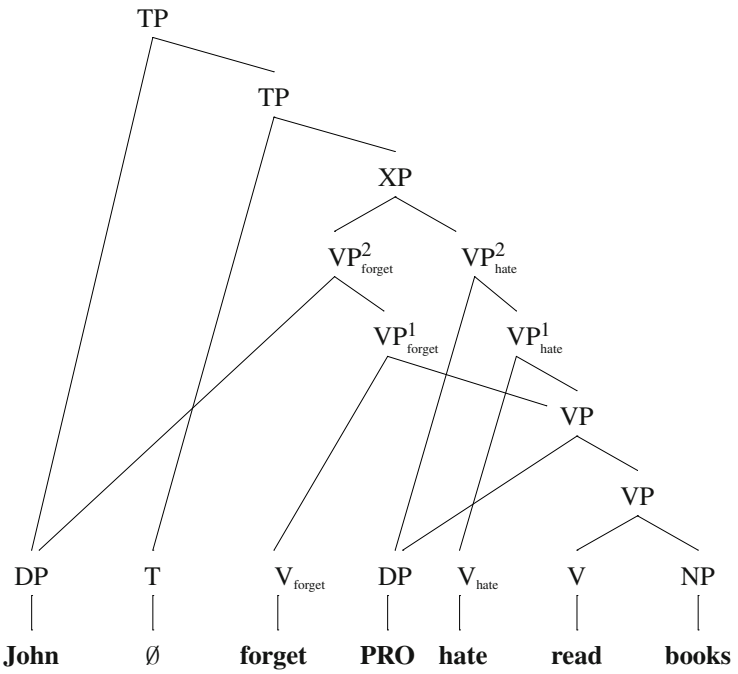
5 Pleonastic modals

5.1 A revision of "Propositional Modification"

This subsection introduces a slight revision of the rule of *Propositional Modification*. The current version of this rule allows (37) to be derived from (38) which would be interpretable as the conjunction of the proposition that John forgot to read books and the proposition that he had to read books.

(37) **John quên ghét đọc sách**
John forget hate read books
'John forgot to hate reading books' / *'John forgot to read books and hated reading books'

(38)



The fact that (37) cannot have this reading means that (38) must be ruled out. One difference between (27) and (38) is that in the former, one daughter of XP entails the other while in the latter that is not the case. We propose to use this difference to rule out (38). Specifically, we propose that the domain of *Propositional Modification* be restricted in the following way.

(39) *Propositional Modification* (final version)
If A and B are daughters of C, ⟦A⟧ and ⟦B⟧ are members of $\wp(\mathcal{W})$, and ⟦A⟧ ⊆ ⟦B⟧, then ⟦C⟧ = ⟦A⟧ ∩ ⟦B⟧

Given this version of *Propositional Modification*, the structure in (38) would be uninterpretable, as $[\![\mathrm{VP}^2_{\mathrm{forget}}]\!] \not\subseteq [\![\mathrm{VP}^2_{\mathrm{hate}}]\!]$.

5.2 A multidominance analysis of pleonastic modals

5.2.1 Semantic interpretation

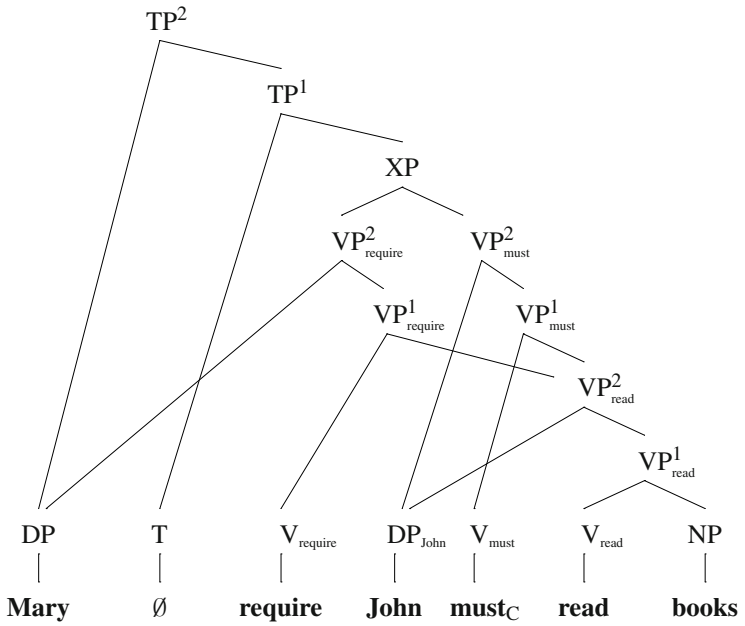
Let us now consider a puzzling fact in Vietnamese: the sentences in (40a) allow a reading in which the embedded modal is semantically transparent, i.e. a reading in which they are semantically equivalent to the sentences in (40b). We call this the "pleonastic reading," due to the obvious similarity to the case of negation considered above.[31]

(40) a. **Mary bắt John phải đọc sách**
Mary require John must read books
'Mary required John to have the obligation to read books' / 'Mary required John to read books'
b. **Mary bắt John đọc sách**
Mary require John read books

We propose that (41) is the structure which underlies the pleonastic reading of (40a). We will discuss the subscript **C** on the universal modal **must** presently.

[31] And similarly to the case of negation, the pleonastic reading is strongly preferred to the compositional reading.

(41)



We make the standard assumption that the interpretation of modals is indexical: they quantify over a contextually determined set of possible worlds. We represent the indexicality of modals by way of a structurally represented variable, **C**, which is subscripted to the modal and whose interpretation is assignment dependent. Thus, $[\![\mathbf{must_C}]\!]^g(p) = 1$ iff $g(\mathbf{C}) \subseteq p$. Now it follows from *Propositional Modification* that (41) is only interpretable if one daughter of XP entails the other. One way to fulfill this necessary condition is to resolve **C** to the set $\mathcal{D}_M$ of possible worlds compatible with injunctions issued by Mary,[32] which would then make $VP^2_{require}$ semantically equivalent to VP^2_{must}: both are true iff John reads books in every one of the worlds in $\mathcal{D}_M$. It seems that **C** must in fact be so resolved. Consider the following discourse.

(42) A: **Mary bắt John phải đọc sách.**
Mary require John must read books
B: **#Không đúng! Nội quy nhà trường cho phép John chơi thay vì đọc sách.**
(Translation: Not true! School regulations allow John to play instead of read books.)

[32] $\mathcal{D}$ is mnemonic for "deontic."

B's response to A's assertion is pragmatically odd, and the reason, intuitively, is that although B appears to contest what A says, her utterance cannot be construed as contesting what A says: A says that Mary requires John to read books, not that Mary and school regulations require John to read books. Note that A's utterance could be given the latter interpretation if **C** in (41) could be resolved to the set of worlds compatible with school regulations. The judgment observed in (42), therefore, is evidence that **C** cannot be resolved to this set, hence evidence that the final version of *Propositional Modification* is correct.

Pleonastic modality in Vietnamese is not limited to constructions containing **require** and **must**. The a-sentences in (43) and (44) also have a reading in which they are equivalent to the b-sentences.

(43) a. **Mary cho phép John được đọc sách**
Mary allow John may read books
b. **Mary cho phép John đọc sách**
Mary allow John read books

(44) a. **Mary cấm John không được đọc sách**
Mary forbid John not may read books
b. **Mary cấm John đọc sách**
Mary forbid John read books

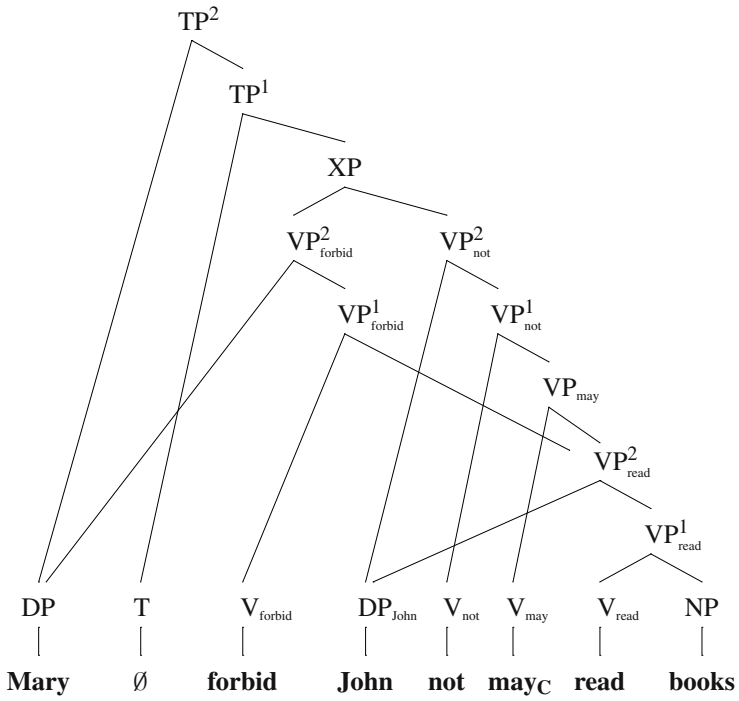
Similarly to what is observed about (40), it would be pragmatically odd to contest (43a) with the claim that school regulations do not allow John to read books, or to contest (44a) with the claim that school regulations do allow him to. We can analyze (43a) and (44a) in the same fashion as we have (40). Thus, the structure underlying the pleonastic reading of (43a) would be just like (40) except **require** is replaced by **allow** and **must** by **may**, and the structure underlying the pleonastic reading of (44a) would be (45).[33]

[33] Another set of facts which might fall under this account concern sentences with "pleonastic" adverbials such as (i).

(i) **John nhất thiết phải đọc sách**
John necessary must read book
'It is necessary that John reads books' / *'It is necessary that it is necessary that John reads books'

I thank a reviewer for pointing this out to me.

(45)



5.2.2 Linearization

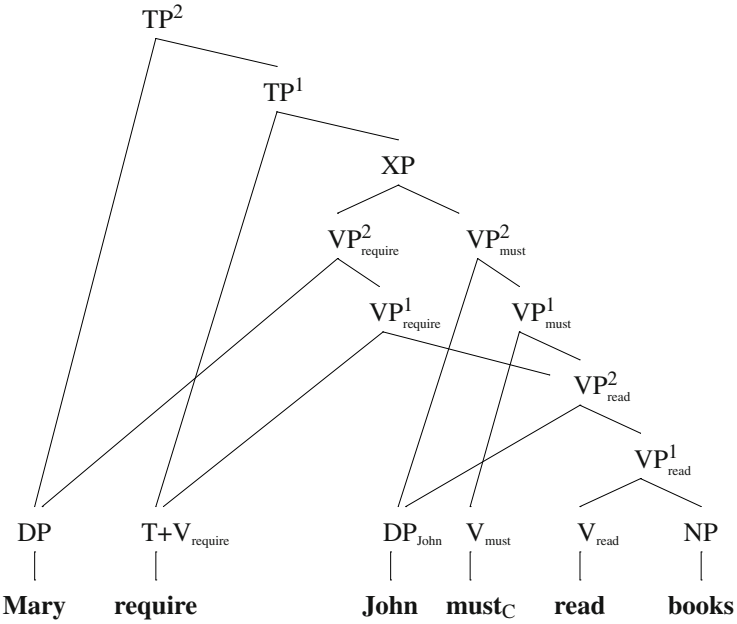
Let us now turn to the linearization of (41) and (45). Specifically, let us ask whether they satisfy the LCA. The answer, of course, is no. And the problem confronting these structures is the same as that which confronts (27): R_2 is not total. The reader can verify for herself that **require** is related to neither **John** nor **must** in (41), and that **forbid** is related to neither **John**, nor **not**, nor **may** in (45).[34] Thus, R_2 is non-total, thus fails to be a linear ordering, in both cases.

How do we solve the *non-totality problem* this time? Suppose we adopt the *overt terminals solution*. If we give XP in (41) and (45) a label, then **require** will be related to **must** in (41) and **forbid** will be related to **not** and **may** in (45). However, the problem with **John**, the embedded subject, persists. Recall that the *overt terminals solution* depends crucially on the non-overtness of the embedded subject. But **John** is overt! Thus, there is no way, under this solution, to relate **John** to **require** in (41), or to **forbid** in (45). The *overt terminals solution* fails.

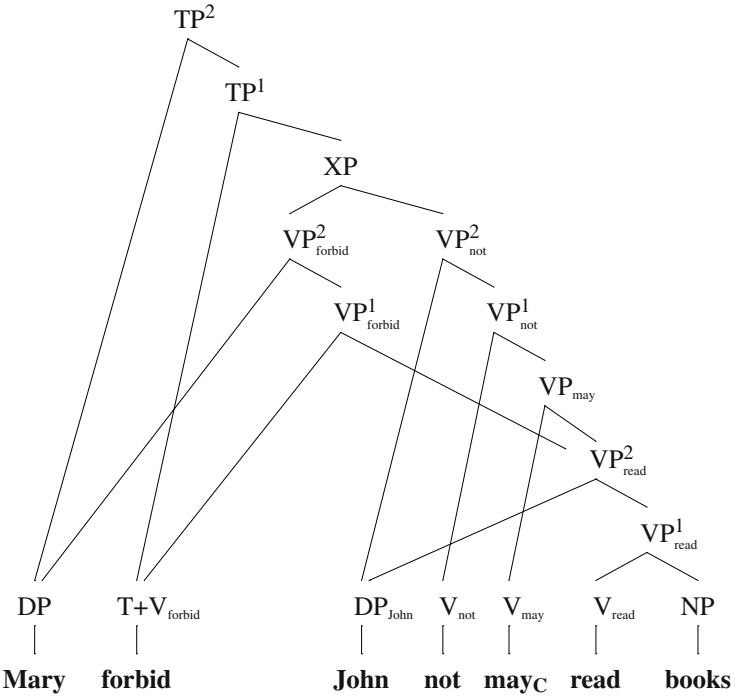
What about the *head-movement solution*. Relocating $V_{require}$ and V_{forbid} to T in (41) and (45) results in (46) and (47), respectively.

[34] When we speak of terminals being related to each other, we mean, of course, that they are related to each other in R_2.

(46)


TP2
TP1
XP
VP2require
VP2must
VP1require
VP1must
VP2read
VP1read
DP
T+Vrequire
DPJohn
Vmust
Vread
NP
Mary
require
John
mustC
read
books

(47)


TP2
TP1
XP
VP2forbid
VP2not
VP1forbid
VP1not
VPmay
VP2read
VP1read
DP
T+Vforbid
DPJohn
Vnot
Vmay
Vread
NP
Mary
forbid
John
not
mayC
read
books

As the reader can verify, both (46) and (47) satisfy the *LCA*. Furthermore, they induce the attested word order. Thus, we have evidence that the *head-movement solution* is correct.

However, there is still the possibility of the *overt terminals solution* being redundantly correct. If we can argue that XP cannot be labeled, then we will have conclusive evidence that only the *head-movement solution* is correct. That argument is provided immediately below.

6 Residual issues

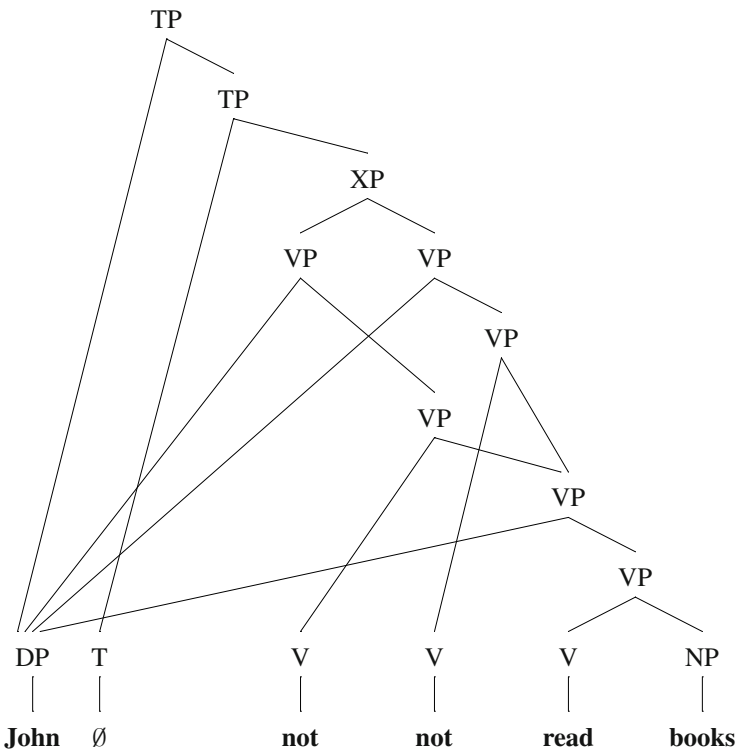
6.1 Symmetry

Can we derive the fact, mentioned in Sect. 2, that (48) does not allow the pleonastic reading of one of the two negations?

(48) **John không không đọc sách**
John not not read books
'John does *(not) read books'

It turns out that we can. What would have to be the structure underlying this unattested reading? Presumably, it would have to be (49).

(49)



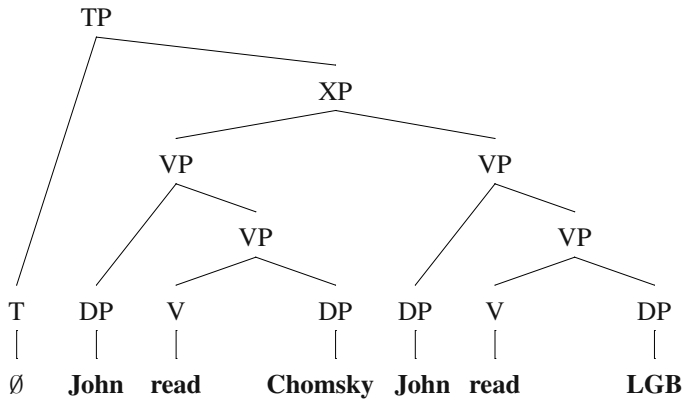
This structure violates the *LCA* because the two **not**'s are not related in R_2. The violation can be circumvented moving one of these verbs to T. Suppose we say, however, that this option is off the table because there is no way for the grammar to decide which verb to move: *Relativized Minimality* does not apply since the two verbs do not stand in an asymmetric c-command relation, and *Preserve Spec-Head* does not apply since the two VPs share one specifier. Now there is one more way to rescue (49) from violating the *LCA*, and that is labelling XP as one of its daughters, making the other a specifier. Doing this would relate the two VPs in R_1 and the two **not**'s in R_2, resulting in (48) having the pleonastic reading. The fact that (48) does not have this reading, then, is evidence that XP cannot be labelled. And as remarked in the last paragraph of Sect. 5, this is evidence that among the two solutions to the *non-totality problem* presented in Sect. 4, only the *head-movement solution* is correct.

Our assumption that movement is not possible if there are two equally eligible candidates is supported by the ungrammaticality of (50). The example is chosen for the fact that reading LGB entails reading Chomsky.

(50) ***John đọc Chomsky John đọc LGB**
John read Chomksy John read LGB

Presumably, (50) could be derived from (51) by movement of one of the two subjects to [Spec,T] together with either movement of one of the verbs to T or labelling XP. But as the two VPs are totally symmetric, at least the first operation is not possible.

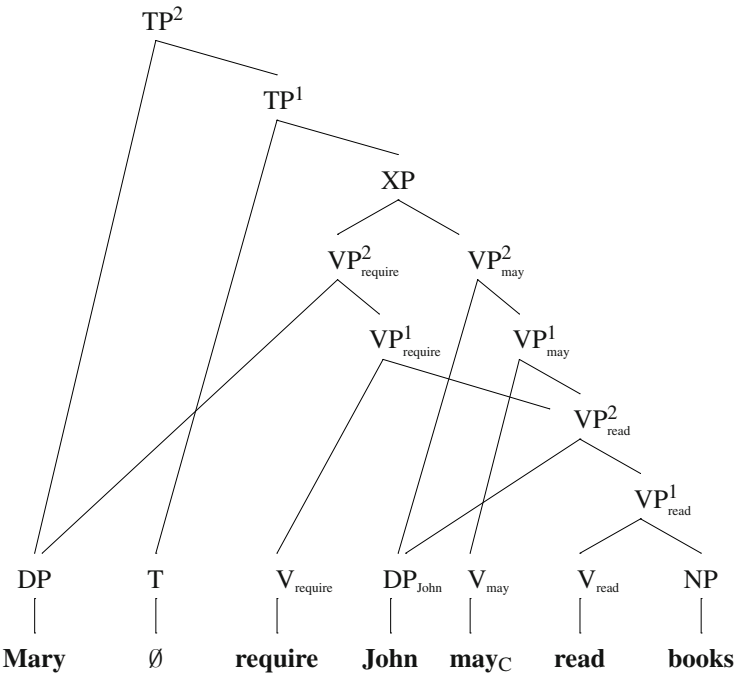
(51)



6.2 Embedded exhaustification

Given the final version of *Propositional Modification*, we predict (52) to be possible and interpretable as meaning Mary requires John to read books. This is the interpretation we get when the variable **C** is resolved to the set of worlds compatible with Mary's requirement.

(52)

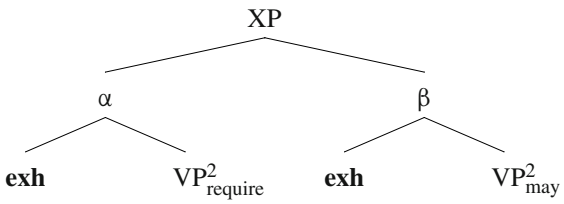


However, this is a wrong prediction. Consider the interpretation of (53). This sentence cannot be construed as saying Mary requires John to read books, but rather as saying Mary requires John to be allowed to read books.

(53) **Mary bắt John được đọc sách**
Mary require John may read books
'Mary requires John to be allowed to read books' / *'Mary requires John to read books'

Our tentative answer is that both daughters of XP are interpreted in their "exhaustive meaning." To be concrete, we will say that there is an operator, **exh**, which is appended to both $VP^2_{require}$ and VP^2_{may} (cf. among many others Krifka 1995; Fox 2007; Chierchia et al. 2012; Magri 2009, 2011; Sauerland 2012). In other words, XP is really to be analyzed as (54).

(54)



Assuming that **may** and **must** are scalar items, the meaning of β would be that Mary's injunction is compatible with both John reading books and him not reading books,

and this meaning, of course, does not entail or follow from the meaning of α, which is that Mary's injunction is not compatible with John not reading books. Hence, the structure cannot be interpreted by *Propositional Modification*.[35]

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[35] One reviewer raises the question about such sentences as (i).

(i) **John biết nghĩ là Mary đọc sách**
John know think that Mary read books
'John knows (how) to think that Mary reads books' / *'John knows that Mary reads books'

It is observed that **nghĩ** 'think' cannot have the pleonastic reading in (i). This fact would follow if **John know that** φ logically entails φ ∧ **John think that** φ, thus **exh(John think that Mary read book)** negates **exh(John think that Mary read book)**. More generally, it would follow if "soft presuppositions" are in fact semantic entailments, as has been proposed (cf. Romoli 2015, and references therein). Another example is (ii), suggesting that the phenomenon is general.

(ii) **John quên nên đọc sách**
John forget should read book
'John forgot to have the obligation to read books' / *'John forgot to read books'

In this connection, it should be noted that the logical relationship between **John forget read book** and **John should read book** is very different from that between **John forget read book** and **John not read book**, as evidenced in the following contrast (cf. Karttunen 1971).

(iii) a. John should read books, and he didn't forget to read books.
b. #John didn't read books, and he didn't forget to read books.

This means that even if both daughters of XP are exhaustified, the structure is still interpretable by Propositional Modification, since **exh**, by assumption, is contradiction-free (cf. Fox 2007). We hope to return to this complicated issue in future research.

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