

## Neg-raising and positive polarity: The view from modals\*

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**Abstract** This article shows that the deontic modals *must*, *should* and *supposed to* are all Positive Polarity Items which can raise in order to avoid being in an anti-licensing environment; it also establishes that *should* has a dual nature, i.e., it is not just a PPI, but it is also a neg-raising predicate, which can achieve wide scope through a homogeneity inference, and that *supposed to*, also a PPI, exhibits a neg-raising behavior under certain pragmatic conditions which shed new light on the neg-raising phenomenon.

**Keywords:** Neg-raising, Positive Polarity, Modals

### 1 Introduction

Among deontic modal verbs, some, e.g., *have to* and *required to*, have obligatory narrow scope under a clausemate negation. Others, e.g., the three deontic modal verbs which are put under the microscope in this article, namely *must*, *should*<sup>1</sup> and *supposed to*, seem at first sight to have rigid scope over a clausemate negation. This asymmetry is all the more puzzling because the two kinds of modals express the same modality (deontic), and have the same quantificational force. (In the framework that this article belongs to, i.e., the

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<sup>1</sup> In the course of my investigations, I did not encounter any relevant difference in the way *should* and *ought to* behave with respect to negation: the reader can thus assume that the conclusions drawn about *should* in this article hold of *ought to* as well.

classic account of modals initiated by Kratzer 1977 and based on standard modal logic, they are all universal quantifiers.)<sup>2</sup>

How can certain verbs achieve wide scope over negation? It is important to answer this question in order to understand the workings of negation in natural language, and to have a better grasp of the architecture of the clause. An immediate hypothesis is that wide scope takers are generated above negation. This article shows that we do not need to postulate a different base-generation position to account for the variation across the aforementioned verbs, for they are all generated lower than the position that hosts negation; the three wide scope takers (*must*, *should* and *supposed to*) are Positive Polarity Items (PPIs), which explains why they are not normally interpreted with narrow scope under a clausemate negation, and they are able to scope out (I therefore call them *mobile PPIs*): they can raise out of an anti-licensing environment, such as the scope of a clausemate negation, hence their observed wide scope. Other modal PPIs (e.g., *would rather*, *had better*) are not mobile: they have no other option but to stay under a clausemate negation and get anti-licensed.

Establishing an exact typology of verbs according to their behavior with respect to negation requires that we have at our disposal reliable diagnostic tools: it is the main goal of this article to design those tests. Thanks to them, it is possible to distinguish neg-raising — neg-raisers, e.g., *think*, do not move past negation but achieve semantic wide scope through an excluded middle or homogeneity inference, see Gajewski 2007 — from PPIhood, and to establish, as is done for the first time in this article, the polarity sensitivity of *must*, *should* and *supposed to*. Another fact is established: *should* has a dual nature, i.e., it is both a neg-raiser and a mobile PPI; and in a certain dialect of English, the PPI *supposed to* is also a neg-raiser, but a part-time one. The

<sup>2</sup> Given that it sometimes seems that a concept of so-called weak necessity is needed to analyze *should*, it might be tempting to draw an analogy between it and a quantifier which is not universal, namely *most*: the idea is that with *should*, we are not dealing with all accessible worlds, but with most of them. But there are infinitely many accessible worlds. Therefore if *should* were to be treated as a proportional quantifier, assessing the truth value of a statement of the form  $\text{Should}(p)$  would necessitate the impossible task of comparing the sizes of two infinite sets of possible worlds, the set in which  $p$  is true and the set in which  $p$  is not true. I will hold on to the classic approach in terms of universal quantification for *should*, and for the other two deontic modals under scrutiny; see von Stechow & Iatridou 2008 for an articulated proposal, according to which weak necessity modals are universal modals with a relatively small domain of quantification.

particular conditions under which it allows a neg-raised construal shed new light on the mechanisms of neg-raising itself.

The structure of the article is the following. Section 2 is a detailed exploration of the neg-raising phenomenon. The criteria it supplies are used in Section 3 to show that deontic *must* is not a neg-raiser; the section also provides positive tests that show that it is a mobile PPI. The way is paved for the exploration of the more complex modal verb *should*: its dual nature (neg-raiser and mobile PPI) is brought to light in Section 4. The PPI *supposed to* exhibits, in the dialect of certain speakers, an even subtler character (Section 5): it is a neg-raiser, but manifests this property only when certain pragmatic conditions are met.

## 2 Background: Neg-raising

### 2.1 Homogeneity

The verbs *want* and *think* are said to be neg-raising predicates (NRPs). This means that, when negated, they are preferentially — but not necessarily — interpreted as having semantic scope over negation, as shown in the paraphrases (1a-i) and (2a-i) below. By contrast, the predicates *desire* and *be certain* are not NRPs:

- (1) a. John doesn't want to help me.
  - (i) *Paraphrasable as*: John wants not to help me. (NR reading)
  - (ii) *Paraphrasable as*: John doesn't have a desire to help me.  
(Non-NR reading)
- b. John doesn't desire to help me.  
*Not paraphrasable as*: John desires not to help me.
- (2) a. John doesn't think that he's competent.
  - (i) *Paraphrasable as*: John thinks that he is not competent.  
(NR reading)
  - (ii) *Paraphrasable as*: John doesn't have the belief that he's competent.  
(Non-NR reading)
- b. John is not certain that he is competent.  
*Not paraphrasable as*: John is certain that he is not competent.

There is a long history of research on the topic. Early proposals in the generative tradition (under the name of “Negative Transportation” theories, Lakoff 1969) took the near synonymy between e.g., (1a) and (1a-i) at face value

and held that the wide scope of NR predicates over negation is achieved by syntactic means, i.e., negation originates in a low base-position (in the embedded clause), at which it is eventually interpreted (after what would be called in modern terms “reconstruction”).

This purely syntactic view is hard-pressed to explain neg-raising with negative quantifiers, e.g., *no one* and *never*. (3a) and (4a) are preferentially — but not necessarily — interpreted as meaning (3b) and (4b) respectively, i.e., as having a neg-raised reading:

- (3) a. No one wants to help me.
  - b. *Paraphrasable as*: Everyone wants not to help me. (NR reading)
  - (4) a. John never wants to help me.
  - b. *Paraphrasable as*: John always wants not to help me.
- (NR reading)

Here again, it seems that negation is interpreted in the scope of the embedding predicate; what is surprising though is that these paraphrases contain positive universal quantifiers, *every* and *always*. If interpreting negation in the embedded clause is all there is to neg-raising, then the facts are inexplicable. The reason is that if negative quantifiers spell out negation and an existential quantifier as I assume here (5a),<sup>3</sup> then the negative transportation hypothesis, i.e., the syntactic raising of negation hypothesis, predicts an inadequate neg-raised reading (as first observed in Horn & Bayer 1984 and

<sup>3</sup> This view is shared by a number of researchers, e.g., Kratzer 1995 and Sauerland 2000. The hypothesis is inspired by cases of so-called Neg-split reading in Dutch, German and English. With a modal verb (a quantifier over possible worlds) negative quantifiers can give rise to Neg-split, whereby the negative element is interpreted above the modal, while an existential component is interpreted below it:

- (i) Ze mogen geen eenhoorn zoeken. (Dutch)  
they are allowed no unicorn seek  
[Rullmann 1995, cited in Iatridou & Sichel 2008]
  - a. There is no unicorn  $x$  such that they are allowed to seek  $x$ . (wide scope)
  - b. What they are allowed to do is seek no unicorn. (narrow scope)
  - c. They are not allowed to seek a unicorn. (split scope)
- (ii) No doctor has to be present.
  - a. There is no doctor  $x$  such that  $x$  has to be present. (wide scope)
  - b. It is not required that a doctor be present. (split scope)

In a similar fashion, one can show that *never* gives rise to Neg-split:

Horn 1978). It is given in (5b) below; (5c) is the paraphrase of the result of reconstructing the entire negative quantifier (negation and the existential quantifier):

- (5) a. NEG<sub>1</sub> someone want [ t<sub>1</sub> help ]  
 b. Someone wants not to help me.  
 c. (There) wants no one to help me.

Not only is the actual reading not derived, but the two readings obtained by reconstruction ((5b) and (5c)) are simply unavailable. The syntactic accounts are therefore insufficient. Semantic or pragmatic alternatives were proposed very early on: the intuition they develop, dating back to Bartsch 1973, is that neg-raising predicates are true either of their complement or of its negation, in other words they give rise to an excluded middle or homogeneity inference. Bartsch's own analysis was pragmatic, not semantic (she invoked a "pragmatische Implikation"); but Gajewski 2005, 2007, who retains the idea of a homogeneity inference, proposes after Heim 2000 that this inference is a semantic presupposition, and that it is lexically attached to certain predicates but not to others. This way, he aims to account for differences among predicates, for example between the near synonyms *want* and *desire*, of which only the former is an NRP.

I give a semantics for the verb *want* in the spirit of his proposal. First of all, I define  $\text{Boul}(x, i, w)$ , the set of bouletic alternatives of individual  $x$  in world  $w$  at time  $i$ :<sup>4</sup>

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- (iii) a. I never can thank you enough. NEG>>CAN>>EVER  
 b. Ten disposable things you never have to buy again. NEG>>HAVE\_TO>>EVER  
     [planetgreen.discovery.com/home-garden/disposables-avoid-cut-clutter.html](http://planetgreen.discovery.com/home-garden/disposables-avoid-cut-clutter.html)  
 c. I love what I do and can never imagine doing anything else.  
NEG>>CAN>>IMAGINE>>EVER>>DO

Notice that in (iiic) the existential part, equivalent to *ever*, is interpreted in the second embedded clause under *can* while the negative part is a clausemate of *can*, which indicates that the two components can be fairly far apart. Such facts militate, it seems, against an analysis of Neg-split in terms of movement of the modal past the existential component, such as Lechner 2006.

The decompositional approach to negative quantifiers presented and adopted here is not a consensus view, though: on this question, see Klima 1964, Jacobs 1980, Ladusaw 1992, Geurts 1996, de Swart 2000, Penka & Zeijlstra 2005, Penka 2011, Iatridou & Sichel 2008 among others

<sup>4</sup> For expository purposes, I present here the homogeneity inference as being a lexical presupposition triggered by an NRP; but I will discuss a possible alternative, see Section 5.

- (6) When  $\neq \#$ ,  $\text{Boul}(x, i, w)$  is a set of triples of  $D_e \times D_i \times D_s$ :  
 $\text{Boul}(x, i, w) =$   
 $\{\langle x', i', w' \rangle : \langle x', i', w' \rangle \text{ is compatible with what } x \text{ wants in } w \text{ at } i\}$

The third disjunct in the definedness condition of the following lexical entry for *want* is the homogeneity presupposition (I adopt a trivalent system):

- (7)  $\llbracket \text{want} \rrbracket^{c,s} = \lambda p_{\text{eist}}. \lambda x_e. \lambda i_i. \lambda w_s.$   
 $\#$  iff (i)  $\text{Boul}(x, i, w) = \#$   
(ii) for some  $\langle x', i', w' \rangle \in \text{Boul}(x, i, w)$ ,  $p(x')(i')(w') = \#$   
(iii) it is not the case that either  
for each  $\langle x', i', w' \rangle \in \text{Boul}(x, i, w)$ ,  $p(x')(i')(w') = 1$  or  
for each  $\langle x', i', w' \rangle \in \text{Boul}(x, i, w)$ ,  $p(x')(i')(w') = 0$ ;  
if  $\neq \#$ , 1 iff for each  $\langle x', i', w' \rangle \in \text{Boul}(x, i, w)$ ,  $p(x')(i')(w') = 1$

Adopting this perspective makes the movement of negation useless: negation is base-generated and interpreted in the same clause as the NRP and above it; the neg-raising effect is due to the computation of a homogeneity inference in concert with the assertive content of the sentence. Combining the assertive content and the homogeneity inference gives the desired result first for non-quantified sentences:

- (8) a. John doesn't want to help me.  
b. (i) *Assertion*: It is not the case that John wants to help me.  
(ii) *Homogeneity inference*: John wants to help me or John wants not to help me.  
 $\therefore$  John wants not to help me.

We now turn to quantified sentences of the form *No  $x$  wants to  $p$* : the presupposition attached to the predicate is assumed to project universally under a universal quantifier (Heim 1983), in other words, *each* individual  $x$  is such that  $x$  either wants  $p$  or its negation.<sup>5</sup> Under this assumption, we correctly predict the attested (and favored) reading of (9a) given in (9c) and derived in (9d):<sup>6</sup>

<sup>5</sup> See Chemla 2009 for experimental data that show that presuppositions project universally in the nuclear scope of negative universal quantifiers.

<sup>6</sup> Assuming that the homogeneity inference projects universally under a universal quantifier over times, we derive the neg-raised reading of (4a) — repeated below — in a parallel fashion:

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- (9)
- a. No one wants to help me.
  - b. *Paraphrasable as*: No one desires to help me. (Non-NR reading)
  - c. *Paraphrasable as*: Everyone wants not to help me. (NR reading)
  - d. (i) *Assertion*: It is not the case that there is an  $x$  such that  $x$  wants to help me.  
(ii) *Projection of the homogeneity inference*: For every  $x$ , either  $x$  wants to help me or  $x$  wants not to help me.  
∴ Everyone wants not to help me.

Assuming that the presupposition also projects universally under *not every*, we correctly derive the neg-raised reading of (10a) given in (10c):

- (10)
- a. Not everyone wants to help me.
  - b. *Paraphrasable as*: Not everyone desires to help me. (Non-NR reading)
  - c. *Paraphrasable as*: There are some people who want not to help me. (NR reading)
  - d. (i) *Assertion*: It is not the case that everyone wants to help me.  
(ii) *Projection of the homogeneity inference*: For every  $x$ , either  $x$  wants to help me or  $x$  wants not to help me.  
∴ There is some  $x$  such that  $x$  wants not to help me.

I will call the neg-raised reading instantiated in (10c) a *wide scope existential quantification reading*, because, as the paraphrase indicates, the contribution of *not everyone* is equivalent, due to homogeneity, to the combination of a high existential quantifier and a low negation. This reading is not very often discussed in studies on neg-raising, but it is a hallmark of neg-raisers and I will use it as a test in the investigation of the scope of *must*, *should* and *supposed to* (see Sections 3 through 5).

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- (i)
- a. John never wants to help me.
  - b. (i.) *Assertion*: It is not the case that there is a time  $t$  at which John wants to help me.  
(ii.) *Projection of the homogeneity inference*: For every time  $t$ , either John wants at  $t$  to help me or John wants at  $t$  not to help me.  
∴ John always wants not to help me.

## 2.2 Cyclic neg-raising

While neg-raisers can uneventfully take narrow scope under a negation that surfaces in a superordinate clause, wide scope is also possible, as indicated for *want* by the second paraphrase of the following sentence (the first paraphrase is not particularly remarkable, it just illustrates the neg-raising potential of *think*):

- (11) I don't think that John wants to help me.

✓NEG>>WANT; ✓THINK>>WANT>>NEG

*Paraphrasable as:* I think that it is not the case that John wants to help me. (NR reading)

*Paraphrasable as:* I think that John wants not to help me. (NR reading)

This narrowest scope interpretation of a surface superordinate negation is only possible with certain embedding verbs in the higher clause, namely verbs that are themselves neg-raisers, hence the name “cyclic neg-raising” for the phenomenon (Fillmore 1963, Horn 1972a; see Gajewski 2007 for a recent discussion). But there is a further constraint about the verb in the higher clause: only some NRPs make cyclic neg-raising possible. While *think* does, *want* doesn't:

- (12) I don't want John to think that I'm angry.

*Not paraphrasable as:* I want John to think that I'm not angry. (NR reading)

Gajewski (2005: 53 ff.) convincingly argues that the projection of the homogeneity inference (a presupposition, according to him) explains the unequal availability of cyclic neg-raising with the desire predicate *want* and with the doxastic predicate *think*. He offers the following account (which draws on Karttunen 1974 and Heim 1982).<sup>7</sup>

Presuppositions triggered in the complement of a doxastic predicate, e.g., *think*, hold in all the doxastic alternatives that the predicate quantifies over. Consider for example the existence presupposition (= there exists a cello that belongs to Bill) triggered by the definite description *his cello* in (13):

<sup>7</sup> Gajewski points out that the following question arises: does the homogeneity presupposition of an embedded NRP contribute to the homogeneity presupposition of an embedding NRP? For simplicity, I simply assume in my presentation that the answer is negative. See Gajewski 2005 for an in-depth discussion.



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- (13) Bill will sell his cello.  
*Presupposition:* Bill has a cello.

When (13) is embedded under *think*, as in (14), the resulting sentence presupposes that in all of Bill's doxastic alternatives, Bill has a cello (and it also presupposes that Bill has a cello).

- (14) Bill thinks he will sell his cello.  
*Presupposition:* Bill thinks he has a cello.

The presuppositions triggered in the complement of a desire predicate, e.g., *want*, hold in the *doxastic* alternatives of the subject of the desire predicate, not in her bouletic alternatives. In the case at hand, *Bill wants to sell his cello* presupposes that Bill thinks that he has a cello (and it also presupposes that he has one), not that he wants to have one.

- (15) Bill wants to sell his cello.  
*Presupposition:* Bill thinks he has a cello.  
*Doesn't presuppose:* Bill wants to have a cello.

In light of these facts, we can now have a better grasp of cyclicity (and lack thereof) with NR predicates: assuming that the homogeneity inference is a presupposition, we expect that it will project differently under *think* and under *want*. Let us first look at embedding under the former:

- (16) [I don't think [John wants to help me] <sub>$\beta$</sub> ] <sub>$\alpha$</sub>
- Assertion of  $\alpha$ :* It is not the case that I think that John has a desire to help me.
  - Homogeneity inference* triggered by *think* in  $\alpha$ : I think that John has a desire to help me or I think that John doesn't have a desire to help me.
  - Homogeneity inference* triggered by *want* in  $\beta$ : John has a desire to help me or John has a desire not to help me.
  - Projection of the homogeneity inference* triggered in  $\beta$ : I think that John has a desire to help me or John has a desire not to help me.

(16a) and (16b) together entail (17):

- (17) I think that John doesn't have a desire to help me.

(17) and (16d) together entail (18):

(18) I think that John has a desire not to help me.

(18) is the reading of (16) that obtains by cyclic neg-raising, as desired. Now consider what happens if *think* is embedded under *want*:

- (19) [I don't want [John to think I'm angry]<sub>β</sub>]<sub>α</sub>
- a. *Assertion of α*: It is not the case that I want John to think I'm angry.
  - b. *Homogeneity inference* triggered by *want* in  $\alpha$ : I want John to think I'm angry or I want it not to be the case that John thinks I'm angry.
  - c. *Homogeneity inference* triggered by *think* in  $\beta$ : John thinks I'm angry or John thinks I'm not angry.
  - d. *Projection of the homogeneity inference* triggered in  $\beta$ : I think that John thinks I'm angry or John thinks I'm not angry.

(19a) and (19b) together entail (20):

(20) I want it not to be the case that John thinks I'm angry.

(20) and (19d) do not entail together (21):

(21) I want John to think I'm not angry.

In contrast to what happens with a doxastic embedding attitude, the projection of the inference triggered in the embedded clause doesn't combine with (20) to yield (21). Therefore the presupposition approach appears to capture the data adequately.

### 2.3 Lack of neg-raising

There is however a question that needs to be addressed. The neg-raising construal of verbs like *want* and *think* doesn't seem to be necessary (this is a fairly old observation, see among others Bartsch 1973); for example, (22a) is felicitous (and (23a) is too) although it is not used to convey the neg-raised meaning in (22b) ((23b) resp.). I emphasize that the sentences are felicitous, because this means that no presupposition failure occurs:

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- (22) a. Unlike many people nowadays, my great-grandparents didn't want to spend all their spare time on the internet.  
b. My great-grandparents wanted not to spend all their spare time on the internet.
- (23) *Context:* At a job interview...  
a. I don't want to make a lot of money, you know.  
b. I want not to make a lot of money.

It is well-known that presuppositions can be cancelled, i.e., prevented from projecting by being satisfied locally. The only plausible way the putative homogeneity presupposition could be satisfied in (22a) and (23a) is if it is silently included in the assertive content in the scope of negation. This is what is traditionally called "local accommodation" (see Heim 1983). For example, (24) carries an existence presupposition which is notoriously not supported by the current political state of affairs; in (25), this presupposition is said to be locally accommodated:

- (24) #The King of France is (not) bald.  
*Presupposition:* There exists a King of France.
- (25) The King of France is not bald, because there is no King of France.  
*Presupposition:* None.  
*Local accommodation in (25):* It is not the case that (there is a King of France and that he is bald), because there is no King of France.

Local accommodation is not very well understood (and often criticized, see von Stechow 2008). It is typically invoked to account for lack of projection when the presupposition is explicitly denied in a continuation, as in (25). It could equally well be invoked about (27):

- (26) Bill doesn't think that Sue is here.  
*Hypothetical presupposition:* Bill thinks either that Sue is here or that Sue is not here.
- (27) Bill doesn't think that Sue is here because he has no opinion.  
*Hypothetical local accommodation in (27):* It is not the case that (Bill thinks either that Sue is here or that Sue is not here and that Bill thinks that Sue is here) because he has no opinion.

But the facts in (22a) and (23a) are not exactly, it seems, of the same nature as those in (25) and (27). If we try to block the projection of the presupposition that there exists a King of France by inserting the sentence that carries it in the same frame in which the putative homogeneity presupposition fails to project in (22a)-(23a), we still get a presupposition failure:

- (28) a. #Unlike many people, the King of France is not bald.  
 b. #The King of France is not bald, you know.

This suggests that there could be a difference between the presupposition attached to definite descriptions and the inference attached to neg-raisers. The lack of projection in (22a)-(23a) is reminiscent of what happens with so-called *soft* presupposition triggers (Abusch 2002, Abbott 2006), i.e., triggers which can relatively easily fail to give rise to a presupposition, e.g., *stop*:

- (29) a. John has stopped smoking.  
*Presupposition:* John used to smoke.  
 b. *Context:* John, who I met a minute ago, seems to be a very aggressive person. I wonder why this is so...  
 Has John stopped smoking or something?  
*No presupposition projects.*  
 c. *Context:* John didn't use to smoke...  
 Unlike many people, John hasn't stopped smoking.  
*No presupposition projects.*

It is thus *a priori* reasonable to view NRPs as soft triggers, and this is precisely the move that Gajewski 2007 makes. It is important to note however that the difference between soft and hard triggers is still an open theoretical problem: we do not know yet whether the lack of projection in sentences such as (29b) is due to a satisfaction mechanism of a triggered presupposition (in the spirit of, but not necessarily identical to, local accommodation) or to lack of triggering.<sup>8</sup> We will come back to the workings of the presupposition of NRPs in Section 5.3.

<sup>8</sup> In Homer 2010c, I offer the first empirical test to adjudicate between local accommodation and lack of triggering of a presupposition. The test relies on NPI licensing: for NPIs whose licensing is disrupted by presuppositions, local accommodation does not salvage them, while non-triggering does. This test, however, is of no avail here, as the putative presupposition is not a disruptor of NPI licensing.

## 2.4 Summary

To sum up, I have presented in this section the main properties of neg-raising predicates and shown that the semantic approach to the phenomenon is more adequate than the syntactic one: a neg-raiser achieves wide scope over negation *while being in the syntactic scope of negation* all along. Specifically, an analysis in terms of presupposition makes the right predictions about the cyclicity phenomenon. If this analysis is correct, lack of neg-raising in certain cases can be explained either as an instance of satisfaction (perhaps local accommodation) or as an instance of non-triggering of the homogeneity presupposition.

We will draw heavily on this discussion in the rest of the article: we now have criteria to recognize neg-raisers and tell them apart from other wide scope takers, namely mobile Positive Polarity Items.

## 3 Deontic *must* is a mobile PPI

In this section, I show that deontic *must* is a PPI<sup>9</sup> which can raise out of an anti-licensing environment. And I also exclude the hypothesis that it is a neg-raiser.

In certain configurations such as (30), deontic *must* necessarily takes scope over a clausemate negation; similarly with a clausemate negative quantifier (e.g., *no one*, *never*):

- (30) a. John  $\text{must}_{\text{deon}}$ n't jog.  $\checkmark \text{MUST} \gg \text{NEG}; * \text{NEG} \gg \text{MUST}$   
 b. John  $\text{must}_{\text{deon}}$ n't jog, #but he's allowed<sub>deon</sub> to.  
 c. No one  $\text{must}_{\text{deon}}$  jog.  $\checkmark \text{MUST} \gg \text{NEG}; * \text{NEG} \gg \text{MUST}$   
 d. No one  $\text{must}_{\text{deon}}$  jog, #but everyone is allowed<sub>deon</sub> to.<sup>10</sup>

<sup>9</sup> The claim that  $\text{must}_{\text{deon}}$  is a PPI was first made in [Israel 1996](#) (it can also be found in [Iatridou & Zeijlstra 2013](#), see Appendix III (A.3)), but had never been established empirically, as far as I know. The demonstration presented here elaborates on [Homer 2010a](#).

<sup>10</sup> Deontic accessibility relations are extremely diverse, much more so than, say, epistemic accessibility relations: by this I not only mean that there are multifarious types of obligations and permissions, *viz.* moral, legal, religious, etc., but that those categories break down into subcategories; conflicts are rife among those obligations/permissions, even within a given category, as classical tragedies have long taught us. The kind of contradictions by means of which the lack of certain scopal relations is evidenced in examples like (30b) and (30d) only arise if the accessibility relations are kept strictly constant in the two conjuncts.

The problem of the scope of *must* has not received much attention in the literature (de Haan 1997). The wide scope of *must* is generally assumed to be absolutely rigid (for Horn 1989, it is somehow lexically encoded).

But there are other expressions which, in certain configurations, cannot be interpreted in the scope of a clausemate negation or a negative quantifier. The quantifier *some* is one of them:

- (31) When Fred speaks French. . .
- a. . . Jean-Paul doesn't understand something. ✓SOME≫NEG; \*NEG≫SOME
  - b. . . no one understands something. ✓SOME≫NEG; \*NEG≫SOME

Because of this very restriction, *some* is described as being a Positive Polarity Item (Szabolcsi 2004, Jespersen 1909–1949 among others). If certain items are unable to scope under negation because they are polarity sensitive, it is natural to think that deontic *must* is one of them; the rest of this section establishes that this hypothesis is indeed correct, and it does so through a close comparison of the distributional patterns of *must* and of *some*, a well-known PPI. I also discuss and dismiss the most sensible alternative hypotheses, namely that *must* is base-generated above negation, and that *must* is a neg-raising predicate.

### 3.1 PPIs

In Homer 2012b, I explain that *some* is licensed in sentence *S* only if there is at least one (eligible) constituent  $\beta$  of *S* which is not downward-entailing (DE) with respect to the position of *some* (licensing is thus environment-based rather than operator-based).<sup>11</sup> The downward-entailingness of constituents is defined as follows:

- (32) **Downward-entailingness of a constituent (after Gajewski 2005):**  
 A constituent *A* is DE with respect to the position of  $\alpha$  ( $[\alpha] \in D_\sigma$ ) iff the function  $\lambda x. [A[\alpha/v_{\sigma,i}]]^{g[v_{(\sigma,i)} \rightarrow x]}$  is DE, where  $A[\alpha/v]$  is the result of replacing  $\alpha$  with  $v$  in *A*.

<sup>11</sup> While I claim that *some* is anti-licensed in *DE environments*, previous researchers, e.g., van der Wouden 1997 and Szabolcsi 2004, hold a view that is different in two ways: according to them, *some* is anti-licensed by *anti-additive operators*. On anti-additivity, see Zwarts 1998.

In [Homer 2012b](#), I also show that there is a procedure at LF which examines, for each polarity item in a sentence  $S$ , the monotonicity properties of the constituents that contain it; and for any given PI  $\pi$  only some constituents are *eligible* for the assessment of its acceptability; the constituents in which the acceptability of  $\pi$  can be evaluated are what I call the *domains* of this item  $\pi$ . Specifically, I was able to propose an empirical claim about the domains of *some* (other PIs may have other domains):

- (33) **Domains of *some*:** The set of domains of *some* in a sentence  $S$  is the set of constituents of  $S$  that contain *some* and their clausemate Pol head.

Pol (similar to [Laka's \(1990\)  \$\Sigma\$](#) ) is the projection whose specifier is filled with negation when the polarity of the clause is negative, with a silent positive operator when the clause is positive. I will say that PolP is the minimal domain of *some*.

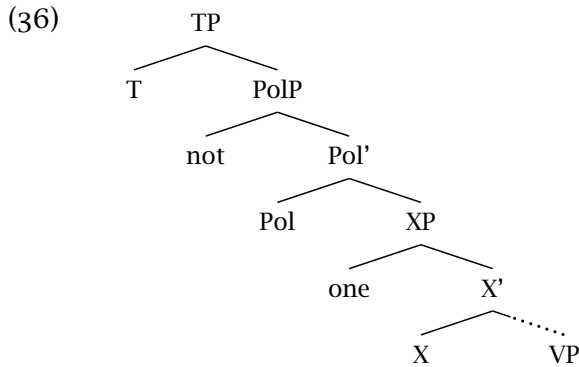
For example, consider again sentence (31a): it contains the PPI *some*; the domains of *some* are all the constituents of (31a) which contain *some* and their clausemate Pol head (this is a simplex clause, there is only one Pol head); VP, which does not contain Pol, is not a domain of *some*, while PolP and its superconstituents are:

- (34) LF of (31a):  $*[_{\text{TP}} \text{Jean-Paul } [_{\text{PolP}} \text{not } [_{\text{VP}} \text{something}_i \text{understand } t_i ] ] ]$

PolP is the minimal domain of *some* and in (31a), it contains a negation. We can thus say that all the domains of *some* are downward-entailing with respect to its position, leading to anti-licensing. If VP were a domain of *some*, the PPI would be licensed because one of its domains would be free of any negative expressions. The same holds of (31b), given the analysis of negative quantifiers which I am assuming (see p. 4):

- (35) LF of (31b):  $*[_{\text{TP}} [_{\text{PolP}} \text{no one something}_i \text{understand } t_i ] ]$

For perspicuity, the decomposition of *no one* that I assume is shown in this tree:



What is demonstrated here is a locality condition on acceptability, different from the condition on the negative strength of the environment (i.e., the difference between mere downward-entailingness, anti-additivity and anti-morphism, established by [Zwarts 1998](#)<sup>12</sup>). It is important to separate the two factors that bear on the acceptability of polarity items: different polarity items are (can be) subject to different locality conditions, i.e., domains are item specific; and they are (can be) sensitive to different logical properties (polarity items are more or less strong).

- (37) **Licensing Condition of Polarity Items:** A PI  $\pi$  is licensed in sentence  $S$  only if there is at least one domain of  $\pi$  which has the monotonicity properties required by  $\pi$  with respect to the position of  $\pi$ .

As this condition, which applies to NPIs and PPIs alike, makes clear, there is an interpretation mechanism which has access to subparts of sentences, and can evaluate the acceptability of polarity items within them: acceptability need not be global. It bears also saying that, because of the existence of minimal domains, uninterpretability in the scope of a clausemate negation is not a necessary condition for being a PPI (see [Homer 2012b](#) and Appendix II): there exist PPIs with a minimal domain smaller than PolP; they are interpretable under a clausemate negation because one can find domains of theirs, e.g., VP, in which negation is not present.<sup>13</sup>

<sup>12</sup> These properties can be viewed, informally, as degrees of negativity: any environment that is anti-morphic is also anti-additive and downward-entailing, but not vice versa; any environment that is anti-additive is also downward-entailing but not vice versa.

<sup>13</sup> Specifically, I propose that *devoir*<sub>deon</sub>, the French counterpart of *must*<sub>deon</sub> and also a PPI, can be evaluated in constituents that do not contain Pol, and that this property explains why it can take scope below a clausemate negation, see Section [A.2.1](#).



As far as locality is concerned, we can already conclude from (30a) that if  $must_{deon}$  is a PPI (it is in fact, as I will show in 3.3 and 3.4), it cannot be evaluated in constituents that do not contain the local Pol, just like *some*. (30a) and (30c) are not significantly different from the perspective of locality: since *no one* consists of (sentential) negation and an existential component, in both cases, there is a negation in the local PolP of  $must_{deon}$ . There is a strength difference however: while negation creates an antimorphic environment, the composition of negation and an existential quantifier in its scope creates an anti-additive environment, which is less strongly negative, so to speak; since  $must_{deon}$  cannot be interpreted in those syntactic environments, it appears that it is vulnerable to anti-additivity.

One fact in particular lends decisive support to this approach to PPIs in terms of domains: while *some* is not interpretable under a clausemate negation (unless it is rescued as in 3.3 or shielded as in 3.4), it can unproblematically be interpreted under a superordinate negation. As we will see,  $must_{deon}$  shows the same behavior, which is a point of some significance towards showing that  $must_{deon}$  is a PPI.

Let us first consider *some* ((38b) is a control):

- (38) a. Sue doesn't think that Jean-Paul understands something. ✓NEG≫SOME  
       b. Jean-Paul doesn't understand something. \*NEG≫SOME

The availability of the narrow scope reading of *some* in (38a), in contrast with (38b), is easily explained by the principles laid out above (and in Homer 2012b, to which the reader is referred for details): in (38a), *some* is acceptable in an eligible constituent that doesn't contain negation, e.g., the embedded clause (this CP is a domain of *some* because it contains its clausemate Pol head); this is sufficient since a PPI of the *some*-type must find at least one eligible constituent in which it is not in a downward-entailing environment. In (38b) on the other hand, there is no such constituent, since the minimal domain of *some*, i.e., the smallest possible constituent in which its acceptability can be checked, is PolP, and it contains a negation.

Similarly, observe that  $must_{deon}$  can (and in fact must) have a narrow scope interpretation with respect to negation in (39a); this is not the case in (39b):

- (39) a. The doctor doesn't think that John  $must_{deon}$  jog. ✓NEG≫MUST  
       b. John  $must_{deon}$  not/ $must_{deon}$ n't jog. \*NEG≫MUST

So far, we haven't provided decisive evidence that *must*<sub>deon</sub> is a PPI (this will be achieved in 3.3 and 3.4); but we can already say that the contrast in (39) is compatible with an analysis of *must*<sub>deon</sub> as a PPI with PolP as the smallest constituent eligible for its evaluation (its minimal domain): in (39a), unlike in (39b), there is at least one eligible constituent in which *must* is in an upward-entailing environment, e.g., the embedded clause.

Note that the kind of embedding that we are considering here indicates that *must*<sub>deon</sub> is not a neg-raiser. In effect, when it is embedded under an epistemic neg-raiser, e.g., *think*, *must*<sub>deon</sub> fails the *cyclicity* test, i.e., it cannot scope both under the embedding predicate and over negation:

- (40) a. The doctor doesn't think that John *must*<sub>deon</sub> jog. (=39a)  
\*THINK >> MUST >> NEG  
*Not paraphrasable as*: The doctor thinks that John is required not to jog. (NR reading)
- b. No one thinks that John *must*<sub>deon</sub> jog. \*THINK >> MUST >> NEG  
*Not paraphrasable as*: Everyone thinks that John is required not to jog. (NR reading)

In this respect, it stands in sharp contrast with *want*:

- (41) a. The doctor doesn't think that John wants to jog.  
✓THINK >> WANT >> NEG  
*Paraphrasable as*: The doctor thinks that John wants not to jog. (NR reading)
- b. No one thinks that John wants to jog. ✓THINK >> WANT >> NEG  
*Paraphrasable as*: Everyone thinks that John wants not to jog. (NR reading)

Furthermore, *must*<sub>deon</sub> differs from neg-raisers in that it *cannot* be interpreted under a clausemate negation (in the absence of rescuing or shielding, see Subsections 3.3 and 3.4), as the hypothesis that it is a PPI with PolP as its minimal domain leads one to expect; compare (39b) on the one hand and (22a)-(23a)-(42c), in which the narrow scope of the NRP *want* is possible, on the other:

- (42) a. Unlike many people nowadays, my great-grandparents didn't want to spend all their spare time on the internet. (=22a)  
 b. I don't want to make a lot of money, you know. (=23a)  
 c. John doesn't want to jog. ✓NEG>>WANT  
*Paraphrasable as:* John doesn't have a desire to jog.

To sum up, the facts described in this section are at odds with the hypothesis that *must*<sub>deon</sub> is a neg-raiser. They are compatible with the hypothesis that it is a PPI (with PolP as its minimal domain, i.e., the smallest constituent eligible for its evaluation); but they are also consistent with the alternative view that it is always generated above its clausemate negation.

In order to show that *must*<sub>deon</sub> is indeed a PPI and a mobile one, in other words, a PPI which can raise out of an anti-licensing environment, the argument will unfold as follows: (i.) *must*<sub>deon</sub> can be interpreted in two different syntactic positions, one which is higher, and one which is lower, than the position of sentential negation (in simplex sentences such as (30), *must*<sub>deon</sub> is necessarily interpreted in the higher position); (ii.) *must*<sub>deon</sub> can be interpreted in the low position only if in this position it is in a non-negative environment, hence *must*<sub>deon</sub> is a PPI; (iii.) the high position of interpretation is only available if the environment under negation is one in which *must*<sub>deon</sub> is unacceptable, therefore the high position is a derived one, to which *must*<sub>deon</sub> moves.

### 3.2 A high syntactic position

I will now show that there are two different syntactic positions of interpretation of *must*<sub>deon</sub>. In this subsection, I establish that there is a high position above negation, in which it is interpreted in simplex negative sentences such as (30); this means that the wide scope of *must* over a clausemate negation (or negative quantifier) is a reflex of a certain syntactic configuration; the semantic machinery of neg-raising is not involved, as argued previously. And in the next two subsections, I show that *must* can also be interpreted in a low position under negation, which is only available in the configurations (rescuing and shielding) in which a PPI like *some* is interpretable under a clausemate negation.

It is possible to show that deontic *must* is in a position higher than negation when it is interpreted with wide scope, by devising a test that I will henceforth call the “pin” test (named after this example):

- (43) *Context:* The rules of this bowling game state that exactly one pin must remain standing, no matter which one...

Exactly one pin mustn't be knocked down.

✓MUST»EXACTLY\_ONE»NEG

*Paraphrasable as:* It is necessary that there is exactly one pin (no matter which one) that is not knocked down.

I use a subject quantifier and examine whether it can take scope below *must* and above negation: this is indeed the case (it is essential to use a contracted negation for the test to show anything;<sup>14</sup> the use of a non-monotonic quantifier is an additional precaution explained in Appendix I,

<sup>14</sup> It is important to use contracted forms of negation in the examples that support the investigation of the relation between *must* and a clausemate negation: I claim that only a negation that is a clausemate of a verb can get affixed to it. It is likely that root modals create biclausal structures, and under this hypothesis, given that *must* undergoes V-to-T, the base position of non-contracted negation is uncertain: it can be either in the matrix clause or in the embedded clause, as shown in the logical forms below:

- (i) John must<sub>deon</sub> not jog.  
 a. [... must not [<sub>Embedded Clause</sub> ... John jog]]  
 b. [... must [<sub>Embedded Clause</sub> ... not John jog]]

Since we are interested in the interaction of *must* with a clausemate negation, it is important to exclude embedded or constituent negations (a point that Iatridou & Zeijlstra 2013 fail to take into account, see Appendix III (A.3)).

When negation is contracted, it is a clausemate of the modal that it is affixed to. To see this, I will use ability *could* as a criterion because, unlike deontic *must*, it does not exhibit unexpected wide scope over negation — this is evidenced by its interaction with so-called negative quantifiers (ii) — and is therefore a straightforward index of the position of the modal with respect to negation.

- (ii) a. No one could<sub>abil</sub> jog here. \*CAN»NEG  
 b. No one must<sub>deon</sub> jog here. ✓MUST»NEG

*Could* is generated in a low position, lower than the position of negation in a negative sentence; but it undergoes V-to-T: it therefore ends up linearized before a clausemate negation. Under the hypothesis that V-to-T is semantically idle (see Chomsky 2000), it is expected to remain in the scope of clausemate negation after head-movement. This is exactly what one observes when negation is contracted (iii): *could* scopes rigidly below it (as already observed in Horn 1989, Chapter 4):

- (iii) John could<sub>abil</sub>n't jog. \*COULD»NEG  
 a. [... not could [... John jog]]  
 b. *Not available:* [... could [... not John jog]]

A.1). Importantly, it is not possible to derive this intermediate scope reading of (43) (the pins may vary across possible worlds) using a homogeneity inference. The only way for this option to be at least viable would be to reconstruct the subject quantifier into the complement of the modal.<sup>15</sup> The resulting meaning is not even a possible reading of the sentence:

- (44) a. [t<sub>1</sub> not must [[exactly\_one pin]<sub>1</sub> be\_knocked\_down]]  
 b. (i) *Assertion*: It is not the case that it is required that exactly one pin be knocked down.  
 (ii) *Hypothetical homogeneity inference*: It is required that exactly one pin be knocked down or it is forbidden that exactly one pin be knocked down.  
 ∴ It is forbidden that exactly one pin be knocked down.

This confirms the result that we reached earlier (3.1): *must*<sub>deon</sub> does not achieve wide scope via the semantic route of neg-raising. It thus stands to reason that the availability of the intermediate scope of *exactly one* indicates that the quantifier is syntactically sandwiched between the modal and negation, and that *must* achieves wide scope by syntactic means. The validity of the test is confirmed by the fact that a non-specific reading of the modified indefinite is not available in (45) despite the equivalence between  $\Box\neg$  and  $\neg\Diamond$ :

- (iv) John could<sub>abil</sub> not jog. ✓COULD>>NEG  
 a. [...not could [... John jog]]  
 b. [...could [...not John jog]]

But when negation is not contracted (iv), the two scope options are possible: this indicates that two structures are available ((iva) and (ivb)), and that the form *not*, unlike *n't*, can be generated below *could*, as a constituent or an embedded negation, as in (ivb).

Consequently, whenever possible, I only use contracted negations to probe the interaction between deontic *must* and a clausemate negation.

<sup>15</sup> Without reconstruction, the meaning that obtains is as follows. It is a possible reading of the sentence, although not the one we are after.

- (i) a. [[exactly\_one pin] not must [be\_knocked\_down]].  
 b. (i) *Assertion*: There is exactly one pin such that it is not required to knock it down.  
 (ii) *Hypothetical homogeneity inference*: For each pin, it is either required that it be knocked down or it is forbidden that it be knocked down.  
 ∴ There is exactly one pin such that it is forbidden to knock it down.

- (45) Exactly one pin cannot be knocked down. *Not paraphrasable as:* It is necessary that there is exactly one pin (no matter which one) that is not knocked down.

Note that at this stage, we can entertain two different hypotheses about this high position of interpretation: either *must*<sub>deon</sub> is base-generated in it, or it raises to it; that the latter hypothesis is the correct one will be established in due course (Subsection 3.4).

We can now proceed to complete the first step of the argument: I am going to show that deontic *must* can also be interpreted in a low syntactic position, under sentential negation; and because this option is available in exactly the same conditions under which a PPI like *some* can take narrow scope under negation, I will conclude that *must* is itself a PPI (step 2). The conditions in question are: either there is another downward-entailing expression outscoping *some* (this is what Szabolcsi 2004, building on Jespersen 1909-1949, Jackendoff 1969 and Baker 1970, calls “rescuing”, Subsection 3.3), or a quantifier intervenes between *some* and the offending negation (“shielding” in Szabolcsi’s (2004) terminology, Subsection 3.4). The behavior of *must*<sub>deon</sub> under shielding will also allow us to conclude that the high position of interpretation is the landing position of a movement (step 3).

### 3.3 Rescuing

With the downward-entailingness inducers *few people*, *no one* and *only* among others, rescuing of *some* can be observed, that is, *some* can take narrow scope under negation:

- (46) When Fred speaks French...
- a. ... few people don’t understand something. ✓FEW»NEG»SOME
  - b. ... there is no one who doesn’t understand something.  
✓NEG»NEG»SOME
  - c. ... only Marie doesn’t understand something.  
✓ONLY»NEG»SOME

In each of the above, following Homer 2012b, *some* has a domain which is not downward-entailing with respect to its position under the clause-mate negation: in (46a) for example, the maximal constituent (= main TP) is upward-entailing with respect to *some*, as a result of the composition of two

downward-entailing functions. This suffices to make the PPI acceptable in one of its domains: this explains that it is licensed.

With deontic *must*, similar configurations allow (but do not mandate) a narrow scope reading of the modal under a clausemate negation:

- (47) a. John is so unbelievably incompetent! He does nothing that  
            $\text{must}_{\text{deon}}\text{n't}$  be done over again.<sup>16</sup> NEG»NEG»MUST  
 b. John is the most competent accountant I know, but this is a free  
       country: so he does nothing that  $\text{must}_{\text{deon}}\text{n't}$  be done over again.  
NEG»MUST»NEG
- (48) a. Few boys  $\text{must}_{\text{deon}}\text{n't}$  read this very long book.  
✓FEW»NEG»MUST; ✓FEW»MUST»NEG  
 b. Only John  $\text{must}_{\text{deon}}\text{n't}$  read this very long book.  
✓ONLY»NEG»MUST; ✓ONLY»MUST»NEG

The conditions that allow it to be interpreted in a low position are related to the logical properties of the context, i.e., its *monotonicity*: following [Homer 2012b](#), rescuing occurs when a constituent is made available in which the modal is in an upward-entailing position, by the composition of two downward-entailing functions, e.g., the matrix TP in (47a). This suggests that, like *some*,  $\text{must}_{\text{deon}}$  is a PPI.

The fact that in rescuing configurations,  $\text{must}_{\text{deon}}$  can take either narrow or wide scope with respect to a clausemate negation is due to what I call the “liberal” character of the licensing procedure. This means that the evaluation can be operated in any domain of the PPI: here, it can take place in a domain which contains two DE expressions, or in one which contains just one. The former option makes a narrow scope interpretation possible; the latter option makes it impossible.

At this point, it is important to spell out some important assumptions I will be making throughout the article: (i.) there is only one sentential negation per clause; (ii.) negation cannot move; (iii.) there are no rightward movements. The possible narrowest scope of *must* is incompatible with the hypothesis that it is *always* base-generated above negation, given the assumption that

<sup>16</sup> There is some inter-speaker variation. Although all English speakers accept narrow scope readings of deontic *must* when the modal is “shielded” by a quantifier like *every* and *always*, see Section 3.4, for some speakers, rescuing is very hard if not impossible. (The same holds for  $\text{should}_{\text{deon}}$  and  $\text{supposed}_{\text{deon}}$  *to*: I did not observe, unlike [Iatridou & Zeijlstra 2013](#), that rescuing is harder with *should* than with *must*.) The same speakers find rescuing with *some* possible but less than optimal, which might be a clue towards an explanation.

there are no rightward movements. There must then be a base-generation position of *must* lower than negation (I submit that it is in VP); it is also incompatible with the hypothesis that *must* inevitably moves past negation for interpretation.

The next subsection deals with the other kind of configuration in which a PPI of the *some*-type can be interpreted under a clausemate negation, namely *shielding*, a configuration created by an intervening quantifier. Just like *some*, *must*<sub>deon</sub> can be shielded, a fact which constitutes the second piece of evidence in support of the claim that it is a PPI. The subsection also contains the observation that in a shielding configuration, *must*<sub>deon</sub> cannot be interpreted in the high position (over negation): the high position is thus one that *must*<sub>deon</sub> moves to when the environment under negation is an anti-licensing one.

### 3.4 Shielding

The PPI *some* is said to be shielded from negation when certain quantifiers, e.g., *always*, *necessarily*, intervene (*ever* in (49b) and *possibly* in (49d) are used as controls):

- (49) When Fred speaks French...
- a. ...Jean-Paul doesn't always understand something/\*anything.  
✓NEG >> SOME
  - b. ...Jean-Paul doesn't ever understand something/anything.  
\*NEG >> SOME
  - c. ...Jean-Paul doesn't necessarily understand something/\*anything.  
✓NEG >> SOME
  - d. ...Jean-Paul doesn't possibly understand something/anything.  
\*NEG >> SOME

*Always* and *necessarily* are strong scalar terms. In Homer 2012b, I adopt Chierchia's (2004) proposal that the indirect scalar implicatures that strong scalar terms give rise to in DE environments are monotonicity-breakers (when they are factored into the meaning that is relevant for the licensing of polarity items): as such their intervention is fatal to NPIs, and beneficial to PPIs. Existential quantifiers such as the NPI *ever* are not strong scalar terms, and as such, they do not trigger an indirect scalar implicature: *ever* doesn't shield *some* (and doesn't anti-license *any*). Strikingly, the universal



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quantifiers and strong scalar terms *always* and *necessarily* make the narrow scope of *must*<sub>deon</sub> available:

- (50) *Context: Speaking of clarinets...*
- a. One *must*<sub>deon</sub> n't always go with "new" to get "good".<sup>17</sup>  
✓NEG≫ALWAYS≫MUST
  - b. One *must*<sub>deon</sub> n't ever go with "new" to get "good".  
\*NEG≫EVER≫MUST
  - c. The show *must*<sub>deon</sub> n't necessarily go well, but it *must*<sub>deon</sub> go on.<sup>18</sup>  
✓NEG≫NECESSARILY≫MUST
  - d. The show *must*<sub>deon</sub> n't possibly go well.  
\*NEG≫POSSIBLY≫MUST

That the narrow scope of *must*<sub>deon</sub> is possible in (50a) and (50c) strongly suggests that *must*<sub>deon</sub> is sensitive to the modification that the presence of *always* and *necessarily* brings to the monotonicity of its context, in other words that it can be shielded, and this is a hallmark of a polarity item: we thus have the second piece of evidence that it is a PPI.

Another strong scalar term is worth examining in the same connection, namely *every*. Like *always* and *necessarily*, but unlike the existential *a single*, it can shield *some*:

- (51) a. Not everyone understands something. ✓NEG≫EVERY≫SOME  
b. Not a single person understands something.  
\*NEG≫A\_SINGLE≫SOME

Let us take some time to examine *not everyone*. It is unlikely to be a constituent: it is not available in object position (*\*I saw not everyone*) and it allows

<sup>17</sup> The original example can be found here:

[forum.saxontheweb.net/showthread.php?21845-Good-clarinet-for-beginning-clarinet-student](http://forum.saxontheweb.net/showthread.php?21845-Good-clarinet-for-beginning-clarinet-student).

<sup>18</sup> Iatridou & Zeijlstra 2010 examine a similar example taken from Homer 2010a, and claim that it has a modal concord reading, "where the two modals are felt to yield one single semantic modal". I fail to see this reading: if modal concord means that only one of the two modals is interpreted, the sentence should mean the same as (ia) or (ib) below, contrary to fact. Rather, it has the meaning of (ic):

- (i) a. It is not necessarily the case that the show goes well.  
b. It is not the case that the show must go well.  
c. It is not necessarily the case that the show must go well.

Neg-split (which is used as evidence for the analysis of negative quantifiers as comprising sentential negation and an existential quantifier):

- (52) *Context:* Words of wisdom found on a management consultant’s blog. Although each member is entitled to be on the board, not everybody can be on the board. ✓NEG>>CAN>>EVERY

Therefore it stands to reason that the constituency of (51a) is as follows, with *not* being sentential negation (assuming that Pol is lower than T):

- (53) LF: [<sub>TP</sub> T [<sub>PolP</sub> not [everyone<sub>2</sub> [something<sub>1</sub> t<sub>2</sub> understand t<sub>1</sub>]]]]

Strikingly, the narrow scope reading of *must*<sub>deon</sub> under negation is not only possible, but mandatory (as evidenced in (54b)), when *every* intervenes:

- (54) a. Not everyone *must*<sub>deon</sub> jog.<sup>19</sup> ✓NEG>>EVERY>>MUST; \*MUST>>NEG>>EVERY  
 b. #Not every one of you *must*<sub>deon</sub> jog; it doesn’t matter who doesn’t, but I want to make sure that I am not the only one who doesn’t jog.

Observe that the narrow scope of *must* is not obligatory with an adverb such as *always*:

- (55) a. You’re too credulous. You *must*<sub>deon</sub>n’t always believe what you are told. ✓MUST>>NEG>>ALWAYS  
 b. LF: [<sub>TP</sub> *must*<sub>1</sub> not t<sub>1</sub> [<sub>TP</sub> always ... ]

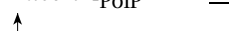
The discrepancy between the two kinds of shielders (*every* and *always*) is easily explained away once one takes into consideration the structural ambiguity of the sentences in which *always* follows the modal: due to the V-to-T movement of the modal, it is impossible to ascertain whether the adverb is a clausemate of the modal and thus intervenes, or if it is located within its complement clause (as in (55b)). An important fact thus gets obscured with

<sup>19</sup> Certain speakers of English allow for the reconstruction of subject *every* under negation (ia); the same speakers can interpret (ib) with *every* taking intermediate scope between the negation and the modal after reconstruction as shown in the LF in (ic):

- (i) a. Everything isn’t expensive. ✓NEG>>EVERY  
 b. Everything *must*<sub>deon</sub>n’t be expensive to be worthwhile. ✓NEG>>EVERY>>MUST  
 c. [t<sub>1</sub> not everything<sub>1</sub> *must* [t<sub>1</sub> be\_expensive]]

*always* but becomes visible with *every*: when  $must_{deon}$  is effectively shielded (by an intervener), it takes obligatory narrow scope under negation.

We can then draw an interesting conclusion about the high position of interpretation. If this position above negation were one in which  $must_{deon}$  can be generated, the monotonicity of the environment *below* negation should have no effect on the availability of this base-generation position. Since we do observe that the presence of a quantifier below negation makes the high position above negation unavailable, we are led to conclude that the high position is one to which  $must_{deon}$  moves, from a base-generation position below negation. I submit that the low position of interpretation is the one and only base-generation position of  $must_{deon}$  and that it is located within VP.  $Must_{deon}$  achieves wide scope over a clausemate negation (or a negative quantifier) in a simplex negative sentence, e.g., (30), through a movement out of the scope of an offending negation: this is what I proposed to label “escape” in [Homer 2010a](#); the motivation for this movement is polarity sensitivity:

- (56) a. John  $must_{deon}$ n’t leave. MUST >> NEG; \*NEG >> MUST  
 b. LF: [John<sub>1</sub>  $must_{deon}$  [<sub>PolP</sub> not \_\_\_ [ t<sub>1</sub> leave ]]]
- 

The LF in (56b) is the outcome of a procedure which evaluates *must* and licenses it in a position to which it arrives after raising past an offender. In this case, the offender, negation, is in the minimal domain of the PPI. But in principle, as argued in [Homer 2012b](#), if an anti-licenser is present outside of the minimal domain of *must*, escape is possible past it. The reason is that the procedure that evaluates a polarity item can evaluate it in any of its domains, not just in its minimal domain; suppose an anti-licenser is not present in the minimal domain but in some superconstituent of it, and the evaluation takes place in that constituent, then the conditions for escape are met, and it gets triggered. Licensing can subsequently take place in the landing position. There are restrictions however: escape appears to be clause-bound, because *must* cannot take scope in a superordinate clause, witness (39a), repeated here as (57):<sup>20</sup>

<sup>20</sup> If escape is a covert movement, it has clause-boundedness in common with another well-known covert movement, *viz.*, QR; *some*, which we use as a model PPI, can take very wide scope out of its base-generation clause, presumably through a choice function construal, see [Reinhart 1997](#).

- (57) The doctor doesn't think that John  $\text{must}_{\text{deon}}$  jog. (=39a)  
 \*MUST>>NEG>>THINK

### 3.5 Escape, a last resort

Let us now go back to the observation that when escape is made *unnecessary* (due to shielding), it is *impossible*,<sup>21</sup> resulting in obligatory narrow scope. Observe for control that the wide scope reading of *must* is possible and mandatory in the presence of the existential weak scalar term *a single person*:

- (58) Not a single person  $\text{must}_{\text{deon}}$  jog.  
 \*NEG>>A\_SINGLE>>MUST; ✓MUST>>NEG>>A\_SINGLE

The minimal pair (54a)-(58) confirms that the lack of wide scope of *must* in (54a) is due to monotonicity reasons. I thus propose (see also Homer 2010a, 2012b) that  $\text{must}_{\text{deon}}$ , and mobile positive polarity items in general, are subject to a Principle of Laziness:

- (59) **Principle of Laziness:** Let  $\pi^+$  be a PPI; for any domain *A* of  $\pi^+$  in which the acceptability of  $\pi^+$  gets evaluated, don't move  $\pi^+$  for polarity purposes if the monotonicity of *A* with respect to the position of  $\pi^+$  does not make  $\pi^+$  unacceptable in *A*.

The lack of wide scope over an upward-entailing adverb, e.g., *often*, generated above follows from this principle:

- (60) *Context:* John is an unexperienced cook; to help him, Bill gave him very strict instructions about the dinner he is cooking for his girlfriend...  
 #John often  $\text{must}_{\text{deon}}$  stir this pot, otherwise the risotto will scorch.  
 ✓OFTEN>>MUST; \*MUST>>OFTEN

<sup>21</sup> I do not know why *every* in *not every* cannot be reconstructed in its base position with the modal *must*, while it can with the existential modal *can*, giving rise to Neg-split, see (52). If this were possible, a wide scope reading of *must* would be expected to obtain: once *every* reconstructs, i.e., ceases to intervene, the environment of the modal is negative and escape can take place:

- (i) [  $\text{must}_2$  [not  $t_1$   $t_2$   $\text{every}_1$  ... ] ]

The same phenomenon, i.e., lack of reconstruction of *every* in *not every*, recurs with *supposed to*, see Section 5.

In the control (61), *often* can be generated below *must*, as it is linearized after it: this is the only way *must* can outscope *often*; it cannot outscope an adverb generated above it through V-to-T because this movement is semantically idle (Chomsky 2000):

(61) *Same context.*

John  $must_{deon}$  often stir this pot, otherwise the risotto will scorch.

✓MUST≫OFTEN

Also consonant with the principle is the obligatory narrow scope of  $must_{deon}$  under a merely downward-entailing adverb generated above, such as *rarely* (62a), assuming that  $must_{deon}$  is a relatively weak PPI (by which one means that it is only vulnerable to a subset of the negative environments: specifically, it is vulnerable to antimorphic and to anti-additive environments, not to merely downward-entailing ones<sup>22</sup>):

(62) *Same context.*

a. #John rarely  $must_{deon}$  open the oven, otherwise the cake won't rise.

✓RARELY≫MUST; \*MUST≫RARELY

b. John  $must_{deon}$  rarely open the oven, otherwise the cake won't rise.

✓MUST≫RARELY

Wide scope of *must* is available in (62b) but not in (62a), because only in the former is it possible to construe the adverb as generated *below* the modal, i.e., in an embedded clause.

It bears saying that in order to investigate the movement of the modal, it is advisable to use expressions that do not reconstruct, such as *every* in *not every*, or fixed points such as the adverbs *often* and *rarely*; subject quantifiers, if they can reconstruct under the modal, yield results that are harder to interpret. For instance, the merely downward-entailing subject quantifier *few students* can take wide or narrow scope with respect to *must*:

(63) Few students  $must_{deon}$  jog.

✓FEW≫MUST; ✓MUST≫FEW

The violation of Laziness is only apparent; precisely because the wide scope of  $must_{deon}$  occurs with a subject quantifier and not with an adverb, what

<sup>22</sup> While negation creates an antimorphic environment and “negative quantifiers” such as *no one* an anti-additive one, *few NP*, *at most three NP*, etc., create merely downward-entailing environments. On these distinctions, and on the definition of the properties, see Zwarts 1998.

happens in fact is that this option obtains when the subject quantifier reconstructs under the modal. Even with adverbs, the effects of Laziness do not always shine through, due to structural ambiguity. Recall that *always* can shield *must*<sub>deon</sub> (50a), but because of its linearization after the modal, it is impossible to ascertain whether this adverb is always a clausemate of the modal or not (it is the V-to-T movement of the modal that makes it hard to determine where the adverb is; facts are clearer with *supposed to*, see footnote 43 on p. 51); as a matter of fact, the surface string is scopally ambiguous. But the narrow scope of the modal (55a) is not a counterexample to Laziness: it obtains when the adverb is generated in the embedded clause.

Four things are worth noticing in closing. (i.) The Principle of Laziness is nothing but a last resort principle; this has some interesting consequences. If escape is a covert movement (as I will assume from now on), then it differs from QR, which is standardly not assumed to be a last resort. Besides if it took place in shielding configurations, escape would have a semantic effect, therefore Fox's (2000) economy principle against vacuous movements does not block it. And since it routinely gives rise to strengthened meanings, it violates another principle governing covert movement, *viz. Not Too Strong!* (Mayr & Spector 2009), which bans not only those covert scope shifting operations which are vacuous, but also those which lead to a strictly stronger reading than the surface-scope reading. (ii.) We have additional evidence about the smallest constituent in which the acceptability of *must* can be evaluated. Our assumption that it is PolP receives support from the intermediate scope of *must* in (48a), repeated as (64), together with the Principle of Laziness:

(64) Few boys mustn't read this very long book. (= (48a))  
 ✓FEW >> MUST >> NEG

If subject quantifiers sit in Spec,TP, then TP in (64) is upward-entailing with respect to the position of *must* (while PolP isn't), therefore escape should be blocked by Laziness if the minimal domain of *must* were TP. Since escape is possible in (64), *must* has a domain in which it is, prior to movement, in an anti-licensing environment: therefore the minimal domain of *must* has to be smaller than TP, and the hypothesis that it is PolP remains viable. But I emphasize that TP is also a domain — although not minimal — of *must*, i.e., a constituent where its acceptability can be assessed (hence the availability of a narrowest scope reading of (48a)): so are, for any clause, all the constituents that encompass the Pol head of that clause. (iii.) There is some uncertainty about the exact role of *every* in the shielding of *must*: I

claimed that *every* under *not* is a monotonicity-breaker because it induces an indirect scalar implicature, and I think this is indeed why it shields *some*, which, as I show in [Homer 2012b](#), is a strong PPI, i.e., it is vulnerable to mere downward-entailingness (although the locality condition on acceptability tends to obfuscate this fact).  $Must_{deon}$  appears to be a weaker PPI since it is not vulnerable to *rarely*, as escape cannot take place, which indicates that it doesn't have to; then the calculation of an indirect implicature is overkill, because the mere composition of *not* with *every* creates a merely downward-entailing environment, in which *must* is not anti-licensed anyway. (iv.) The shielding facts corroborate the claim that  $must_{deon}$  is a PPI; importantly, they also confirm the conclusion drawn earlier (3.1) that it is not a neg-raiser. For the *wide scope existential quantification* reading that obtains with neg-raising predicates under *not every* (see (10a) repeated below as (65)) is not available with  $must_{deon}$ , as evidenced by the incoherent discourse in (67):

- (65) Not everyone wants to help me. (=10a)  
*Paraphrasable as:* There is some  $x$  such that  $x$  wants not to help me.  
 (NR reading)
- (66) Not everyone  $must_{deon}$  get a flu shot.  
*Not paraphrasable as:* There is some  $x$  such that it is required that  $x$  does not get a flu shot.
- (67) — Doctor A: Not everyone  $must_{deon}$  get a flu shot.  
 — Doctor B: #Sorry but I don't think that there are people that must be left unvaccinated.

Recall that this reading, typical of neg-raisers, is derived through the addition of a homogeneity inference. It should be available in (66) if deontic *must* were a neg-raiser too: therefore we have another reason, in addition to lack of cyclicity and lack of narrow scope in simple cases (42c), to dismiss the hypothesis that deontic *must* is a neg-raiser.

At this point, there are several unanswered questions about escape. (And the LF in (56b) is intentionally noncommittal about them.) First of all, is escape a phrasal or a head movement? *Must* is undeniably a head, since it undergoes head-movement (V-to-T). But the view that V-to-T movement has semantic effects faces immediate problems: a number of modals head-move to T, e.g., *can* and *could*, but do not take scope over negation (see however [Lechner 2006](#) for a defense of the interpretive effects of head-movement which takes such facts into account; notice that I reject this proposal in 5.1):

(68) John can't (couldn't) smoke. \*CAN≫NEG; ✓NEG≫CAN

This view that the head-movement of modals affects their scope also poses a compositionality problem (unless Matushansky's (2006) theory is adopted, whereby phrasal and head movement do not differ essentially with regard to their landing site). Assuming that so-called "auxiliary" modals, e.g., *must*, head-move to T, functional application cannot combine a modal and T, since T has the right type to take as argument a constituent  $\gamma$  which contains the modal prior to movement. In the unlikely event that the modal and  $\gamma$  happen to be of the same type, the result of combining T and the modal still cannot have the appropriate type to combine with  $\gamma$ . A phrasal movement on the other hand would not raise a similar issue, but it is unclear what its exact target would be. Section 5.1 will bring what I think is decisive evidence against the view that escape reduces to (or even requires) overt V-to-T movement.

Second, is escape overt or covert? If it does not reduce to overt V-to-T, it is likely to be covert. Alternatively, one could imagine that some silent element moves *overtly*. Since the reading which obtains when *must*<sub>deon</sub> escapes is strictly equivalent to a reading in which it is *wholly* interpreted above negation, this option has little *a priori* appeal, but cannot be readily discarded.<sup>23</sup>

### 3.6 Summary

To sum up, deontic *must* is a PPI and it is not a neg-raiser. It shares with the PPI *some* four key properties, which suggests that it is itself a PPI (with PolP as its minimal domain):

- i. It cannot be interpreted under a clausemate negation, except in two circumstances enumerated below...
- ii. ... it can be rescued by another DE expression;
- iii. ... it can be shielded by a strong scalar term;
- iv. It has narrow scope under a superordinate negation.

These facts are inconsistent with the hypothesis that *must* is always base-generated above negation (or has to be interpreted in a position higher than

<sup>23</sup> Other technical questions are open, such as: where does escape land? Does it leave a trace? They too will have to await further research.



negation). The first property is incompatible with the hypothesis that it is a neg-raiser (neg-raising is optional, 2.3); so is the failure on the cyclicity test (40), and the lack of a wide scope existential quantification reading in (66). *Must*<sub>deon</sub> achieves wide scope over a clausemate negation by syntactic means: it can be shown that it is interpreted in a syntactic position that is higher than negation whenever it outscopes a clausemate negation. This high position of interpretation is only available when the environment under negation is negative; crucially, it is not available when this environment is non-monotonic, as happens when a shielder is present. Therefore *must*<sub>deon</sub> is what I call a mobile PPI, i.e., a PPI which can raise past an offender (the prototypical offender is clausemate negation). The next section investigates deontic *should* and shows, using the criteria that we now have under our belt, that it is both a neg-raiser and a mobile PPI.

#### 4 The dual nature of *should*<sub>deon</sub>

We now have tests to determine whether or not a given predicate is a neg-raiser and other tests to determine whether or not it is a PPI. Using them, I am going to show two things: first, that deontic *should* is a neg-raiser; and second, that it is concomitantly a mobile PPI, which explains its mandatory wide scope over negation in certain configurations:

- (69) a. John should<sub>deon</sub>n't jog.                    ✓SHOULD≫NEG; \*NEG≫SHOULD  
 b. John should<sub>deon</sub>n't jog, #it is okay if he does.  
 c. No one should<sub>deon</sub> jog.                    ✓SHOULD≫NEG; \*NEG≫SHOULD  
 d. No one should<sub>deon</sub> jog, #it is okay if everyone does.

In other words, *should* has a dual nature.

##### 4.1 *Should*<sub>deon</sub> is a neg-raiser

To establish that deontic *should* is a neg-raiser, we first use the cyclicity test.<sup>24</sup> Recall that a neg-raiser embedded under a negated doxastic neg-raiser can be interpreted as having wide scope over negation and under the embedding predicate (Section 2.2): of the three deontic modals *should*, *have to* and *must*,

<sup>24</sup> The claim that deontic *should* is a neg-raiser — and that *must* is not — is not new. It is already made in Horn 1989. Note 37, p. 578 (in the 2001 edition) substantiates the claim with a cyclicity test.



Neg-raising and positive polarity

- d. *Paraphrasable as*: There is some  $x$  such that  $x$  should not get a flu shot. (NR reading)
- e. (i) *Assertion*: It is not the case that every  $x$  is such that  $x$  should get a flu shot.  
(ii) Projection of the homogeneity inference: For every  $x$ , either  $x$  should get a flu shot or  $x$  should not get a flu shot.  
∴ There is some  $x$  such that  $x$  should not get a flu shot.

(72) *Control*:

Not a single person should get a flu shot.

Only paraphrasable as: It should be the case that no one gets a flu shot.

To ascertain whether sentence (71a) does have this wide scope existential quantification reading, we verify that it can be coherently inserted in a discourse of this kind:

- (73) — Doctor A: Not everyone should get a flu shot.  
— Doctor B: Sorry, but I don't think that there are people that should be left unvaccinated.

To sum up, cyclicity and wide scope existential quantification lead us to conclude that deontic *should* is a neg-raiser.

#### 4.2 *Should*<sub>deon</sub> is a mobile PPI

Is deontic *should* a PPI? Nothing in principle precludes that it is both a neg-raiser and a PPI. And we happen to have criteria that attest to its PPIhood: *should* cannot be interpreted under a clausemate negation (69a),<sup>25</sup> except in rescuing and shielding configurations. First, rescuing:

<sup>25</sup> An anonymous reviewer of *Semantics and Pragmatics* argues that in some sentences a narrow scope reading of *should* under a clausemate negation is actually possible:

- (i) a. — A: John must leave.  
— B: #No, he mustn't.
- b. — A: John should jog.  
— B: No, he shouldn't.

If the data are robust, they might challenge the generalization that *should* cannot be interpreted without shielding or rescuing under a clausemate negation. But it might be that the negation in (ib) can be a metalinguistic one, and we know independently that metalinguistic

- (74) John is so unbelievably incompetent! He does nothing that shouldn't be done over again. ✓NEG>>NEG>>SHOULD

We can account for (74) if *should* is a PPI, which can be generated lower than negation. In (74), it has a non-DE domain, i.e. the acceptability of this PPI can be evaluated in a constituent, e.g., the matrix TP, which contains two DE expressions and is therefore, by the composition of the functions they denote, upward-entailing with respect to the position of *should*.<sup>26</sup> This is all that the licensing condition in (37) requires. *Should* can also be shielded, e.g., by *every* (while *a single* is not a shielder (76)): in this case, as we saw earlier (see (71a) repeated as (75) below), either neg-raising kicks in, and a wide scope existential quantification reading is available, or it doesn't:

- (75) Not everyone should get a flu shot.  
*Paraphrasable as:* There is some *x* such that *x* should not get a flu shot. (NR reading)  
*Paraphrasable as:* It is not the case that every *x* is such that *x* should get a flu shot. (Non-NR reading)
- (76) *Control:*
- a. Not a single person should<sub>deon</sub> get a flu shot. \*NEG>>SHOULD; SHOULD>>NEG
  - b. Not a single person should<sub>deon</sub> get a flu shot; #it is okay if everyone does.

This is the second piece of evidence that *should*<sub>deon</sub> is a PPI, which cannot be evaluated in constituents that do not contain the local Pol head (like *must*<sub>deon</sub> and *some*). If this were not the case, *should* could in principle be interpreted under a clausemate negation, and take scope below it despite

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negation is not a PPI anti-licenser (Szabolcsi 2004). The problem would then remain to explain why a metalinguistic construal is not possible in (ia).

<sup>26</sup> Notice that when *should* is in a rescuing configuration, it can still outscope a clausemate negation (i):

- (i) John is the most competent accountant I know, but this is a free country: so he does nothing that shouldn't be done over again. ✓NEG>>SHOULD>>NEG

We know that this is also true of the mobile PPI *must*<sub>deon</sub> (see (47b) on p. 23). The source of the optionality is the same: it lies in the liberal character of the licensing procedure, i.e., there is some freedom in the choice of the domain in which acceptability is checked, see Appendix II A.2.

being concomitantly a neg-raiser: in Section 2.3 on p. 10, we observed that neg-raising is optional under a clausemate negation with *want* and *think*. *Should* simply never takes narrow scope under a clausemate negation (except when it is shielded or rescued).

We also have the “pin” test to decide whether a modal takes *syntactic* scope over negation. We apply the test to the simple case where *should* is in the scope of a clausemate negation:

- (77) *Context:* The rules of this bowling game state that exactly one pin must remain standing, no matter which one. . .  
Exactly one pin shouldn't be knocked down.  
✓SHOULD»EXACTLY\_ONE»NEG

The test is positive, therefore *should* can occupy a high syntactic position. To show that this is a derived position, to which *should* moves in order to avoid an anti-licensing environment, we need to show that the wide scope of *should* over negation is contingent on the monotonicity of the environment of the low position (within PolP):

- (78) Not everyone should<sub>deon</sub> get a flu shot; #no matter who doesn't get one, we just need to budget our doses.      \*SHOULD»NEG»EVERY

This is indeed the case, as shielding blocks the wide scope reading of *should* both over negation and *every*, due to Laziness (and *every* does not reconstruct prior to the evaluation of the acceptability of the modal, see footnote 21). I conclude that this modal is, like *must*, a *mobile* PPI.

To sum up, deontic *should* appears to be both a neg-raiser and a mobile PPI. In the presence of a clausemate negation and barring rescuing or shielding, it has to escape, and it is thus through covert raising that it achieves wide scope over negation. Escape trumps neg-raising, for neg-raising requires that an NR predicate be syntactically *lower* than negation. The neg-raiser nature of *should* is thus only manifest when it is generated in a configuration where escape cannot take place (i.e., under a superordinate negation or under a shielder like *every*). If we assume that *want* and *think* are pure neg-raisers

(i.e., not PPIs<sup>27</sup>), the discrepancy between them on the one hand and *should* on the other is explained away:

- (79) a. I envy my great-grandparents: unlike many people nowadays they didn't want to spend all their spare time on the internet. (=22a)  
*Paraphrasable as:* Unlike many people, my great-grandparents didn't have a desire to spend all their spare time on the internet.  
 (Non-NR reading)
- b. I envy my kids: unlike me, they should not jog.  
*Not paraphrasable as:* Unlike me, they are not required to jog.  
 (Non-NR reading)

The next section compares *must* (a pure PPI) and *should* (a PPI and a neg-raiser at the same time) and shows that *should* is clearly assessor dependent, while the assessor dependence of *must* is more problematic. I submit that this difference opens up new perspectives, and might further our understanding of neg-raising itself.

#### 4.3 Assessor dependence of *should*<sub>deon</sub>

*Should* is special among deontic modals in that it is assessor dependent:<sup>28</sup> the modal evaluation it encodes is relativized to some salient individual. For a sentence of the form *Should*( $\Phi$ ), this individual is opinionated about the truth of  $\Phi$  in deontic alternatives.<sup>29</sup> This assessor is the speaker in a simple unembedded sentence or in a relative clause modifying an NP at the top level, and when the modal is placed under an attitude verb, it is the subject of

<sup>27</sup> This hypothesis seems reasonable, since they can be interpreted under a clausemate negation without shielding nor rescuing. In Appendix II (A.2) however, I show that there are some reasons to suspect that *want* is a PPI, but a PPI of a special brand: it can unproblematically stay under a clausemate negation. The reasoning presented in the text is not affected.

<sup>28</sup> Frank (1996: 84) makes a similar point: “the reference context for the modal operators *might* and *should* is (preferably) constrained to the speaker's epistemic state or his conception of what is advisable for the addressee in the particular contextual setting.” This precedent was brought to my attention by Magda Kaufmann — whom I would like to thank — after I wrote the first version of this article.

<sup>29</sup> As an anonymous reviewer of *S&P* notes, it is important to distinguish two things that a deontic modal can be relativized to: on the one hand, a certain modal base and ordering source, whereby the worlds accessed can vary (‘in view of my obligations to my country I must take up arms, but in view of my obligations to my family, I must stay and protect my homestead’) and, on the other, the assessor, who has an opinion about the truth or falsity of the embedded proposition across those worlds.

that verb; to make the dependence conspicuous, I use a continuation which contradicts the assessor dependence (leading to infelicity, as desired):

- (80) a. #Hermann should<sub>deon</sub> marry Zelda, but I don't have an opinion about this marriage.<sup>30</sup>  
b. Hermann should<sub>deon</sub> marry Zelda, but you don't have an opinion about this marriage.
- (81) a. #Hermann<sub>i</sub> met a woman that he<sub>i</sub> should<sub>deon</sub> marry, but I don't have an opinion about this marriage.  
b. Hermann<sub>i</sub> met a woman that he<sub>i</sub> should<sub>deon</sub> marry, but you don't have an opinion about this marriage.
- (82) a. #Fred<sub>i</sub> thinks that Hermann should<sub>deon</sub> marry Zelda, but he<sub>i</sub> doesn't have an opinion about this marriage.  
b. Fred thinks that Hermann should<sub>deon</sub> marry Zelda, but I don't have an opinion about this marriage.

This property sets it apart from two other universal deontic modals, namely *have to*, and — this is of more direct relevance to the present discussion — *must*<sub>deon</sub>:

- (83) a. Hermann must<sub>deon</sub> marry Zelda, but I/you don't have an opinion about this marriage.  
b. Hermann has<sub>deon</sub> to marry Zelda, but I/you don't have an opinion about this marriage.
- (84) a. Hermann<sub>i</sub> met a woman that he<sub>i</sub> must<sub>deon</sub> marry, but I/you don't have an opinion about this marriage.

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<sup>30</sup> An anonymous reviewer of *S&P* rightly points out that the sentence improves when the context gets enriched so as to home in on a very specific accessibility relation for *should*, and a very definite restriction for *opinion* in the second conjunct:

- (i) In light of the fact that he got her pregnant, Hermann should<sub>deon</sub> marry Zelda, but I have no opinion about whether his marrying her is a good thing.

This observation is correct: one can exploit the diversity of accessibility relations (certain social or practical conventions vs. more strictly moral criteria) already pointed out in footnote 10 to avoid a conflict between the two conjuncts. But the point of my example is that when the context is not as rich, the sentence comes out as odd, and the contrast with *must* and *have to* persists, because no such fine distinctions are spontaneously made; the accessibility relation is thus kept constant, and it is only then that the assessor dependence can be probed.

- b. Hermann<sub>i</sub> met a woman that he<sub>i</sub> has<sub>deon</sub> to marry, but I/you don't have an opinion about this marriage.
- (85) a. Fred<sub>i</sub> thinks that Hermann must<sub>deon</sub> marry Zelda, but he<sub>i</sub>/I do(es)n't have an opinion about this marriage.
- b. Fred<sub>i</sub> thinks that Hermann has<sub>deon</sub> to marry Zelda, but he<sub>i</sub>/I do(es)n't have an opinion about this marriage.

The behavior of *should*<sub>deon</sub> bears a striking resemblance to that of epistemic modals, e.g., *might*<sub>epis</sub> and *must*<sub>epis</sub> (the following observations are well-known, unlike the facts about *should*<sub>deon</sub>):

- (86) a. #The key might<sub>epis</sub> be in the drawer, but I think it's not.
- b. The key might<sub>epis</sub> be in the drawer, but you think it's not.
- (87) a. #Fred met a woman who might<sub>epis</sub> be French, but I think she's not.
- b. Fred met a woman who might<sub>epis</sub> be French, but you think she's not.
- (88) a. #Fred<sub>i</sub> thinks that the key might<sub>epis</sub> be in the drawer, but he<sub>i</sub> thinks it's not.
- b. Fred thinks that the key might<sub>epis</sub> be in the drawer, but I think it's not.<sup>31</sup>

Epistemic modals, like personal taste predicates, are standardly described as being assessor dependent (MacFarlane 2003, Moltmann 2010, Egan, Hawthorne & Weatherson 2005, Stephenson 2007), i.e., their accessibility relation is not only relativized to a world of evaluation, but also to an individual, whose belief state in the world of evaluation determines which possible worlds are accessible. In order to derive the identity between the assessor of an epistemic modal and the author of the context (either the matrix context or the embedded context), I assume that the assessor is realized in syntax as a PRO. (I stipulate that *might*<sub>epis</sub> and *must*<sub>epis</sub> select for a PRO as opposed to any other kind of variable.)<sup>32</sup>

<sup>31</sup> The same infelicity arises without explicit mention of the speaker's beliefs: epistemic modals give rise to Moore's paradox (see Yalcin 2007):

- (i) a. #The key might<sub>epis</sub> be in the drawer, but it's not.
- b. #Fred met a woman who might<sub>epis</sub> be French, but she's not.

<sup>32</sup> See Stephenson 2007 for a technically different implementation of the same idea.



Let us see how this works with *might*<sub>epis</sub>. For unembedded *might*<sub>epis</sub>, we need to bind the assessor variable: this requires a binder at the top of the matrix clause.<sup>33</sup> I posit that matrix clauses are headed by a silent complementizer which acts as a binder of individuals, times and worlds: the bound variables are mapped to the author ( $c_a$ ), the time ( $c_t$ ) and the world ( $c_w$ ) of context  $c$  respectively (a context is a triple of an author, a time of thought or utterance and a world of thought or utterance): context  $c$  if and only if it takes context  $c$  as argument.

- (89) a.  $\llbracket [C_{k,l,m} S] \rrbracket^{c,s} = \lambda x_e. \lambda i_t. \lambda w_s. \llbracket S \rrbracket^{c,s[x_k \rightarrow x][i_t \rightarrow i][w_m \rightarrow w]}$   
 b. It is raining.  
 c.  $[C_{1,2,3} W_3 i_2 \text{ rain}]$   
 d.  $\llbracket (89c) \rrbracket^{c,s} = \text{if } \neq \#, 1 \text{ iff it is raining in } w \text{ at } t.$

To define *might*, we need to use epistemic alternatives: the epistemic alternatives of an individual  $x$  at time  $i$  in world  $w$  are the set of pairs  $\langle i', w' \rangle$  compatible with  $x$ 's beliefs in  $w$  at  $i$ :<sup>34</sup>

- (90) When  $\neq \#$ ,  $\text{Ep}(x, i, w)$  is a set of pairs of  $D_i \times D_s$ :  
 $\text{Ep}(x, i, w) = \{ \langle i', w' \rangle : \langle i', w' \rangle \text{ is compatible with what } x \text{ believes in } w \text{ at } i \}$
- (91)  $\llbracket \text{might} \rrbracket^{c,s} = \lambda p_{\text{ist}}. \lambda x_e. \lambda i_t. \lambda w_s.$   
 $\# \text{ iff (i) } \text{Ep}(x, i, w) = \#, \text{ or}$   
 (ii) for some  $\langle i', w' \rangle \in \text{Ep}(x, i, w)$ ,  $p(i')(w') = \#;$   
 $1 \text{ iff } \neq \# \text{ and for some } \langle i', w' \rangle \in \text{Ep}(x, i, w)$ ,  $p(i')(w') = 1$

Recall that we stipulate that the individual argument of *might* is a PRO. We can now derive the meaning of a simple unembedded sentence containing *might*. (92a) is true in context  $c$  if and only if at least one of the author of  $c$ 's epistemic alternatives is such that it is raining at this alternative:

<sup>33</sup> I use an extensional system with indexed abstractors over variables which are syntactically represented, *à la* Percus 2000.

<sup>34</sup> The semantics of modals that I propose here for *might*, *must*, *should*, etc., ignores, for the sake of simplicity, the double relativity of modals, i.e., the distinction between modal bases and ordering sources (Kratzer 1981).

- (92) a. It might be raining.  
 b.  $[C_{1,2,3} w_3 i_2 \text{ PRO}_1 \text{ might } [\lambda_4 \lambda_5 w_5 i_4 \text{ rain}]]$   
 c.  $[[\text{(92b)}]]^{c,s} = \text{if } \neq \#,$   
 1 iff for some  $\langle i', w' \rangle \in \text{Ep}(c_a, c_t, c_w)$ , it is raining in  $w'$  at  $i'$ .

Let us now consider a case of embedding under *think*. We need to define first the set of doxastic alternatives of  $x$  at  $i$  in  $w$   $\text{Bel}(x, i, w)$  (it is important that doxastic alternatives be triples with an individual coordinate because we want to ensure that the assessor of embedded *might* is interpreted *De Se*):

- (93) When  $\neq \#$ ,  $\text{Bel}(x, i, w)$  is a set of triples of  $D_e \times D_i \times D_s$ :  $\text{Bel}(x, i, w) = \{\langle x', i', w' \rangle : \langle x', i', w' \rangle \text{ is compatible with what } x \text{ believes in } w \text{ at } i\}$

I assume that the complementizer of the embedded clause acts as a binder (just like the covert complementizer at the top of a matrix clause):

- (94)  $[[\text{think that}_{k,l,m} F]]^{c,s} = [[\text{think}]]^{c,s} (\lambda x_e. \lambda i_i. \lambda w_s. [F]^{c,s[x_k \rightarrow x][i_l \rightarrow i][w_m \rightarrow w]})$

- (95)  $[[\text{think}]]^{c,s} = \lambda p_{\text{eist}}. \lambda x_e. \lambda i_i. \lambda w_s.$

- $\#$  iff (i)  $\text{Bel}(x, i, w) = \#$ , or  
 (ii) for some  $\langle x', i', w' \rangle \in \text{Bel}(x, i, w)$ ,  $p(x')(i')(w') = \#$ , or  
 (iii) it is not the case that either  
 for each  $\langle x', i', w' \rangle \in \text{Bel}(x, i, w)$ ,  $p(x')(i')(w') = 1$ , or  
 for each  $\langle x', i', w' \rangle \in \text{Bel}(x, i, w)$ ,  $p(x')(i')(w') = 0$ ;<sup>35</sup>

- 1 iff  $\neq \#$  and for each  $\langle x', i', w' \rangle \in \text{Bel}(x, i, w)$ ,  $p(x')(i')(w') = 1$

The truth conditions of (96a) can now be derived accordingly (with  $[[\text{Fred}]]^{c,s} = f$ ):

- (96) a. Fred thinks that it might be raining.  
 b.  $[C_{1,2,3} w_3 i_2 \text{ Fred thinks } [\text{that}_{4,5,6} w_6 i_5 \text{ PRO}_4 \text{ might } [\lambda_7 \lambda_8 w_8 i_7 \text{ rain}]]]$

<sup>34</sup> Here and in the remainder of this article, I assume that the event time of the predicate under the modal coincides with the time of modal evaluation; I think this is essentially correct as far as epistemic *might* is concerned, but it is not in the case of other modals, e.g., deontic modals. I choose to gloss over these fine-grained distinctions that ought to be made, for the sake of simplicity.

<sup>35</sup> I provisionally include in the lexical entry of the neg-raiser *think* a homogeneity presupposition; as Section 5 will show, this move might be unwarranted.

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- c.  $\llbracket (96b) \rrbracket^{c,s} = \text{if } \neq \#$ ,  
 1 iff for each  $\langle x', i', w' \rangle \in \text{Bel}(f, c_t, c_w)$ ,  
 $\llbracket [w_6 i_5 \text{ PRO}_4 \text{ might}$   
 $[\lambda_7 \lambda_8 w_8 i_7 \text{ rain}]] \rrbracket^{c,s[x_4-x'] [i_5-i'] [w_6-w']} = 1$ ,  
 iff for each  $\langle x', i', w' \rangle \in \text{Bel}(f, c_t, c_w)$ ,  
 there is some  $\langle i'', w'' \rangle \in \text{Ep}(x', i', w')$   
 such that it is raining in  $w''$  at  $i''$ .

I propose to apply a similar treatment to deontic *should*. I assume that this modal is associated with  $\langle \text{time, world} \rangle$  pairs compatible with what some individual deems right (in a moral or legal sense<sup>36</sup>). This individual is the authority whose point of view is critical in determining what counts as the norm;  $\text{should}_{\text{deon}}$  has a PRO individual argument.

First of all, we define the relevant kind of deontic alternatives:

- (97) When  $\neq \#$ ,  $\text{Sh}(x, i, w)$  is a set of pairs of  $D_i \times D_s$ :  
 $\text{Sh}(x, i, w) = \{ \langle i', w' \rangle : \langle i', w' \rangle \text{ is compatible with what is right according to } x \text{ in } w \text{ at } i \}$
- (98)  $\llbracket \text{should} \rrbracket^{c,s} = \lambda p_{\text{ist}}. \lambda x_e. \lambda i_i. \lambda w_s$ .  
 $\neq \#$  iff (i)  $\text{Sh}(x, i, w) = \#$ , or  
 (ii) for some  $\langle x', i', w' \rangle \in \text{Sh}(x, i, w)$ ,  $p(x')(i')(w') = \#$ , or  
 (iii) it is not the case that either  
 for each  $\langle x', i', w' \rangle \in \text{Sh}(x, i, w)$ ,  $p(x')(i')(w') = 1$ , or  
 for each  $\langle x', i', w' \rangle \in \text{Sh}(x, i, w)$ ,  $p(x')(i')(w') = 0$ ;  
 1 iff  $\neq \#$  and for each  $\langle x', i', w' \rangle \in \text{Sh}(x, i, w)$ ,  $p(x')(i')(w') = 1$

We can now account for the assessor dependence in (99a) and (100a) below (the assessor is the author of the context):

- (99) a. John should leave.  
 b.  $\llbracket [C_{1,2,3} w_3 i_2 \text{ PRO}_1 \text{ should} [\lambda_4 \lambda_5 w_5 i_4 \text{ John leave}]] \rrbracket$   
 c.  $\llbracket (99b) \rrbracket^{c,s} = \text{if } \neq \#$ ,  
 1 iff for each  $\langle i', w' \rangle \in \text{Sh}(c_a, c_t, c_w)$ , John leaves in  $w'$  at  $i'$ .

<sup>36</sup> This is an obvious oversimplification of the meaning of *should*: I refer the reader to Copley 2006 and Lassiter 2011 for a more refined semantics of *should*.

- (100) a. Fred thinks that John should leave.  
 b.  $[C_{1,2,3} w_3 i_2 \text{ Fred thinks } [\text{that}_{4,5,6} w_6 i_5 \text{ PRO}_4 \text{ should } [\lambda_7 \lambda_8 w_8 i_7 \text{ John leave}]]]$   
 c.  $[[\text{(100b)}]^{c,s} = \text{if } \neq \#,$   
     1 iff for each  $\langle x', i', w' \rangle \in \text{Bel}(f, c_t, c_w),$   
      $[[w_6 i_5 \text{ PRO}_4 \text{ should}$   
      $[\lambda_7 \lambda_8 w_8 i_7 \text{ John leave}]]]^{c,s[x_4 \rightarrow x'] [i_5 \rightarrow i'] [w_6 \rightarrow w']} = 1,$   
     iff for each  $\langle x', i', w' \rangle \in \text{Bel}(f, c_t, c_w),$   
     for each  $\langle i'', w'' \rangle \in \text{Sh}(x', i', w')$   
     John leaves in  $w''$  at  $i''$ .

In the case of  $must_{\text{deon}}$ , the presence of an assessor argument is uncertain. We have seen that neither the author nor the addressee of the context has to be opinionated in that case. It is possible that an assessor argument exists however, but is unspecified. We need further data to adjudicate on this issue; pending the results of this investigation, I will provisionally assume, in the semantics that I give for  $must_{\text{deon}}$ , that it does have an assessor argument, which is not necessarily the author of the context (therefore not a PRO).<sup>37</sup>

First, I define the relevant set of deontic alternatives (the same treatment would apply to  $have_{\text{deon}}$  to, *mutatis mutandis*):

- (101) When  $\neq \#, \text{Mu}(x, i, w)$  is a set of pairs of  $D_i \times D_s$ :  
 $\text{Mu}(x, i, w) = \{\langle i', w' \rangle :$   
      $\langle i', w' \rangle$  is compatible with what is right according to  $x$  in  $w$  at  $i\}$
- (102)  $[[\text{must}]]^{c,s} = \lambda p_{\text{ist}}. \lambda x_e. \lambda i_i. \lambda w_s.$   
      $\neq \#$  iff (i)  $\text{Mu}(x, i, w) = \#,$  or  
     (ii) for some  $\langle x', i', w' \rangle \in \text{Mu}(x, i, w), p(x')(i')(w') = \#;$   
     1 iff  $\neq \#$  and for each  $\langle x', i', w' \rangle \in \text{Mu}(x, i, w), p(x')(i')(w') = 1$

And second I derive a simple sentence:

<sup>36</sup> The same caveat made earlier applies here: a lexical homogeneity presupposition might not be needed.

<sup>37</sup> Notice that giving an assessor to  $must$  does not lead to the prediction that, like  $should$ , it is a neg-raiser: assessor-dependence, as I claim in Section 4.4, is a necessary condition for neg-raising, not a sufficient one. Additional factors come into play, see Section 5.3.

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- (103) a. John must leave.  
b.  $[C_{1,2,3} w_3 i_2 \text{pro}_9 \text{ must } [\lambda_4 \lambda_5 w_5 i_4 \text{ John leave}]]$   
c.  $[[\text{(103b)}]]^{c,s} = \text{if } \neq \#,$   
1 iff for each  $\langle i', w' \rangle \in \text{Mu}(s(9), c_t, c_w)$ , John leaves in  $w'$  at  $i'$ .

#### 4.4 A generalization

The observations that we have made so far converge towards a generalization (in the form of a necessary, non-sufficient, condition):

- (104) **Generalization:** Only assessor dependent predicates are neg-raisers.

This generalization is not trivial, because one can conceive of possible predicates which would be assumed to be true of their complement or of its negation, and their accessibility relations would *not* be relativized to any assessor. This would amount to homogeneity without opinionatedness. But it is not very easy to falsify: to disprove it, one needs to find a neg-raising predicate which unequivocally lacks an assessor argument; but it is hard to discard the existence of unspecified assessors (realized as silent context-dependent variables), as I pointed out in relation to *must*<sub>deon</sub>, so we have reason to think that showing the absence of an assessor argument is difficult.

The following list of neg-raising predicates provided in [Horn 1978](#) conforms with the generalization (caveat: *supposed to* is in fact a special case as we will see in Section 5):

- (105) [OPINION] think, believe, expect, suppose, imagine, reckon  
[PERCEPTION] seem, appear, look like, sound like, feel like  
[PROBABILITY] probable, likely, figure to  
[INTENTION/VOLITION] want, intend, choose, plan  
[JUDGMENT/OBLIGATION] supposed to, ought, should, desirable, advise

All these predicates can be analyzed as having accessibility relations relativized to an assessor individual. For the predicates that are not impersonal or raising-to-subject verbs, e.g., *want*, the assessor is always the individual denoted by the external argument of the verb; for the others, e.g., *seem* or *should*, the assessor is a (possibly) silent argument, almost always the author of the context (again, *supposed to* stands out).

However assessor dependence is by no means sufficient. We know this independently of the consideration of modals. Other assessor dependent predicates, e.g., *certain*, *guess*, *hope* etc., are not neg-raisers. And among modal verbs, besides deontic *must* (for which the evidence about its assessor dependence is insufficient) there are uncontroversial assessor dependent predicates that are not neg-raisers. This is true of epistemic *must* in American English (in this dialect, (106) is actually felt to be deviant; see Anand & Hacquard 2011 for a possible account of this deviance):

- (106) #I don't think that John *must*<sub>epis</sub> be very intelligent. [American English]  
*Not paraphrasable as:* I think that it is very likely that John is not very intelligent. (NR reading)

In British English however, *must*<sub>epis</sub> is a neg-raiser, and thanks to the cyclicity of neg-raising, the sentence is felicitous when neg-raising is applied to the embedding verb and to *must* (similarly in my dialect of French, *devoir*<sub>epis</sub> is a neg-raiser while *devoir*<sub>deon</sub> is not):

- (107) I don't think that John *must*<sub>epis</sub> be very intelligent. [British English]  
*Paraphrasable as:* I think that it is very likely that John is not very intelligent. (NR reading)

Although it is hard to falsify, the generalization might gain some indirect support if we broaden our perspective to consider not just propositional attitudes but also quantifiers over times or other individuals. There is *a priori* no reason to disregard them, as they share with propositional attitudes the key property of being quantificational operators, a property that can safely be assumed to play a role in the neg-raising phenomenon. In all fairness, with a few notable exceptions, such as Horn 1978, they are often absent from discussions of neg-raising: let us focus for a moment on those quantifiers, which are standardly assumed to be deprived of such an assessor argument. As such, if the generalization is correct, we predict that they should not allow neg-raising: concretely then, one should not find a quantifier *Q* such that  $\neg Q(p)$  can be interpreted as  $Q(\neg p)$ . I think this is indeed the case (as illustrated below with *always* and *often* (109)). But *usually* is a potential counterexample, as it shows some signs of allowing for scope reversal with negation, as noted by Horn:<sup>38</sup>

<sup>38</sup> Thanks to an anonymous reviewer of *S&P* for raising this issue.

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- (108) She doesn't usually attend church. [Horn 1989: 327, ex. (62b)]  
✓USUALLY»NEG

*Paraphrasable as:* She usually doesn't attend church.

- (109) *Control:*  
She doesn't always/often attend church. \*ALWAYS/OFTEN»NEG  
*Not paraphrasable as:* She always/often doesn't attend church.

Horn takes such facts to indicate that *usually* is a neg-raiser (and thus concludes that his "mid-scalar" hypothesis, see Section 5.3.1 of this article, is corroborated, treating *usually* as a scalar quantifier of intermediate strength). However, scope reversal with negation is, as this article purports to show, by no means a sufficient condition for neg-raising. Covert movement (specifically, movement motivated by positive polarity), could also be the source of the wide scope of *usually*. To settle the matter, we need to consider more complex configurations. First, it turns out that *usually* can take part in scope reversals that cannot be accounted for in terms of neg-raising:

- (110) *Context:* A stressed-out school teacher shares her experience...  
At 8:00 a.m., I don't yet usually have any stress.<sup>39</sup>  
✓USUALLY»NEG»YET  
*Paraphrasable as:* At 8:00 a.m., it is usually the case that I don't yet have any stress.

*Yet* is linearized before *usually*, but can end up in its scope, as shown by the paraphrase. This cannot be an effect of neg-raising. It is useful to compare *usually* with a *bona fide* neg-raiser, e.g., *think*, which in a similar configuration has to be interpreted in the scope of *yet*, while negation can be interpreted with narrowest scope:

- (111) He doesn't yet think that we are gone. \*THINK»NEG»YET  
*Paraphrasable approximately as:* He thinks that we are not gone, but I expect him to think that we are gone at some point.<sup>40</sup> (NR reading)  
*Not paraphrasable as:* He thinks that we are not gone yet.

<sup>39</sup> [infavorofthinking.blogspot.com/2005/08/change-my-life-plan.html](http://infavorofthinking.blogspot.com/2005/08/change-my-life-plan.html)

<sup>40</sup> This example provides additional support to the view that neg-raising is a semantic phenomenon rather than a syntactic reconstruction of negation: *yet* is an NPI, and as such it needs to be in a downward-entailing environment at LF, therefore negation cannot be interpreted in a position lower than *yet*.

The culprit of the wide scope of *usually* over *yet* observed in (110) might very well be a syntactic movement, and its motivation be polarity sensitivity, given that it occurs in the presence of negation; if this is correct, then there is a simple and unique explanation for the wide scope of *usually* both above *yet* and negation, namely escape. In other words, *usually* might be a mobile PPI. Neg-raising is not, for sure, at fault in the reversal of *usually* with respect to *yet*.

Therefore neg-raising is not necessarily involved in the wide scope of *usually*. But can it ever be? There is evidence that it can't, for *usually* fails the wide scope existential quantification reading test (10a):

- (112) *Context*: Speaking of a set of ten coins. . .
- a. Not every coin usually lands heads.
  - b. *Not paraphrasable as*: There is some coin  $x$  such that  $x$  usually does not land heads. (NR reading)
  - c. *Paraphrasable as*: Usually it is not the case that every coin lands heads. USUALLY»NEG»EVERY (Non NR reading)
  - d. *Paraphrasable as*: Not every coin  $x$  is such that  $x$  usually lands heads.<sup>41</sup> NEG»EVERY»USUALLY (Non NR reading)

The unnaturalness of the following discourse indicates that the reading is indeed unavailable:

<sup>41</sup> If, as the main text claims, escape can be the source of the wide scope of *usually*, then it remains to be explained why this movement is not mandatory, and why it is not blocked by the intervention of *every* in (112a). Regarding the first issue, one could hypothesize that the minimal domain of *usually* is so small that it need not include the Pol head, i.e., the acceptability of *usually* can be evaluated in an upward-entailing environment: see Appendix A.2.1 for an application of this line of reasoning to French *devoir*. The second problem can be rephrased as follows: it doesn't seem that the presence of the shielder *every* makes the wide scope of *usually* over negation impossible (112c) as one would expect, given Laziness; now, it is possible that the subject quantifier gets reconstructed below *usually* when this reading obtains, such that it does not actually shield the adverb at the level of representation at which the acceptability of this putative PPI is evaluated. Why this reconstruction would be possible here while it appears to be impossible in the presence of *must*<sub>deon</sub>, *should*<sub>deon</sub> and *supposed*<sub>deon</sub> *to* (see footnote 21, (78) and (121a) below) is unclear, though. There is in fact a third issue awaiting us if we want to claim that *usually* is a mobile PPI: adverbs are widely assumed to have a fixed scope and are therefore not expected to move covertly (granted, they are open to some movements, namely Topicalization and Focus Movement).



(113) *Context*: Speaking of a set of ten coins...

— A: Not every coin usually lands heads.

— B: #Really? I'm very curious to know which of those coins are the ones that usually don't land heads.

Obviously, further research is needed to determine how the wide scope of *usually* is possible.<sup>42</sup> But for the time being, it is important to notice that, using Generalization (104) as a guide, we correctly predict that outside

<sup>42</sup> According to Horn, there is another candidate to neg-raising among quantifiers, *viz.* *most* (which also conforms with his "mid-scalar" hypothesis); he gives the following example:

(i) I don't think that most of my friends would approve. [Horn 1989: 327, ex. (62a)]

(ii) *Control*:

I don't think that every friend of mine would approve. \*EVERY»NEG

He claims that in (i) negation can be interpreted with narrow scope with respect to the subject quantifier *most*. If the facts are as stated, then *most* passes the cyclicity test, which is a hallmark of neg-raisers. However, intuitions appear to be a little difficult to probe in this case: it seems to me that narrowest scope of negation is hard to distinguish from intermediate scope, i.e., THINK»NEG»MOST. Judgments can be made sharper in my opinion when the difference between those two readings is practically important; and I think it then becomes apparent that a neg-raised reading (narrowest scope of negation) is in fact hard to get. Consider the following example:

(iii) *Context*: A trial jury of 12 members is about to be constituted. A and B bet on its makeup...

— A: I'm pretty sure that there will be 6 or more African Americans on this jury.

— B: #You are so wrong! I know the advocates, so I don't think that most jurors will be black!

This dialogue is odd, because B's reply cannot be read with narrowest scope of negation (this would amount to neg-raising) and thus cannot be used to disagree with A's statement. In fact, and perhaps more directly, it is pretty clear that *most* fails other neg-raising tests. In particular, wide scope over a clausemate negation is either strained or plainly unavailable (the following test uses a so-called negative quantifier and a bound variable *their* in the restrictor of *most*, to ensure that *most* does not end up c-commanding negation via QR):

(iv) *Context*: At the end of a very unsuccessful yard sale...

Not a single vendor sold most of their goods.

*Not paraphrasable as*: For every vendor *x*, most of *x*'s goods failed to be sold.

(NR reading)



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- (115) I don't think that John is supposed<sub>deon</sub> to jog. [Dialect A]  
*Not paraphrasable as:* I think that John is supposed to not jog.  
(NR reading)

And it is a PPI (anticipating a little, this is also true of Dialect B). First of all, it can be shown to be in a high syntactic position when it outscopes a clausemate negation: it passes the “pin” test, i.e., a subject quantifier can take intermediate scope between the modal and a clausemate negation (in that order):

- (116) *Context:* The rules of this bowling game state that exactly one pin must remain standing, no matter which one...  
Exactly one pin is not supposed<sub>deon</sub> to be knocked down.  
[Dialect A and B]  
✓SUPPOSED»EXACTLY\_ONE»NEG

Second, the modal can be rescued:

- (117) I'm not sure that John is not supposed<sub>deon</sub> to leave. [Dialect A and B]  
✓NEG»NEG»SUPPOSED

And it can be shielded, e.g., by *every*:

- (118) a. Not everyone is supposed<sub>deon</sub> to get a flu shot. [Dialect A]  
✓NEG»EVERY»SUPPOSED; \*SUPPOSED»NEG»EVERY  
*Paraphrasable as:* It is not the case that every *x* is such that *x* is supposed to get a flu shot.

- (119) *Control:*  
a. Not a single person is supposed<sub>deon</sub> to get a flu shot.  
[Dialect A and B]  
\*NEG»SUPPOSED; SUPPOSED»NEG  
b. Not a single person is supposed<sub>deon</sub> to get a flu shot; #it is okay if everyone does.

The fact that the wide scope of *supposed*<sub>deon</sub> *to* with respect to negation is impossible (i.e., the high position of interpretation is unavailable) in a shielding configuration such as (118a), as shown in (120), attests that it is a mobile PPI (wide scope is blocked by Laziness (59)):<sup>43</sup>

<sup>43</sup> Shielding also occurs with *always* and *necessarily*:

- (120) Not everyone is supposed<sub>deon</sub> to get a flu shot; #no matter who doesn't get one, we just need to budget our doses. [Dialect A and B]  
 \*SUPPOSED»NEG»EVERY

Note also that no wide scope existential quantification reading obtains when *supposed*<sub>deon</sub> *to* appears under *not every* (this is a *shielding* configuration in which neg-raising of predicates that are both NRPs and PPIs can occur: compare with *should* in (71a)), as evidenced by the incoherent discourse in (121b):

- (121) a. Not everyone is supposed<sub>deon</sub> to get a flu shot. [Dialect A]  
*Not paraphrasable as:* There is some *x* such that *x* is supposed to not get a flu shot. (NR reading)  
*Paraphrasable as:* It is not the case that every *x* is such that *x* is supposed to get a flu shot. (Non-NR reading)

- (i) a. John is not always supposed<sub>deon</sub> to leave.  
 ✓NEG»ALWAYS»SUPPOSED; \*SUPPOSED»NEG»ALWAYS  
 b. John is not necessarily supposed<sub>deon</sub> to leave.  
 ✓NEG»NECESSARILY»SUPPOSED; \*SUPPOSED»NEG»NECESSARILY

Narrow scope of the modal is then forced, per Laziness (59). With a modal that does not head-move to T, it is easy to ascertain that an adverb linearized before it is its clausemate: *supposed*<sub>deon</sub> *to* thus offers us unequivocal evidence that when *always/necessarily* actually intervenes, it blocks escape (recall that the picture with auxiliary modals, e.g., *must p. 30*, is ambiguous).

Laziness also blocks wide scope in the presence of upward-entailing and merely downward-entailing adverbs:

- (ii) *Same context as in (60).*  
 a. #John is often supposed<sub>deon</sub> to stir this pot, otherwise the risotto will scorch.  
 ✓OFTEN»SUPPOSED; \*SUPPOSED»OFTEN  
 b. #John is rarely supposed<sub>deon</sub> to open the oven, otherwise the cake won't rise.  
 ✓RARELY»SUPPOSED; \*SUPPOSED»RARELY

These two sentences are particularly informative, compared to (60)-(62a). In effect, they show that *supposed* cannot escape, even past *low* adverbs. *Rarely* and *often* can be generated either below or above Pol (*John rarely doesn't smoke/John doesn't rarely smoke*): (60)-(62a) only show that *must* cannot escape past *high* adverbs; there is thus a chance that this inability is not due to Laziness (59), but rather to some locality restriction. With a modal that does not head-move to T on the other hand, the evidence is clearer: *supposed*<sub>deon</sub> *to* is not vulnerable to mere downward-entailingness, and it is subject to Laziness.

- b. — Doctor A: Not everyone is supposed<sub>deon</sub> to get a flu shot.  
[Dialect A]  
— Doctor B: #Sorry but I don't think that there are people that are supposed to be left unvaccinated.

This is further evidence that *supposed*<sub>deon</sub> *to* is not, in Dialect A, a neg-raiser.

In sum in Dialect A, *supposed*<sub>deon</sub> *to* is not a neg-raiser, but it meets the criteria for being a mobile PPI, just like *must*<sub>deon</sub> and *should*<sub>deon</sub>: all three cannot be evaluated in constituents that do not contain the local Pol head, and can raise covertly out of an anti-licensing environment.

*Supposed to* shows us something that *must* and *should* could not show as unambiguously: since it never undergoes V-to-T, unlike *must* and *should*, *supposed* has to raise *covertly* past an offending negation. Therefore V-to-T is unnecessary for the wide scope of *supposed*<sub>deon</sub>, and I propose that it is consequently not involved in the wide scope of mobile PPIs at all. This claim is straightforwardly supported by the obligatory narrow scope under negation of certain modals which undergo V-to-T and are not PPIs, e.g., *can* and *could*.<sup>44</sup>

## 5.2 Dialect B: A part-time neg-raiser

In Dialect B, *supposed*<sub>deon</sub> *to* is a PPI and a neg-raiser (but we will see that it is only a “part-time” neg-raiser). First of all it is a PPI (with PolP as its minimal domain), for it takes obligatory wide scope over a clausemate negation (114a), it can be rescued (117) and shielded (120) (witness also the second paraphrase of (122a), (122b) and (122c) below); it ends up higher syntactically than negation (it passes the pin test in (116)), and when shielded, it has to take narrow scope; those are properties of a mobile PPI.

Second, under certain conditions, this modal shows in Dialect B (to reiterate, not in Dialect A) two hallmarks of neg-raising predicates, in those configurations in which escape cannot take place (i.e., when the effects of positive polarity are blocked): it sometimes allows for a wide scope existential quantification reading (122), and passes the cyclicity test (123). Consider the following paradigms, in which *supposed*<sub>deon</sub> *to* exhibits the behavior of a neg-raiser, but importantly, only in the a. and b. sentences:

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<sup>44</sup> That *supposed*<sub>deon</sub> *to* is a mobile PPI is at variance with a theory like Iatridou & Zeijlstra's (2013), who assume, following Lechner 2006, that V-to-T has semantic effects, see Appendix III (A.3).

- (122) a. Not everyone is supposed<sub>deon</sub> to jog. [Dialect B only]  
*Paraphrasable as:* There is some  $x$  such that  $x$  is supposed to not jog. (NR reading)  
*Paraphrasable as:* It is not the case that every  $x$  is such that  $x$  is supposed to jog. (Non-NR reading)
- b. Not everyone is supposed<sub>deon</sub> to get a flu shot. [Dialect B only]  
*Paraphrasable as:* There is some  $x$  such that  $x$  is supposed to not get a flu shot. (NR reading)  
*Paraphrasable as:* It is not the case that every  $x$  is such that  $x$  is supposed to get a flu shot. (Non-NR reading)
- c. Not everyone is supposed<sub>deon</sub> to win the lottery. [Dialect A and B]  
*Not paraphrasable as:* There is some  $x$  such that  $x$  is supposed to not win the lottery. (NR reading)  
*Paraphrasable as:* It is not the case that every  $x$  is such that  $x$  is supposed to win the lottery. (Non-NR reading)
- (123) a. I don't think that you're supposed<sub>deon</sub> to jog. [Dialect B only]  
*Paraphrasable as:* I think that you are supposed to not jog. (NR reading)
- b. I don't think that you're supposed<sub>deon</sub> to get a flu shot. [Dialect B only]  
*Paraphrasable as:* I think that you are supposed to not get a flu shot. (NR reading)
- c. I don't think that you're supposed<sub>deon</sub> to win the lottery. [Dialect A and B]  
*Not paraphrasable as:* I think that you are supposed to not win the lottery. (NR reading)

What are the conditions under which *supposed*<sub>deon</sub> *to* allows neg-raising in Dialect B? As the above paradigms (122)-(123) suggest, the key to the neg-raising behavior of *supposed*<sub>deon</sub> *to* lies in the difference between *win the lottery* on the one hand, and *jog* and *get a flu shot* on the other. Importantly, the neg-raising behavior of *should* is not sensitive to such subtle differences (I will propose an explanation of the contrast between the two modals in Subsection 5.3.2):

(124) *Controls:*

- a. Not everyone should<sub>deon</sub> win the lottery. [Dialect A and B]  
*Paraphrasable as:* There is some  $x$  such that it should be the case that  $x$  does not win the lottery. (NR reading)
- b. I don't think that you should<sub>deon</sub> win the lottery. [Dialect A and B]  
*Paraphrasable as:* I think that it should be the case that you do not win the lottery. (NR reading)

One can easily see that commands about winning the lottery are less naturally issued than commands about jogging or getting a flu shot. In other words, the neg-raising behavior of *supposed*<sub>deon</sub> *to* is only observed in [<sub>S</sub> A not supposed to  $p$ ] if a command about the proposition expressed by  $p$  is pragmatically supported in the context of utterance of  $S$ . Speakers of Dialect B explain that they have the intuition that in such statements, the existence of some agent is postulated which passes a judgment about the proposition denoted by  $p$ . For example, it is easy to imagine that (122a)-(122b) and (123a)-(123b) are uttered against the background of a doctor's recommendation: jogging can be beneficial or detrimental; some people are intolerant of flu shots, but for others a flu shot is a valuable prophylactic measure. In (122c) and (123c) on the other hand, it is hard to conceive of an agent issuing a similar command about winning the lottery.

This suggests that *supposed*<sub>deon</sub> *to* is likely to be assessor dependent: some individual's point of view matters. It is clear at the very least that the assessor, if she exists, need not be the author nor the addressee of the context; this can be shown using our continuation test (the results are the same in Dialect A and Dialect B):

- (125) a. Hermann is supposed<sub>deon</sub> to marry Zelda, but I/you don't have an opinion about this marriage.  
b. Fred<sub>i</sub> thinks that Hermann is supposed<sub>deon</sub> to marry Zelda, but he<sub>i</sub>/I do(es)n't have an opinion about this marriage.

In fact, the following contrast suggests that an assessor associated with *supposed*<sub>deon</sub> *to* does exist, who is assumed *not* to be the author of the (embedded) context:

- (126) *Context*: — A: Why do you take all those vitamins?...
- a. — B: #My doctor thinks that I'm supposed to take vitamins.  
[Dialect A and B]
  - b. — B': My doctor thinks that I should take vitamins.

While (126b) is fine, (126a) is odd because the doctor is the most natural authority who can judge whether vitamins are good or bad for the speaker, while the sentence implies that she is not the source of the judgment.

The passive form of *supposed* might play a role in explaining the difference between *should* and *supposed to* with regard to the identity of the assessor. I assume that the latter is an obligatorily passivized ECM predicate, and I submit that its external argument (the assessor argument), is arbitrary PRO, just like with other verbs in the passive (Collins 2005). (Alternatively, it could be a silent non-specific SOMEONE, see Kayne's (2008) analysis of unaccusative verbs.) The same reason, whatever it is, which explains why the external argument of a verb in a short passive is by default interpreted as being non-coreferential with the speaker (127), also explains the preferential anti-author orientedness of *supposed<sub>deon</sub> to*:

- (127) This book was written in 2002.

In the same connection, when asked to compare the following four sentences, consultants have a strong intuition that in (128d) an individual other than the speaker (=the author of the context) is the judge of the necessity for the speaker to leave the party (and they do not have the same intuition about the other sentences):

- (128) *Context*: At a party at 2 a.m. . . .
- a. I must go now.
  - b. I have to go now.
  - c. I should go now.
  - d. I'm supposed to go now.

Are there other examples of assessor dependent predicates whose assessor is not the author of the context? I think French offers such an example. In contradistinction to other personal taste predicates, e.g., *bon* 'good', *plaire* 'be-liked' stands out as being anti-author oriented: hearers of (129b) naturally infer that the speaker is not opinionated about the dish under discussion (and would typically use the kind of reply shown in (129b)):



- (129) a. #Ce plat est bon, mais je n' ai pas d'avis à son sujet.  
 this dish is good but I NEG have NEG opinion at its subject  
 'This dish is good, but I have no opinion about it.'
- b. — A:Ce plat plaît beaucoup.  
 this dish is-liked very-much  
 'This dish is very popular.'
- B:D'accord, mais qu'est-ce que tu en penses toi ?  
 ok but what you of-it think you  
 'Ok, but what do *you* think?'

In light of this, I propose the following lexical entry for *supposed*<sub>deon</sub>, in which the external argument of the modal is PRO<sub>arb</sub>:

- (130) When  $\# \neq \#$ ,  $Su(x, i, w)$  is a set of pairs of  $D_i \times D_s$ :  
 $Su(x, i, w) = \{\langle i', w' \rangle :$   
 $\langle i', w' \rangle$  is compatible with what is right according to  $x$  in  $w$  at  $i\}$
- (131)  $\llbracket \text{supposed} \rrbracket^{c,s} = \lambda p_{\text{ist}}. \lambda x_e. \lambda i_i. \lambda w_s.$   
 $\#$  iff (i)  $Su(x, i, w) = \#$  or  
 (ii) for some  $\langle i', w' \rangle \in Su(x, i, w)$ ,  $p(i')(w') = \#$ , or  
 (iii) it is not the case that either  
 for each  $\langle i', w' \rangle \in Su(x, i, w)$ ,  $p(i')(w') = 1$  or  
 for each  $\langle i', w' \rangle \in Su(x, i, w)$ ,  $p(i')(w') = 0$ ;  
 $1$  iff  $\# \neq \#$  and for each  $\langle i', w' \rangle \in Su(x, i, w)$ ,  $p(i')(w') = 1$

Notice again that the lexical entry encompasses a homogeneity presupposition, but this assumption is more questionable than ever (see the next subsection). The truth conditions of a simple sentence can now be derived:

- (132) a. John is supposed<sub>deon</sub> to leave.  
 b.  $[C_{1,2,3} w_3 i_2 \text{ PRO}_{\text{arb}} \text{ supposed} [\lambda_4 \lambda_5 w_5 i_4 \text{ John leave}]]$   
 c.  $\llbracket (132b) \rrbracket^{c,s} = \text{if } \# \neq \#$ ,  
 $1$  iff for each  $\langle i', w' \rangle \in Su(\llbracket \text{PRO}_{\text{arb}} \rrbracket, c_t, c_w)$ ,  
 John leaves in  $w'$  at  $i'$ .

### 5.3 Questions about neg-raising

The relative complexity of the neg-raising pattern with *supposed*<sub>deon</sub> *to* raises a number of interesting issues. I will go over two of them, one of which is very commonly discussed in relation to neg-raising, while the other one is new. First then, there is the “typological” issue (5.3.1), i.e., the difference between neg-raisers and non-neg-raisers, for which there exist two main contenders on the non-syntactic side, namely the lexical presupposition approach, which we have already drawn upon to a large extent, and the strength-based pragmatic approach. And second (5.3.2), there is what one might call the “triggering” problem of neg-raising: under what conditions does a predicate which is in principle capable of neg-raising actually neg-raise in a given sentence? In that matter, our guide will be the behavior of *supposed*<sub>deon</sub> *to* in Dialect B and the effects of its assessor dependence.

#### 5.3.1 About the two dialects

The first question is one about which I can say right off the bat that I do not have a satisfactory answer to offer: why isn't *supposed*<sub>deon</sub> *to* a neg-raiser in Dialect A while it is in Dialect B? One could venture, in keeping with the idea that the homogeneity inference is a lexically encoded presupposition (this is how exceptions to neg-raising are explained in Gajewski 2005, 2007), that the two dialects differ in the lexical specifications of the predicate.<sup>45</sup> This answer is, as it stands, too harsh, as it ignores the fact that although the set of neg-raisers is not perfectly constant across languages (e.g., German *hoffen* ‘hope’ is reported to neg-raise while its English counterpart doesn't; see Horn 1978 for a very detailed examination of crosslinguistic differences), it only varies within narrow limits: if the distribution was arbitrary as one would come to expect if certain predicates are lexically marked, one would be unfazed by a language in which the counterpart of *think* would not be a neg-raiser while that of *certain* would be. Not only is such a language unheard of, but I assume that, should it exist, the general reaction to its unveiling would be one of deep perplexity. It is thus not fair to say that the variation is arbitrary: there is a pattern, and it is legitimate to seek to derive it. An

<sup>45</sup> This is not to say that researchers who accept the premise that neg-raising is due to a lexical presupposition do not try to derive the neg-raising pattern. It is in fact Gajewski's (2005) explicit goal to do so; he proposes that neg-raising predicates are definite plural world descriptions. However I do not see independent evidence that this is a property that distinguishes among predicates, e.g., *want* and *desire*, or *believe* and *guess*.

alternative solution rests on the intuition, shared by many, that *strength* is of the essence. Specifically, the proponents of a pragmatic approach to neg-raising, Horn 1978, 1989 and Horn & Bayer 1984, hold that neg-raisers are scalar predicates. There are two main ingredients to their explanation of the pattern of neg-raising predicates: first, a generalization about so-called “mid-scalar” predicates, and, second, conventionalization.

First, the “mid-scalar” generalization: neg-raising predicates are scalar quantifiers which sit just above the midpoint of their scales. For example, of the three scale mates *possible*, *likely* and *certain*, only *likely* qualifies as a neg-raiser, because only it meets the necessary condition of being just above the middle of its positive scale. The source of neg-raising is, according to these authors, to be found in the following pragmatic rule, which appears to be at work in various phenomena beyond neg-raising (note that contrary statements are statements that cannot be simultaneously true but may be simultaneously false):

(133) Contrary negation tends to be maximized in natural language.

[Horn 1989: 330]

Take a statement of the form *it is not likely that p* (134b): this statement is the contradictory of *it is likely that p*. When (134b) is uttered, a hearer tends to infer a *contrary*, viz. (134c), by virtue of (133):

- (134) a. It is likely that *p*.  
b. It is not likely that *p*. (Contradictory negation)  
c. It is likely that not *p*. (Contrary negation)

(133) is in fact a corollary of the so-called R-principle, a very general pragmatic principle rooted in the second Gricean Maxim of Quantity (“Do not make your contribution more informative than required”), whereby a statement evokes a stronger alternative which the hearer is led to assume to be the case (it is thus distinct from the Q-principle, which generates scalar implicatures, that is, inferences to the *falsity* of stronger alternatives):

“The R-principle is an upper-bounding law which may be (and systematically is) exploited to generate lower-bounding implicata: a speaker in saying ‘...*P<sub>i</sub>* ...’ implicates ‘...*P<sub>j</sub>* ...’ for some *P<sub>j</sub>* stronger than *P<sub>i</sub>* and/or representing a salient subcase of *P<sub>i</sub>*.” (Horn 1989: 195)

The “mid-scalar” generalization holds because maximizing contrary negation is only possible, according to these authors, when there is a slim functional difference between the neg-raised reading and the non-neg-raised reading: crucially, the difference between external and internal negation is far greater in the case of quantifiers that are high or low on their scale (e.g., *certain*, *possible*) than in the case of quantifiers of intermediate strength. Conversational breakdown can thus be expected with the former quantifiers, not with the latter. Intermediate strength is thus a necessary condition for neg-raising, and this is the first key ingredient to the proposal. As a matter of fact, the examination of modal predicates appears to be in line with this generalization, in that it seems that the non-neg-raiser *must*<sub>deon</sub> is in some intuitive sense stronger than the neg-raisers *should*<sub>deon</sub> and *supposed*<sub>deon</sub> *to*, and that the non-neg-raiser *have*<sub>epis</sub> *to* is stronger than the neg-raiser *must*<sub>epis</sub>. (In British English the latter is a neg-raiser but the former is not.<sup>46</sup>) In the same connection, the command in (135a) and (135b) below is intuitively weak to the point that it can be bypassed without jeopardizing the achievement of the goal, namely running the marathon:

- (135) *Context*: If you want to run the marathon...
- a. You should train every day.
  - b. You’re supposed to train every day.
  - c. You must train every day.
  - d. You have to train every day.

In (135c) and (135d) on the other hand, the rule is unescapable. I notice that the divide between the two pairs is also a divide between potential neg-raisers and non-neg-raisers. (But I cannot draw more substantial conclusions at this point.) There is thus a sense in which neg-raisers can appear to be relatively weak members of scales: *should*<sub>deon</sub> and *supposed*<sub>deon</sub> *to* can be seen as having *have*<sub>deon</sub> *to* and *must*<sub>deon</sub> as scale mates and as being weaker than them, as can be shown even more directly with two tests that Horn 1978 applies e.g., to *want*, building on Horn 1972b:<sup>47</sup>

<sup>46</sup> But this is not true of all English dialects, see (106).

<sup>47</sup> I thank an anonymous reviewer of *S&P* for reminding me of those scalar diagnostics. There is one practical difficulty with those tests, though, which pertains to the extreme diversity of deontic accessibility relations. So the same caveat expressed in footnote 10 applies here: the reader should, for each sentence in (136), evaluate the sentence keeping the exact same accessibility relations in mind.

- (136) a. {You should/are supposed to} go, in fact you have to.  
b. #You have to go, in fact {you should/are supposed to}.  
c. Not only {should you/are you supposed to} go, you have to.  
d. #Not only do you have to train every day, {you should/are supposed to}.

If we trust that the so-called scalar tests in (136) tell us something about the quantificational strength of the modals, *should*<sub>deon</sub> and *supposed*<sub>deon</sub> *to* ought to be seen as scalar elements of intermediate strength;<sup>48</sup> as such they meet the first requirement for being neg-raisers, according to this pragmatic approach: and indeed they are neg-raisers in Dialect B. But we are still short of an explanation for the failure to neg-raise of *supposed*<sub>deon</sub> *to* in Dialect A. The innovation of Horn & Bayer 1984, and the second ingredient of the strength-based pragmatic approach to neg-raising, is pragmatic conventionalization, whereby a certain pragmatic reasoning gets “short-circuited”, i.e., a certain implicature often triggered by a given linguistic form becomes conventionally associated with it, without an actual calculation by speakers. This way, the authors contend, we can account for lexical exceptions to pragmatic rules. Their answer to my first question, then, would be that conventionalization is what differentiates Dialect A and Dialect B with respect to *supposed*<sub>deon</sub> *to*. Unfortunately, I cannot think of any way of testing this claim.

### 5.3.2 Hypotheses about the triggering of neg-raising

The second question is: what exact factors does the triggering of neg-raising depend upon? Because it is a *part-time* neg-raiser (in Dialect B), *supposed*<sub>deon</sub> *to* offers a vantage point to answer the *triggering* issue.

Here I will content myself with presenting the various hypotheses that can be entertained, given our current understanding of neg-raising and of presupposition; central in this discussion is the fact that neg-raising with *supposed*<sub>deon</sub> *to* in Dialect B appears to be conditional on the availability of a plausible assessor, in accordance with our Generalization (104). Note first that the comparison between *should*<sub>deon</sub> and *supposed*<sub>deon</sub> *to* is particularly useful: these modals are very close in meaning as well as in their argument structure. But in Dialect B, neg-raising is always possible with *should* — although the

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<sup>48</sup> Here I remain agnostic about the exact nature of strength. As I said earlier, I do not endorse the view that these modals are not universal quantifiers; but I offer no explanation for the observed difference with other modals which I also consider to be universal quantifiers.

result is felt weird outside of a supporting context — while it is sometimes impossible with *supposed to*:

- (137) a. Not everyone is supposed<sub>deon</sub> to win the lottery. [Dialect B]  
*Unless in appropriate context, not paraphrasable as:* There is some individual  $x$  such that  $x$  is supposed to not win the lottery.  
 (NR reading)
- b. Not everyone should<sub>deon</sub> win the lottery. [Dialect A and B]  
*Paraphrasable as:* There is some individual  $x$  such that  $x$  should not win the lottery. (NR reading)

The lack of a neg-raised reading of (137a) seems to be due to the absence of a plausible assessor of the necessity to win the lottery. If we assume, after Gajewski 2005, that neg-raising is always due to a homogeneity lexical presupposition, we are led to postulate that the homogeneity presupposition triggered by *supposed to* (namely — factoring in the universal projection — that for some assessor every individual is supposed to win the lottery or supposed not to win the lottery) fails to project in (122c), (123c) and (137a), i.e., in those contexts that do not support it. Failure to project means either (i.) that the presupposition is not triggered or (ii.) that it is triggered but satisfied (or accommodated) locally. We have seen that adjudicating between the two options is difficult ((29b) and footnote 8). Saying that neg-raisers are “soft” presupposition triggers is seen by some, e.g., Gajewski 2007, as an explanation for non-neg-raised readings (see (22)-(23) among others). And neg-raising is actually optional, both with *supposed to* and *should* (71c). But what is the difference between the two? Is it rooted in soft triggering?

The main explanandum for the lexical presupposition approach is that in certain sentences, e.g., (137a), the presupposition of *supposed to* obligatorily fails to project (either it is not triggered or it is but it gets cancelled along the way), unlike that of *should*. The origin of the discrepancy is unclear, unless we postulate some pragmatic principle to take into account the effect of a lack of plausible assessor in some sentences, e.g., (137a). As a first pass (taking the word “cancel” as a cover term for non-triggering and non-projection):

- (138) **Pragmatic Principle:** *To avoid a failure, cancel a presupposition if you can!*

This is obviously too strong, because the presupposition of *should* would *not* project in (137b), contrary to fact. Then we could try, stipulating that the presupposition of *supposed to* is easy to cancel while that of *should* isn't:

- (139) **Pragmatic Principle:** *To avoid a failure, cancel a presupposition if it's easy to do so!*

Clearly, soft triggering cannot be the whole story here: it might be helpful in order to explain why certain presuppositions can fail to project, but not, as we would need in view of *supposed<sub>deon</sub> to*, why certain presuppositions *cannot* project. Besides, if all NRPs are soft triggers, we must still find a difference between *supposed to* and *should* (hence the appeal to easiness of cancellation). Be it as it may, adding a pragmatic principle such as (139) to the lexical presupposition approach is perhaps a viable route, but a stipulative one, for sure.

Taking a fully pragmatic route (rather than the lexical presupposition route) has some appeal. For it is quite clear that some important pragmatic ingredient needs to be acknowledged, which does not fit well with the lexical presupposition approach: as we uncovered in previous sections, the two modals *should<sub>deon</sub>* and *supposed<sub>deon</sub> to* differ in some fundamental way, as their assessors are just not the same. Let us see how this fact bears on the question at hand.

It seems that the divide (authors of contexts vs. other individuals) coincides with a key pragmatic difference: general assumptions, in particular opinionatedness, hold about speakers and authors of contexts that do not hold about other assessors. There are some grammatical facts about which the opinionatedness of authors of contexts is invoked: the derivation of scalar implicatures in the Gricean framework relies on this assumption. The proponents of this line (Russell 2006, Geurts 2009a) also assume that the opinionatedness of the subject of (certain) embedding verbs accounts for scalar implicatures triggered in the scope of those verbs.<sup>49</sup> For example in (140), it is the assumption that the speaker believes that George is opinionated which allows the derivation of a conversational inference in the scope

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<sup>49</sup> Notice however that this account does not generalize, by Geurts's (2009a) own admission, to scalar implicatures in the complements of all attitude verbs, specifically of non-neg-raisers; but here is not the place to discuss how the Gricean approach deals with those, see Geurts 2009a.

of the intensional operator *believe* ( $B_S$  stands for ‘the speaker believes that’ and  $B_G$  for ‘George believes that’).<sup>50</sup>

- (140) George believes that some of his advisors are crooks.
- a. *Implicature*:  $B_S \neg B_G$ [all of G’s advisors are crooks]
  - b. *Assumption*:  $B_S B_G$ [all of G’s advisors are crooks]  $\vee$   $B_S B_G \neg$ [all of G’s advisors are crooks]
- $\therefore B_S B_G \neg$ [all of G’s advisors are crooks] [Geurts 2009b: 34]

If the opinionatedness of certain distinguished individuals is part of the background assumptions of the participants in a conversation, it is at least plausible that an asymmetry between assessors (authors of contexts are always assumed to be opinionated, others are not) can explain why a homogeneity inference sometimes doesn’t arise with *supposed to*, whose assessor is some unspecified individual, while it is always available with *should* and all other neg-raisers, whose assessor is the author of the context.

If this is so, it seems that the facts about *should* and *supposed to*, and more generally about neg-raisers, could be derived without invoking a *lexical* homogeneity presupposition: common assumptions about the opinionatedness of assessors make it redundant. For the homogeneity inference can be a pragmatic assumption, namely the assumption that the assessor is opinionated: in other words, assuming that the assessor of a predicate is opinionated about  $p$  (the proposition denoted by its complement) is equivalent to assuming that his or her doxastic, bouletic, etc., alternatives are homogeneous with respect to  $p$ . Such an assumption is not readily available when the assessor is not the author of the local context (as is the case with *supposed to*), but it is by default part of the background assumptions when s/he is (as is the case with *should*; also with *want*, *think*, etc., whose external argument is the author of the most local context). Importantly, this view gives center stage to assessor dependence, a property which, according to our Generalization (104), is shared by all neg-raisers.

In sum, if homogeneity is a lexical presupposition, the behavior of *supposed<sub>deon</sub> to* is hard to justify, as ways of blocking the projection of the presupposition in non-supporting contexts appear to be stipulative. These facts are on the other hand more easily accommodated by a pragmatic, non-

<sup>50</sup> In the rival framework, which claims that embedded implicatures exist and derives them using exhaustifying operators (this is the “grammatical view”, Chierchia, Fox & Spector 2012), the assumption that subjects of attitude verbs are opinionated is not needed; but it is not excluded either.



lexical take on the triggering of neg-raising (a view at least compatible with Horn 1978, 1989). After all, there are other facts that go in the same direction: (i.) the relative stability of the typology of neg-raisers across languages speaks for a deep connection, derivable from independent principles, between the meaning of certain predicates and the homogeneity inference attached to them, rather than for some lexical property; and (ii.) neg-raising is obviously context sensitive: this is the lesson we learned in particular from *want* in (22)-(23), where the homogeneity inference is not drawn.

It is important to stress that the behavior of *supposed*<sub>deon</sub> *to* in Dialect B is primarily relevant to the question of the triggering of neg-raising, and that I do not claim that it provides all the keys to neg-raising. Having the right assessor is indeed not sufficient for neg-raising: certain predicates have the author of the local context as their assessor, e.g., epistemic modals in American English, *desire*, *hope*, *certain*, etc., and still, they are not neg-raisers. Therefore although neg-raising requires opinionatedness, some other factors limit the range of possible neg-raisers. But then determining what those factors are comes down to solving the “typological” problem of neg-raising, which is an open question (5.3.1).<sup>51</sup>

## 6 Conclusion

This article offers a case study of the scopal properties of three deontic modal verbs with respect to negation. It shows that *must*, *should* and *supposed to* are mobile PPIs and that *should* is also a neg-raiser, while *supposed to* exhibits the neg-raising behavior only in certain dialects and provided that the opinionatedness of some individual is assumed in the context of utterance. (The typology is presented in Table 1.) The examination of *supposed to* thus favors a pragmatic approach to neg-raising.

In sum then, there are three main empirical and theoretical contributions: one about polarity, the second about neg-raising, and the third about the ways to tease the first two apart.

With respect to the third point, the reader interested in describing and analyzing the properties of expressions in their interaction with negative

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<sup>51</sup> Granted, whoever wants to pursue the line that the triggering of neg-raising with *supposed to* is entirely pragmatic (no lexical presupposition is needed) and proposes to extend this view to *all* known neg-raisers, must make sure that her theory explains why the homogeneity inference appears to “project” (i.) universally (2.1) and (ii.) differentially under doxastic and bouletic predicates (like well-known presuppositions) (2.2).

	Is a PPI	Can Raise Covertly	Is a Neg-raiser
<i>must</i> <sub>deon</sub>	yes	yes	no
<i>should</i> <sub>deon</sub>	yes	yes	yes
<i>supposed</i> <sub>deon</sub> <i>to</i>	yes	yes	English <sub>A</sub> : no English <sub>B</sub> : yes
<i>have</i> <sub>deon</sub> <i>to</i>	no	no	no

**Table 1** Properties of Some Modals

elements, can find in this article a systematic collection of tests, some of them original, e.g., the “pin” test, to separate positive polarity and neg-raising.

Regarding polarity, this article extends the class of PPIs to include some modal verbs, *viz.* deontic *must*, *should* and *supposed to*, and also argues for the existence of a hitherto undocumented covert movement, labelled “escape”, whereby certain PPIs, the “mobile” ones, can raise out of an anti-licensing environment. The most evident question raised by this investigation is: why are certain verbs PPIs while others are not? Judging only from the three verbs studied here, it looks like we could generalize that only universal modals can be PPIs; but one needs to exercise caution, as other flavors of modals are yet to be looked at, in particular epistemic modals. Furthermore, we also need to explain why not all universal deontic modals are PPIs, witness *have*<sub>deon</sub> *to*. As the reader can easily note, here I am just restating a more general problem about polarity: why is it that certain expressions are polarized while others are not? Maybe modal PPIs can offer us a vantage point to solve that daunting riddle. If we choose to follow that route, what is needed first and foremost is a better understanding of the semantic and syntactic differences between near synonyms like *must*<sub>deon</sub> and *have*<sub>deon</sub> *to*.

As far as neg-raising is concerned, this article brings to light facts that might challenge certain well established assumptions about the nature of the phenomenon. First, I proposed that assessor dependence is a necessary condition for neg-raising, a fact that only emerges when raising-to-subject verbs like modals are brought into the limelight, since those do not all have (obvious) assessor arguments. And as I argued, the behavior of the part-time neg-raiser *supposed*<sub>deon</sub> *to* is not easy to capture in a framework in which NRPs come with a lexical homogeneity presupposition. More empirical work

is needed to find and analyze other part-time neg-raisers, in English and in other languages, in order to decide whether such facts definitely tip the scales in favor of a (more) pragmatic approach to neg-raising.

## A Appendix

### A.1 Appendix I: Intermediate scope or split scope?

In this Appendix, I explain why the “pin” test (43) has the particular shape it has, specifically why I use a non-monotonic subject quantifier: in a nutshell the reason is that we need to exclude the possibility that the observed scopal sandwich is due to neg-raising.

Abels & Martí 2010 propose a unified analysis of the split scope readings that negative indefinites, comparative quantifiers and numerals give rise to across intensional verbs such as *must* and *can*. In this theory (inspired by Sauerland 1998, 2004), quantifiers are quantifiers over choice functions of type  $\langle\langle et, e \rangle, t \rangle$ ; in split readings, they bind a choice function variable which is the trace that they leave behind after movement; this trace combines with the noun phrase restriction in the scope of the intensional verb. This way, the narrow scope reading of the indefinite in (141a) can be derived as a split scope reading involving a choice function:

- (141) a. You must wear a tie.
- b.  $[[\text{(141a)}]]^{c,s} = \text{iff } \exists f [CF(f) \wedge \forall w' \in \text{Acc}(c_w)$   
 $[\text{wear}'(f(w', \text{tie}'))(\llbracket \text{you} \rrbracket^{c,s}) = 1 \text{ in } w']]$

Importantly, the choice function has to be parameterized (so that the choice of ties varies from world to world; this amounts to Skolemization); to simplify our entries, the modal is treated as a universal quantifier over possible worlds and the set of accessible worlds is specified by the accessibility relation *Acc*.

Recall that we used a quantifier over individuals with intermediate scope between *must* and negation to show that *must* is syntactically higher than negation when it is interpreted as having wide scope over it (43). With certain quantifiers, Abels & Martí’s (2010) analysis in terms of choice functions can derive an intermediate scope reading without giving *must* syntactic scope over negation and without giving the quantifier over individuals intermediate syntactic scope between the modal and negation.

### A.1.1 Split scope with simple indefinites

Consider the case of a simple indefinite:

- (142) *Context:* The rules of this bowling game state that exactly one pin must remain standing, no matter which one. . .  
 A pin mustn't be knocked down. ✓MUST»A»NEG

Suppose that a choice function variable combines with the restriction below the modal and below negation. *Must* takes semantic scope over negation; whether *must* is syntactically higher than negation (as claimed in Section 3) or achieves wide scope through a homogeneity inference (assuming, contrary to fact, that deontic *must* is a neg-raiser) doesn't change the prediction. In both cases, the semantics of (142) will be as follows under the split scope analysis (which means that if this analysis is correct for the key sentence (43), p. 20, it deprives us of our argument in favor of the syntactic wide scope of *must*):

- (143)  $\llbracket (142) \rrbracket^{c,s} = \exists f [CF(f) \wedge \forall w' \in Acc(c_w)$   
 $\quad \quad \quad [\neg \text{knock\_down}'(f(w', \text{pin}')) = 1 \text{ in } w']]$

This is correct, as can be checked intuitively in Table 2 (which describes a state of affairs in a universe made up of six accessible possible worlds written  $w_1$  through  $w_6$ ;  $p_1 \dots p_6$  are pins): the first row describes the state of affairs across possible worlds; the next rows describe outputs of choice functions. I box the outputs of the choice functions if they happen to be pins that are not knocked down in the worlds under consideration. There happens to be a choice function, namely  $f_1$ , which in every possible world  $w'$  picks the pin that is not knocked down in  $w'$ . This means that the intermediate scope of a plain indefinite is not an argument in favor of the syntactic scope of *must* over negation: it is possible to achieve the reading through a homogeneity presupposition and a choice function variable bound across the modal.

### A.1.2 No split scope with *exactly*-numerals

Things are very different with *exactly*-numerals: their intermediate scope between *must* and negation is not amenable to the analysis in terms of split scope. Consider first a non-negated sentence:

- (144) Exactly one of those 6 people must come. ✓MUST»EXACTLY\_ONE

	w <sub>1</sub>	w <sub>2</sub>	w <sub>3</sub>	w <sub>4</sub>	w <sub>5</sub>	w <sub>6</sub>
pins that stay up:	p <sub>1</sub>	p <sub>2</sub>	p <sub>3</sub>	p <sub>6</sub>	p <sub>5</sub>	p <sub>4</sub>
output of f <sub>1</sub> :	<span style="border: 1px solid black;">p<sub>1</sub></span>	<span style="border: 1px solid black;">p<sub>2</sub></span>	<span style="border: 1px solid black;">p<sub>3</sub></span>	<span style="border: 1px solid black;">p<sub>6</sub></span>	<span style="border: 1px solid black;">p<sub>5</sub></span>	<span style="border: 1px solid black;">p<sub>4</sub></span>
output of f <sub>2</sub> :	<span style="border: 1px solid black;">p<sub>1</sub></span>	p <sub>1</sub>	p <sub>1</sub>	p <sub>5</sub>	<span style="border: 1px solid black;">p<sub>5</sub></span>	p <sub>1</sub>
	...					

**Table 2** Simple Indefinite

Analyzing *exactly n* as ‘at least n and no more than n’, the choice function approach fails to derive the narrow scope reading of the *exactly*-numeral with respect to *must* in a sentence like (144). The predicted truth conditions are as follows:<sup>52</sup>

$$\begin{aligned}
 (145) \quad & \llbracket (144) \rrbracket^{c,s} = \exists f [CF(f) \wedge \text{dom}(f) = \{p : \exists X \in p[|X| = 1]\}] \wedge \\
 & \quad \forall p [p \in \text{dom}(f) \rightarrow |f(p)| \geq 1] \wedge \\
 & \quad \forall w' \in \text{Acc}(c_w) [\text{come}'(f(w', \text{person}')) = 1 \text{ in } w'] \wedge \\
 & \quad \neg \exists g [CF(g) \wedge \text{dom}(g) = \{p : \exists X \in p[|X| > 1]\}] \wedge \\
 & \quad \forall p [p \in \text{dom}(g) \rightarrow |g(p)| > 1] \wedge \\
 & \quad \forall w' \in \text{Acc}(c_w) [\text{come}'(g(w', \text{person}')) = 1 \text{ in } w']
 \end{aligned}$$

In the situation described in the first row of Table 3 (where I box the outputs of the choice functions if they happen to be people that come in the worlds under consideration), the narrow scope reading of (144) is intuitively false: it is not the case that in every possible world  $w'$  exactly one person comes in  $w'$ . But the split scope reading given in (145) is true in that situation: there exists a choice function, namely  $f_1$ , which outputs individuals with at least one atom in them, such that in all possible world  $w'$  it picks a person that comes in  $w'$ ; and there is no function  $g$  which outputs individuals with more than one atom in them such that in every possible world  $w'$   $g$  picks an individual that comes in  $w'$ . (This is because in the worlds  $w_1$  through  $w_5$

<sup>52</sup> The first restriction (“ $\text{dom}(f) = \{p : \exists X \in p[|X| = 1]\}$ ”) says that in the domain of the choice function, all properties are such that you can find at least one member in them which has one atomic individual; the second restriction (“ $\forall p [p \in \text{dom}(f) \rightarrow |f(p)| \geq 1]$ ”) says that all properties in the domain of the choice function are such that the output of the application of the choice function to the property has one or more atoms.

exactly one individual comes: in those worlds in which exactly one person comes, the output of a function which selects plural individuals only cannot be in the extension of the property ( $\lambda x.x$  come.)

	$w_1$	$w_2$	$w_3$	$w_4$	$w_5$	$w_6$
people that come:	$p_1$	$p_2$	$p_3$	$p_4$	$p_5$	$p_1, p_2, p_3, p_4, p_5, p_6$
output of $f_1$ :	$\boxed{p_1}$	$\boxed{p_2}$	$\boxed{p_3}$	$\boxed{p_4}$	$\boxed{p_5}$	$\boxed{p_4}$
output of $f_2$ :	$\boxed{p_1}, p_2$	$p_1, \boxed{p_2}$	$p_1, \boxed{p_3}$	$p_1, \boxed{p_4}$	$p_1, \boxed{p_5}$	$\boxed{p_1}, \boxed{p_2}$
...						

**Table 3** *Exactly One Must*

The problem carries over to the cases that interest us directly, i.e., intermediate scope of *exactly*-numerals in negative sentences:

- (146) Exactly one pin mustn't be knocked down. (=(43))  
 $\checkmark$ MUST $\gg$ EXACTLY\_ONE $\gg$ NEG

Regardless of the source of the wide scope of the modal (raising or homogeneity inference), the truth conditions under the split scope hypothesis are as follows:

- (147)  $[(144)]^{c,s} =$   
 $\exists f[CF(f) \wedge \text{dom}(f) = \{p : \exists X \in p[|X| = 1]\}] \wedge$   
 $\forall p[p \in \text{dom}(f) \rightarrow |f(p)| \geq 1] \wedge$   
 $\forall w' \in \text{Acc}(c_w)[\neg \text{knock\_down}'(f(w', \text{pin}')) = 1 \text{ in } w'] \wedge$   
 $\neg \exists g[CF(g) \wedge \text{dom}(g) = \{p : \exists X \in p[|X| > 1]\}] \wedge$   
 $\forall p[p \in \text{dom}(g) \rightarrow |g(p)| > 1] \wedge$   
 $\forall w' \in \text{Acc}(c_w)[\neg \text{knock\_down}'(g(w', \text{pin}')) = 1 \text{ in } w']]$

In the situation described in the first row of Table 4, the intermediate scope reading of the numeral in (146) is intuitively false but the split scope reading given in (147) is true. (This is because there is at least one world, e.g.,  $w_1$ , in which the plural output of any function that only outputs plural individuals fails to stay up.)

	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	W <sub>5</sub>	W <sub>6</sub>
pins that stay up:	p <sub>1</sub>	p <sub>2</sub>	p <sub>3</sub>	p <sub>4</sub>	p <sub>5</sub>	p <sub>1</sub> , p <sub>2</sub> , p <sub>3</sub> , p <sub>4</sub> , p <sub>5</sub> , p <sub>6</sub>
output of f <sub>1</sub> :	<span style="border: 1px solid black; padding: 2px;">p<sub>1</sub></span>	<span style="border: 1px solid black; padding: 2px;">p<sub>2</sub></span>	<span style="border: 1px solid black; padding: 2px;">p<sub>3</sub></span>	<span style="border: 1px solid black; padding: 2px;">p<sub>4</sub></span>	<span style="border: 1px solid black; padding: 2px;">p<sub>5</sub></span>	<span style="border: 1px solid black; padding: 2px;">p<sub>4</sub></span>
output of f <sub>2</sub> :	<span style="border: 1px solid black; padding: 2px;">p<sub>1</sub></span> , p <sub>2</sub>	p <sub>1</sub> , <span style="border: 1px solid black; padding: 2px;">p<sub>2</sub></span>	p <sub>1</sub> , <span style="border: 1px solid black; padding: 2px;">p<sub>3</sub></span>	p <sub>1</sub> , <span style="border: 1px solid black; padding: 2px;">p<sub>4</sub></span>	p <sub>1</sub> , <span style="border: 1px solid black; padding: 2px;">p<sub>5</sub></span>	<span style="border: 1px solid black; padding: 2px;">p<sub>1</sub></span> , <span style="border: 1px solid black; padding: 2px;">p<sub>2</sub></span>
	...					

**Table 4** *Exactly One Mustn't*

*Exactly*-numerals are not amenable to the split scope analysis. It is possible to derive intermediate scope of a quantifier between a modal and negation as a reflection of split scope in concert with a homogeneity inference when the quantifier is a simple indefinite (A.1.1), but not when it is an *exactly*-numeral.

We have independent evidence that deontic *must* is not a neg-raiser (see Sections 3.1 on p. 18 and 3.5 on p. 31). But for other modals which can be shown to be neg-raisers, *should* in particular, it is crucial to use *exactly*-numerals in the “pin” test: only then does the test show that the modal can be syntactically higher than negation and is therefore a potential mobile PPI.

In closing, it is important to say that there is something unexpected about the triggering of escape in a sentence like (146) (= (43)). In effect, I claim that when a mobile PPI escapes, it is because it would otherwise be unacceptable in the constituent in which it is evaluated. But when it is generated under negation and a non-monotonic quantifier, the entire clause is in fact non-monotonic with respect to its base-position. (The composition of a non-monotonic quantifier with negation creates a non-monotonic environment.) In Homer 2012b, I show that PPIs (*some* in any case) are not vulnerable to non-monotonicity: therefore, we expect the movement past *exactly one pin* to be impossible, per Laziness. But one could then imagine the following scenario for (146): the evaluation of the acceptability of the modal takes place in a domain which does not encompass the subject quantifier, e.g., PolP, leading to escape; but the landing site of escape lies outside of this constituent, higher than *exactly one pin*. However the problem runs deeper as it has a corollary: one would expect narrowest scope of *must* to be at least *possible* (by rescuing) in this non-monotonic environment, contrary to fact:

(148) Exactly one person must<sub>deon</sub>n't leave. \*EXACTLY\_ONE≫NEG≫MUST

Notice that, in a parallel fashion, a non-monotonic subject quantifier does not rescue the PPI *some*:

(149) Exactly one person didn't understand something.  
\*EXACTLY\_ONE≫NEG≫SOME

In [Homer 2012b](#), I discuss similar facts and propose, based on the experimental results of [Chemla, Homer & Rothschild 2011](#), that speakers can actually err in the computation of monotonicity when non-monotonic quantifiers are involved. If speakers do not compute the environment as non-monotonic, then we can derive both the impossibility of narrowest scope and the possibility of widest scope. But I admit that the question is still an open one at this stage.

## A.2 Appendix II: Does *want* have a dual nature too?

As I explained on p. 14, the smallest possible constituent in which the acceptability of *some* is evaluated (this is what in [Homer 2012b](#) I call the minimal domain of *some*) is PolP. We saw that this is also the case for deontic *must*, *should* and *supposed to*.

### A.2.1 French deontic *devoir*

In French as well, there is a universal deontic modal which takes scope over a clausemate negation, namely *devoir*. But it can also be interpreted with narrow scope ([Homer 2010a](#)):

(150) Marc ne doit<sub>deon</sub> pas parler à Léa.  
Marc NEG must NEG talk to Léa  
'Marc mustn't talk to Léa.' or 'Marc doesn't have to talk to Léa.'

It can be shown that *devoir*<sub>deon</sub> can raise covertly past a clausemate negation. First of all, it passes the “pin” test, which indicates that it can be interpreted in a high position above negation (in the following sentence, the marker *ne* indicates that negation is a clausemate of the modal):



- (151) *Context:* The rules of this bowling game state that exactly one pin must remain standing, no matter which one...  
 Exactly one of those pins NEG must.PRES NEG be  
 renversée.  
 knocked-down  
 'Exactly one of those pins mustn't be knocked down.'  
 ✓DEVOIR»EXACTEMENT\_UNE»NEG

Since the narrow scope of *devoir*<sub>deon</sub> is always possible, a number of tests that we used to show that *must* can have narrow scope under a clausemate negation (and is therefore a probable mobile PPI rather than an item base-generated higher than negation) are uninformative in French. There is one important exception. We can show that *devoir*<sub>deon</sub>, just like *must*<sub>deon</sub>, can be forced to take narrow scope when it is shielded. (We have observed that raising of *must* is blocked under *not every* (54a) on p. 26.) We use the universal quantifier *toujours* 'always' and ensure that it is in the matrix clause together with negation and *devoir*<sub>deon</sub>, by substituting a pronoun for the embedded clause (this is right dislocation): the only possible reading is one in which the modal has scope under negation:

- (152) Jean ne le doit<sub>deon</sub> pas toujours, m' aider.  
 Jean NEG it must.PRES NEG always me help  
 'Jean is not always required to help me.' (only reading)  
 NEG»TOUJOURS»DEVOIR; \*DEVOIR»NEG»TOUJOURS

The existential quantifier *jamais* 'ever' does not have this blocking effect:

- (153) *Control:*  
 Jean ne le doit<sub>deon</sub> jamais, m' aider.  
 Jean NEG it must.PRES ever me help  
 'Jean is required to never help me.' or 'Jean never has to help me.'  
 NEG»JAMAIS»DEVOIR; DEVOIR»NEG»JAMAIS

By the criteria that we have used in this article, the high position is thus a landing position, and *devoir*<sub>deon</sub> is a mobile PPI.<sup>53</sup> I also note that *devoir*<sub>deon</sub>, like *must*<sub>deon</sub>, is not a neg-raiser, as it fails the cyclicity test, and doesn't give rise to wide scope existential quantification readings:

<sup>53</sup> Notice also that deontic *devoir* must have narrow scope under negation in the perfective (the same is true in Spanish and Italian):

- (154) a. Je ne pense pas qu' il doive<sub>deon</sub> faire du jogging.  
 I NEG think NEG that he must do of-the jogging.  
 'I don't think that he has to jog.'  
*Not paraphrasable as:* I think that he mustn't jog.
- b. Tout le monde ne doit<sub>deon</sub> pas faire du jogging.  
 all the people NEG must NEG do of-the jogging.  
 'Not everyone has to jog.'  
*Not paraphrasable as:* There is some  $x$  such that  $x$  mustn't jog.

Now, back to the PPIhood of *devoir*<sub>deon</sub>. What is mysterious is why it can routinely be interpreted under a clausemate negation: this is a very unusual behavior for a PPI. Using the theory developed in [Homer 2012b](#), we can explain away this mystery if we stipulate that the minimal domain of *devoir*<sub>deon</sub> doesn't contain Pol (suppose that it is the VP that the modal heads). If this is so, when acceptability is checked in VP, the PPI can be licensed (and doesn't need to escape). I have shown in [Homer 2012b](#) that licensing is "liberal": a PI need not be licensed in the first eligible constituent (going bottom-up) in which it is acceptable. This means that when *devoir*<sub>deon</sub> is interpreted above a clausemate negation, its licensing has taken place in a larger constituent which encompasses negation (in this constituent escaping is necessary). I illustrate the two options with two different LFs below (for simplicity, I assume that *devoir*<sub>deon</sub> is anti-licensed by DENess; the label  $\boxed{YP \nearrow x}$  used in the representation of logical forms indicates that YP is UE with respect to the position of the bearer of index  $x$ ;  $\boxed{YP \searrow x}$  indicates that YP is DE with respect to the position of the bearer of index  $x$ ; if there is more than one copy due to the existence of traces, the position that is targeted is that of the copy written in full):

- 
- (i) Jean n'a pas dû<sub>deon</sub> fumer.  
 Jean NEG has NEG must.PP smoke  
 'Jean didn't have to smoke.' (only reading) NEG ≫ DEVOIR; \*DEVOIR ≫ NEG

This shows that *devoir* is indeed generated below negation. But I do not have an explanation for the lack of wide scope in the perfective. The fact that the modal is a participle is immaterial: the same inability is observed in simple "perfective tenses" i.e., *passé simple* ([Borgonovo & Cummins 2007](#)). I can only conjecture that aspectual coercion ([Homer 2010b, 2011](#)) shields the modal, and per Laziness, blocks escape.

Neg-raising and positive polarity

- (155) Jean ne doit pas parler.  
 Jean NEG must.PRES NEG talk  
 a. *Paraphrasable as:* Jean is not required to talk. (LF (156a))  
 b. *Paraphrasable as:* Jean mustn't talk. (LF (156b))
- (156) a. [<sub>TP</sub> Jean<sub>2</sub> T [<sub>XP</sub> pas [<sub>VP</sub> devoir<sub>deon1</sub> [<sub>TP</sub> t<sub>2</sub> parler]]]]  
 b. [<sub>TP</sub> Jean<sub>2</sub> T [<sub>XP</sub> devoir<sub>deon1</sub> [<sub>PolP</sub> pas [<sub>VP</sub> t<sub>1</sub> [<sub>TP</sub> t<sub>2</sub> parler]]]]]]

### A.2.2 *Vouloir and want*

Armed with the hypothesis that certain PPIs can be interpreted under a clausemate negation, we can now turn to *vouloir* ‘want’ and its English counterpart. Some facts strongly suggest that it can take syntactic scope above negation. First, we run the “pin” test: an *exactly*-numeral can be sandwiched between it and negation (in both languages), as shown by the non-specific reading that obtains in (157):<sup>54</sup>

- (157) *Context:* N. Sarkozy wants to cut public spending drastically: 60% of the civil servants who retire this year will not be replaced.  
 Le président ne veut pas remplacer exactement 30 000  
 the president NEG wants NEG replace exactly 30,000  
 fonctionnaires.  
 civil servants  
 ‘The president doesn’t want to replace exactly 30,000 civil servants.’  
 VOULOIR»EXACTEMENT\_30000»NEG

As we know, this reading cannot be achieved by the semantic route of a homogeneity inference, and is a test for a high position of interpretation.

Second, *vouloir* can outscope the presupposition trigger *plus* ‘anymore’ (to the left of which it surfaces through V-to-T; *plus* is a clausemate of *vouloir* because it surfaces before the complementizer):

<sup>54</sup> The position of the negative marker *ne* is crucial: it indicates where negation is interpreted. When *ne* precedes a verb, negation is a clausemate of this verb. Therefore negation is interpreted in the matrix in (157).

- (158) Je ne veux plus qu' on me traite d' imbécile.  
 I NEG want anymore that one me treats of idiot  
 'I no longer want to be called an idiot.' VOULOIR»PLUS  
*Paraphrasable as:* I want it to be the case that I am no longer called  
 an idiot.

If we assume, as seems reasonable, that the n-word *plus* carries the presupposition that the proposition denoted by the clause in its syntactic scope used to hold, its presupposition tells us what lies in its c-command domain. The above sentence is ambiguous between a narrow and a wide scope of *vouloir* with respect to *plus*: its most natural reading is the latter, i.e., it is not assumed that the speaker ever had a desire to be called an idiot. (It also has the less natural reading whereby it is assumed that the speaker used to want to be considered an idiot.) Compare with another neg-raiser, *penser* 'think':

- (159) Je ne pense plus qu' on me traite d' imbécile.  
 I NEG think anymore that one me treats of idiot  
 'I no longer think that I am called an idiot.' \*PENSER»PLUS  
*Not paraphrasable as:* I think that I am no longer called an idiot.

This time, the only possible reading is one in which it is assumed that the speaker used to think that he was called an idiot (thus *plus* outscopes *penser*). Similarly in English:

- (160) a. Consumers no longer want to be kept in the dark about food.  
 WANT»NO\_LONGER  
 b. Consumers no longer think they're kept in the dark about food.  
 \*THINK»NO\_LONGER

The absence of *vouloir/want* from the presupposition of *plus/no longer* bears witness to its syntactic scope over negation. Neg-raising cannot explain that *vouloir/want* is sometimes not part of the presupposition of *plus/no longer*: when an NRP achieves wide scope through homogeneity, no movement is needed, as it still lies in the syntactic scope of negation (p. 6).

Now we can also show that the high position of interpretation is unavailable when a strong quantifier intervenes, which amounts to shielding (that the adverb is generated as a clausemate of *vouloir/want* is shown by its linearization before the complementizer in French and before the main verb in English):

- (161) a. Je ne veux pas toujours que tu m' aides.  
 I NEG want NEG always that you me help  
 'I do not always want you to help me.' \*VOULOIR»TOUJOURS
- b. I don't always want you to help me. \*WANT»ALWAYS  
*Paraphrasable as:* It is not the case that I always want you to help me.  
 (Non-NR reading)
- Paraphrasable as:* There are times at which I want you to not help me.  
 (NR reading)
- Not paraphrasable as:* I want it to be the case that you don't always help me.

A natural explanation of those facts is that *vouloir/want* is a mobile PPI, which, when shielded, is unable to escape (per Laziness). Just like with *devoir*, we can stipulate that the minimal domain of this PPI can be very small, and thus need not encompass the Pol head and the n-word it licenses: depending on the choice of the domain of evaluation, we observe either wide or narrow scope of the predicate. There is therefore some evidence that *vouloir* and *want* are mobile PPIs, whose minimal domain doesn't include negation (since they can always be interpreted with narrow scope under it).

If this is correct, do we have to jettison the analysis that we gave for *want* in Section 2? Did we misanalyze the wide scope of *want* over a clause-mate negation as an effect of semantic neg-raising? No, wide scope through neg-raising is still an option open to *want*; but it is not the only one. In unembedded clauses, non-shielded *want* can achieve wide scope in two different ways: either through escape when its acceptability is checked in a constituent at least as large as PolP, or through the semantic route of neg-raising otherwise. When it achieves wide scope over negation while the only negation available surfaces in a superordinate clause (cyclicity, 2.2), it is only through neg-raising (i.e., the semantic route); and when a wide scope existential quantification reading obtains under *not every* (as in (10a) on p. 7), it is also only through neg-raising. Cyclicity and wide scope existential quantification are unequivocal indicators that *want* is indeed a neg-raiser.

However reaching a final verdict about the PPIhood of *want* is difficult, and I must defer to future research a complete exploration of its properties. What encourages me to exercise caution is a complication with the *no longer* test. In effect, under *no longer* (which, as seems reasonable, we can analyze as comprising sentential negation in the form of *no*) deontic *must* doesn't have to raise, and, in fact, cannot:

(162) You no longer must jog.  $\checkmark$ NO\_LONGER $\gg$ MUST; \*MUST $\gg$ NO\_LONGER

This in turn suggests that *must* is shielded by *longer*, maybe by the presupposition it triggers (see Homer 2010c, where certain presuppositions are shown to block the licensing of certain NPIs). If this is so, the putative PPI *want* is expected to be shielded as well if the meaning relevant to its acceptability incorporates the presupposition of *longer*, which means that it shouldn't be allowed to raise (per Laziness). In fact, it might be that different PPIs are sensitive to different presuppositions; actually, we know that this is precisely what happens with NPIs (Homer 2008a,b, 2010c, Gajewski 2005, 2011). All these hypotheses need to be checked before adjudicating on the case of *want*.

### A.3 Appendix III: On Iatridou and Zeijlstra 2013

At approximately the same time as the author of this article, S. Iatridou and H. Zeijlstra rediscovered the idea, already present in Israel 1996, that *must*<sub>deon</sub> is a PPI. Iatridou & Zeijlstra 2009, 2010, 2013 partially build their case on the arguments first developed in the forerunner to this article (Homer 2010a): lack of wide scope of *must* over a superordinate negation, rescuing by a DE expression, shielding by a quantifier, evidence that *must* is syntactically high when it outscopes negation (through an argument close to the “pin” test<sup>55</sup>); they offer some other arguments such as the lack of wide scope of *must*<sub>deon</sub> over a metalinguistic negation, together with data from Modern Greek and Dutch. But alongside these points of agreement, there are some clear differences between our contributions, which I will now go over.

The first and perhaps most important divergence lies in the movement mechanism whereby what I call mobile PPIs achieve wide scope. I argued for

55 Their argument is the following: the subject quantifier in (i) can be scopally sandwiched between *must* and negation, therefore *must* is syntactically higher than negation when that reading obtains:

- (i) Some students must not leave. [ex. (83)]  
MUST $\gg$ SOME $\gg$ NEG

This argument is doubly insufficient. First, when negation is not contracted, it is possible that it is in the complement of *must*, see footnote 14: therefore all it takes to get the reading MUST $\gg$ SOME $\gg$ NEG in such a case is that *some* reconstructs lower than *must*, but higher than negation; the evidence that *must* is high melts away. Second, one needs to exclude the possibility that the reading comes about through neg-raising; this is not a trivial task, and I tried to exclude this possibility as carefully as possible in Appendix I (A.1)

the existence of a *covert* movement motivated by polarity, labelled escape: in my view, the source of the wide scope of mobile PPIs cannot be overt V-to-T movement. The strongest motivation for this stance can be found in the behavior of *supposed*<sub>deon</sub> *to*. As I said earlier (p. 53, Section 5.1), since *supposed* is not subject to head-movement but nevertheless is a mobile PPI which can be shown (via the “pin” test) to end up higher than the element which creates an anti-licensing environment, we need a mechanism distinct from V-to-T to account for the behavior of mobile PPIs. And I thus propose that V-to-T is never responsible for this behavior. For Iatridou and Zeijlstra, who do not discuss *supposed*<sub>deon</sub> *to*, all English “auxiliary” modals raise to T (overt head-movement) and then reconstruct for interpretation, unless they are prevented from doing so for reasons of polarity sensitivity. According to them, in (163a) the modal reconstructs obligatorily and gets interpreted in its final position; in (163b) this reconstruction movement is blocked because the landing position is in the scope of an offending clausemate negation:

- (163) a. John cannot smoke.  
 b. John mustn’t smoke.

This view holds that the linearization of the modal before the negative marker is an indication that at some level of representation the modal takes scope over negation; so it holds that head-movement has semantic effects (a point that I reject). In addition to the problem posed by the case of *supposed*<sub>deon</sub> *to* (wide scope of the modal occurs while the modal is linearized after negation, a fact that the theory is not suited to explain), I should also point out that the mobile PPI *devoir*<sub>deon</sub> in French can unproblematically outscope negation even when linearized after negative markers. This is what happens in infinitives:<sup>56</sup>

- (164) J’ accepte totalement le fait de ne pas devoir fumer dans les  
 I accept totally the fact of NEG NEG must.INF smoke in the  
 lieux publics.  
 places public  
 ‘I fully accept the ban on smoking in public places.’

Secondly, our analyses of deontic *should* are also clearly divergent. I argued that it is both a mobile PPI and a neg-raiser. Neg-raising does not occupy a central place in Iatridou and Zeijlstra’s articles. They refer the reader to previous versions of this article for arguments that *must*<sub>deon</sub> is not a neg-

<sup>56</sup> Things are different with the past participle of *devoir*, see footnote 53.

raising predicate; but when they address *should*<sub>deon</sub>, they reject the idea that it is a neg-raiser (in their footnote 18 and 22). I think there are strong reasons, such as cyclicity (see Section 4.1), to maintain that view though. Furthermore, these authors consider data, partially at variance with the data discussed in this article, which lead them to conclude that the two PPIs are of different strength, a point that I do not make: according to them, *should*<sub>deon</sub> is a stronger PPI than *must*<sub>deon</sub>, that is, it is vulnerable to a superset of the properties that *must*<sub>deon</sub> is vulnerable to. Specifically, it is vulnerable to mere downward-entailingness. One interesting aspect of their contribution is thus that they offer a confirmation and extension, to the modal domain, of the typology of PPIs proposed by van der Wouden 1997: just like there are NPIs that are stronger than others, there are then degrees of strength in PPIs, and specifically, in modal PPIs. Here are the observations that the authors base their claim upon, with the judgments that they report (importantly, they claim that the readings that are impossible with *should*<sub>deon</sub> are possible with *must*<sub>deon</sub>):

- (165) a. Few people should leave. [ex. (28a)]  
\*FEW≫SHOULD; ✓SHOULD≫FEW  
 b. At most five students should leave. [ex. (29a)]  
\*AT\_MOST\_FIVE≫SHOULD; ✓SHOULD≫AT\_MOST\_FIVE  
 c. Not every student should leave. [ex. (30a)]  
\*NEG≫EVERY≫SHOULD; ✓SHOULD≫NEG≫EVERY  
 d. Only John should leave. [ex. (31a)]  
\*ONLY\_JOHN≫SHOULD; ✓SHOULD≫ONLY\_JOHN

The readings reported as missing are not unavailable according to my consultants. But even if they were, there is nothing in my analysis that is incompatible with the view that modal PPIs vary in strength (in fact, in Homer 2012a, I show that *seem* is a relatively strong mobile PPI); so it might very well be that *should*<sub>deon</sub> is, at least in certain dialects, a stronger PPI than *must*<sub>deon</sub>. For completeness, *should* in those dialects would have to have a minimal domain which encompasses subjects, e.g., TP, otherwise it would not be forced to take wide scope via movement in (165a), (165b) and (165d).

But in fact, it is also entirely possible that for the speakers that Iatridou and Zeijlstra polled, *should*<sub>deon</sub> is not a stronger PPI than *must*<sub>deon</sub>, and it doesn't have a larger minimal domain, but it is a neg-raiser: then one way to reconcile my own observations with theirs would be to say that their consultants did not actually reject a reading where the modal takes



narrowest scope but, rather, accessed a neg-raised reading (with the modal being interpreted in its base position), i.e., as far as the third sentence is concerned, a wide scope existential quantification reading. Evidencing a neg-raised reading, and teasing it apart from the widest scope reading of the modal, can be somewhat difficult, and requires specific tests, such as the falsity judgments presented here, e.g., (73). However, it would remain to be explained why those speakers systematically rejected a non-neg-raised reading, given that neg-raising is optional. Be it as it may, I am confident that it is not the case that, for all speakers, (i.) *should* is stronger than *must* and (ii.) it has TP as its minimal domain, as one can quite easily find natural occurrences of narrow scope of *should* under a merely DE (or Strawson-DE) expression:

- (166) a. Very few parts of the sauna should be sealed against the moisture. Seal the floor and door with a high-quality wood sealant. These areas are most likely to become dirty. Sealing them will make them easier to clean. Benches and walls may be sealed, but not with sealants typically available in hardware stores. Use a special sealant made from paraffin oil on these portions of the sauna.<sup>57</sup>  
b. Some books should be tasted, some devoured, but only a few should be chewed and digested thoroughly.

(C. Funke, *Inkheart*, paraphrasing F. Bacon in *On Studies*)

More puzzling to me is (165c). I have argued that *every* shields mobile PPIs and thus prevents them from escaping, per Laziness. Iatridou and Zeijlstra do not have an equivalent of Laziness at all, probably because they did not observe the same blocking effect of the universal quantifier. They give the following, which is clearly at odds with my (54a):

- (167) Not every student must leave.      ✓MUST»NEG»EVERY [ex. (30b)]

Now, even if certain speakers accept the wide scope of *must* over negation and *every*, this does not mean that their grammar lacks Laziness: perhaps they allow for the reconstruction of *every* in its base position under the modal; when this has taken place, *must* finds itself in an anti-licensing environment and thus needs to escape. Assuming that *every* reconstructs optionally, it will either shield the modal when it does not reconstruct (giving rise to the narrow scope of the modal, per Laziness), or trigger escape when it does,

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<sup>57</sup> [www.ehow.com/info\\_7815225\\_proper-maintenance-sauna-wood.html](http://www.ehow.com/info_7815225_proper-maintenance-sauna-wood.html)

hence the two purported readings. The conditions under which *every* in *not every* can reconstruct are unclear to me, see footnote 21.

In closing, I note that (165c) and (167) pose a problem for Iatridou & Zeijlstra's claim that the PPI modals *must*<sub>deon</sub> and *should*<sub>deon</sub> achieve wide scope via movement (this movement is overt V-to-T according to them). Since they do not observe that shielding blocks widest scope of the modals, they cannot exclude the possibility that there are two base-generation positions for those modals, one above, and one below, negation. In other words, step 3 of the argument in favor of the movement of certain PPIs (p. 19) is simply missing.

## References

- Abbott, Barbara. 2006. Where have some of the presuppositions gone? In Betty Birner & Gregory Ward (eds.), *Drawing the boundaries of meaning*, 1–20. Amsterdam: John Benjamins.
- Abels, Klaus & Luisa Martí. 2010. A unified approach to split scope. *Natural Language Semantics* 18(4). 435–470. <http://dx.doi.org/10.1007/s11050-010-9060-8>.
- Abusch, Dorit. 2002. Lexical alternatives as a source of pragmatic presuppositions. *Semantics and Linguistic Theory (SALT)* 12. Brendan Jackson (ed.). 1–19. <http://elanguage.net/journals/salt/article/view/12.1/1772>.
- Anand, Pranav & Valentine Hacquard. 2011. Epistemics with attitude. *Semantics and Linguistic Theory (SALT)* 18. 37–54. <http://elanguage.net/journals/salt/article/view/18.37/1889>.
- Baker, Carl Leroy. 1970. Double negatives. *Linguistic Inquiry* 1(2). 169–186.
- Bartsch, Renate. 1973. “Negative transportation” gibt es nicht. *Linguistische Berichte* 27(7). 1–7.
- Borgonovo, Claudia & Sarah Cummins. 2007. Tensed modals. In Luis Eguren & Olga Fernández Soriano (eds.), *Coreference, modality, and focus*, 1–18. Amsterdam: John Benjamins.
- Chemla, Emmanuel. 2009. Presuppositions of quantified sentences: Experimental data. *Natural Language Semantics* 17(4). 299–340. <http://dx.doi.org/10.1007/s11050-009-9043-9>.
- Chemla, Emmanuel, Vincent Homer & Daniel Rothschild. 2011. Modularity and intuitions in formal semantics: The case of polarity items. *Linguistics and Philosophy* 34(6). 537–570. <http://dx.doi.org/10.1007/s10988-012-9106-0>.

- Chierchia, Gennaro. 2004. Scalar implicatures, polarity phenomena, and the syntax/pragmatics interface. In Adriana Belletti (ed.), *Structures and beyond*, 39–103. Oxford: Oxford University Press.
- Chierchia, Gennaro, Danny Fox & Benjamin Spector. 2012. Scalar implicature as a grammatical phenomenon. In Claudia Maienborn, Klaus von Stechow & Paul Portner (eds.), *Semantics: An international handbook of natural language meaning*, vol. 3, 2297–2331. Mouton de Gruyter.
- Chomsky, Noam. 2000. Minimalist inquiries: the framework. In Roger Martin, David Michaels & Juan Uriagereka (eds.), *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, 89–155. Cambridge, MA: MIT Press.
- Collins, Chris. 2005. A smuggling approach to the passive in English. *Syntax* 8(2). 81–120. <http://dx.doi.org/10.1111/j.1467-9612.2005.00076.x>.
- Copley, Bridget. 2006. What *should* should mean. Ms., CNRS/Université Paris 8, January. <http://halshs.archives-ouvertes.fr/halshs-00093569/>.
- Egan, Andy, John Hawthorne & Brian Weatherson. 2005. Epistemic modals in context. In Gerhard Preyer & Georg Peter (eds.), *Contextualism in philosophy: Knowledge, meaning, and truth*, 131–170. Oxford: Oxford University Press.
- Fillmore, Charles. 1963. The position of embedding transformations in grammar. *Word* 19(2). 208–231.
- von Stechow, Kai. 2008. What is presupposition accommodation, again? *Philosophical Perspectives* 22(1). 137–170. <http://dx.doi.org/10.1111/j.1520-8583.2008.00144.x>.
- von Stechow, Kai & Sabine Iatridou. 2008. How to say *ought* in foreign: The composition of weak necessity modals. In Jacqueline Guéron & Jacqueline Lecarme (eds.), *Time and modality*, 115–141. Dordrecht: Springer.
- Fox, Danny. 2000. *Economy and semantic interpretation*. Cambridge, MA: The MIT Press.
- Frank, Anette. 1996. *Context dependence in modal constructions*. Universität Stuttgart PhD thesis. [http://web.uni-frankfurt.de/fb10/zimmermann/Diss\\_Anette%20Frank.pdf](http://web.uni-frankfurt.de/fb10/zimmermann/Diss_Anette%20Frank.pdf).
- Gajewski, Jon. 2005. *Neg-raising: Polarity and presupposition*. Cambridge, MA: Massachusetts Institute of Technology PhD thesis. <http://gajewski.uconn.edu/papers/thesis.pdf>.
- Gajewski, Jon. 2007. Neg-raising and polarity. *Linguistics and Philosophy* 30(3). 289–328. <http://dx.doi.org/10.1007/s10988-007-9020-z>.
- Gajewski, Jon. 2011. Licensing strong NPIs. *Natural Language and Semantics* 19(2). 109–148. <http://dx.doi.org/10.1007/s11050-010-9067-1>.

- Geurts, Bart. 1996. On *no*. *Journal of Semantics* 13(1). 67–86. <http://dx.doi.org/10.1093/jos/13.1.67>.
- Geurts, Bart. 2009a. Scalar implicature and local pragmatics. *Mind and Language* 24(1). 51–79. <http://dx.doi.org/10.1111/j.1468-0017.2008.01353.x>.
- Geurts, Bart. 2009b. The psychology of meaning. Lectures given at ENS-Paris, October. <http://ncs.ruhosting.nl/bart/talks/paris2010/index.html>.
- de Haan, Ferdinand. 1997. *Negation and modality: A typological study*. New York, NY & London: Garland Publishing.
- Heim, Irene. 1982. *The semantics of definite and indefinite noun phrases*. University of Massachusetts, Amherst PhD thesis.
- Heim, Irene. 1983. On the projection problem for presuppositions. *West Coast Conference on Formal Linguistics (WCCFL)* 2. 114–126.
- Heim, Irene. 2000. Degree operators and scope. *Semantics and Linguistic Theory (SALT)* 10. 40–64. <http://elanguage.net/journals/salt/article/view/10.40/1700>.
- Homer, Vincent. 2008a. Disruption of NPI licensing: The case of presuppositions. *Semantics and Linguistic Theory (SALT)* 18. 429–446. <http://elanguage.net/journals/salt/article/view/18.429/1911>.
- Homer, Vincent. 2008b. Presuppositions can be disruptors too: A case against Strawson-entailment. *West Coast Conference on Formal Linguistics (WCCFL)* 27. 220–228. <http://www.lingref.com/cpp/wccfl/27/paper1835.pdf>.
- Homer, Vincent. 2010a. Epistemic modals: High *ma non troppo*. *North East Linguistic Society (NELS)* 40. 273–286. [https://sites.google.com/site/vincenthomer/publications/Epistemic\\_modals\\_high\\_ma\\_non\\_troppo.pdf?attredirects=o&d=1](https://sites.google.com/site/vincenthomer/publications/Epistemic_modals_high_ma_non_troppo.pdf?attredirects=o&d=1).
- Homer, Vincent. 2010b. French modals and perfective: A case of aspectual coercion. *West Coast Conference on Formal Linguistics (WCCFL)* 28. Mary Byram Washburn, Katherine McKinney-Bock, Erika Varis, Ann Sawyer & Barbara Tomaszewicz (eds.). 106–114. <http://www.lingref.com/cpp/wccfl/28/paper2441.pdf>.
- Homer, Vincent. 2010c. Presuppositions and NPI licensing. Ms., UCLA, December. [https://sites.google.com/site/vincenthomer/publications/Paper\\_on\\_NPIs\\_vweb.pdf?attredirects=o&d=1](https://sites.google.com/site/vincenthomer/publications/Paper_on_NPIs_vweb.pdf?attredirects=o&d=1).
- Homer, Vincent. 2011. *Polarity and modality*. University of California, Los Angeles PhD thesis. <https://sites.google.com/site/vincenthomer/publications/Thesis.pdf?attredirects=o&d=1>.
- Homer, Vincent. 2012a. As simple as it seems. *18<sup>th</sup> Amsterdam Colloquium*. Maria Aloni, Vadim Kimmelman, Floris Roelofsen, Galit Weidman Sassoon,

- Katrin Schulz & Matthijs Westera (eds.). 351–360. [http://dx.doi.org/10.1007/978-3-642-31482-7\\_36](http://dx.doi.org/10.1007/978-3-642-31482-7_36).
- Homer, Vincent. 2012b. Domains of polarity items. *Journal of Semantics* to appear.
- Horn, Laurence R. 1972a. Negative transportation: Unsafe at any speed? *Chicago Linguistic Society (CLS)* 7. 120–133.
- Horn, Laurence R. 1972b. *On the semantic properties of logical operators in English*. University of California, Los Angeles PhD thesis.
- Horn, Laurence R. 1978. Remarks on neg-raising. In Peter Cole (ed.), *Pragmatics*, vol. 9 (Syntax and Semantics), 129–220. New York: Academic Press.
- Horn, Laurence R. 1989. *A natural history of negation*. Chicago, IL: University of Chicago Press.
- Horn, Laurence R. & Samuel Bayer. 1984. Short-circuited implicature: A negative contribution. *Linguistics and Philosophy* 7(4). 397–414. <http://dx.doi.org/10.1007/BF00631074>.
- Iatridou, Sabine & Ivy Sichel. 2008. Negative DPs and scope diminishment: Some basic patterns. *North East Linguistic Society (NELS)* 38. Anisa Schardl, Martin Walkow & Muhammad Abdurrahman (eds.). 411–424.
- Iatridou, Sabine & Hedde Zeijlstra. 2009. On the scopal interaction of negation and deontic modals. *17<sup>th</sup> Amsterdam Colloquium*. Maria Aloni et al. (ed.). 315–324. [http://link.springer.com/chapter/10.1007/978-3-642-14287-1\\_32](http://link.springer.com/chapter/10.1007/978-3-642-14287-1_32).
- Iatridou, Sabine & Hedde Zeijlstra. 2010. Modals, negation and polarity. Ms., August.
- Iatridou, Sabine & Hedde Zeijlstra. 2013. Negation, polarity and deontic modals. *Linguistic Inquiry* 44(4). 529–568. [http://dx.doi.org/10.1162/LING\\_a\\_00138](http://dx.doi.org/10.1162/LING_a_00138).
- Israel, Michael. 1996. Polarity sensitivity as lexical semantics. *Linguistics and Philosophy* 19(6). 619–666. <http://dx.doi.org/10.1007/BF00632710>.
- Jackendoff, Ray S. 1969. An interpretive theory of negation. *Foundations of Language* 5(2). 218–241. <http://jstor.org/stable/25000377>.
- Jacobs, Joachim. 1980. Lexical decomposition in Montague grammar. *Theoretical Linguistics* 7(1–3). 121–136. <http://dx.doi.org/10.1515/thli.1980.7.1-3.121>.
- Jespersen, Otto. 1909–1949. *A modern English grammar on historical principles*. London: George, Allen, & Unwin Ltd.
- Karttunen, Lauri. 1974. Presupposition and linguistic context. *Theoretical Linguistics* 1(1). 181–193. <http://dx.doi.org/10.1515/thli.1974.1.1-3.181>.
- Kayne, Richard. 2008. What are the limits of (comparative) syntax? Lecture given at ENS-Paris, Oct. 20 2008.

- Klima, Edward S. 1964. Negation in English. In Jerry A. Fodor & Jerrold J. Katz (eds.), *The structure of language*, 246–323. Englewood Cliffs, NJ: Prentice Hall.
- Kratzer, Angelika. 1977. What “must” and “can” must and can mean. *Linguistics and Philosophy* 1(3). 337–355. <http://dx.doi.org/10.1007/BF00353453>.
- Kratzer, Angelika. 1981. The notional category of modality. In Hans-Jürgen Eikmeyer & Hennes Rieser (eds.), *Words, worlds, and contexts*, 38–74. Berlin: de Gruyter.
- Kratzer, Angelika. 1995. Stage-level and individual-level predicates. In Gregory N. Carlson & Francis Jeffry Pelletier (eds.), *The generic book*, 125–175. Chicago, IL: The University of Chicago Press.
- Ladusaw, William A. 1992. Expressing negation. *Semantics and Linguistic Theory (SALT) 2*. Chris Barker & David Dowty (eds.). 237–259. <http://semanticsarchive.net/Archive/mEzODgoZ/>.
- Laka, Itziar. 1990. *Negation in syntax: On the nature of functional categories and projections*. Cambridge, MA: Massachusetts Institute of Technology PhD thesis.
- Lakoff, Robin. 1969. A syntactic argument for negative transportation. *Chicago Linguistic Society (CLS)* 5. 140–147.
- Lassiter, Daniel. 2011. *Measurement and modality: The scalar basis of modal semantics*. New York University, NY PhD thesis. <http://semanticsarchive.net/Archive/WMzOWU2O/Lassiter-diss-Measurement-Modality.pdf>.
- Lechner, Winfried. 2006. An interpretive effect of head movement. In Mara Frascarelli (ed.), *Phases of interpretation* (Studies in Generative Grammar 91), 45–69. Berlin: de Gruyter.
- MacFarlane, John. 2003. Epistemic modals and relative truth. Ms., University of California, Berkeley. <http://johnmacfarlane.net/epistmod-2003.pdf>.
- Matushansky, Ora. 2006. Head movement in linguistic theory. *Linguistic Inquiry* 37(1). 69–109. <http://dx.doi.org/10.1162/002438906775321184>.
- Mayr, Clemens & Benjamin Spector. 2009. Not too strong! Generalizing the scope economy condition. *Sinn und Bedeutung* 14. 305–321. <http://www.univie.ac.at/sub14/proc/mayr-spector.pdf>.
- Moltmann, Friederike. 2010. Relative truth and the first person. *Philosophical Studies* 150(2). 187–220. <http://dx.doi.org/10.1007/s11098-009-9383-9>.
- Penka, Doris. 2011. *Negative indefinites* (Oxford Studies in Theoretical Linguistics 32). Oxford University Press.
- Penka, Doris & Hedde Zeijlstra. 2005. Negative indefinites in Dutch and German. Ms., Universität Tübingen, Tübingen, Germany, September. <http://>



- [//ling.uni-konstanz.de/pages/home/penka/Pubs/penka\\_zeijlstra\\_CGSW05.pdf](http://ling.uni-konstanz.de/pages/home/penka/Pubs/penka_zeijlstra_CGSW05.pdf).
- Percus, Orin. 2000. Constraints on some other variables in syntax. *Natural Language Semantics* 8(3). 173-229. <http://dx.doi.org/10.1023/A:1011298526791>.
- Reinhart, Tanya. 1997. Quantifier scope: How labor is divided between QR and choice functions. *Linguistics and Philosophy* 20(4). 335-397. <http://dx.doi.org/10.1023/A:1005349801431>.
- Rullmann, Hotze. 1995. Geen eenheid. *Tabu: Bulletin voor Taalwetenschap* 25(4). 194-197.
- Russell, Benjamin. 2006. Against grammatical computation of scalar implicatures. *Journal of Semantics* 23(4). 361. <http://dx.doi.org/10.1093/jos/ffloo8>.
- Sauerland, Uli. 1998. *The meaning of chains*. Cambridge, MA: Massachusetts Institute of Technology PhD thesis.
- Sauerland, Uli. 2000. No *no*: On the crosslinguistic absence of a determiner *no*. In *The Tsukuba workshop on determiners and quantification*, 415-444. <http://publikationen.ub.uni-frankfurt.de/frontdoor/index/index/docId/11851>.
- Sauerland, Uli. 2004. The interpretation of traces. *Natural Language Semantics* 12(1). 63-127. <http://dx.doi.org/10.1023/B:NALS.0000011201.91994.4f>.
- Stephenson, Tamina. 2007. Judge dependence, epistemic modals, and predicates of personal taste. *Linguistics and Philosophy* 30(4). 487-525. <http://dx.doi.org/10.1007/s10988-008-9023-4>.
- de Swart, Henriëtte. 2000. Scope ambiguities with negative quantifiers. In Klaus von Stechow & Urs Egli (eds.), *Reference and anaphoric relations*, 109-132. Dordrecht: Kluwer.
- Szabolcsi, Anna. 2004. Positive polarity-negative polarity. *Natural Language and Linguistic Theory* 22(2). 409-452. <http://dx.doi.org/10.1023/B:NALA.0000015791.00288.43>.
- van der Wouden, Tom. 1997. *Negative contexts: Collocation, polarity and multiple negation*. London: Routledge.
- Yalcin, Seth. 2007. Epistemic modals. *Mind* 116(464). 983-1026. <http://dx.doi.org/10.1093/mind/fzm983>.
- Zwarts, Frans. 1998. Three types of polarity. In Fritz Hamm & Erhard Hinrichs (eds.), *Plurality and quantification* (Studies in Linguistics and Philosophy 69), 177-238. Springer. [http://dx.doi.org/10.1007/978-94-017-2706-8\\_5](http://dx.doi.org/10.1007/978-94-017-2706-8_5).

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