

Modal scope in negative inversion constructions

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1 Introduction

1.1 Background on negative inversion

Negative inversion is characterized by the presence of a “negative” expression at the left edge of the clause, followed by an auxiliary, followed by the subject:

- (1) a. [Never] have I seen such a majestic giraffe!
- b. [On no fewer than three occasions] did the giraffe bite Rory.
- c. [Only then] did he realize that he had made a terrible mistake.
- d. [Under no circumstances] are you to buy another pet giraffe.

Ingredients: I^0 -to- C^0 (or I^0 -to- Foc^0) movement of the auxiliary and movement of the negative expression to the specifier of that projection (Emonds 1976, Haegeman 1995, Rizzi 1996, Haegeman 2000, and Collins & Postal 2014, a.o; see Sobin 2003 for a non-movement account).

- Collins and Postal (2014): Negative expressions include
 - (Strawson) downward-entailing NPI licensers (*never, only, no*)
 - Upward-entailing expressions containing NEG (*no fewer than three*)

A claim in the literature: The negative expression must take scope over everything else in the clause (Haegeman 2000, Büring 2004, Collins & Postal 2014; see also Potsdam 2013).

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- The uninverted sentence in (2) is ambiguous, but its counterpart with negative inversion in (3) has only one reading - one where the negative expression takes scope over the subject.

(2) **No negative inversion – ambiguous**

- a. *The first year semantics exam is always really hard; every year, most students fail. The record number of students in a single class to have passed the exam is four.*

More than four students have never passed this exam.
(NEVER > MORE THAN FOUR)

- b. *Boris, Doris, Horace, Morris, and Norris have been trying to get their drivers' licenses for years, but they keep failing the written exam. They have retaken it several times now, but these five always fail.*

More than four students have never passed this exam.
(MORE THAN FOUR > NEVER)

(3) **Negative inversion – unambiguous**

- a. *The first year semantics exam is always really hard; every year, most students fail. The record number of students in a single class to have passed the exam is four.*

Never have more than four students passed this exam.
(NEVER > MORE THAN FOUR)

- b. *Boris, Doris, Horace, Morris, and Norris have been trying to get their drivers' licenses for years, but they keep failing the written exam. They have retaken it several times now, but these five always fail.*

#Never have more than four students passed this exam.
(*MORE THAN FOUR > NEVER)

Today's talk: We will explore some counterexamples to this claim.

1.2 Background on modals

Positive polarity items (PPIs) are expressions that cannot be interpreted downward-entailing environments.¹

- *some, somewhat, would rather*

Certain modals obligatorily scope over sentential negation (Cormack & Smith 2002; Butler 2003; von Stechow & Iatridou 2003):

- deontic *must, ought to, should, to be to*

¹As Szabolcsi (2004) discusses, being a PPI means more than simply being unable to scope under such an operator; see Appendix for details. One characteristic of PPIs highlighted by Szabolcsi that will be important to keep in mind in the following discussion is that PPIs are licensed in the immediate scope of metalinguistic/contrastive negation.

- They have been argued to be PPIs (Iatridou & Zeijlstra 2010, 2013; see also Israel 1996 and Homer 2010 on the PPI-hood of *must*).²
- PPIs come in different strengths, depending on whether they are sensitive to antimorphic,³ anti-additive,⁴ or simply downward-entailing⁵ contexts (van der Wouden 1994, Szabolcsi 2004).

PPI modals come in different strengths too (Iatridou & Zeijlstra 2013):

Must is a medium-strength PPI allowed in non-antiadditive downward-entailing contexts.⁶

(4) Licensing of *must*

	Downward-entailing (e.g. <i>few</i>)	Antiadditive (e.g. <i>no</i>)	Antimorphic (e.g. <i>not</i>)
Medium PPI (<i>must</i>)	ok	*	*

It has been argued that modal auxiliaries are not generated in I^0 but move there from a position below sentential negation and obligatorily reconstruct (Lechner 2006, Iatridou & Zeijlstra 2010, 2013, Homer 2010, 2015).

(5) You may_{DEO} not leave.

- Iatridou & Zeijlstra (2010, 2013) argue that modals are exempt from reconstruction when this would create a PPI violation (as in the case of sentential negation).
- When a PPI modal's surface position is in the scope of an anti-licenser (e.g. a subject NegDP), it can undergo covert movement to escape (Iatridou & Zeijlstra 2013, Homer 2015).

Iatridou & Zeijlstra (2013) characterize this movement as QR that leaves a type *s* trace.

- (6) a. SS: $\text{not}_{t,t} [\text{PPI modal}_{st,t} [\text{vP}_{s,t}]]$
 b. LF: $\text{PPI modal}_{1,st,t} [\text{not}_{t,t} [t_{1,s} [\text{vP}_{s,t}]]]$ (Iatridou & Zeijlstra 2013: 551)

Homer (2015) notes that this movement is more restricted than QR in that it is only available as a last resort; he dubs this movement *escape*.

1.3 A prediction

If deontic modals like *must* are PPIs, and if the negative expression takes widest scope in negative inversion, we should predict the following pattern of acceptability:

²Epistemic modals whose deontic counterparts are PPIs are also PPIs, with the exception of epistemic *may*; epistemic *may* behaves like a PPI even though deontic *may* is polarity neutral (Iatridou & Zeijlstra 2013)

³A function *f* is antimorphic iff it is antiadditive and $f(a \wedge b) = fa \vee fb$. Example: classical negation

⁴A function *f* is antiadditive iff $f(a \vee b) = fa \wedge fb$. Example: *no*

⁵A function *f* is downward-entailing iff, when $A \leq B$, $f(A) \geq f(B)$. Example: *few*

⁶Iatridou and Zeijlstra (2013) note that there is dialectal variation on this point; for some speakers *must* is a weak PPI, anti-licensed only in anti-morphic contexts.

(7) Predicted acceptability of PPI *must* by preposed negative expression

	Downward-entailing (e.g. <i>few</i>)	Antiadditive (e.g. <i>no</i>)
Medium PPI (<i>must</i>)	ok	*

We should also predict that wide-scope interpretations for the modal will not be available.

2 The puzzle

2.1 Part 1: Deontic PPI modals

Negative inversion constructions are unexpectedly grammatical with deontic PPI modals. These modals are able to take scope above the preposed negative expression.⁷

(8) *Must*_{DEO} + DE operator

- a. *You are teaching a class. You hate failing people, but two of your students haven't turned in any homework and failed the midterm; there's nothing you can do to make them pass. Your friends try to comfort you by pointing out that at least you only have to fail a small number of students.*

To (very) few students must you give an F.
(FEW > MUST)

✓ NI
✓ PPI

- b. *You are teaching a class. The university is concerned that too many students have been failing in recent years, so they tell all instructors to limit the number of Fs they give out.*

To (very) few students must you give an F.
(MUST > FEW)

✗ NI
✓ PPI

(9) *Must*_{DEO} + AA operator

- a. *Kaz and Radu are TAs for a class. After the exam, students can request to go over the answers with a TA, but TAs are under no obligation to meet with them; they can refer students to the instructor. Radu is complaining about all the students who want to meet with him; Kaz tells him to stop griping.*

#To no student must you give the answers.
(*NEG > MUST)

✗ NI
✓ PPI

- b. *Joanna is training her TAs on how to deal with students. She warns them not to accidentally give away the answers to the exam questions when helping students during tutorials and office hours.*

To no student must you give the answers.
(MUST > NEG)

✗ NI
✓ PPI

⁷The boxes next to the data in this section track the predictions of the claim in the negative inversion literature that the negative expression takes widest scope in these constructions (NI) and those of the literature on the PPI-hood properties of modals (PPI).

Generalization: Deontic PPI modals take the same scope with respect to other quantifiers in negative inversion sentences as they would in their non-inverted counterparts.⁸

2.1.1 Possible explanations for deontic PPI modal scope

There are three ways for the modal to take wide scope over the negative expression: neg-raising, reconstruction of the negative expression, or covert movement of the modal.

Neg-raising:

- Some predicates can take scope over a NEG that appears above them in the surface structure.

- (10) a. Tomo doesn't want to study.
 i. *Paraphrasable as:* Tomo wants to not study.
 b. Marisa doesn't think that he passed the exam.
 i. *Paraphrasable as:* Marisa thinks that he didn't pass the exam.

Frequently assumed to arise without movement via an excluded middle presupposition (Horn 1989, Gajewski 2005, a.o.).⁹

If *must* were a neg-raiser, it could achieve a wide scope interpretation while still being structurally lower than the negative expression at LF.

Homer (2015) has shown that *must* is not a neg raiser.

Reconstruction of the negative expression:

- Iatridou and Sichel (2011) argue that NEG does not undergo reconstruction; the indefinite portion of NegDPs can reconstruct, but the NEG does not (see also Lasnik 1999).¹⁰

This is why Iatridou and Zeijlstra (2013) argue for covert modal movement as the mechanism by which deontic PPI modals escape the scope of a subject NegDP.

Covert movement:

- If we already believe that PPI modals take scope over things that occur above them in the surface structure by moving covertly, why not allow them to do so here?

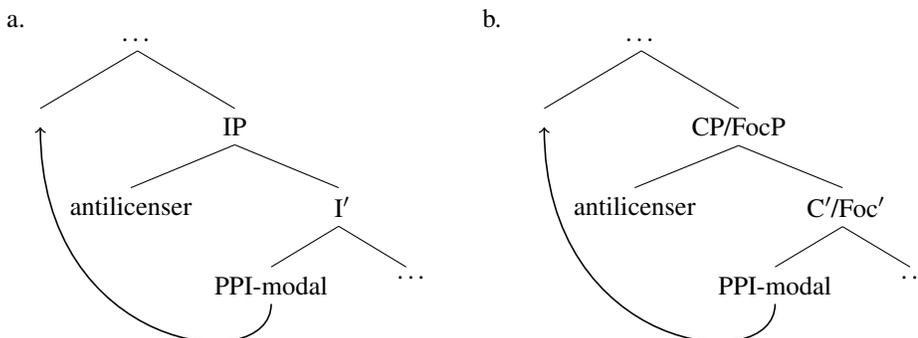
⁸This seems to be a fact about PPI modals and not PPIs more generally. DP PPIs are unable to take wide scope in negative inversion.

1. ?*Never has someone in my department seen the ocean. (??*SOME > NEG)

⁹See Collins & Postal 2014 for a recent defence of a syntactic movement account

¹⁰Zeijlstra (2013) argues that NEG can reconstruct as a last resort measure to prevent it from taking scope over a speech act operator in C⁰ (see also Han (2001)); he argues this to account for the cross-linguistic rarity of true negative imperatives and the absence of bare NEG in sentence-initial position in V-to-C V2 languages. I do not believe that this kind of argument can be extended to negative inversion. If we assume a non-articulated view of the left periphery, the speech act operator would lie in C, and the preposed negative expression in Spec,C would be in danger of outscoping the speech act operator, so Zeijlstra's proposal would be that the negative expression would reconstruct. Yet we have also seen that the preposed expression in negative inversion obligatorily takes scope over the subject. To get the facts right, it would have to reconstruct to a position below C⁰ but above Spec,IP. There is no reason to believe that this A-bar movement would have passed through any such position. If we adopted instead an articulated view of the left periphery, the problem that Zeijlstra is concerned with would never arise. As noted above, recent work on negative inversion (e.g. Haegeman 2000, Collins & Postal 2014) that makes this assumption places the preposed expression in negative inversion in Spec,FocP - below the Force projection that would host the speech act operator in an articulated left periphery.

(11) Escaping a PPI violation by covert modal movement



2.2 Part 2: Epistemic PPI modals

If deontic PPI modals are able to take wide scope in negative inversion constructions to escape PPI-hood violations, we might expect epistemic PPI modals to behave in the same way.

Two patterns of responses; neither of them is identical to the deontic pattern.

(12) *Must*_{EPI} + DE operator

- a. *Julie was teaching a class of 200 students. Before the final exam, she told you about two students who were guaranteed to fail the course; they had failed the midterm and they never handed in assignments. After the exam, you wonder how the class did. You know that in a class of that size more than two students usually fail, but you have no idea who the other Fs might have gone to.*

#To few students must she have given an F. English A: (*FEW > MUST)

English B: (*FEW > MUST)

- b. *Maida has been teaching a class. She posts the final grades outside of her office. You see all her students checking their grades; the vast majority of them look very happy.*

%To few students must she have given an F. English A: (MUST > FEW)

English B: (*MUST > FEW)

(13) *Must*_{EPI} + AA operator

- a. *Dan has been teaching a class. You wonder whether he failed any students; you haven't spoken to him, so you don't know for sure.*

#To no student must he have given an F. English A: (*NEG > MUST)

English B: (*NEG > MUST)

- b. *Chris has been teaching a class. After the exam, he posts the final grades outside of his office. You see his students checking their grades; all of them look happy.*

%To no student must he have given an F.

English A: (MUST > NEG)

English B: (*MUST > NEG)

Generalization: English A allows epistemic PPI modals in negative inversion sentences only when the modal takes wide scope, regardless of whether the negative expression is an anti-licenser or not. English B does not allow epistemic PPI modals in negative inversion sentences at all, regardless of intended scope.

2.2.1 Possible explanations for epistemic PPI modal scope

The English A pattern looks like the deontic pattern plus the Epistemic Containment Principle, which bans moved quantifiers from taking scope over epistemic modals:

- (14) The Epistemic Containment Principle (ECP) (von Stechow & Iatridou 2003: 181):
At LF, a quantifier cannot bind its trace across an epistemic modal.

This principle crucially only applies to epistemic modals; both wide and narrow scope readings are available for deontic modals with respect to a subject quantificational DP.

Once we consider the ECP, the English A pattern is predicted. English B remains mysterious:

- (15) Epistemic negative inversion data revisited

Reading	Predicted acceptability	English A	English B
MUST > FEW	ok	ok	*
FEW > MUST	* (ECP violation)	*	*
MUST > NO	ok	ok	*
NO > MUST	* (ECP violation, PPI violation)	*	*

2.3 Interim summary

Deontic PPI modals can take scope above the negative expression; they take the same scope as they would in non-inverted sentences.

Epistemic PPI modals exhibit variation:

- English A: An epistemic PPI modal can only take wide scope above the negative expression. The narrow scope reading is blocked by the ECP.
- English B: Negative inversion sentences with epistemic PPI modals are ungrammatical, regardless of the intended scope. Epistemic PPI modals are unable to take wide scope.

The puzzle: Why is this the case?

3 A closer look at modal scope

English B speakers exhibit a contrast between wide-scoping abilities of deontic and epistemic PPI modals. English A speakers do not.

The direction of the asymmetry for English B is unexpected; if anything, we might expect wide scope to be available for epistemic and not deontic modals, as epistemics are believed to be interpreted higher than deontics (see e.g. Cinque 1999, Hacquard 2006).

Recall: We have argued that deontic PPI modals get a wide scope reading by covert movement over the preposed negative expression.

Hypothesis: English A and B differ in the availability of this movement for epistemic modals.

3.1 A brief history of covert modal movement

The Epistemic Containment Principle (von Stechow & Iatridou 2003) was identified before covert movement of modals was first proposed (Iatridou & Zeijlstra 2013).

- The wide scope that epistemic modals achieve in sentences like (16) was assumed to come about by reconstruction of the subject quantifier to its original vP-internal position.

(16) Everyone₃ may_{EPI} t₃ have left. (von Stechow & Iatridou 2003: 175)

- von Stechow and Iatridou (2003) note that this view of the ECP, combined with the fact that NEG does not reconstruct in A-chains (see Lasnik 1999, Iatridou & Sichel 2011), correctly predicts that epistemic modals will be ungrammatical in sentences with subject NegDPs.¹¹

(17) *Nobody may have pushed him. (Maybe he just fell.)

(cf. Maybe nobody pushed him. Maybe he just fell.)

(18) *No student may have solved the biology problem.

(cf. It may be the case that no student solved the biology problem.)

(19) *Nobody may be home.

(cf. Maybe nobody is home. It may be the case that...) (von Stechow & Iatridou 2003: 192)

In later work on the PPI-hood of modals, it is argued that covert modal movement is necessary, because deontic PPI modals are able to take wide scope over subject NegDPs (Iatridou & Zeijlstra 2013).

(20) No one must leave this room.

a. It must be the case that no one leaves; everyone must stay. (MUST_{DEO} > NO)

b. #No one is required to leave; everyone may stay. (*NO > MUST_{DEO})¹²

The upshot: It looks like we need to posit a contrast in the availability of covert movement for deontic and epistemic modals to account for (17)-(20), independent of the negative inversion facts.

- This is exactly what we need to account for English B.

¹¹All of their examples on this point involve epistemic *may*; in principle, though, the same should be true of *must*.

¹²As noted in fn. 6 above, this reading is available for some speakers.

But wait! What about English A?

- If epistemic modals are unable to undergo covert movement, how are they getting wide scope in negative inversion constructions for English A speakers?
- **Hypothesis:** The difference between English A and English B is that English A speakers do allow epistemic modals to move covertly.

Prediction: English A speakers can access a grammatical wide scope reading for epistemic modals in non-inverted sentences with NegDP subjects, but English B speakers cannot.

(21) *An accident took place last night, but it wasn't reported. The police think that the reason it was not reported is probably that there were no witnesses.*

- | | |
|-----------------------------------------------|----------------------------------------------|
| a. No one must have seen the accident. | English A: (MUST _{EPI} > NEG) |
| | English B: (MUST _{EPI} > NEG) |
| b. ?*No one may/might have seen the accident. | English A: (?MAY/MIGHT _{EPI} > NEG) |
| | English B: (*MAY/MIGHT _{EPI} > NEG) |

(22) *You go to visit your friends Alex and Derek at their house. You knock on the door and ring the doorbell, but no one answers.*

- | | |
|--------------------------------|----------------------------------------------|
| a. No one must be home. | English A: (MUST _{EPI} > NEG) |
| | English B: (MUST _{EPI} > NEG) |
| b. ?*No one may/might be home. | English A: (?MAY/MIGHT _{EPI} > NEG) |
| | English B: (*MAY/MIGHT _{EPI} > NEG) |

- English A speakers are able to get a wide scope reading for epistemic modals over subject NegDPs, as predicted.

- English B speakers are also able to get a wide scope reading; this is unexpected.

The degraded status of epistemic possibility modals is mysterious.

The full pattern of epistemic modal data is summarized in (23):

(23) Availability of a grammatical wide scope reading for epistemic modals

	Negative inversion (e.g. <i>To no student must she have given an F</i>)	No negative inversion (e.g. <i>No one must be home</i>)
English A	ok	ok
English B	*	ok

These data indicate that English B speakers are not unable to move epistemic modals covertly.

- Something about negative inversion itself must be preventing these speakers from accessing a grammatical wide scope reading for epistemic modals in negative inversion sentences.

All of these speakers, to the extent that they accept negative inversion at all, do allow deontic PPI modals to take wide scope in this construction.

Hypothesis: The Epistemic Containment Principle differs for English A and English B.

- English A: ECP looks at representations
(‘Don’t allow a quantifier to bind its trace across an epistemic modal at LF’)

As long as potential violations are repaired by LF, all is well.

- English B: ECP is active throughout the derivation
(‘Don’t allow a quantifier to bind its trace across an epistemic modal unnecessarily’)

Gratuitous violations banned, even when they could be repaired later by covert movement.

In sentences without negative inversion, an ECP violation is created by movement of the subject NegDP from Spec,vP over the modal to Spec,IP.

This movement is obligatory, so the violation is tolerated.

It is repaired at LF by covert movement of the modal.

In sentences with negative inversion, an ECP violation is created by movement of the negative expression from Spec,IP over the moved modal to Spec,CP/Spec,FocP

Negative inversion is never obligatory, so this violation is not tolerated in English B.

4 Conclusions

We have explored a tension between the generalization that negative expressions take widest scope in negative inversion constructions and the PPI-hood properties of certain modals.

- Deontic PPI modals can take scope over the proposed negative expression to avoid being antilicensed.
- Epistemic PPI modals exhibit variation, but for some speakers (English A) they show a similar pattern of behaviour.

When the wide scoping needs of the negative expression and the PPI licensing needs of the modal are in conflict, the needs of the PPI modal win.

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6 Appendix

6.1 Properties of PPIs

PPI modals behave like PPI DPs according to the following criteria outlined in Szabolcsi (2004):

Cannot be interpreted in the *immediate* scope of a downward-entailing/antiadditive/antimorphic operator (depending on the strength of the particular PPI)

– Are acceptable in the scope of an NPI-licenser if another scope-bearing element intervenes

- (1) a. *Danielle didn't forget something. (NEG > SOMETHING)
b. Danielle doesn't always forget something. (NEG > ALWAYS > SOMETHING)
- (2) a. *No student must leave. (NEG > MUST)
b. No student must always leave. (NEG > ALWAYS > SHOULD/MUST)

– Are acceptable in the scope of clause-external negation

- (3) a. *Emilia didn't say something. (NEG > SOMETHING)
b. I don't believe that Emilia said something. (NEG > [CP SOMETHING])
- (4) a. *No student must leave. (NEG > MUST)
b. I don't believe that any student must leave. (NEG > [CP MUST])

Are acceptable even in the immediate scope of negation if that negation is metalinguistic/contrastive

- (5) a. *Ailis didn't buy something. (NEG > SOMETHING)
b. Ailis didn't buy SOMETHING; she bought EVERYTHING! (NEG > SOMETHING)
- (6) a. *No student must attend the colloquium party. (NEG > MUST)
b. No student MUST attend the colloquium party; they're just encouraged to. (NEG > MUST)

Rescuing: Although a PPI in the immediate scope of an NPI-licenser is illicit, putting that illicit combination in an NPI-licensing context is acceptable (first observed by Baker 1970)¹³

- (7) a. *Shayna didn't find something. (NEG > SOME)
b. I don't believe that Shayna didn't find something. (NEG > SOME)
c. If Shayna didn't find something, I'll eat my hat. (NEG > SOME)
d. I am surprised that Shayna didn't find something. (NEG > SOME)
- (8) a. *No student must leave. (NEG > MUST)
b. I don't believe that no student must leave. (NEG > MUST)
c. If no student must leave, then all of them may stay. (NEG > MUST)
d. I am surprised that no student must write a paper for this class. (NEG > MUST)

¹³As Iatridou and Zeijlstra (2013) point out, this is only true for weak and medium-strength PPIs.