

Modal Scope in Negative Inversion Constructions

Naomi Francis

1. Introduction

1.1. Background on negative inversion

Negative inversion is a construction characterized by the presence of a negative expression at the left edge of the clause, followed by an auxiliary, followed by the subject, as in (1).

- (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.

This construction is usually analyzed as 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; Collins & Postal, 2014, a.o.; see Sobin, 2003 for a non-movement analysis). Expressions that count as negative for the purposes of this operation include a variety of NPI-licensors – (Strawson) downward-entailing expressions such as *never*, *only*, and *no* – as well as upward-entailing expressions that contain a negation, such as *no fewer than three* (Collins & Postal, 2014). It has been claimed that the preposed expression in negative inversion constructions must take widest scope in the clause (Haegeman, 2000; Büring, 2004; Collins & Postal, 2014; see also Potsdam, 2013). This view is supported by the contrast between (2) and (3) below; the sentence without negative inversion in (2) is ambiguous, but its counterpart with negative inversion in (3) only has a reading where the negative expression takes scope over the quantificational DP subject.

- (2) 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) 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)

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- 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)

This paper will present counterexamples to the claim that the preposed expression always takes widest scope in negative inversion sentences. We will see that this generalization is in some sense an artefact of the particular examples that have been studied in the literature. Our investigation will focus on cases where the auxiliary that undergoes inversion is a polarity-sensitive modal; we will see that in these cases a very different pattern emerges – one that has consequences for our understanding of both negative inversion and the scopal properties of modals.

1.2. Background on modals

Positive polarity items (PPIs) are expressions that cannot be interpreted in downward-entailing environments.¹ Certain modals (e.g. deontic *must*, *ought to*, *should*, *to be to*) obligatorily scope over sentential negation (Cormack & Smith, 2002; Butler, 2003; von Stechow & Iatridou, 2003); they have therefore 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 antiadditive,⁴ or simply downward-entailing⁵ contexts (van der Wouden, 1994; Szabolcsi, 2004). PPI modals come in different strengths too (Iatridou & Zeijlstra, 2013). This paper will focus on *must*, which is a medium-strength PPI; it is unacceptable in the scope of antiadditive and antimorphic expressions, but is acceptable in non-antiadditive downward-entailing contexts (Iatridou & Zeijlstra, 2013).⁶

It has been argued that modal auxiliaries are not generated in I^0 but move there from a position below sentential negation to which they obligatorily reconstruct for interpretation (Lechner, 2006; Iatridou & Zeijlstra, 2010, 2013; Homer, 2010, 2015). This is why (4) only has the reading in (4-a) and not the surface scope reading in (4-b).

- (4) You may_{de_o} not leave.
- a. You are not permitted to leave; you must stay. (NEG > MAY_{de_o})
- b. #You are permitted to not leave; you may stay. (*MAY_{de_o} > NEG)

Iatridou and Zeijlstra (2010; 2013) argue that modals are exempt from reconstruction when this would create a PPI violation, as in the case of reconstruction across sentential negation. When a PPI modal's surface position is already 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 and Zeijlstra (2013) characterize this movement as QR that leaves a type *s* trace.

- (5) a. SS: not_{t,t} [PPI modal_{st,t} [vP_{s,t}]]
- b. LF: PPI modal_{1,st,t} [not_{t,t} [t_{1,s} [vP_{s,t}]]] (Iatridou & Zeijlstra, 2013:551)

¹ As Szabolcsi (2004) discusses, being a PPI means more than simply being unable to scope under such an operator. 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.

² Epistemic 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).

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

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

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

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

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*. The particulars of this movement operation will not be the focus of this paper; what matters for our purposes is that this operation has been argued to be available for the PPI modals that we are investigating.

1.3. Predictions

If deontic modals like *must* are PPIs, and if the negative expression takes widest scope in negative inversion, we should predict that the acceptability of *must* will depend on the identity of the preposed expression. More particularly, we should predict that *must* will be unacceptable in negative inversion sentences where the preposed expression is antiadditive (e.g. *no*), but acceptable in sentences where the preposed expression is downward-entailing (e.g. *few*). 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 regardless of what kind of negative expression is preposed; these modals are able to take scope above the preposed negative expression. In (6), *must* is paired with a preposed downward-entailing expression (*few*). As *must* is not anti-licensed by expressions that are merely downward-entailing, the availability of wide scope for *few* in (6-a) is exactly what we should expect. However, the acceptability of (6-b), where *must* takes scope over *few*, is surprising given the claim in the negative inversion literature that the preposed expression obligatorily takes widest scope; in contrast, it is completely unremarkable from the perspective of the PPI licensing properties of this modal.

- (6) 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 the course. 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_{deo})

- 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_{deo} > FEW)

In (7), *must* is paired with a preposed antiadditive expression (*no*). As *no* is an anti-licenser for *must*, the unacceptability of (7-a), where *no* takes scope over *must*, is predicted by the PPI properties of this modal. However, a wide scope interpretation is available for the modal in (7-b). The acceptability of (7-b) is unsurprising given the PPI properties of this modal; as it takes widest scope, it is certainly not in the scope of an anti-licenser. However, the data in (7) are quite surprising from the perspective of what has been claimed in the negative inversion literature; if the preposed expression must take widest scope, we should expect that this sentence will have only the reading in (7-a) – precisely the opposite of what the data actually show.

- (7) 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_{deo})

- 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_{deo} > NEG)

These data demonstrate that deontic PPI modals take the same scope with respect to other quantifiers in negative inversion sentences as they would in their non-inverted counterparts.⁷

2.1.1. Explaining the deontic PPI modal data

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 is a property that allows certain predicates (e.g. *want*, *think*) to receive a wide scope interpretation over negation that appears above them in the surface structure. It is this property that allows (8-a) and (9-a) to be paraphrased as (8-b) and (9-b), respectively.

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

It is frequently assumed to arise without movement via an excluded middle presupposition (Horn, 1989; Gajewski, 2005, a.o.).⁸ If *must* were a neg-raising predicate, it could achieve a wide scope interpretation while still being structurally lower than the negative expression at LF. However, Homer (2015) has shown that *must* is not a neg-raising predicate; we must therefore search elsewhere for an explanation of the negative inversion data above.

Reconstruction of the negative expression would likewise be problematic, because Iatridou and Sichel (2011) argue that negation does not undergo reconstruction; they demonstrate that the indefinite portion of a NegDP can reconstruct but the negation cannot (see also Lasnik, 1999).⁹ Indeed, 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.

⁷ This seems to be a fact about PPI modals and not PPIs more generally. DP PPIs are unable to take wide scope in negative inversion, as demonstrated by the following example:

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

⁸ See Collins and Postal (2014) for a recent defence of a syntactic movement account of neg-raising.

⁹ Zeijlstra (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 V⁰-to-C⁰ 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 C⁰, and the preposed negative expression in Spec,CP would be in danger of outscoping the speech act operator, so following Zeijlstra we would expect the negative expression to reconstruct. Yet we have also seen that the preposed expression in negative inversion constructions 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.

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

Table 1: Summary of epistemic PPI modal data

3. A closer look at modal scope

English B speakers exhibit a contrast between wide-scoping abilities of deontic and epistemic PPI modals while 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).

As we have argued that deontic PPI modals get a wide scope reading by covert movement over the preposed negative expression. A reasonable hypothesis is therefore that 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 Fintel & 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 (13) was therefore assumed to come about by reconstruction of the subject quantifier to its original vP-internal position.

- (13) Everyone₃ may_{epi} t₃ have left. (von Fintel & Iatridou, 2003:175)

von Fintel and Iatridou (2003) note that this view of the ECP, combined with the fact that negation 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.¹⁰

- (14) a. *Nobody may have pushed him. (Maybe he just fell.)
 (cf. Maybe nobody pushed him. Maybe he just fell.)
 b. *No student may have solved the biology problem.
 (cf. It may be the case that no student solved the biology problem.)
 c. *Nobody may be home.
 (cf. Maybe nobody is home. It may be the case that...) (von Fintel & 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).

- (15) 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})¹¹

Thus, we need to posit a contrast in the availability of covert movement for deontic and epistemic modals to account for the difference in availability of wide scope for the modal in (14) and (15), independent of the negative inversion facts. This is exactly what is needed to account for English B.

3.2. Epistemic PPI modals and NegDPs

If the difference between English A and English B is that English A allows epistemic modals to move covertly while English B does not, we should predict that English A speakers are able to access a

¹⁰All of their examples on this point involve epistemic *may*; in principle, though, the same should be true of *must*.

¹¹As noted in footnote 6 above, this reading is available for some speakers.

grammatical wide scope reading for epistemic modals in non-inverted sentences with NegDP subjects, but English B speakers are not.

- (16) *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)
- (17) *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)

As demonstrated by the acceptability of (16-a) and (17-a), English A speakers are able to get a wide scope reading for epistemic modals over subject NegDPs, as predicted. However, English B speakers are able to do so too; this is precisely the opposite of what was predicted.¹² The full pattern of data for epistemic *must* is summarized in Table 2 below.

	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

Table 2: Availability of a grammatical wide scope reading for epistemic modals

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, because 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.

We have already encountered a constraint that affects epistemic but not deontic modals: the Epistemic Containment Principle. Let us therefore entertain the hypothesis that the Epistemic Containment Principle differs for English A and English B.

- (18) a. **Epistemic Containment Principle (English A):**
At LF, a quantifier cannot bind its trace across an epistemic modal.
- b. **Epistemic Containment Principle (English B):**
A quantifier cannot bind its trace across an epistemic modal unnecessarily.

The version of the ECP that is active in English A (18-a) looks at representations. As long as potential violations are repaired by LF, all is well. In English B, on the other hand, the ECP is active throughout the derivation, as in (18-b). In this version of the ECP, 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 or Spec,FocP. Negative inversion is never obligatory, so this violation is not tolerated in English B.

¹²The degraded status of epistemic possibility modals in (16-b) and (17-b) is mysterious and will not be addressed here. One possible explanation is that epistemic *may* is not a PPI, contrary to what Iatridou & Zeijlstra (2013) claim.

4. Conclusions

This paper has 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 preposed negative expression to avoid being anti-licensed. Epistemic PPI modals exhibit variation. For at least some speakers (English A), these PPI modals show a similar pattern of behaviour to their deontic counterparts. Finally, we have seen that, 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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Proceedings of the 34th West Coast Conference on Formal Linguistics

edited by Aaron Kaplan, Abby Kaplan,
Miranda K. McCarvel, and Edward J. Rubin

Cascadilla Proceedings Project Somerville, MA 2017

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Francis, Naomi. 2017. Modal Scope in Negative Inversion Constructions. In *Proceedings of the 34th West Coast Conference on Formal Linguistics*, ed. Aaron Kaplan et al., 214-221. Somerville, MA: Cascadilla Proceedings Project. www.lingref.com, document #3314.