

What forbids existential deontic modal PPIs?

Languages vary with respect to whether modal auxiliaries or particles have fixed or flexible quantificational force (Rullmann et al. 2008, Matthewson 2016). However, among languages where the quantificational force of modal auxiliaries is fixed, particular patterns emerge when it comes to the scope that these modals take with respect to negation. Strikingly, in the domain of deontic modals, all existential modal and certain universal modals generally take scope below negation, whereas other universal modals can only take scope above negation. To illustrate this for English, in their deontic construals, *can* and *may* take both narrow scope with respect to negation; however, whereas *need to* and *have to* also take narrow scope, *must* and *should* take wide scope:

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| (1) | a. | Mary {cannot / may not} leave | $OK \rightarrow > \diamond; ? \diamond > \neg$ | deontic |
| | b. | Mary doesn't / does not {have / need} to leave | $OK \rightarrow > \square; ? \square > \neg$ | deontic |
| | c. | Mary {must / should} not leave | $* \rightarrow > \square; OK \square > \neg$ | deontic |

Iatridou & Zeijlstra (2010, 2013) and Homer (2015) argue that this pattern is the result from the fact that modals like *must* and *should* are Positive Polarity Items (PPIs), whereas the other modals are polarity-insensitive. The PPI-status of *must* and *should* forbids reconstruction of the modal below negation, and therefore they have to outscope them.

PPI-modals in the domain of deontic modals have only been observed among universal modals. So far, no existential deontic PPI-modal, which obligatorily outscoops negation, has been attested (cf. De Haan 1997, Van der Auwera 2001, Nauze 2008). However, in the domain of epistemic modals, such existential PPI-modals have been attested. *Might* is a good example, as it obligatorily scopes over negation, even though other existential epistemically used modals, such as *could*, do not do so (cf. Iatridou & Zeijlstra 2013), and generally take scope under negation:

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| (2) | a. | She might not have been there | $* \rightarrow > \diamond; OK \diamond > \neg$ | epistemic |
| | b. | She could not have been there | $\rightarrow > \diamond; ? \diamond > \neg$ | epistemic |

In fact, even though deontic *may* is polarity-insensitive, epistemic *may*, again, is a PPI:

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| (3) | | She may not have been there | $* \rightarrow > \diamond; OK \diamond > \neg$ | epistemic |
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The question now arises why in the domain of deontic modals no existential PPIs exist, whereas in the domain of epistemic modals they do. And why is it that certain existential epistemic PPIs lose their PPI-status in a deontic construal? What forbids existential deontic modal PPIs? To see this, let us first focus on other existential PPIs, such as *somewhat* or *some*:

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| (4) | a. | *Mary isn't somewhat ill | |
| | b. | Mary didn't see some girl | $OK \exists > \neg; * \rightarrow > \exists$ |

The PPI-hood of such existential PPIs does not follow from most theories of polarity-sensitivity and has not yet received a proper explanation. A potential explanation for the source of existential PPI-hood comes from Lin's (1996, 1998) lexically encoded *Non-Entailment-of-Existence Condition*. In this framework, developed for Chinese existential NPIs/*Wh*-phrases. Elements such as *shenme* ('what/any') may not appear in contexts that would entail the existence of a referent satisfying their description (where such contexts are formed by the proposition whose widest scope operator is a scope operator that the *Wh*-phrase is in the scope of). The sentence in (5a) without the modal is bad as the sentence would entail that there is a book bought yesterday by Mary; if the modal is present (or a negation, as in (5b)), the sentence is fine: the existence of a book bought yesterday by Mary is no longer entailed.

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| (5) | a. | Mali zuotian *(haoxiang) mai-le senme shu | (Lin 2016) |
| | | Mary yesterday probably bought-PERF what/any book | |
| | | 'Mary has (probably) bought a book yesterday' | |
| | b. | Mali zuotian mei mai senme shu | |
| | | Mary NEG bought what/any book | |
| | | 'Mary didn't buy any book yesterday' | |

For this reason, phrases like *shenme* may only appear in non-veridical contexts, as has been proven correct by Lin (2016). Following Lin, Giannakidou (1997, 2011) argues that NPIs that are sensitive to non-veridicality (i.e., NPIs that, unlike *any* or *ever*, are licensed by all non-veridical operators, and not only by DE ones) are NPIs because they are referentially deficient (and cannot give rise to an existentiality entailment of the kind). In veridical contexts such existential import is warranted.

This alternative approach readily offers an opening to capture the PPI-hood of existentials like *some/somewhat*, but as we will see, also to these epistemic existential PPIs. Let's assume that such existentials can always give rise to existential import. Then they are subject to the reverse of Lin's *Non-Entailment-of-Existence Condition*, which I dub the *Non-Entailment-of-Non-Existence Condition*: Such elements may not appear in contexts that would entail the non-existence of referents satisfying their description, where, again, such contexts are formed by the proposition whose widest scope operator is a scope operator that they are in the scope of. The reason that (4b) does not allow a reading with a scopal construal $\rightarrow\exists$, is that its assertion under this scopal construal would entail that there is no girl seen by Mary. That violates the *Non-Entailment-of-Non-Existence Condition*, which forbids excluding the existence of such girls.

Applying the *Non-Entailment-of-Non-Existence Condition* to existential modals, the distinction between the epistemic PPI and the deontic polarity-neutral versions naturally follows. To see this, first look at the following examples from Kratzer (1991):

- (6) a. Hydrangeas can grow here. b. There might be hydrangeas growing here.

In a context where the speaker speaks about some land where it is clear that no hydrangeas grow there, even though the physical circumstances (such as fertile soil, etc.) would make it possible, (6a) could be felicitously uttered, but (6b) could not. The difference between epistemic and deontic (and other) modal flavours, along the lines of Kratzer (1991), is that epistemic modals have an *epistemic* modal base, whereas the other ones have a *circumstantial* modal base, to which an ordering source applies. *Might*, being an epistemic modal, thus has a modal base that is restricted to those worlds that are compatible with the speaker's knowledge and beliefs. Now, (6b) assert that there is at least one world compatible with the speaker's knowledge and beliefs where hydrangeas grow in the land, even though the speaker clearly knows and believes that no hydrangea grows in this land: a clear contradiction. By contrast, in (6a) there can still be a world in the circumstantial modal base (consisting of the set of worlds that are compatible with the circumstances) where hydrangeas grow in the land, even though the speaker knows/believes that such a world has not been actualized.

I hypothesize that *may* and *might*, unlike other modals, in all their construals may not appear in contexts where the existence of the worlds in their modal base that meet their description is denied, which is in full essence the same type of restriction that *some(what)* imposes on its domain of quantification; they are subject to the *Non-Entailment-of-Non-Existence Condition*. This, then, explains *may*'s and *might*'s scopal behaviour with respect to negation. For deontic *may* (1a), with the construal $\rightarrow\Diamond$, the sentence asserts that there is no world in line with the speaker's wishes where she leaves, but the *Non-Entailment-of-Non-Existence Condition* is nevertheless met: there can still be worlds part of the circumstantial modal base where she leaves. The ordering source here selects a subset of the worlds that are part of the modal base. By contrast, (3), with the construal $\rightarrow\Diamond$, would assert that there is no world according to the speaker's knowledge/belief where she would have been there. But this would violate the *Non-Entailment-of-Non-Existence Condition*, which excludes non-existence of such worlds. The *Non-Entailment-of-Non-Existence Condition* thus contradicts the assertion. This anomaly disappears once the scopal relations are reversed: then the sentence means that there is a world where she hasn't been there, which is fully in line with the speaker's knowledge/belief state and the *Non-Entailment-of-Non-Existence Condition*.

Consequently, modals whose modal base is subject to the *Non-Entailment-of-Non-Existence Condition*, behave PPI-like when used epistemically, and polarity-neutral when used with another modal flavour. Other existential modals, such as *could*, lack this lexically encoded *Non-Entailment-of-Non-Existence Condition* and can take thus scope below negation when a negation is present. Since the usage of *might* is restricted to epistemic usages, it always behaves PPI-like (cf. Iatridou & Zeijlstra 2013); *may*, on the other hand, is predicted to behave only PPI-like when used epistemically, and not when used deontically.

To conclude: accounting for existential PPI-hood along the lines of the *Non-Entailment-of-Non-Existence Condition* predicts that no existential deontic modal PPIs can be attested, a prediction that hitherto has been confirmed, but that should of course be subject to more intensive typological scrutiny.