

Not Too Strong!

Generalizing the Scope Economy Condition

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Abstract

Fox (1995, 2000) argued that covert scope shifting operations (CSSOs) such as QR or reconstruction are subject to a semantic economy condition: they are not licensed if they are semantically vacuous. In this paper, we argue for a generalization of this condition according to which a CSSO is ruled out not only if it is vacuous, but also if it leads to a reading that is strictly stronger than the surface-scope reading.

1 The Generalized Scope Economy Condition

Fox (1995, 2000) argues that covert scope shifting operations (CSSO) such as QR and reconstruction (or quantifier lowering) are constrained by economy considerations. More specifically, according to Fox’s Economy Condition, a CSSO can take place only if it is not semantically vacuous:

- (1) *Economy condition on scope shifting (Scope Economy)*
OP can apply only if it affects semantic interpretation (i.e., only if inverse-scope and surface-scope are semantically distinct) (*where OP stands for CSSO; M&S*)
(Fox 2000: 21)

Fox’s claim has far-reaching consequences for the architecture of the grammar, as it implies that some syntactic operations have access to certain semantic properties of logical forms. In the present paper, we discuss data that suggest that the principle of Scope Economy in (1) must be generalized. Our Generalized Scope Economy Condition (GSEC) is stated in (2).

- (2) *Generalized Scope Economy condition (GSEC)*
A CSSO cannot apply if the meaning of the resulting reading is equivalent to or stronger than (i.e. entails) the meaning that would have resulted without it.

The GSEC incorporates the cases subsumed under Fox’s Scope Economy condition, but moreover disallows CSSOs whose output structures have a reading which asymmetrically entails that of the input structure. In other words, we claim that a CSSO is ruled out not only when it is semantically vacuous, but also when it is semantically *strengthening*.

In section 2, we will show that (2) explains various complicated facts about the relative scopes of various operators. In section 3 we discuss a potential methodological counterargument to our claim and provide additional evidence for the GSEC. In section 4 we will discuss two systematic apparent exceptions to our theory, and we will argue that these exceptions support the GSEC under closer scrutiny.

2 Complicated scope facts

In this section, we discuss two sets of cases where certain scope ambiguities are missing and show that the GSEC correctly predicts the absence of the relevant readings.

2.1 Interaction between quantifiers and negation

Consider the pair of sentences in (3). (3a) is ambiguous between a reading equivalent to “no student of mine showed up on time” (the surface-scope reading, where the universal subject scopes over negation) and a weaker reading equivalent to “it is not the case that every student of mine showed up on time” (the inverse-scope reading, which we assume involves reconstruction of the universal quantifier to a VP-internal position, lower than negation). (3b), on the other hand, is not ambiguous (Beghelli and Stowell 1997). The universal quantifier cannot take scope over negation. The only difference with (3a) is that we have changed the surface-scope of the scope-bearing elements involved, but crucially the type of elements involved are the same.

- (3) a. Every student of mine didn’t show up on time ($\forall > \neg$) ($\neg > \forall$)
 b. John didn’t meet every student of mine on time ($\neg > \forall$) *($\forall > \neg$)

Beghelli and Stowell (1997) also observe that a narrow scope reading with respect to negation for an indefinite subject is difficult to obtain, as illustrated by (4). (4) differs minimally from (3a): the universal subject has been replaced by an indefinite. Reconstruction seems impossible in this case.

- (4) A/One student of mine didn’t show up on time ($\exists > \neg$) ??($\neg > \exists$)

These facts are puzzling, and, as far as we know, they have not been accounted for so far in a principled way.¹ It turns out that the unavailable interpretations for (3b)

¹Beghelli and Stowell (1997) provide a syntactic account of these differences between quantifiers: they posit that QR operations move various quantifiers to various designated syntactic positions, but they do not explain why these positions are ordered the way they are. Büring (1997) provides a

and (4) are ruled out by the GSEC, provided we assume that universal quantifiers are *aristotelian*, i.e. presuppose that their restrictor is non-empty.²

First consider (3a) and (3b). Both involve negation and a universal quantifier. Now, note that the following generally holds:

- (5) If the extension of a predicate P is presupposed not to be empty, then, for any contingent predicate Q , the formula $\forall x(P(x) \rightarrow \neg Q(x))$ a-symmetrically entails ('a-entails' for short) the formula $\neg \forall x(P(x) \rightarrow Q(x))$.

In the case of (3a), the 'surface-scope' reading ($\forall > \neg$) is thus the one that a-entails the inverse-scope reading ($\neg > \forall$). Hence the inverse-scope reading does not entail the surface-scope reading. As a result, the inverse-scope reading is not ruled out by the GSEC, a correct result. In the case of (3b), on the contrary, the inverse-scope reading ($\forall > \neg$) entails the surface-scope reading ($\neg > \forall$), and therefore it is ruled out by the GSEC – a correct result again.

Next consider (4). With an existential quantifier instead of a universal quantifier, the logical relationships between the various putative readings are reversed. Namely, it is now the reading where negation takes wide scope which is the strongest. In other terms:

- (6) If the extension of a predicate P is presupposed not to be empty, then, for any contingent predicate Q , the formula $\neg \exists x(P(x) \wedge Q(x))$ a-entails the formula $\exists x(P(x) \wedge \neg Q(x))$.

Hence, in the case of (4), the inverse-scope reading ($\neg > \exists$) entails the surface-scope reading, and is thus correctly ruled out by the GSEC. These well-known data lend first circumstantial support to the GSEC, which correctly predicts that the sentences in (3b) and (4) should be perceived as unambiguous.³

2.2 Contrasts between UE-indefinites and DE-indefinites

In the preceding subsection we have seen that quantifiers show differing behavior in their ability to scope below or above negation, in a way that the GSEC manages to

principled account for the fact that the inverse-scope reading is obligatory for (3a) if the subject bears a 'topic' accent and negation is focussed, but does not provide a general theory of scope restrictions.

²If one does not want to commit oneself to the view that universal quantifiers presuppose their restrictor to be non-empty, one can as well stipulate that the GSEC involves a non-standard notion of entailment, whereby ϕ is said to entail ψ whenever every model of ϕ in which the relevant restrictors are not empty is also a model of ψ .

³Unless more is said, the GSEC also predicts that a wide-scope reading for the indefinite is impossible in (i), contrary to fact. But note that bare indefinites are known to be able to take 'exceptional wide scope', and it is widely assumed that the mechanism whereby they achieve wide-scope is not syntactic movement. Thus we do not expect this mechanism to be subject to the GSEC, a conclusion already reached by Fox in the context of his original proposal. See Heim (1982), Abusch (1994), Reinhart (1997), Winter (1997), Chierchia (2001), among others.

predict. In this section we turn to the interactions between indefinites and universal operators (universal quantifiers over individuals, times, or worlds – necessity modals). We argue for the following generalization:

- (7) An indefinite which c-commands a universal operator in overt syntax can take scope below it if it is upward-entailing and cannot if it is downward-entailing.

The pairs in (8), (9) and (10) illustrate this generalization. The (a)-examples have an UE-indefinite in subject position which c-commands a universal quantifier. The (b)-examples differ minimally in that the UE-indefinite is replaced by a DE-one. The (a)-examples allow for an inverse-scope reading, whereas the (b)-examples do not.

- (8) a. Many windows are always open in this building (i.e. it is always the case that few are closed) (many > always) (always > many)
 b. Few windows are always open in this building (#i.e, it's always the case that most are closed) (few > always) *(always > few)
- (9) a. More than three students are certain to pass, (i.e., it's certain that at least four pass) (more than 3 > certain) (certain > more than 3)
 b. Fewer than three students are certain to pass, (#i.e., it's certain that at most two pass) (fewer than 3 > certain) *(certain > fewer than 3)
- (10) a. A boy heard every girl sing ($\exists > \forall$) ($\forall > \exists$)
 b. Few boys heard every girl sing (few > \forall) *($\forall >$ few)

The generalization in (7) follows from the GSEC. Let us for instance concentrate on the pair in (8). The inverse-scope reading of (8a) says that at any given moment, one can find many open windows in the building. This, of course, does not entail that a single, specific window is open permanently. Hence it does not entail the surface-scope reading, which says that there are many specific windows which are permanently open. Since the inverse-scope reading in this case does not entail the surface-scope reading, the inverse-scope reading is licensed by the GSEC. Consider now (8b). The inverse-scope reading for (8b) says that at any given moment, the number of open windows, call it k , is low. Now, note that the number of windows that are *permanently* open, call it k' , is necessarily smaller than or equal to k . Hence if k counts as low, then so does k' . In other words, if the inverse-scope reading is true, then there are few windows that are permanently open, i.e., the surface-scope reading is true as well. Therefore the inverse-scope reading entails the surface-scope reading, and it is thus ruled out by the GSEC. A completely parallel line of reasoning accounts for the cases in (9) and (10).

To predict the generalization in (7) in full generality, let us first remark that a UE-indefinite can be assimilated to an existential quantifier ranging over its so-called ‘witness-sets’ (cf. Barwise and Cooper 1981). Hence the relevant ambiguity in all the (a)-examples is reducible to an ambiguity in the relative scope of a universal quantifier and an existential quantifier. Given that the reading where the universal quantifier scopes over the existential quantifier is the weaker reading, it is not ruled out by the

GSEC, i.e., inverse-scope is predicted to be possible. In contrast with this, a DE-indefinite is equivalent to the negation of a UE-indefinite. That is, the relevant readings in cases involving a DE-indefinite can be schematically represented as follows:

- (11) a. Surface scope: $\neg\exists x\forall yP(x, y)$
 b. Inverse scope: $\forall y\neg\exists xP(x, y)$

Now, (11b) entails (11a), and therefore the inverse-scope reading is ruled out by the GSEC.

3 Further Evidence

3.1 A potential objection: Truth Dominance

In a recent paper, Meyer and Sauerland (2009) argue that if a sentence is ambiguous between two readings $R1$ and $R2$, where $R1$ entails $R2$ and $R2$ is ‘the most accessible reading’, then $R1$ is not detectable by mere inspection of speakers’ truth-conditional intuitions, due to a principle they call *Truth Dominance*.

Now, if one assume that inverse-scope readings are never as ‘accessible’ as surface-scope readings, then Truth Dominance predicts that an inverse-scope reading will be undetectable when it entails the surface-scope reading. Hence Truth Dominance is able to account for the facts we have discussed so far. Crucially, Truth Dominance and the GSEC are genuinely *distinct* hypotheses: the GSEC says that the grammar rules out certain LF representations, while Truth Dominance does not. In fact, Meyer and Sauerland’s (2009) general argument for Truth Dominance is that one can provide independent evidence for the availability of certain LFs which happen to be undetectable by purely truth-conditional means.

We agree that it is possible that some ambiguities cannot be detected due to a principle along the lines of Truth Dominance. We thus need to provide additional arguments for the GSEC. To this we now turn.

3.2 The parallelism condition on VP-ellipsis

Notice that if we grant that inverse-scope readings that are not licensed by the GSEC could not be detected anyway by consulting our truth-conditional intuitions, we find ourselves in the same situation as Fox did when he argued for his original Economy Condition. Trivially, Fox’s ban on vacuous CSSOs has no observable effect on truth-conditions. Fox argued for his Economy Condition by using certain constraints on VP-ellipsis as diagnostic tools, and we will follow him in this respect.

Fox adduced data such as the ones in (12) originally discussed by Sag (1976) and Williams (1977) to give support to Scope Economy. (12a) shows a scope ambiguity as expected. But the very same sentence becomes sometimes unambiguous when followed

by a sentence involving VP-ellipsis, as in (12b) (Fox 2000: 30).

- (12) a. A boy admires every teacher. $(\exists > \forall) (\forall > \exists)$
 b. A boy admires every teacher. Mary does, too. $(\exists > \forall) *(\forall > \exists)$

Fox's account for the lack of ambiguity in (12b) is based on two principles, namely the 'parallelism constraint on ellipsis', stated in (13) below, and his Scope Economy Principle.⁴

- (13) *Parallelism*
 If a CSSO has applied in a given sentence A , and A is followed by a sentence B in which the VP is elided, then a parallel CSSO must have applied in B .

Here is how (13) and Scope Economy conspire to make (12b) above unambiguous. First, we notice that QR of the (elided) universal quantifier over *Mary* would be vacuous and is thus ruled out by Scope Economy. Second, given parallelism (cf. (13)), the parallel CSSO in the antecedent sentence is blocked as well. As a result, (12b) is unambiguous.

Fox's account makes the further prediction that (14) should exhibit scopal ambiguity, as it indeed does. Why? The inverse-scope interpretation of the ellipsis sentence is different from the surface-scope interpretation, i.e., Scope Economy allows the required CSSO. Parallelism entails that either both or neither of the two sentences will be interpreted under the inverse-scope reading, a correct prediction which provides independent evidence for parallelism.

- (14) A boy admires every teacher. A girl does, too. $(\exists > \forall) (\forall > \exists)$

We can replicate Fox's arguments in order to test whether our GSEC, which is strictly stronger than Fox's original Scope Economy condition, is a real grammatical principle. Imagine a VP-ellipsis discourse where the antecedent sentence shows a scope ambiguity when it appears on its own, just like in (12a) above. Now, if the inverse-scope reading in the ellipsis sentence is ruled out by the GSEC (i.e., if it entails the surface-scope reading), then the CSSO in the antecedent should be blocked by the parallelism constraint. This means that the antecedent sentence should appear to be unambiguous. Such examples would thus provide crucial support for the GSEC, as the relevant facts cannot be predicted by Truth Dominance.

With this in mind, consider the examples in (15). We notice that under the given context (15a) sounds fine, whereas (15b) is odd.

- (15) *Context:* Preprints of several new books are sent to both male and female reviewers. No male reviewer received every book.
 a. More than five men read every book. And more than five women did, too.

⁴Notice that the formulation in (13) is stronger than one might initially expect. In particular, it requires that the scopal relations for the complete sentences are parallel and not just the ones in the VPs. We return to this issue below.

- #(more than 5 > \forall) (\forall > more than 5)
- b. #More than five men read every book. However, fewer than five women did.
 #(more than 5 > \forall) *(\forall > more than 5)

In the specified context, the surface-scope reading is pragmatically odd for the antecedent sentences in (15a)-(15b), because this reading implies that there are men who read every book. So only the inverse-scope reading (which states that every book was read by more than five men) is compatible with the context. We can thus interpret these facts as showing that the inverse-scope reading is available for the first sentence in (15a) but not in (15b) (even though it is the very same sentence in both cases).

Now consider the ellipsis sentences. The one in (15a) contains an UE-indefinite in subject position. As discussed in section 2.2, in such a case the GSEC licenses an inverse-scope reading. Hence the parallel inverse-scope reading in the first sentence is licensed as well (and in fact forced by parallelism if the relevant CSSO occurs in the ellipsis sentence). In (15b), however, the subject in the ellipsis sentence is DE. As we have seen, in such a case QR of the universal quantifier is ruled out by the GSEC. By parallelism, the parallel CSSO is ruled out in the antecedent sentence, which makes the inverse-scope reading unavailable for the first sentence. But since only this reading is compatible with the context, (15b) is correctly predicted to sound odd.

(16) is a similar example.⁵ The context makes sure that no person could have possibly watched every film shown at the festival. It follows that the surface-scope reading of the antecedent sentence in both (16a) and (16b) should be infelicitous, because it would say that many critics are such that they watched every movie. The inverse-scope reading, on the other hand, is licensed by the context, which allows every movie to be such that many critics watched it. But as in the previous example, we see that the overall discourse is odd when the ellipsis sentence contains a DE-indefinite subject, as in (16b), and not when it contains a UE-indefinite subject, as in (16a). This again is predicted by the combination of the GSEC and parallelism (as we have just explained).

- (16) *Context:* A film festival has parallel sessions. No one was able to watch every movie.
- a. Still, many critics watched every movie. And a few ordinary people did, as well. #(many > \forall) (\forall > many)
- b. #Still, many critics watched every movie. However, very few ordinary people did. #(many > \forall) *(\forall > many)

A parallel account can be given for the oddness of (17). The surface-scope interpretation of the antecedent sentence is false, because it is not true that no Californian lives in LA. Thus the inverse-scope interpretation should be forced. The ellipsis sentence contains an indefinite and a negation. Applying reconstruction to the indefinite below negation results in an interpretation that is stronger than the surface reading. This interpretation is blocked by the GSEC. But then, in order to meet the parallelism constraint, the first

⁵Thanks to Danny Fox (p.c.) for help with the construction of the example.

sentence must be interpreted under its surface-scope reading, which is incompatible with world knowledge.

- (17) #Every Californian doesn't live in LA, and a New Yorker doesn't either
 $\#(\forall > \neg) *(\neg > \forall)$

(18) below differs minimally. Here the ellipsis sentence contains a universal quantifier. Applying reconstruction does not violate the GSEC. Hence the GSEC licenses inverse-scope in the second sentence, and as a result inverse-scope is licensed as well in the antecedent (given parallelism). No oddness is thus predicted, a correct result again.⁶

- (18) Every Californian doesn't live in LA, and every New Yorker doesn't either
 $\#(\forall > \neg) (\neg > \forall)$

To summarize, the conclusions that Fox reached in the case of vacuous CSSOs on the basis of discourses involving ellipsis can be generalized to 'strengthening' CSSOs. This is predicted by the GSEC, but not by Truth Dominance.

3.3 Pragmatic deviance

Truth Dominance can certainly not be assumed to be an absolute principle. Sometimes an ambiguous sentence is disambiguated in favor of its *stronger* reading, because the weaker reading cannot be assumed to be what the speaker meant (for instance, because it is so weak that it expresses a tautology).⁷ Hence, let us consider a case where only the inverse-scope reading is a plausible reading. If this reading exists, it should be the most salient reading, even if it is stronger than the surface-scope reading. If the sentence instead sounds odd, this provides evidence that the inverse-scope reading is not generated by the grammar. With this in mind, consider the acceptable (19a) and the infelicitous (19b) under the context given in (19).

⁶Note that for (17) and (18) the argument rests on the assumption that it is the whole sentences that matter for parallelism, as stated in (13), i.e., it is not the scopal relations in the VPs alone that matter. We follow Rooth (1992a,b), Tancredi (1992), Fox (2000) in this assumption. Also note that the difference in acceptability between (17) and (18) itself provides support for the particular formulation of parallelism in (13).

⁷For instance, (i) below strongly favors the reading where the than-clause ('than he has') is interpreted *de re*, i.e., is taken to refer to the number of children that Jack has *in the actual world* (paraphrased in (ia)), rather than the reading where the than-clause is interpreted *de dicto* (paraphrased in (ib)), which happens to be a tautology.

- (i) Jack could not have had more children than he has.
- a. *De re*: there is no accessible world w such that the number of children that Jack has in w is more than the number of children that Jack has *in the actual world*.
 - b. *De dicto*: there is no accessible world w such that the number of children that Jack has in w is more than the number of children that Jack has in w .

- (19) *Context: in some particular driving school, on every day, many people from many different states take a driving exam*
- a. More than three people from New York State always pass
#(more than 3 > always) (always > more than 3)
 - b. #Fewer than three people from New York State always pass
#(fewer than 3 > always) *(always > fewer than 3)

First, consider (19a). The surface-scope interpretation, which can be paraphrased as in (20a) below, is pragmatically odd due to general knowledge of driving exams. The inverse-scope reading, on the other hand, can be paraphrased as in (20b) below, which fits our assumptions about driving exams. Since the inverse-scope reading in (20b) is asymmetrically entailed by the surface-scope reading in (20a), hence is weaker than it, the GSEC predicts that the necessary CSSO can apply. That is, the only appropriate reading for (19a) is the inverse-scope one, and it is predicted to be available by the GSEC.

- (20) a. ‘There are more than three people from New York who take the exam repeatedly and always pass.’
b. ‘It is always the case that more than three people from New York pass the exam.’

Why is (19b) infelicitous? Again, the surface-scope reading for (19b), paraphrased in (21a) below, is pragmatically odd (it is basically a tautology, given our general knowledge about driving exams). It follows that Truth Dominance is obviated in this context: even though the inverse-scope reading given in (21b) asymmetrically entails the surface-scope reading, if the former reading is available at all, it should be detected in this context. In contrast with this, the GSEC predicts reconstruction to be impossible in (19b), hence rules out the only sensible interpretation. It thus correctly predicts that (19b) should sound pragmatically odd.

- (21) a. ‘There are fewer than three people from New York who take the exam repeatedly and always pass.’
b. ‘It is always the case that fewer than three people from New York pass the exam.’

4 Two classes of systematic exceptions

In the present section we will look at two classes of apparent exceptions to the GSEC and discuss how they can be reconciled with our proposal.

4.1 Quantifiers at the right edge

Recall that (3a), repeated below as (22), does not have an inverse-scope reading.

- (22) John didn’t meet every guest on time ($\neg > \forall$) *($\forall > \neg$)

In contrast with this, however, in the case of (23) the inverse-scope reading *is* available, under a particular intonation.⁸ At first sight this is completely unexpected. The quantifiers involved in (23) are the same as in (22), and the GSEC rules out the inverse-scope reading in both cases.

- (23) The student couldn't answer every question that was marked with a star.
 $(\neg > \forall) (\forall > \neg)$

We will now suggest an explanation for this pattern: we contend that these apparent counterexamples to the GSEC are only found when the relevant operator is positioned at the right edge of the sentence. We will claim that in such cases the operator can undergo an *overt* but string-vacuous movement operation to the right, which a) gives it wide-scope, and b) is not subject to the GSEC (since it is overt).

According to us, what distinguishes (22) from (23) is that in the latter case, but not in the former, it is possible that the universal quantifier underwent Heavy NP Shift (HNPS) – that is, string-vacuous movement to the right – to scope over negation, but not in (22), because in the latter case the QNP is not phonologically heavy enough.⁹ This means that (22) has (24) as its underlying structure under the inverse-scope construal.

- (24) [The student [couldn't answer t_1]] [every question that was marked with a star]₁

This approach makes certain predictions. For instance, the availability of the inverse-scope reading in (23) should disappear once we make sure that the universal quantifier cannot undergo string-vacuous HNPS. So if we place some material X that needs to be in the scope of negation to the right of the universal quantifier, the latter should not be able to move overtly but string-vacuously high enough to take scope over negation: this is so because in order for it to scope over negation, it should also scope over X , hence should move to the right of X . A CSSO would be called for, but this would violate the GSEC.

This prediction is borne out. Consider the scopally ambiguous (25) and the unambiguous (26). Both examples use NPI *yet*, which must be in the scope of negation to be licensed. In (25) the universal precedes the NPI. In order for it to take scope over negation itself, it has to undergo movement. Covert movement is blocked by the GSEC. Overt movement to the right would not be high enough if it is string-vacuous, because in order to take scope over negation the universal would have to move past the NPI, which is trapped under negation. Therefore the lack of ambiguity is expected.

- (25) I haven't solved every problem that was marked with a star yet.
 $(\neg > \textit{yet} > \forall) *(\forall > \neg > \textit{yet})$

⁸We thank an anonymous reviewer for SuB 14 for pointing out data like (23).

⁹Furthermore, for HNPS in (22) to be string-vacuous, it would have been necessary that the phrase 'on time' itself had moved to the right as well

(26) differs from (25) in having the universal follow the NPI. This can be plausibly attributed to the fact that the universal underwent HNPS (indeed, if the universal is replaced with a ‘light’ DP, the sentence becomes ungrammatical). What is important is that the landing site of the HNPS is not forced to be under the scope of negation. Therefore the scope ambiguity in (26) is again explained by appeal to overt movement, which is not subject to the GSEC.¹⁰

- (26) I haven’t solved yet every problem that was marked with a star
 $(\neg > yet > \forall) (\forall > \neg > yet)$

Similarly, the account relying on overt movement to the right predicts that the ECM-marked universal quantifier in (27) cannot take scope over negation. It is not on the right edge. Therefore covert movement is the only way wide-scope could be achieved. But, again, this movement is blocked by the GSEC.¹¹

- (27) *Context:* These students usually don’t solve any problem whatsoever.
 I don’t expect every problem that was marked with a star to be solved.
 $(\neg > \forall) *(\forall > \neg)$

The same observation applies to subjects embedded by perception verbs, as in (28)

- (28) a. I didn’t see every building collapse. $(\neg > \forall) *(\forall > \neg)$
 b. I didn’t see every girl laugh. $(\neg > \forall) *(\forall > \neg)$

The fact that the linear position of certain quantifiers matters for their scope taking abilities has thus been shown to actually lend support to the GSEC. Apparent exceptions to the GSEC involve quantifiers on the right edge and can thus be analyzed in terms of overt but string-vacuous movement to the right. We saw independent evidence for such an analysis.

4.2 Modals¹²

A second class of apparent exceptions involves certain modals. In section 2.2, we saw that the GSEC predicts that DE-indefinites in subject positions, unlike UE-indefinites,

¹⁰Kayne (1998) made similar observations in cases that do not involve a violation of the SGEC. He noticed that quantifiers at the right edge can violate the clause-boundedness of QR (May 1985) and assumed that overt rightward movement was responsible for this (despite the fact that rightward movement is usually taken to be clause-bound as well – a constraint known as the right roof constraint – Ross 1967). Kayne (1998) proposes a system where QR is reduced to overt rightward movement. This is incompatible with our own approach, which is based on a distinction between covert movement and string-vacuous overt movement.

¹¹(i) shows that ECM-marked subjects can take scope over the matrix subject (cf. May 1985: 44), i.e. covert movement to the matrix level is not blocked in general.

(i) A different boy wants every girl to marry him $(\exists > \forall) (\forall > \exists)$

¹²Some of the judgments reported in this section are not very stable, and require further investigation.

are not able to reconstruct below a universal operator, and, in particular a necessity modal (cf. (9b)). Things are nevertheless more complicated. For there are other cases where a UE-indefinite can clearly reconstruct below a universal modal, as in (29) (which, given the specified context, favors the reading where the subject takes scope below ‘must’. See however footnote 13).

- (29) *Context:* A dinner party is to take place, but the host hopes that there will not be too many people attending, for otherwise it could be a disaster. The host thus thinks ...
Fewer than five people must come for the dinner to be pleasant.
- a. Surface-Scope: $\#(\text{fewer than } 5 > \Box)$ There are fewer than five people x such that x must come for the dinner to be pleasant.
 - b. Inverse-Scope: $(\Box > \text{fewer than } 5)$ It must be the case that fewer than five people come for the dinner to be pleasant.¹³

Now, note first that this fact is problematic for the GSEC only if we ignore the fine details of the semantics of modal constructions. For the inverse-scope reading entails the surface-scope reading only on the assumption that the extension of the predicate *people* is the same in the actual world and in the worlds quantified over by the necessity modal. That is, the entailment goes through only if the noun *people* is interpreted *de re* in the case of the inverse-scope reading. This could be a sufficient answer to the puzzle, but then of course we should remove modals entirely from the set of data which we can consider as evidence or counterevidence for the GSEC. Whether we want to adopt this answer depends on what we take to be the notion of entailment relevant to the GSEC. For we could also take the view that the GSEC, because it operates on very impoverished Logical Forms,¹⁴ fails to see that the entailment-relation is broken under a *de-dicto* reading, in which case another answer is called for.

While we will not provide such an answer in this paper, we would like to suggest that the violation of the GSEC that we have just observed correlates with another property: the modal ‘must’, when adjacent to negation, licenses an interpretation in which negation applies to the verb embedded under ‘must’ rather than to ‘must’ itself. Let us call modals and predicates which behave like ‘must’ in this respect ‘neg-raising’. Now, not all necessity modals are neg-raising. *Must* is, but *have to* is not. Let us thus contrast (29), repeated below as (30a), with a minimally different sentence where ‘must’ has been replaced with ‘have to’, as in (30b). For many speakers, the inverse-scope reading is at best marginal in (30b), which makes it somewhat odd, because the surface-scope reading is pragmatically deviant.¹⁵

¹³Note that (29) has an additional interpretation, which we ignore here due to lack of space, and which can be paraphrased as ‘the number n such that it must be the case that n people come and it is not necessary that more than n people come for the dinner to be pleasant is smaller than 5’.

¹⁴Following Fox’s original proposal, and for entirely similar reasons (cf. Fox 2000: 70), we assume that the GSEC operates in a ‘modular way’, to the effect that it does not ‘see’ all the details of the syntactic structure: the notion of entailment relevant to the GSEC would thus not be fully equivalent to the standard notion, as it is computed on the basis of impoverished representations.

¹⁵Some speakers do not seem to get a strong contrast. For a reason unknown to us, the analogous contrasts in French are much stronger than in English. We ignore a potential complication alluded to

- (30) a. Fewer than five people must come for the dinner to be pleasant
 #(fewer than 5 > □) (□ > fewer than 5)
 b. #Fewer than five people have to come for the dinner to be pleasant
 #(fewer than 5 > □) *(□ > fewer than 5)

It must be noted that *have to* does not disallow reconstruction in general. As (31) shows, UE-indefinites can reconstruct below *have to*.

- (31) More than five people have to come for the dinner to be pleasant
 #(more than 5 > □) (□ > more than 5)

Have to is thus well behaved with respect to the GSEC, contrary to *must*.

Further evidence for the claim that the predicates that are not ‘well-behaved’ are the neg-raising predicates comes from the difference between the doxastic predicates *be believed to* and *be supposed to* on the one hand, and *be known to* on the other hand. Only the former are neg-raising predicates but not the latter, as shown by the paraphrases for (32a), (32b), (32c), respectively.

- (32) a. John is not believed to be home
 ‘John is believed not to be home
 b. John is not supposed to be home
 ‘John is supposed not to be home
 c. John is not known to be home
 ‘It is not known that John is home

On the assumption that all these attitude predicates are universal operators of some sorts, the GSEC predicts that a DE-indefinite subject, unlike a UE-indefinite subject, cannot reconstruct below them. Now, on the one hand, the neg-raising predicates *be believed to* and *be supposed to* license a violation of the GSEC, as illustrated in (33), where an inverse-scope interpretation is available, in contradiction with the GSEC:

- (33) a. Fewer than 1000 Americans are believed to have been been hit by the swine flu (fewer than 1000 > believe) (believe > fewer than 1000)
 b. Fewer than 1000 Americans are supposed to have been been hit by the swine flu (fewer than 1000 > suppose) (suppose > fewer than 1000)

On the other hand, the predicate *be known to* does not license the inverse-scope interpretation, as shown in (34).

- (34) Fewer than 1000 Americans are known to have been been hit by the swine flu
 (fewer than 1000 > know) *(know > fewer than 1000)

in footnote 13: (30b), just like (30a), has another reading, saying that the minimal required number of guests (for the party to be a success) is smaller than 5. This reading is not pragmatically deviant.

Again, note that *be known to* does not block inverse-scope in general – that is, reconstruction of UE-quantifiers is allowed under the same configuration, as (35) shows.

- (35) More than 1000 Americans are known to have been hit by the swine flu
(fewer than 1000 > know) (know > fewer than 1000)

So the contrast between *be supposed to* and *be believed to*, on the one hand, and *be known to* provides support for the view that all the exceptions to the GSEC do indeed involve neg-raising predicates. Further investigation is needed in order to show that this is a correct generalization. But if it proves correct, it suggests a research strategy where these apparent exceptions are to be explained in terms of the specific properties of neg-raising predicates, rather than by giving up the GSEC.

5 Is the GSEC a local or a global constraint?

Our current formulation of the GSEC makes a clearly incorrect prediction: it predicts that for some sentences *S* which license an inverse-scope reading, embedding *S* in a downward-entailing context will eliminate the relevant inverse-scope reading. This prediction is made because downward-entailing contexts are, by definition, contexts that reverse entailment patterns. Consider for concreteness the following sentence:

- (36) Whenever a girl dances with every boy, everybody is happy.
 a. Surface-scope: Whenever there is a girl who dances with every boy, everybody is happy.
 b. Inverse-scope: Whenever for every boy, there is a girl that dances with him, everybody is happy.

Contrary to what happens when *A girl dances with every boy* is not embedded, the inverse-scope reading for (36) happens to entail the surface-scope reading, and thus should be ruled out by the GSEC. But we observe that the inverse-scope reading is in fact clearly available. A natural way of solving this problem is to conceive of the GSEC as a *local* constraint, rather than a *global* constraint, in the following sense: what would count for the GSEC is not (necessarily) the global reading of the full sentence, but rather the semantic value of a specific syntactic constituent, minimally the one that contains both the pre-movement position and the landing site of the moved operator. If so, the inverse-scope reading remains licensed in (36), because the GSEC is met for the constituent [*a girl dances with every boy*].¹⁶

Before determining how exactly this ‘local’ version of the GSEC should be formulated, let us note a second prediction that is made when GSEC is viewed as a global constraint. It is predicted that new scope possibilities arise when a sentence is embedded in a DE-context. For suppose that the GSEC does not license the inverse-scope

¹⁶The fact that the inverse-scope reading is clearly perceived provides additional evidence against an account based only on Truth Dominance.

reading for a certain sentence S . This means that the inverse-scope reading entails the surface-scope reading. But then when S is embedded in a DE-context, entailment relations are reversed, and therefore the inverse-scope reading will generally not entail anymore the surface-scope reading, and should thus be licensed. Consider (37a) in this light. As shown in subsection 2.1, the GSEC blocks the inverse-scope reading (equivalent to ‘No guest showed up’). But when (37a) is embedded in a DE-environment as in (37b), the inverse-scope interpretation becomes available (Spector 2004), i.e. (37) can be interpreted as ‘If no guest had shown up, the party would have been a disaster.’

- (37) a. A guest didn’t show up ($\exists > \neg$) ??($\neg > \exists$)
 b. If a guest had not shown up, the party would have been a disaster
 ($\exists > \neg$) ($\neg > \exists$)

Now, as we have just discussed, this fact is predicted by the GSEC *viewed as a global constraint*. This might indicate that the GSEC, contrary to what was suggested in the previous paragraph, should not be formulated as a purely local constraint. It is in fact possible to characterize the GSEC as a constraint that can be met *either locally or globally*. Our final version of the GSEC is thus the following:

- (38) A CSSO is licensed in a sentence S only if there exists a constituent C of S (possibly S itself) such that the CSSO does not make the semantic value of C stronger than or equivalent to what it would be without the CSSO.

6 Conclusion

In this paper, we provided several arguments for the following generalization of Fox’s economy condition on covert scope shifting operations: a CSSO is ruled out not only if it is vacuous, but also if it leads to a reading that is strictly stronger than the surface-scope reading. We suggested various strategies in order to deal with some apparent counterexamples, and we argued that our generalized condition has to be formulated as a constraint that can be met either locally or globally. Further investigation is needed in order to explore the theoretical and empirical ramifications of our proposal.

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