Subjective Containment*

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Abstract

This article suggests that subjective categories, including certain epistemic modals, evaluative adverbs, metalinguistic comparatives and outside negation, must take scope over non-subjective ones, such as quantified NP, tense, question and focus operators. This requirement captures previously noted containment effects (von Fintel & Iatridou (2003) and subsequent work), but also gives rise to additional scope freezing effects not previously discussed. The latter type of data also provide an argument for the view that subjective categories have a truth-conditional impact, contra previous work (e.g. Halliday, 1970; Palmer, 1986). We argue that the full range of effects necessitates an analysis in which scope shift is encoded through percolation of scope indices constrained by a minimality condition (as in Neeleman & Van de Koot (2012)).
Keywords: quantification, subjectivity, epistemic modality, focus, scope freezing

1 Introduction

Among the many restrictions on the scope of quantified NPs (QPs) discovered in recent years, von Fintel and Iatridou (2003) have contributed the observation in (1), the Epistemic Containment Principle, which is concerned with the relative scope of QPs and epistemic modals:

(1)   *Epistemic Containment Principle* (ECP)[1]
        A quantifier [(i.e. QP)] cannot have scope over an epistemic modal.
                                        (von Fintel & Iatridou, 2003, p. 174).

The ECP accounts for sentences like (2) and (3), in which a QP is unable to scope over auxiliary verbs of epistemic possibility and necessity, respectively.[2,3] In each example, the continuation forces a wide scope reading of the QP, which – as the ECP leads us to expect – results in a contradiction.

(2)   #Every student may have left, but not every one of them has.
        (*every > may*)

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[1] The ECP or an approximation of it is also observed in other works, including Leech (1971), McDowell (1987), Picallo (1990), Brennan (1997), Drubig (2001) and Butler (2003).

[2] We avoid the combination of quantificational items with the same quantificational force in order to facilitate the diagnosis of scope (un)ambiguities. For instance, we do not combine *every* with modals of epistemic necessity, such as *must*.

[3] Sentences with QPs and other types of modals (e.g. deontic *must*) or temporal elements (e.g. *will*) behave as expected, that is, they present scope ambiguities. See von Fintel and Iatridou (2003) for discussion.

(3)   #Fewer than half the students must have passed, but perhaps all of them did.
       (*fewer than half > must)

The ECP effect is by no means restricted to the combination of a QP and an epistemic modal auxiliary. As shown in (4), the epistemic adverb *probably* also limits the scope of the QP *every student*. Example (5) shows that the effect is also manifested with an epistemic raising predicate like *certain*, whereas (6), a Dutch version of (4), illustrates that the phenomenon is not restricted to English.

(4)   #Every student has probably left, but not everyone has.

(5)   *Context*: *John is hiring employees and has just interviewed 20 applicants.*
       #John is certain to have hired fewer than half the applicants, but perhaps he hired all of
          them.

(6)   #Iedere   student is waarschijnlijk vertrokken, maar niet iedereen is
       Everyone student is probably   left   but   not   everyone is
       vertrokken.
       left
       'Every student has probably left, but not everyone has left.'

Since the ECP was proposed by von Fintel and Iatridou (2003), several authors have argued that exceptions to it relate to whether epistemic modals are interpreted subjectively or objectively (Tancredi, 2007; Huitink, 2008; Anand & Hacquard, 2009). The subjective interpretation of epistemics corresponds to the invocation of less widely accepted evidence in the evaluation of the proposition in the scope of the epistemic. In particular, on the subjective use of an epistemic this proposition is evaluated with respect to the speaker's personal belief state, and hence her full commitment to this evaluation is highlighted. By contrast, the objective interpretation of an epistemic category relies on evidence that is widely accepted by the relevant community (Lyons, 1977).[4] "What differentiates a subjective modal statement from others is that it is one that cares only about the speaker's subjective belief state. All other modals involve something additional. An objective, metaphysical, modal statement for example is based on speaker-external facts" (Tancredi, 2007, p. 2); that is, the relevant knowledge and beliefs of the discourse participants are taken into consideration when evaluating such a statement.

    A statement whose evaluation is dependent on other speakers' mental models, in particular their knowledge and beliefs, which in turn depend on the state of the world, could in principle be false. On the other hand, a subjective statement, whose interpretation solely depends on the rational speaker's mental model, must always be true. This could imply that subjective categories make no truth-conditional contribution, as has previously been suggested for (subjective) epistemic modality (e.g. Halliday, 1970; Palmer, 1986; Drubig, 2001), whereas objective categories do. Since epistemic modals can be either subjective or objective, this position is at odds with standard semantic treatments of modality (see, for

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[4] Lyons (1977) discusses the following example to illustrate the different interpretations of *may*:

(i) It may rain tomorrow.

On the subjective (layman's) reading of the modal in (i), the speaker reasons on the basis of private concerns, whereas on its objective reading (for example when (i) is uttered by a meteorologist), the evaluation is understood to be based on reliable, complete and accessible scientific evidence.

instance, Kratzer (1991)). Here, we contribute to this discussion by demonstrating (in section 0) that subjective categories, including subjective epistemic modals, do have truth-conditional effects as they scopally interact in non-trivial ways with other intra-clausal scopal elements (see Papafragou (2006) for additional arguments).

The above observations impact on the evaluation of the ECP. In out of the blue contexts (see (7a)), epistemics tend to default to the subjective interpretation and exhibit ECP effects. Indeed, (7a), when rendered with neutral stress, only allows an interpretation where the modal out-scopes the universal QP (i.e. *It is possible that every party guest is the murderer*) and this results in infelicity (unless there was a collective murder). However, as shown in (7b), it is possible to provide a context that strongly favours the objective interpretation, and this in turn gives rise to obviation of the ECP effect.

(7)   a.   *Every party guest might be the murderer. (*_every>might_)
       b.   Given the currently available evidence/Objectively speaking, every party guest might be the murderer. (✓_every>might_)

The literature identifies three further exceptions to the ECP, illustrated in (8) - (10).

(8)   Each girl might be in love with John, but some of them aren't.   (Hacquard, 2006)

(9)   EVERY party guest might be the murderer.   (Anand & Hacquard, 2009)

(10)   *Context: Same as* (5).
       Fewer than half the applicants are certain to have been hired, but perhaps all of them were (hired).

                                                            (Constantinou & Van de Koot, 2015)

In (8) a strongly distributive universal QP is able to out-scope the (subjective) epistemic modal. Similarly, in (9) a prosodically prominent universal QP can out-scope the same modal. (10) shows that a QP like *fewer than half the applicants* can out-scope the epistemic raising predicate *certain* when it raises across it (cf. (5)).

In what follows we argue that the ECP-related facts reviewed above are in fact unrelated to the epistemic nature of the categories involved and should be attributed exclusively to their subjective interpretation. In other words, we propose to replace the ECP with the more general Subjective Containment Principle:

(11)   *Subjective Containment Principle (SCP)*
       A category carrying a subjective interpretation must take scope over other operators in the proposition with which the subjective attitude is connected.

The main evidence supporting the SCP comes from the existence of containment effects in sentences involving speaker-oriented *non*-epistemic operators, such as evaluative adverbs (Ernst, 2009), metalinguistic comparatives (Giannakidou & Yoon, 2011) and outside negation (Ladd, 1981). These facts are presented in section 0. In section 0 we show how these data can be captured once the SCP is combined with the theory of scope put forward in Neeleman and Van de Koot (2012). In fact, this theory predicts that subjective categories should trigger scope freezing effects that go well beyond the containment effects that motivated the SCP, and we show that these further predictions are borne out as well. In section 0 we turn to information-structural factors that affect the distribution of subjective categories. We first discuss structures in which an A'-moved operator blocks obligatory

scope extension of a category in its c-command domain. We show that, as predicted by the SCP, subjective categories cannot occur in the relevant environment. We then turn to the exceptional data in (8) and (9) and argue that their status is due to a conspiracy of independent, information-structural factors and should not be taken as presenting an exception to the ECP, or our SCP. Section 0 lists our main conclusions.

2 Subjective containment
2.1 Speaker-oriented adverbs

The subjective-objective distinction has also been invoked to explain various apparently non-containment-related facts about the distribution of epistemic modals; Papafragou (2006) and Ernst (2009) show that the occasional acceptability of an epistemic modal in the antecedent of a conditional and in questions correlates with the way that modal is interpreted. An epistemic adverb like *probably* can be interpreted objectively, and can thus occur in such environments (see (12a-b)), whereas an epistemic auxiliary verb like *must* lexically resists such an interpretation; that is, *must* is strongly subjective, hence the ungrammaticality of (13a-b).

(12)   a.   Where have they probably put the loot?   (=Ernst's (56b))
        b.   If he will probably get drunk, I am not coming to the party.
                                                                (=adapted from Papafragou's (33))

(13)   a.   *Where must they have put the loot?
        b.   *If he must get drunk, I am not coming to the party.

In (12a) the speaker-oriented adverb (henceforth SpOA) *probably* turns into an addressee-oriented one where the speaker is asking about the likelihood of the loot being in some location, given the evidence accessible to the addressee (i.e. *Where is it probable that they put the loot?*).[5] *Probably* receives a similar interpretation in (12b) (i.e. *If it is probable that he will get drunk, I am not coming to the party*); the sentence is felicitous in a context in which the high likelihood of him getting drunk is based on some common knowledge (e.g. it is well-known among the interlocutors that he usually gets drunk at parties). As noted by Ernst (2009), subjective epistemics express the full commitment of the speaker in regards to the evaluation of the proposition *p* the epistemic scopes over. Put differently, SUB(jective) epistemic (p) (=Q) is true in all worlds in the speaker's belief set; OBJ(jective) epistemic (p) (=Q) on the other hand could in principle be at odds with the speaker's belief set (despite the available evidence). Assuming that questions and conditionals allow Q to be true in some worlds and false in others (Karttunnen, 1977; Groenendijk & Stokhof, 1984), the facts in (12) and (13) directly follow. Subjective epistemics can occur in assertions because these are semantic entities that can be true in all worlds in the speaker's belief set.

      In line with much other work (e.g. Papafragou, 2006; Anand & Hacquard 2009; Ernst, 2009), we assume that subjective categories quantify over possible worlds and adopt Ernst's (2009) semantics for such categories, where subjective categories are taken to characterize a relation between a proposition P and the speaker's belief set $M_B(s)$ (see also Papafragou

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[5] As noted by Kratzer (1991) and Hoye (1997), epistemic modal adverbs (e.g. *probably*) and auxiliary verbs (e.g. *must*) tend to be subjective, whereas the corresponding adjectives (e.g. *probable*) and nouns (e.g. *probability*) are objective (with *certain* being the only exception we are aware of). We thus frequently use paraphrases with the adjectival/nominal versions of the adverb in question to highlight an objective interpretation.

(2006)). The semantics are specific to adverbs, but, as Ernst (2009) points out, they are potentially applicable to other categories (by replacing 'Adv' with 'Aux', for instance).

(14) *Subjectivity (for Speaker-Orientation)*
      Where a speaker asserts Q = ADV (p) (thus Q is in M$_B$(s)),
      a) ADV is subjective iff all worlds by which Q is evaluated are consistent with respect to M$_B$(s) at the time of utterance;
      b) otherwise ADV is objective   (Ernst, 2009, p. 516)

(15) Consistency: a set of worlds (q-worlds) is consistent with a belief state M if the proposition q is true both in q-worlds and in all the worlds in M.
                                                                               (Ernst, 2009, p. 516)

In effect, the above semantics suggests that subjective categories must be true for the speaker's entire belief set – the speaker brooks no possibility of the proposition SUBJ(p) being false.

Whilst some epistemic modals (e.g. *probably*) can be either subjective or objective, Ernst (2009) identifies a class of SpOAs that are consistently interpreted subjectively, as well as a class of SpOAs that are consistently interpreted objectively. Strong evaluative adverbs such as *bizarrely*, *unbelievably* and *(un)fortunately* have a strong emotive flavor in that they express the speaker's "extreme judgment of good or bad, or of surprise, astonishment, disbelief, or the like. […] Emotions are of course highly subjective, and a strong emotional attachment to a given proposition does not depend on objective information" (p. 514). On the opposite end of the subjective-objective scale, evidentials like *apparently*, *clearly, evidently* and *obviously* "are objective, since their use depends on evidence that is either physically perceptible, or a matter of very easy, transparent inference from publicly available evidence. […] modals are in the middle: They do not have a strong emotive flavor, nor is their use based on overt evidence to the same extent as evidentials. Thus [most] epistemic modal[s] […] can be used either subjectively or objectively, as has frequently been noted (Lyons, 1977; Nuyts, 2001a; Papafragou, 2000, 2006; Kratzer, 2002)." (p. 514).

The subjective character of strong evaluatives is confirmed by the fact that they are never acceptable in the antecedent of a conditional or in questions; evidentials, on the other hand, are usually acceptable in these environments, a strong indication of their objective interpretation (compare (16) and (17)).

(16) a. *Has she unfortunately found a scorpion in her boot?   (=Ernst's (67))
      b. *If she has unfortunately found a scorpion in her boot, she'll be sorry.
                                                                               (=Ernst's (69))

(17) a. Are they {obviously/clearly} going to be eligible for the competition?
                                                                               (=Ernst's (52b))
      b. If Allison has {obviously/clearly} completed her analysis, there's no need for you to wait around.
                                                                               (=Ernst's (52c))

The generalized containment principle in (11) predicts that QPs will exhibit containment effects in the presence of (non-epistemic) strong evaluative SpOAs, because they are subjective, but not with evidential SpOAs, because they are objective. Indeed, (18) shows that strong evaluative adverbs like *unfortunately* and *sadly* forcibly take wide scope over a clausemate QP, whereas the same QP is able to outscope evidentials like *apparently,*

obviously and *clearly* in (19). The contexts in (18) and (19) force wide scope of the QP *fewer than half of the students* in the associated example. This is because in both cases, the context requires the predicate containing the speaker-oriented adverb to be read as distributing over a subset of the students. Thus, the subject cannot be included in the scope of the adverb. The contextual inappropriateness of (18) therefore indicates that the relevant reading ('Fewer than half of the students are such that they have unfortunately/sadly passed the exam') is inaccessible. By contrast, (19) does permit an analogous reading ('Fewer than half of the students are such that they have apparently/obviously/clearly passed the exam').

(18)   *Context: I had 30 students in my final year syntax class. To obtain their degree, they had to pass my exam. For 10 of these students, I considered it better if they failed as they were just not ready for the big world. After the exam had taken place, I quickly marked all the scripts and discovered that everybody had passed. So as far as I'm concerned…*
       #Fewer than half of the students have {unfortunately/sadly} passed the exam.

(19)   *Context: I had 30 students in my final year syntax class. After the final exam had taken place, I asked my TAs to quickly mark the scripts. They have now marked all of the scripts, but I ask specifically how the first 10 students on the class list did, as I was quite worried that they wouldn't pass due to their poor performance on another test. They are saying that those 10 students have done really well. So ...*
       Fewer than half of the students have {obviously/apparently/clearly} passed the exam.

A containment effect can also be observed with other combinations of QPs and strong evaluative adverbs, even in cases where the narrow scope reading of the QP is also compatible with the context (but pragmatically less appropriate); (20) cannot be assigned the reading in (ii). This reading would be facilitated by placing contrastive stress on *unbelievably/surprisingly* (since for the remaining students it was believable/unsurprising that they passed). The same QP can nevertheless be interpreted in this way (i.e. outscope the evidentials) in (21), rendering the sentence grammatical in the given context.

(20)   *Context: I had 30 students in my final year syntax class. To obtain their degree, they had to pass my exam. For 20 of them, I was pretty certain they would fail it, as they are weak students. After the exam had taken place, I quickly marked all the scripts and discovered that everybody had passed. So as far as I'm concerned…*
       Most students have {unbelievably/surprisingly} passed the exam.
       (i) ✓It is unbelievable/surprising that most students have passed the exam.
       (ii) *Most students are such that it is unbelievable/surprising that they passed the exam.

(21)   *Context: I had 30 students in my final year syntax class. After the final exam had taken place, I asked my TAs to quickly mark the scripts. They marked all of the scripts, but I ask specifically how the first 20 students on the class list did, as I was quite worried that they wouldn't pass due to their poor performance on another test. They are saying that those 20 students have done really well. So ...*
       Most of the students have {obviously/apparently/clearly} passed the exam.
       (i) ✓It is obvious/apparent/clear that most students have passed the exam.
       (ii) ✓Most students are such that it is obvious/apparent/clear that they passed the exam.

2.2 Metalinguistic Comparatives[6]

This section provides further evidence for the SCP by demonstrating that a containment effect also arises when combining QPs with so-called metalinguistic comparatives (MCs).

MCs are a type of clausal comparative construction introducing the speaker's point of view towards a sentence, in particular her preference of one sentence in a given context over another. They are thus similar to other metalinguistic constructions (e.g. metalinguistic negation) in expressing the speaker's subjective evaluation of the appropriateness of a sentence. This aspect of interpretation is what distinguishes them from regular clausal comparatives, which are restricted to mere comparison of predicates/clauses to express an opinion. In their discussion of MCs, Giannakidou and Yoon (2011) show that languages such as Modern Greek and Korean employ distinct linguistic devices in the formation of the two types of clausal comparatives; MCs in Modern Greek, for instance, are realized with the preposition *para* 'than', which is lexically distinct from the 'regular' clausal comparative *apoti* (Giannakidou & Yoon, 2011). Consider (22) and (23), which differ in terms of the possibility of using *para* vs *apoti*.

(22) Ta   provlimata su   einai perissotero oikonomika para/apoti nomika.
      The   problems   yours are   more   financial than   legal.
      'Your problems are financial rather than legal.'   (McCawley, 1968)

(23) Kalitera na   pethano para/#apoti na   ton   pantrefto.
      Better   to   die   than   to   him   marry.
      'I would prefer to die than marry him.'   (Giannakidou & Yoon, 2011)

As pointed out by Giannakidou and Yoon (2011), the difference between (22) and (23) lies in whether they express an assessment of accuracy or appropriateness. Whereas (22) is understood to be expressing the speaker's view in relation to the nature of her addressee's problems, (23) is "not really about what the speaker believes or deems appropriate, but rather, [it] seems to express the speaker's dispreference towards the *para* proposition and its content, i.e. the course of action that this proposition implies" (Giannakidou & Yoon, 2011, p. 623). In this case, "the dispreference is so extreme that something obviously dispreferred in objective terms ('to die') is presented as more preferred than the action of the *para* sentence ('to marry him'), which, in objective terms, should be more preferred" (Giannakidou & Yoon, 2011, p. 623). On the basis of examples like (22) and (23) these authors conclude that as the clausal comparative becomes more preferential of an action, the choice between *apoti* and *para* becomes more constrained, and only *para* is used felicitously. Their conclusion is important for our purposes in two respects; first, a clausal comparative with *para* expresses the speaker's subjective attitude, in particular a personal *preference*, towards one sentence over another; crucially, the speaker's assessment is not epistemic in nature (Giannakidou & Yoon, 2011). Second, *apoti* comparatives can only be used felicitously when the speaker's assessment is more objective, that is, they (are intended to) express mere statements of regular comparative assessment on the basis of some concrete evidence. For instance, a speaker can go on and explain why they hold the view expressed by (22), but they cannot do so when uttering (23), because, in objective terms, they do not hold the view it expresses to begin with.

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[6] For a detailed description of the meaning and syntax of MCs, see Giannakidou and Yoon (2011) and references therein.

With this background in mind, the SCP predicts a containment effect with *para* MCs, because they are consistently subjective (Giannakidou & Yoon, 2011), but not with *apoti* comparatives, because they are objective.

The example in (24) shows that indeed in the context of a *para* MC a QP is unable to take wide scope. As before, the context in (24) is only compatible with wide scope of the QP; this is because on the intended reading the comparative predicate distributes over the individuals picked out by "fewer than half of the students". In other words, the context is compatible with a statement along the lines: fewer than half the students are such that the degree to which the speaker likes the sentence "he/she is a little child" as a description of him/her is greater than the degree to which she likes "he/she is an adult". The same context is incompatible with a reading according to which the degree to which the speaker likes the sentence "fewer than half the students are little children" is greater than the degree to which she likes "fewer than half the students are adults".[7] We follow Giannakidou and Yoon (2011) in assuming that *para* MCs involve the subjective category more$_{ML}$, corresponding to *perissotero* in (24), and assume that this is the item blocking the QP from taking wide scope, in accordance with the SCP.

(24)   *Context: I had 30 students in my final year syntax class. To obtain their degree, they had to pass my exam. For 10 of these students, I considered it better if they failed as they were just not ready for the big world. After the exam had taken place, I quickly marked all the scripts and discovered that everybody had passed. In order to explain to my TAs why this is not necessarily good news for the 10 who are not prepared for post-university life, I say…*

   #Ligoteroi   apo   tous   misous   fitites   einai   perissotero   mikra   paidia
   Fewer   than the   half   students   are   more$_{ML}$ little   children
   para/(*apoti)   enilikes.
   than   adults
   'Fewer than half the students are little children rather than adults.'

The example in (25) demonstrates that an *apoti* comparative does not prevent the QP from taking wide scope. Again, given the explicit reference to a subset of students in the context, which is the same as in (24), the statement in (25) can only take a QP wide scope interpretation, along the lines: fewer than half the students are such that the degree to which they are unemployed citizens is greater than the degree to which they are students. The same context is incompatible with an interpretation of the sort: the degree to which fewer than half the students are unemployed citizens is greater than the degree to which they are students.

(25)   *Context: Same as in (24).*
   Ligoteroi   apo   tous   misous   fitites   twra   einai   perissotero   anergoi
   Fewer   than   the   half   students   now   are   more   unemployed
   polites   apoti   fitites.
   citizens   than   students
   'Fewer than half the students are now unemployed citizens rather than students.'

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[7] The interpretations provided for the comparatives in (24) and (25) are based on Giannakidou & Yoon's (2011) semantics of the relevant constructions.

2.3 Outside Negation Polar Questions

This section demonstrates that containnment effects also arise when combining QPs and so-called 'outside' negation (ON) in the context of polar questions (PQs). Semantically, ONPQs express that the speaker seeks confirmation for a proposition held to be true on the basis of *private* concerns. In line with this, they are incompatible with explicit evidence supporting the truth of the relevant proposition (Büring & Gunlogson, 2000; see also Sudo, 2013). Another important property of ONPQs, which grammatically distinguishes them from PQs with regular truth-conditional negation ('inside' negation or IN), is that they license PPIs like *too*, but not NPIs like *either* (Ladd, 1981). (26a) shows the incompatibility of ONPQs with explicit evidence supporting the positive answer:

(26)   *Context: For a psychological experiment, we are looking for some left-handed subjects. We have asked some of our friends, but only Mary was left-handed so far. To my surprise, John is using a pencil with his left hand.*
          a.   #Isn't John left-handed(, too)?
          b.   Isn't John right-handed(, too)?   (Sudo, 2013)

ONPQs further differ from INPQs in that the latter do not necessarily express any bias (even though they may do so, towards the negative answer; see Sudo (2013)), nor require fronting of negation along with the (auxiliary) verb.

(27)   a.   Is John not right-handed, either?   (meaning: Is it the case that John is not right handed, either?
          b.   Isn't John right-handed, either?   (meaning: Is it the case that John is not right handed, either?

Another property of ONPQs, already noted by Ladd (1981), is that they are answered in exactly the same way as positive PQs (see Holmberg (2015) for extensive discussion of strategies for answering INPQs):

(28)   a.   Does Mary like spinach?
                Yes (she does).
                No (she doesn't).
          b.   Doesn't Mary like spinach(, too)?
                Yes (she does).
                No (she doesn't).

In line with these observations, Ladd (1981) suggests that, in a very concrete sense, ON is not contained in the question (hence the name 'outside'). Holmberg (2015) makes this intuition more precise by assuming that ON must out-scope the question operator; on this view, the properties that distinguish ON from IN, including its non-truth-conditional meaning contribution and inability to license NPIs, are derived from the fact that negation is interpreted extremely high in the clause, negating, in this way, quite literally, the question operator. This results in the question not being interpreted as a question, but instead as some sort of assertion regarding the proposition p the question operator scopes over, hence the bias towards the truth of p.

        We agree with Holmberg that the simplest analysis would assume that ON is just another instance of a property-reversing operator that is nevertheless interpreted

idiosyncratically due to it scoping very high.[8] This would explain the grammatical behavior of ONPQs, including the data we discuss shortly. However, in our opinion the assumption that ON negates the question operator faces an important issue; although ONPQs are understood to express a bias towards the truth of *p*, they are still questions, again in a literal sense. One way of overcoming this objection would be to assume that ON does not really negate the interrogative force of the clause, but instead, the *content* of the Q-operator (see Giannakidou and Yoon (2011) for how subjective evaluations may target either the *form* or the *content* of a sentence). In particular, one could assume that ON targets the likelihood of the alternatives made available by the Q-operator. Assuming that the Q-operator expresses that p and ¬p are equally likely in root PQs, *not* has the effect that the alternatives are not equally likely. Note that this kind of modification is not truth-conditional, but still influences the way the question is to be interpreted because one of the alternatives is taken to be more likely to be true than the other. If the alternative that is taken to be more likely to be true is p, then we get a good approximation of the positive bias expressed by ONPQs.[9]

If ON is indeed a subjective category, its wide scope over very high operators like the Q-operator is forced by the SCP (on the null assumption that Q is a non-subjective operator). This naturally leads to the conclusion that the inability of other subjective categories to occur in questions (see section 0) need not be due to the fact that they occur in the scope of the Q-operator, as suggested by Ernst (2009), but may instead result from semantic incoherence associated with scope extension past the Q-operator.

We now demonstrate that ON exhibits similar scopal behavior to other subjective categories. The context in (29) forces a wide scope reading of the QP and, as shown by the deviance of (29a) in this context, the QP cannot be interpreted outside the scope of ON. Note that the example becomes fully interpretable if ON is moved to a following tag question, as in (29b).

(29)   *Context: I had 30 students in my final year syntax class. They all passed the coursework, but to obtain their degree, they had to pass my exam. I was so impressed with 10 of my students that I was certain they would pass the exam no matter what. But on past experience, I was confident that in fact the vast majority of them would. Now my TAs have marked all the scripts and I ask ...*
    a.   #Haven't fewer than half of the students managed to pass the exam, too?
    b.   Fewer than half of the students managed to pass the exam, haven't they?

Since IN is not subjective, we expect a QP to be able to out-scope it. This prediction is borne out, as shown in (30), which is felicitous in a context forcing wide scope of the QP.

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[8] It should be noted that there are other analyses on the market that assume that ONPQs involve an epistemic operator; either negation itself is such an operator (e.g. Van de Koot et al., 2015) or some other covert element (Romero & Han. 2004). One major problem we see with regard to the former type of approaches is that cross-linguistically, ON looks like regular negation, morphologically, and, to our knowledge, never like an epistemic modal. With regard to Romero and Han (2004), they assume that ONPQs involve a covert epistemic modal that is responsible for the epistemic bias these constructions express. However, as pointed out to us by Floris Roelofsen (p.c.), one major issue for this account is that it is not expected to be possible for ONPQs to be answered in the same way as neutral PQs, contrary to fact (see (28)). Since the focus of the present paper is different, we do not wish to dwell on the pros and cons of each account separately. If it turns out that ONPQs involve an epistemic operator, then the observations in this section should be taken as evidence that this epistemic operator is a subjective one, behaving in accordance with the SCP.

[9] A full analysis of ONPQs must have a way of linking this qualification of interrogative force to the perspective of the attitude holder for ON, but space does not permit us to dwell on this issue here.

(30)	*Context: I had 30 students in my final year syntax class. 10 of them failed the coursework but could still pass the module if they passed my exam. I was so disappointed with the performance of those 10 students at the coursework that I suspected they would not pass the exam either. Now my TAs have marked all the scripts and I ask ...*
Haven't fewer than half of the students passed the exam, either?

(30) is important in another respect, as it demonstrates that movement of negation to C does not necessarily result in wide scope over the QP.

That containment effects are in any case not dependent on movement of negation is easily demonstrated in Dutch, where negation is located below a subject QP irrespective of whether it is a manifestation of ON or IN (compare (31) and (32)). Crucially, Dutch ON gives rise to containment effects even so, as shown in (31a).

(31)	*Context: Same as in* (29).
a.	*Zijn	minder	dan	de	helft	van	de	studenten	niet	ook	voor	het
	*are	fewer	than	the	half	of	the	students	not	also	for	the*
	examen	geslaagd?	Of	niet?
	*exam	passed	or	not*
	'Haven't fewer than half of the students managed to pass the exam, too?'
b.	Minder	dan	de	helft	van	de	studenten	zijn	ook	voor	het
	*fewer	than	the	half	of	the	students	are	also	for	the*
	examen	geslaagd.	Of	niet?
	*exam	passed	or	not*
	'Fewer than half of the students have managed to pass the exam, too. Haven't they?'

(32)	*Context: Same as in* (30).
	Zijn	minder dan	de	helft	van	de	studenten	ook	niet	voor	het
	*are	fewer than	the	half	of	the	students	also	not	for	the*
	examen	geslaagd?
	*exam	passed*
	'Haven't fewer than half of the students passed the exam, either?'

2.4 Subjective categories and tense

In the preceding sections we have reviewed evidence that subjective categories consistently outscope QPs in the proposition with which they are associated. However, unlike von Fintel and Iatridou's (2003) ECP, the SCP is stated in more general terms; putting aside the precise property giving rise to widest scope (i.e. subjectivity vs epistemicity), the SCP states that a subjective category must out-scope *any* operator (as opposed to just QPs) in the relevant proposition. In the last section, we saw that the assumption that ON scopes over the question operator may account for the fact that a PPI, such as *too*, may be licensed in the relevant proposition, but not an NPI, such as *either*, thereby providing some support for the generality of the SCP. In this section we build on observations of Papafragou (2006) that subjective epistemic modals, but not objective ones, consistently out-scope tense and show that this pattern extends to subjective categories more generally.

Papafragou (2006, p. 1695) suggests that "the main difference between subjective and objective epistemic modality is that the former, but not the latter, is indexical, in the sense that the possible worlds in the conversational background are restricted to what the current

speaker knows as of the time of utterance. By contrast, in the case of objective epistemic modality, possible worlds in the conversational background include what is generally known to some community, or, in other words, what the publicly available evidence is". Subjective epistemic modality is thus tied to the here-and-now of the conversation, whereas objective epistemic modality may be used for discussing past and future possibilities. Put differently, subjective epistemic modality consistently out-scopes the tense operator (34), whereas objective epistemic modality does not have to (33).

(33)   Yesterday it was possible that the stock market would go up today.

(Papafragou, 2006, p. 1695)

(34)   John was perhaps arrested by the police yesterday. (#But, at the moment, I don't think he was.)

Evaluative adverbs (36), ON (38) and MC comparatives (40) pattern with the strongly subjective epistemic modal *perhaps*, whereas evidential adverbs (35), IN (37) and RC comparatives (39) pattern with *possibly*, as shown below.

(35)   Until yesterday he was apparently arrested by the police (✓but now it's no longer that apparent.)

(36)   Yesterday, he was unfortunately arrested by the police (#but, I no longer think it's that unfortunate).

(37)   Was he not arrested by the police, yesterday? (means: Is it the case that he was not arrested yesterday?)

(38)   (#Even though I don't believe at the moment that he was,) wasn't he arrested yesterday?

(39)   Persi   ta   provlimata sou   itan   perissotero oikonomika apoti
        Last year the   problems   your were more   financial   than
        nomika, alla twra pistevw to   antitheto.
        legal   but   now believe the   opposite
        'Last year, your problems were more financial than legal, but now I believe the opposite.'

(40)   Persi   ta   provlimata sou   itan   perissotero oikonomika para
        Last year the   problems   your were more   financial   than
        nomika, (#alla twra pistevw to   antitheto.)
        legal   but   now believe the   opposite
        'Last year, your problems were rather financial than legal, but now I believe the opposite.'

We conclude that the generality of the SCP is warranted by the fact that subjective categories consistently out-scope not only QPs, but also very high propositional operators, such as tense. Contrary to the ECP, which is peculiarly specific to epistemic modals out-scoping QPs, the SCP restricts the scope of any subjective category with respect to any non-subjective operator.

3 Accounting for Subjective Containment
3.1 The Condition on Scope Shift

Constantinou and Van de Koot (2015) provide an account of the containment and scope freezing effects induced by subjective epistemics based on the theory of scope shift developed in Neeleman and Van de Koot (2012). We first provide a brief outline of the latter work and then propose a variant of it that captures the containment effects with subjective categories observed in previous sections.

Williams (1994) assumes that an argument QP carries a scope index that may percolate to a dominating node to mark the QP's extended scope. Thus, the scope of QP_1 in (41) below corresponds to the largest category that carries its scope index (γ), minus the QP itself. Note that a scope index inherited by a node α is placed after a colon. This distinguishes it from an index introduced by α, which appears in front of any colon; we omit the colon when there is no inherited index.

(41)
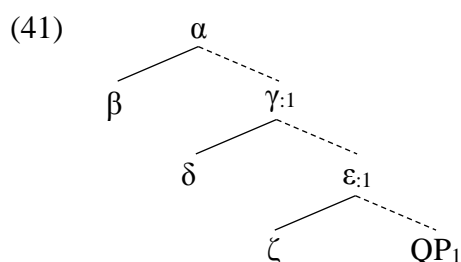
In some languages, such as German and Japanese, a QP argument may also mark its scope through overt A'-movement, in which case scope is marked in the landing site. Scope-marking through movement is discussed in more detail in section 0, where it becomes directly relevant. Finally, an argument QP may also fail to percolate a scope index altogether, in which case it takes surface scope.

Neeleman and Van de Koot combine the index-based scope marking mechanism with the following minimality condition on inheritance of quantificational indices:

(42)   *Condition on Scope Shift (CSS)*
        No node may inherit two scope indices.

It is easy to see that this constraint is incompatible with the widely held view, originating in the work of Chomsky (1976) and May (1977), that there is a syntactic level of Logical Form (LF) that provides a transparent and complete representation of scope relations. A translation of this view into the index-based representations of Williams (1994) yields the representation in (43a) for a structure containing two QPs interpreted as taking surface scope and that in (43b) for the same structure with inverse scope. As can be easily verified, both (43a) and (43b) violate the CSS.

(43)   a.   *$[_{:1} \ldots [_{:\mathbf{1,2}} \ldots QP_1 [_{:2} \ldots QP_2 \ldots]]]$ $QP_1 > QP_2$
        b.   *$[_{:2} \ldots [_{:\mathbf{1,2}} \ldots QP_1 [_{:2} \ldots QP_2 \ldots]]]$ $QP_2 > QP_1$

There is an alternative view of scope according to which LF only represents deviations from surface scope (see Reinhart (1983, 1995, 2006); see also Lakoff (1972), Huang (1982) and Hoji (1985)). On this view, scope extension is limited to structures in which it generates an

interpretation that is otherwise unavailable.[10] Reinhart treats scope extension as QR; a translation of her proposal in terms of indices expresses the readings in (43) with the slightly simpler structures in (44), neither of which violates the CSS, as required.

(44)   a.   [… [… QP$_1$ [… QP$_2$ …]]]   QP$_1$ > QP$_2$
        b.   [$_{:2}$ … [$_{:2}$ … QP$_1$ [$_{:2}$ … QP$_2$ …]]]   QP$_2$ > QP$_1$

We summarize the main tenets of the proposal in (45). The Economy principle in (45b) is intended to block scope extension where it does not give rise to inverse scope, while (45c) is a mapping principle that, in the absence of scope extension, regulates the association of syntactic structures at LF with their semantic representations.

(45)   a.   *Scope Extension*
            If a QP percolates its index to a dominating node α, then its scope coincides with α minus the QP itself.
        b.   *Economy*
            Scope extension must give rise to an otherwise unavailable interpretation.
        c.   *Default Scope Rule*
            If a QP does not percolate its index, it takes scope over its c-command domain.

An important fact about the CSS is that it creates an asymmetry between covert scope shift, analyzed here as index percolation, and scope taking by overt movement. Covert scope shift involves index percolation. It is therefore incompatible with any other scope extensions in its percolation path, as these give rise to CSS violations. This is shown in (46a), where covert scope extension of QP$_2$ freezes the scope of QP$_1$. By contrast, overt movement of a QP cannot trigger CSS violations in the movement path, whether the moved QP marks scope in its landing site (because it has undergone overt QR; see section 0 for details) or not (because it has undergone A-movement, which does not mark scope). This is shown in (46b), where movement of QP$_2$ does not prevent covert scope extension by QP$_1$.

(46)   a.   *

       b.

Thus, overt scope marking is freer than covert scope shift, a prediction that is corroborated by a range of scope interactions (see Neeleman and Van de Koot (2012) for extensive discussion). As will be clear, this predicted difference is hard to reconcile with theories that treat overt and covert scope shift as mediated by the same operation, for example movement.[11] With this background, we now return to subjective categories.

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[10] The view that scope extension is subject to Economy and relativized to an interpretation has been argued for in Fox (1999; 2000). However, unlike Reinhart, Fox assumes that every QP must move.

[11] The key point is that our scope theory predicts the existence of an asymmetry between overt and covert scope extension. To be sure, there may well be alternative theories of scope (extension) that make the same prediction and it is a reasonable expectation that the account of the containment and scope freezing effects to be presented in what follows would be easily adaptable to such alternatives.

3.2 Interactions between the CSS and the SCP

Subjective categories are quantificational and their distribution is, therefore, partly regulated by the system of scope outlined in the previous section. In particular, whenever a subjective category finds itself in the scope of another operator in the clause with which the subjective attitude is connected, it must extend its scope through index percolation, or a violation of the SCP will result.

In sentences with a single QP, this gives rise to the containment effects already discussed,[12] as summarized in (47) (the structure in (47c) in which the subjective category fails to extend its scope violates the SCP).

(47)   a.   [… $SUBJ_1$ [… QP_2 …]]   ($SUBJ_1 > QP_2$)
        b.   [$_{:1}$ … QP_2 [$_{:1}$ … $SUBJ_1$ …]]   ($SUBJ_1 > QP_2$)
        c.   *[… QP_2 [… $SUBJ_1$ …]]   ($QP_2 > SUBJ_1$)

These facts follow in any proposal that adopts the SCP or a similar constraint and do not specifically rely on any particular theory of scope.

However, as we will now show, the combination of the CSS-based scope theory and the SCP predicts scope-freezing effects in sentences with multiple QPs that are unexpected on a QR-based approach. In all six structures below, the subjective category satisfies the SCP. In (48a,b), SUBJ outscopes the two QPs on the surface, and QP_3 may or may not extend its scope across QP_2. By contrast, in (48c-f), QP_2 outscopes SUBJ on the surface. Satisfaction of the SCP therefore requires SUBJ to percolate its scope index past this QP. This, in turn, has the consequence that QP_3 cannot outscope QP_2, because the relevant configurations constitute CSS violations.

(48)   a.   [… $SUBJ_1$ [… QP_2 [… QP_3 …]]]   ($SUBJ_1 > QP_2 > QP_3$)
        b.   [… $SUBJ_1$ [$_{:3}$ … QP_2 [$_{:3}$ … QP_3 …]]]   ($SUBJ_1 > QP_3 > QP_2$)
        c.   [$_{:1}$ … QP_2 [$_{:1}$ … $SUBJ_1$ [… QP_3 …]]]   ($SUBJ_1 > QP_2 > QP_3$)
        d.   *[$_{:1,3}$ … QP_2 [$_{:1,3}$ … $SUBJ_1$ [$_{:3}$ … QP_3 …]]] ($SUBJ_1 > QP_3 > QP_2$)
        e.   [$_{:1}$ … QP_2 [$_{:1}$ … QP_3 [$_{:1}$ … $SUBJ_1$ …]]]   ($SUBJ_1 > QP_2 > QP_3$)
        f.   *[$_{:1,3}$ … QP_2 [$_{:1,3}$ … QP_3 [$_{:1}$ … $SUBJ_1$ …]]] ($SUBJ_1 > QP_3 > QP_2$)

A QR-based theory that assumes the SCP does not make these predictions. In particular, it is unclear why QR of SUBJ to some very high position should ever interfere with QR of QP_3 across QP_2 in the movement path of SUBJ.

In section 0, we show in more detail how the CSS-based approach accounts for the containment effects discussed in the previous sections. Then, in section 0, we evaluate the predictions of the CSS-based theory regarding scope-freezing effects and show that they are corroborated by the data.

3.3 Subjective Containment as a CSS effect

Consider first the examples in (2) and (4), which involve a subjective epistemic auxiliary verb and adverb, respectively. As shown in (49), these instantiate cases in which a subjective category merges in a position from which it has to percolate its index to the top of its own clause (presumably at least up to the TP level) in order to satisfy (11).

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[12] To simplify the discussion, we disregard the conclusions of section 0, where we discuss scope interactions between subjective categories and tense. This does not affect the overall analysis.

(49)   a.   * $\alpha_{:1,2}$ = (2)

              QP$_2$ $\gamma_{:1}$
           Every student

                             M$_1$ ε
                             may

     b.   * $\alpha_{:1,2}$ = (4)

              QP$_2$ $\gamma_{:1}$
           Every student

                         AdvP$_1$ ε
                         probably
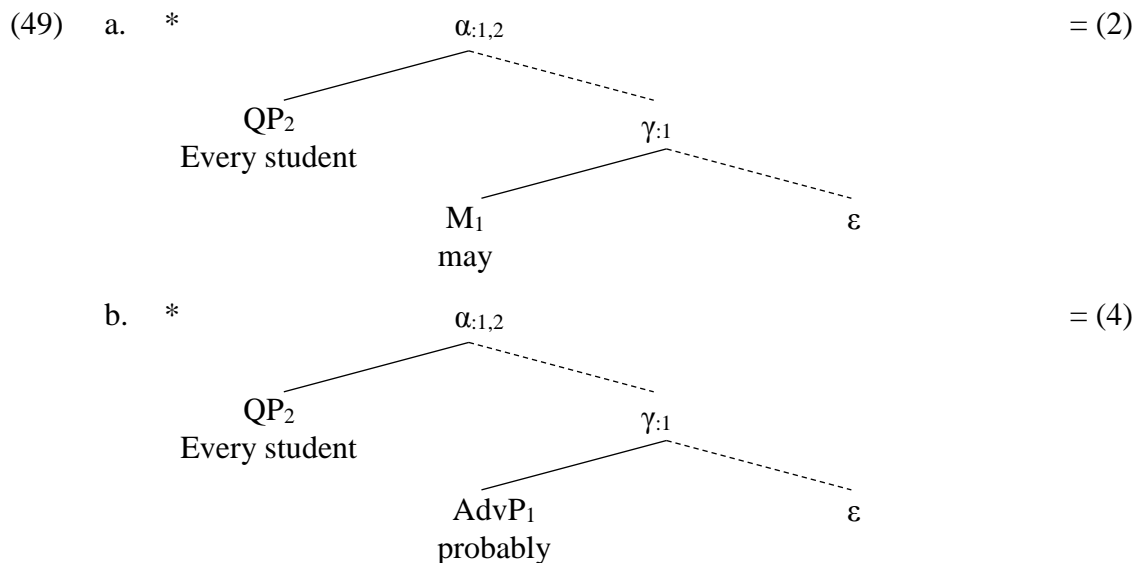
The CSS prevents the subject QP in these structures from percolating its own scope index, as this causes α to inherit a second scope index. It follows that QP in these structures is unable to outscope the subjective category (which, in the relevant examples, gives rise to contextually inappropriate readings).

We now turn to the contrast presented by (5) and (10), involving the subjective epistemic raising adjective *certain*. As discussed earlier, a key feature of the approach to scope taking adopted here is that it predicts an asymmetry between overt and covert scope extension. This was due to the fact that displacement of a QP – whether through A-movement or A'-movement – can potentially assign a quantificational category to its scope without index percolation in the movement path. This predicted asymmetry is borne out by the contrast between (5) and (10).

The structure in (50a) shows the pattern of index percolation that is required if the in-situ QP in (5) is to out-scope the subjective category. Consider first the impact of the SCP, which forces subjective categories to percolate an index past all operators in the proposition they evaluate; for *certain* to satisfy the SCP, just one step of index percolation suffices to mark the appropriate scope, because its clausal complement is the material that corresponds to the proposition with which the subjective attitude *certain* expresses is connected. As a result, it will block any index percolation past its mother node. Thus, if a QP c-commanded by *certain* attempts to extend its scope index to a node that dominates this predicate('s mother node), as shown in (50a), this inevitably results in a CSS violation. A better outcome is guaranteed by A-movement of the QP to a position c-commanding *certain*, as shown in (50b) (= (10)). The raised QP can be assigned surface scope in its landing site by the default scope rule in (45c), correctly predicting that it can out-scope the raising modal.[13]

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[13] The fact that a raised QP can out-scope *certain* is an argument against the possibility raised in von Fintel and Iatridou (2003) that the ECP comes about as a result of the restriction in (i), a potential explanation for our SCP if we replace 'epistemic modal' with 'subjective category' (and assume a QR approach to scope-extension):

(i) At LF, a quantifier [(i.e. QP)] cannot bind its trace across an epistemic modal.

(i) relies on two well-established facts: (a) the subject of an epistemic modal auxiliary is generated somewhere below the auxiliary (presumably in the VP) and then undergoes A-movement past the auxiliary (see, for instance, Wurmbrand (1999)), and (b) the ability of an A-moved category to reconstruct for scope. With these in mind, (i) essentially forces a subject QP to reconstruct to its base-position and thus scope below the epistemic

(50)   a.   *   = (5)

$\alpha_{:1,2}$

     A$_1$ $\gamma_{:2}$
     certain

        QP$_2$ ϵ
  fewer than half the
    applicants

b. α = (10)

  QP$_2$ $\gamma_{:1}$
Fewer than half the
  applicants

      A$_1$ ϵ
    certain

        t$_{QP}$
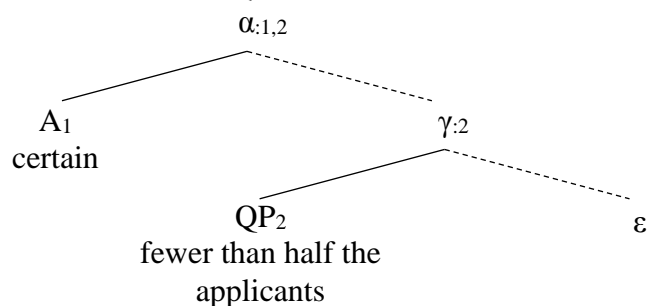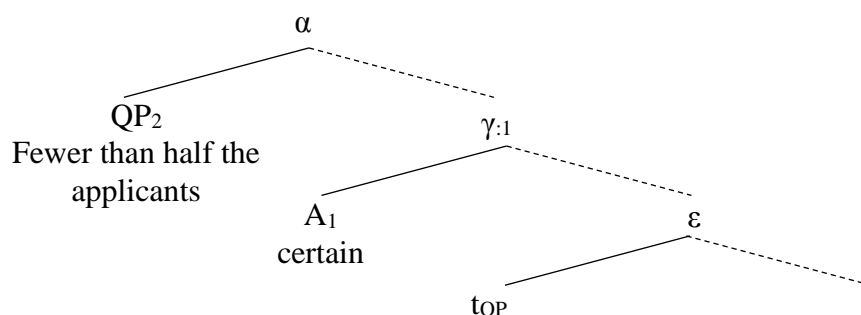
Since the SCP only applies to subjective categories, an objective interpretation of an epistemic modal does not result in percolation of the scope index of that modal. Instead, the default scope rule in (45c) applies. Thus, in (51), the LF of (7b), the structurally higher QP is able to out-scope *might*.

(51) α = (7b)

  QP$_2$ γ
Every party guest

     M$_1$ ϵ
    might
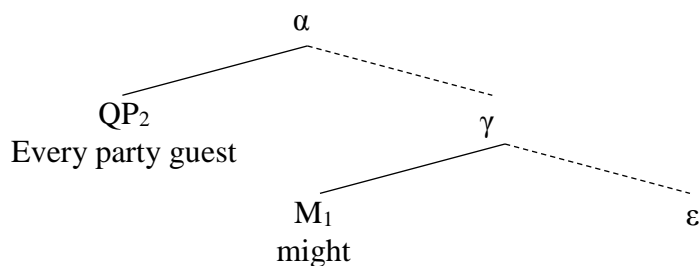
The facts relating to SpOAs and MCs receive a parallel treatment. As regards SpOAs, evaluative adverbs, being subjective, adhere to the SCP and thus prevent a QP from percolating an index. Evidentials, on the other hand, being objective, do not adhere to the SCP, hence the c-commanding QP can out-scope them (compare (52a-b)). (53a-b) show how the contrast between metalinguistic and regular clausal comparatives (24) and (25) is captured. As discussed in 0, we follow Giannakidou and Yoon (2011) in assuming that *para* MCs involve the subjective category more$_{ML}$, i.e. *perissotero* in (53a), the item preventing the QP from extending its own scope index. Similarly to evidentials, regular comparatives are

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modal auxiliaries in examples like (2) and (3). The state of affairs described in (a) and (b) also obtains for the raising case in (10) as the object QP of the complement clause A-moves past the epistemic modal *certain*.

(ii) [Fewer than half the applicants]$_1$ are certain t$_1$ to have been hired t$_1$, …

Reconstruction of the QP for scope explains the *certain>fewer than half* reading, however, (i) leads to the expectation that this should be the only available reading, contrary to fact.

objective; *perissotero* 'more' is thus not forced to mark its scope via index percolation, allowing in this way the higher QP to out-scope it in (53b).

(52)   a.   * $\alpha_{:1,2}$ = (18)

            QP$_2$ $\gamma_{:1}$

      Fewer than half the
           students

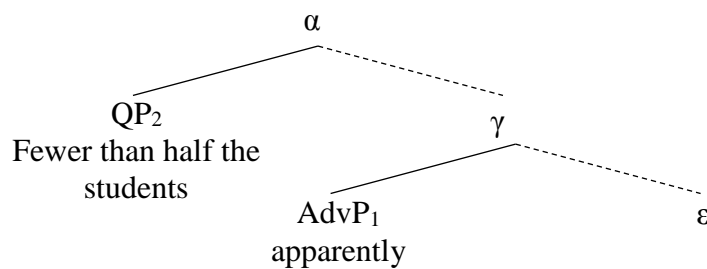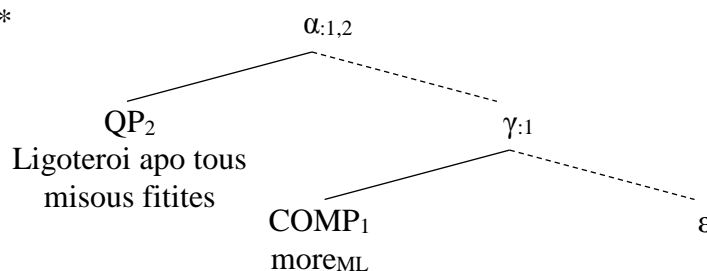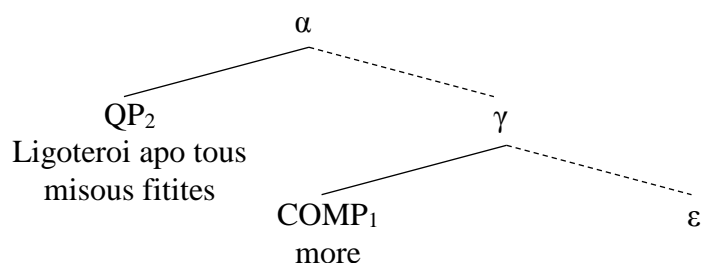   AdvP$_1$ ε
             unfortunately

(52)   b. α = (19)

           QP$_2$ γ

      Fewer than half the
           students

               AdvP$_1$ ε
             apparently

(53)   a.   * $\alpha_{:1,2}$ = (24)

           QP$_2$ $\gamma_{:1}$

      Ligoteroi apo tous
        misous fitites

              COMP$_1$ ε
           more$_{ML}$

(53)   b. α = (25)

           QP$_2$ γ

      Ligoteroi apo tous
        misous fitites

               COMP$_1$ ε
           more
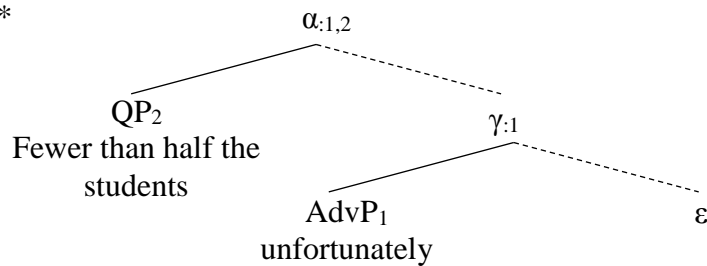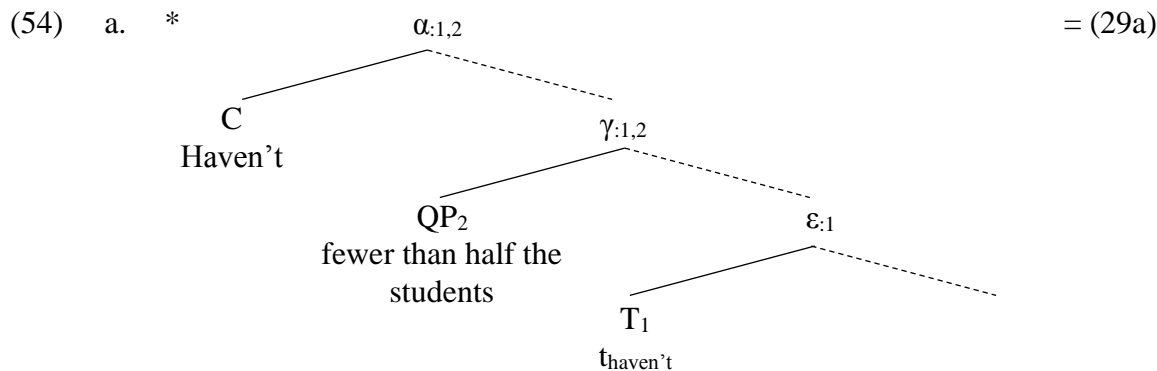
Consider finally the contrast between ONPQs and INPQs in terms of containment effects (see (29a) and (30)). The contrast is accounted for in the same way if, in accordance with the SCP, ON must out-scope other operators by percolating an index. It then follows that the QP in (29a) cannot also extend an index to outscope negation without a CSS violation. IN behaves in the same way as objective epistemics, evidentials and regular comparatives in that index percolation is not necessary. The QP can thus take wide scope either by percolating its own index past the landing position of negation or by the default scope rule (we assume that negation takes/extends scope from its base position, as the movement of negation is not motivated by scope-related considerations).[14,15]

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[14] The structure in (54) assumes that the QP can extend its scope in the left periphery, that is, past the TP level. This is in accordance with evidence suggesting that QPs can indeed extend their scope quite freely, even beyond this level, e.g. specCP. For instance, universal QPs may take wide scope over a moved wh-expression (Krifka, 2001), as evidenced by the pair-list reading of (i).

(54)   a.   * $\alpha_{:1,2}$ = (29a)

C
Haven't $\gamma_{:1,2}$

QP$_2$ $\varepsilon_{:1}$
fewer than half the
students

T$_1$
t$_{haven't}$

(i) Which person did every male guest like? Al (liked) Doris; Bill, Erika; and Carl, Francis.   (Krifka, 2001, p. 2)

[15] A significant point that is not specific to ONPQs, but relates to the scopal properties of subjective categories more generally: subjective SpOAs seem to be unable to co-occur, as exemplified in (i) – (iv), despite the fact that it is possible for a single attitude holder to express some of the relevant attitudes simultaneously, as in (v).

(i)   ***Unfortunately**, John has **perhaps** failed his exam.
(ii)   ***Perhaps**, John has **unfortunately** failed his exam.
(iii)   ***Unfortunately**, John has **surprisingly** failed his exam.
(iv)   ***Surprisingly**, John has **unfortunately** failed his exam.
(v)   I think it is both **unfortunate** and **surprising** that John has failed the exam.

A possible conclusion is that these facts are yet another instance of a containment effect. On this view, the subjective categories at issue would compete for scope; the ungrammaticality of (i) – (iv) would result from a violation of the CSS. A direct consequence would be that the SCP would have to be modified in a way that speaks about subjective categories out-scoping *any* category, including other subjective ones, and not just non-subjective ones, as it stands at the moment.

We do not think, however, that (i) – (iv) constitute conclusive evidence for adopting this conclusion, as a closer inspection of the scope relations between the relevant categories reveals semantic incoherence.

(vi)   *It is **unfortunate** that John has **perhaps** failed the exam.
(vii)   *It is **perhaps** the case, that John has **unfortunately** failed the exam.
(viii) *It is **unfortunate** that John has **surprisingly** failed the exam.
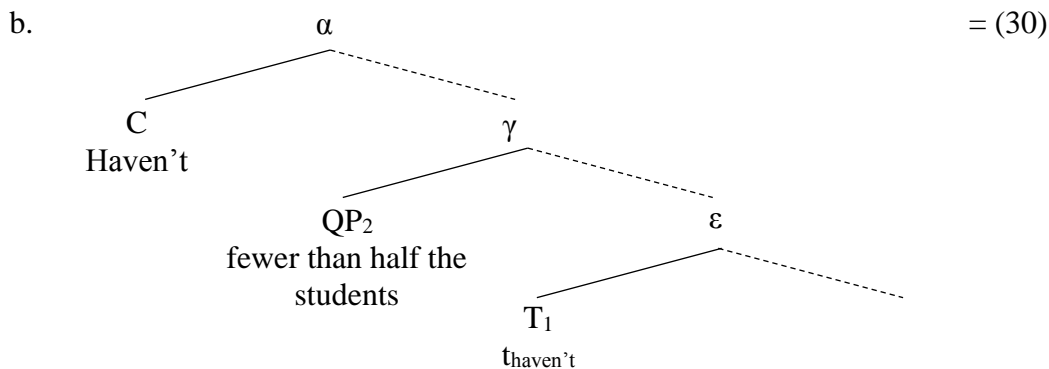(ix)   *It is **surprising** that John has **unfortunately** failed the exam

Note that the relevant adverbs are generally embeddable:

(x)   I think that he has **unfortunately/surprisingly/perhaps** failed the exam.

One semantic constraint accounts for the incoherence of (vi), (viii) and (ix) and another one for the incoherence of (vii). We begin with (vi), (viii) and (ix): one of the properties that is of relevance and that distinguishes the embedding predicates in (vi), (viii) and (ix) from the one in (x) is *factivity*; the former presuppose the domain they scope over to be true but not the latter (see, for instance, Ernst (2002)). Papafragou (2006, p. 1690-1691) (see also Lyons (1977); Anand & Hacquard (2009)) argues that factivity and subjectivity are semantically incompatible; in short, one cannot entertain a subjective attitude SUBJ towards, say, a proposition p, if SUBJ(p) is taken to be objectively true (i.e. OBJ(p) or, put differently, a fact). This explains the contrast between (vi), (viii) and (ix), on the one hand, and (x), on the other, as well as the degraded status of (i), (iii) and (iv) on the surface scope reading. This conclusion is supported by the fact that an objective SPoA, like *apparently* or *probably* (which differs from *perhaps* in that it can easily be interpreted non-subjectively), can in fact combine with a subjective SpOA.

(xi)   **Unfortunately**, John has **apparently/probably** failed the exam.

As for the incoherence of (vi), it follows from the semantics of subjective categories, which must be true for the speaker's entire belief set (see section 0). Since an epistemic modal does allow room for SUBJ(p) to be false, (vii) and (ii) (on the surface scope reading) are ruled out.

b.   α   = (30)

```
                    C                          γ
                 Haven't

                           QP₂                          ε
                      fewer than half the
                          students
                                      T₁
                                   t_haven't
```

3.4 QP scope freezing effects

Recall that the CSS-based theory predicts that one should be able to observe scope-freezing effects in sentences in which the index percolation associated with the intended scope inversion between two QPs overlaps with the (SCP-motivated) index percolation path of a subjective category. To verify this prediction, we use data from Dutch, where placement of adverbs and negation is relatively free. The data in (55), (56) and (57) all involve an indefinite subject QP, a universal object QP and a subjective category in a variety of positions. In (55a), (56a) and (57a), the two QPs occur in the c-command domain of the subjective categories, *waarschijnlijk* 'probably', *helaas* 'unfortunately' and ON *niet* 'not', respectively. Naturally, these sentences may receive a surface scope interpretation, but for a subset of Dutch speakers the inverse scope reading is available as well. However, for these speakers the inverse scope reading becomes inaccessible as soon as one of the QPs c-commands the subjective categories, as in (55b), (56b) and (57b). This scope freezing effect is also present if the subjective category is c-commanded by both QPs, as in (55c), (56c) and (57c).
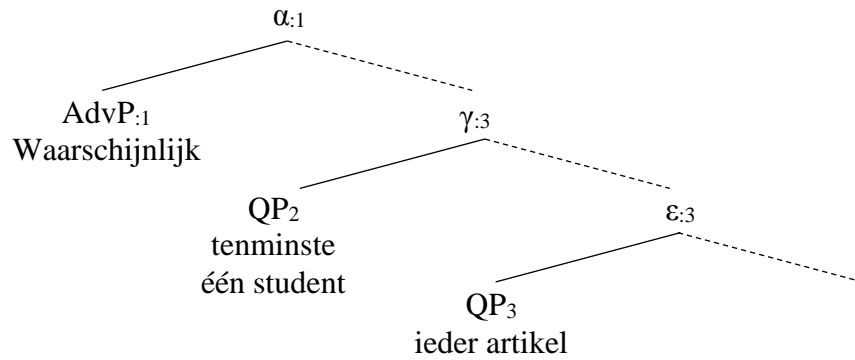
(55) a.   Waarschijnlijk heeft tenminste één student ieder artikel zonder
           probably   has   at-least   one   student every article without
           morren   gelezen.
           complaining read
           ($\exists > \forall; \forall > \exists$)

      b.   Tenminste één student heeft waarschijnlijk ieder artikel zonder
           at-least   one   student has   probably   every article without
           morren   gelezen.
           complaining read
           ($\exists > \forall; *\forall > \exists$)

      c.   Tenminste één student heeft ieder artikel waarschijnlijk zonder
           at-least   one   student has   every article probably   without
           morren   gelezen.
           complaining read
           ($\exists > \forall; *\forall > \exists$)
           'At least one student has probably read every article without complaining.'

(56) a.   Helaas   heeft   tenminste één student ieder artikel zonder
           Unfortunately has   at-least   one   student every article without
           morren   gelezen.
           complaining   read
           ($\exists > \forall; \forall > \exists$)

b. Tenminste één student heeft helaas ieder artikel zonder
at-least one student has unfortunately every article without
morren gelezen.
complaining read
(∃>∀;*∀>∃)

c. Tenminste één student heeft ieder artikel helaas zonder
at-least one student has every article unfortunately without
morren gelezen.
complaining read
(∃>∀;*∀>∃)
'At least one student has unfortunately read every article without complaining.'

(57) a. Had niet tenminste één student ieder artikel zonder morren
had not at-least one student every article without complaining
gelezen?
read
ONPQ: ∃>∀; ∀>∃

b. Had tenminste één student niet ieder artikel zonder morren
had at-least one student not every article without complaining
gelezen?
read
ONPQ: ∃>∀;*∀>∃

c. Had tenminste één student ieder artikel niet zonder morren
had at-least one student every article not without complaining
gelezen?
read
ONPQ: ∃>∀;*∀>∃
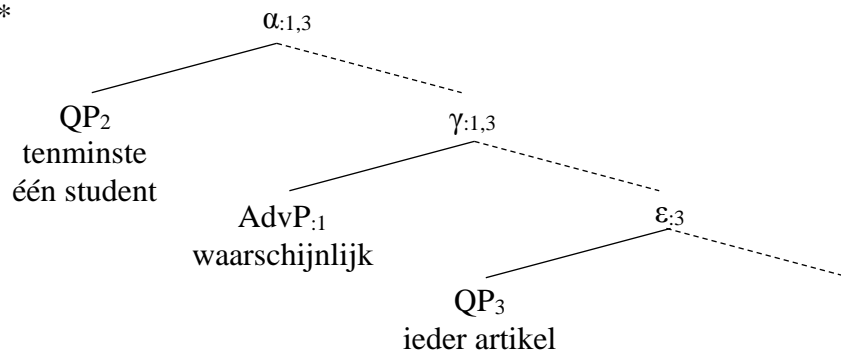'Hasn't at least one student read every article without complaining?'

For a QR-based theory of scope, the effects in (55) – (57) are entirely unexpected; if the subjective category achieves widest scope over other operators by covert movement, there is simply no way of understanding why there are QP scope freezing effects in the (b) and (c) sentences, but not in the (a) ones.

As already explained in section 0, the pattern in (55) – (57) follows directly from the combined effect of the SCP and the CSS. In (55b), (56b) and (57b), the subjective category sits between the two QPs and must therefore percolate its scope index to outscope the highest one. Scope extension of the universal (to outscope the indefinite) is blocked, since its index would travel the same path as that of the subjective category. The scope freezing effect in the (c) examples, where the subjective category is c-commanded by both QPs, follows from our proposal in much the same way: scope extension by the subjective category freezes the scope of QPs in its percolation path. Finally, the well-formedness of (55a), (56a) and (57a) on the inverse scope reading falls out from the fact that the percolation path of the universal may terminate in a node that is below the percolation path of the subjective category. Hence, there is no overlap of the two scope extension paths. Below we only provide partial structures for the inverse scope reading of the data in (55), but the same explanation applies to the data in (56) and (57).
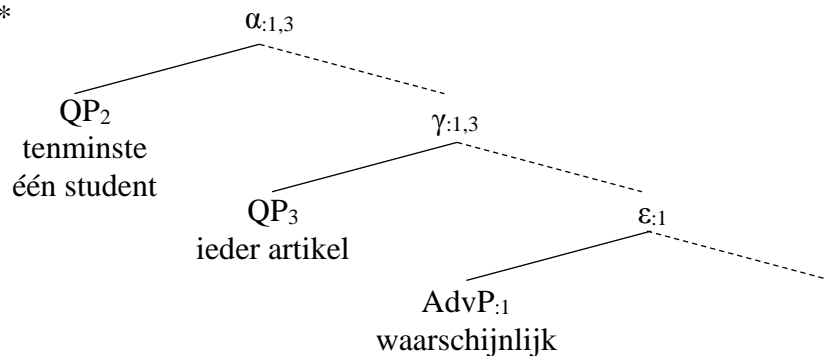
(58) a. $\alpha_{:1}$ = (55a)

$\text{AdvP}_{:1}$ $\gamma_{:3}$
Waarschijnlijk

QP_2 $\varepsilon_{:3}$
tenminste
één student QP_3
             ieder artikel

b. * $\alpha_{:1,3}$ (=(55b)

QP_2 $\gamma_{:1,3}$
tenminste
één student $\text{AdvP}_{:1}$ $\varepsilon_{:3}$
        waarschijnlijk

           QP_3
           ieder artikel

c. * $\alpha_{:1,3}$ = (55c)

QP_2 $\gamma_{:1,3}$
tenminste
één student QP_3 $\varepsilon_{:1}$
        ieder artikel

        $\text{AdvP}_{:1}$
        waarschijnlijk

Note that the scope freezing effects just reviewed are also found when outside negation or a subjective SpOA intervenes between the direct object and a to-dative, as shown in (59) and (60).

(59)   a.   Heeft   Jan   niet   tenminste   één   boek   aan   ieder   meisje   zonder
            has   *John*   *not*   *at-least*   *one*   *book*   *to*   *every*   *girl*   *without*
            morren   gegeven?
            complaining   *given*
            ($\exists{>}\forall;\forall{>}\exists$)
    b.   Heeft   Jan   tenminste   één   boek   niet   aan   ieder   meisje   zonder
            has   *John*   *at-least*   *one*   *book*   *not*   *to*   *every*   *girl*   *without*
            morren   gegeven?
            complaining   *given*
            ($\exists{>}\forall;{*}\forall{>}\exists$)

    c.   Heeft Jan tenminste één boek aan ieder meisje niet zonder
        has   *John* *at-least* *one* *book* *to*   *every* *girl*   *not* *without*
        morren   gegeven?
        complaining   *given*
        (∃>∀;*∀>∃)
        'Has John not given at least one book to every girl without complaining?'

(60) a.   Jan   heeft waarschijnlijk/helaas   tenminste één boek aan ieder
        John   *has* *probably/unforunately* *at-least*   *one* *book* *to*   *every*
        meisje   zonder morren   gegeven.
        girl   *without* *complaining* *given*
        (∃>∀;∀>∃)

    b.   Jan   heeft tenminste één boek waarschijnlijk/helaas   aan ieder
        John   *has* *at-least* *one* *book* *probably/unfortunately* *to*   *every*
        meisje   zonder morren   gegeven.
        girl   *without* *complaining* *given*
        (∃>∀;*∀>∃)

    c.   Jan   heeft tenminste één boek aan ieder meisje
        John   *has* *at-least*   *one* *book* *to*   *every* *girl*
        waarschijnlijk/helaas   zonder morren   gegeven.
        probably/unfortunately   *without* *complaining* *given*
        (∃>∀;*∀>∃)
        'John has probably/unfortunately given at least one book to every girl without complaining.'

The problems for any QR-based approach to these data are compounded by the observation that (for the same group of speakers) an overt A'-movement operation across two QPs does not result in freezing effects. This is demonstrated by the data in (61). In (61b), movement of a contrastively focused direct object (shown with SMALL CAPS) across the subject does not prevent the indirect object from taking scope over the former.

(61) a.   Tenminste   één student heeft iedere professor DAT verhaal verteld.
        at-least   *one* *student* *has* *every* *professor* *that* *story*   *told*
        (∃>∀;∀>∃)
        'At least one student has told every professor THAT story.'

    b.   DAT   verhaal heeft tenminste één student iedere professor *t* verteld.
        that   *story*   *has* *at-least* *one* *student* *every* *professor* *told*
        (∃>∀;∀>∃)
        THAT story at least one student has told every professor.

The CSS-based account successfully captures these facts, because overt A'-movement does not give rise to index percolation in the movement path (i.e. the path from the trace to the landing site). This allows the universal to extend its scope index past the indefinite without triggering a CSS violation.

4 Information Structure and the SCP
4.1 Interactions between IS categories and subjective categories

Neeleman and Van de Koot (2012) motivate their CSS-based theory of scope by showing that it correctly predicts scope restrictions in structures with three quantifiers, ordering restrictions on contrastive topics and foci, and scope interactions between quantifiers and contrastive categories. Of particular interest for the present proposal is their account of topic-focus order restrictions, because it relies on an information-structural condition, Topic Externality, that forces a topic to have wider scope than a focus at LF (see Krifka (2007) and Tomioka (2009) for discussion):

(62)   **Topic Externality**
        a.   topic […focus…]
        b.   *focus […topic…]

We then minimally expect the following predictions to be borne out: (i) any structural environment in which a topic is prevented from satisfying Topic Externality should also be an environment in which a subjective category is prevented from satisfying the SCP; (ii) in a structure in which a topic is forced to percolate a scope index to satisfy Topic Externality, the presence of a subjective category in the percolation path of the topic should give rise to a CSS violation.

We will review these predictions in turn, but before doing so we should clarify the notions of topic and focus we assume. The term focus is reserved for constituents that receive the main stress of the sentence (e.g. Selkirk (1984, 1996)). These constituents usually express new information. For instance, the constituent answering a wh-expression is taken to be in focus. With respect to topics, we follow Reinhart (1981) and subsequent work, in characterizing them in terms of "aboutness". We distinguish between 'discourse topics' and 'sentence topics'. Discourse topics refer to entities that a unit of discourse is about, whereas sentence topics are syntactic constituents that introduce a new discourse topic or narrow down the current discourse topic. On this view, constituents that are merely discourse-anaphoric do not qualify as sentence-topics (not even if they are anaphoric to the current discourse topic). For what follows it is essential that the notion 'topic', including its use in (62), is understood to mean sentence topic.

Let us now consider structures in which a topic is prevented from satisfying Topic externality. The basic pattern observed in Neeleman and Van de Koot (2008, 2012) can be summarized as follows: topics and foci may appear in either order, with the topic c-commanding the focus or vice versa, but as soon as one of these categories moves, a surface structure must be generated in which the topic c-commands the focus. In short, a topic may not be contained in the c-command domain of a moved focus. This pattern is illustrated below with data from Neeleman and Van de Koot (2008). (In all examples, topics are doubly underlined, foci appear in SMALL CAPS and contrastive categories are *italicised*.)[16]

(63)   A: Hoe zit het met *FRED*? Wat heeft *HIJ* gegeten?
        B: Nou, dat weet ik niet, maar ik geloof…
        A: 'What about Fred? What did he eat?'
        B: 'Well, I don't know, but I believe…'

---

[16] We deliberately use a negative quantifier for the contrastive focus. This makes it very difficult to perform a topic-focus swap, since negative quantifiers are very poor topics (except if the topic of discussion is a quantity).

      a.   dat   _**Wim**_ *NERGENS* van   meer gegeten heeft dan   vorig jaar.
             that   *Bill*   *nothing from* *more*   *eaten*   *has*   *than* *last year*

      b.   #dat   [*NERGENS* van] $_1$ _**Wim**_ t_1 meer gegeten heeft dan   vorig jaar.
             that   *nothing of*   _**Bill**_   *more*   *eaten*   *has*   *than* *last*   *year*
             '…that Bill has not eaten more of anything than last year.'

(64)   A: Hoe zit het met de *SOEP*? Wie heeft *DIE* gegeten?
   B: Nou, dat weet ik niet, maar ik geloof…
       A: 'What about the soup? Who ate that?'
       B: ' Well, I don't know, but I believe…'

      a.   dat   *NOBODY* van _de bonen_   meer gegeten heeft dan   vorig jaar
             that   *niemand* *from the beans* *more* *eaten*   *has*   *than* *last year*

      b.   dat   [van _de bonen_]$_1$ *NOBODY* t_1 meer gegeten heeft dan   vorig jaar.
             that   *from the beans* *NOBODY*   *more* *eaten*   *has*   *than* *last* *year*
             '…that nobody has eaten more from the beans than last year.'

Neeleman and Van de Koot (2012) account for these facts using the CSS. They propose that A'-movement of a contrastively marked element determines its scope, much like A'-movement of other quantificational elements.[17] This scope marking operation is formalized as the mandatory percolation of the scope index from the moved category to the node that immediately dominates its landing site (see also Williams's (1994) adjunct scope rule). Thus, in a structure like (65), the scope of QP is α minus the QP itself. This equals to γ.

(65)
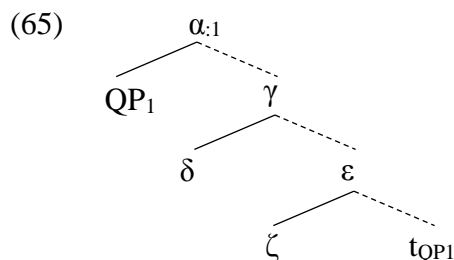
Contrastive elements that remain in-situ are assigned scope via the default scope rule in (45c), which results in surface scope, or they may extend their scope through index percolation (the scope extension rule in (41)).

      Now consider a structure containing a contrastive topic and a contrastive focus. If both are in situ, as in (66), the topic can freely percolate an index past the c-commanding focus, since the focus can be assigned default scope. If the topic has moved across the focus, as in (67a), it marks scope in its landing site and satisfies Topic externality. However, if the focus moves across the topic, as in (67b), it marks scope in its landing site. The CSS therefore prevents the topic from satisfying Topic Externality by percolating an index past the focus.

(66)   a.   [… _topic_ … *FOCUS* …]
       b.   [$_{:2}$ … *FOCUS* … [$_{:2}$ … _topic$_2$_ …]]

(67)   a.   [$_{:2}$ _topic$_2$_ … [… *FOCUS* … t_{topic} …]]
       b.   *[**$_{:1,2}$** *FOCUS* $_1$ … [$_{:2}$ … _topic$_2$_ … t_{focus} …]]

---

[17] In particular, it is assumed that contrastive elements involve a negative operator in their semantics, and it is the presence of this operator that makes contrast quantificational (see also Kiss (1998)). Thus, the movement of the contrastive constituent marks what material is included in the scope of the negative operator.

This brings us to prediction (i): if a moved focus prevents a topic in its c-command domain from satisfying Topic Externality, then it should also prevent a subjective category in its c-command domain from satisfying the SCP. Similarly, since an in situ focus does not prevent a topic in its c-command domain from percolating its index, it should also not prevent a subjective category from doing so. The relevant structures are shown schematically in (68).

(68)   a. $[_{:2} \ldots$ *FOCUS* ... $[_{:2}$ ... unfortunately/unbelievably$_2$ ...]]
        b.   *$[_{:1,2} \ldots$ *FOCUS* $_1$ ... $[_{:2} \ldots$ unfortunately/unbelievably$_2$ ... t_{focus} ...]]

The data in (69) and (70) show that this prediction is borne out. A strong evaluative adverb can occur below an in situ contrastive focus in English and Dutch, as in (69), but an occurrence of the same adverb below a *moved* contrastive focus gives a degraded result, as (70) demonstrates.

(69)   A: John has failed the exam.
        B: No, *BILL* has unfortunately failed the exam.
        B: Nee,   *WILLEM*   is   helaas   gezakt   voor   het   examen.
              no   Bill   is   unfortunately   failed   for   the   exam

(70)   A: John has failed one exam.
        B: #No, *THREE* exams John has unfortunately failed.
        B: #Nee,   voor   *DRIE*   examens   is   Jan   helaas   geslaagd.
              no   for   three   exams   is   John   unfortunately   failed

Let us now consider prediction (ii): in a structure in which a topic is forced to percolate a scope index to satisfy Topic Externality, the presence of a subjective category in the percolation path of the topic should give rise to a CSS violation. The relevant structure is a variant of (66b) above, in which a subjective category occurs between the focus and the topic, as in (71b). By contrast, a structure like (71a), in which a subjective category intervenes between a topic and a focus in a configuration that satisfies Topic Externality, is predicted to be fully acceptable.

(71)   a. $[_{:1}$ *topic* $\ldots$ [SUBJ$_1$ ... [... *FOCUS* ...]]]
        b.   *$[_{:1,2}$ *FOCUS* $\ldots$ $[_{:1,2}$ SUBJ$_1$ ... $[_{:2} \ldots$ *topic*$_2$ ...]]]

Example (72) instantiates the structure in (71a) and is indeed completely unobjectionable. As predicted, example (73), which instantiates (71b), is indeed quite degraded.

(72)   A: Hoe zit het met *FRED*? Wat heeft *HIJ* gegeten?
        B: Nou, dat weet ik niet, maar ik geloof…
        A: 'What about Fred? What did he eat?'
        B: 'Well, I don't know, but I believe…'
        dat   *Wim*   helaas   *NERGENS* van   meer   gegeten   heeft   dan   vorig jaar.
        that   Bill   unfortunately   nothing of   more   eaten   has   than   last year

(73)   A: Hoe zit het met de *SOEP*? Wie heeft *DIE* gegeten?
       B: Nou, dat weet ik niet, maar ik geloof…
       A: 'What about the soup? Who ate that?'
       B: 'Well, I don't know, but I believe…'

??dat	*NIEMAND*	helaas	van *de bonen*	meer	gegeten	heeft	dan	vorig jaar.
that	*nobody*	*unfortunately*	*from the beans*	*more*	*eaten*	*has*	*than*	*last year*

We may, therefore, conclude that our analysis of subjective categories receives further support from the fact that it makes correct predictions regarding interactions between such categories and topics and foci.

4.2 Each and EVERY

Consider finally the two remaining exceptions to von Fintel and Iatridou's (2003) ECP:

(74)   Each girl might be in love with John, but some of them aren't.   (Hacquard, 2006)

(75)   EVERY party guest might be the murderer.   (Anand & Hacquard, 2009)

The strongly distributive universal QP in (74) is able to out-scope the epistemic modal. In (75), a prosodically prominent universal QP can out-scope the same modal. Given the subjective–objective distinction discussed above, one possible explanation for these apparent counterexamples to the SCP would be that the epistemic modal is interpreted objectively and therefore may take narrow scope with respect to the QPs. After all, *might* is one of those modals that allow for an objective interpretation, as indicated by the fact that it can occur in the antecedent of a conditional and a question.

(76)   a.   If it might rain tomorrow, people should take their umbrellas.
        b.   Might it rain tomorrow?   (Ernst, 2009)

We do not think, however, that this is the right explanation. This is because the scope judgements for the examples in (74) and (75) are unaffected by embedding under a doxastic predicate like *believe*, which is known to force a subjective reading of the modal (Anand & Hacquard, 2009).

(77)   I believe that each girl might be in love with John, but some of them aren't.

(78)   I believe that EVERY party guest might be the murderer.

We speculate that the universal QPs out-scope the subjective epistemic categories in (77) and (78) because they undergo a type shift in virtue of being interpreted as a topic (see Krifka (2001) for a proposal). This operation removes them from the scope of the subjective category: in effect, they are interpreted as hanging topics. On this analysis, the predication that follows the QP is about the elements in the restrictor set rather than about the QP itself. A universal QP with a strongly distributive reading (e.g. (74)) is thus an ideal candidate for such interpretation; an example like (74) ends up being interpreted as in (79).

(79)   As for girl x, x might be in love with John & as for girl y, y might be in love with John, & as for girl z, z might be in love with John, etc.

Suppose now that the maximum domain with which a subjective attitude can be connected syntactically corresponds to a clause, and nothing more; the raising case in (10), where the raising adjective *certain* does not extend its scope past the raised QP, supports this view. Since hanging topics are extra-clausal, they must necessarily be outside the domain with which the subjective attitude is connected, and hence can out-scope the subjective category in the clause the two are associated with.

5 Concluding remarks

We have argued that the interpretation of subjective categories is constrained by the *Subjective Containment Principle*. The proposal is motivated by the fact that operators with a subjective interpretation, in particular, evaluative adverbs, MC comparatives, outside negation and subjective epistemic modals (there may be more) consistently out-scope non-subjective ones, including QP, tense, question and focus operators. Categories that adhere to the SCP further give rise to scope freezing effects. Thus, although subjective categories may not contribute a truth-conditional meaning component, they do affect truth conditions through the SCP. We have shown that the data can be captured if scope extension is modeled as index percolation constrained by a minimality condition (the CSS), as in Neeleman and Van de Koot (2012).

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